The Influence of Anticipated Counterfactual Regret on Behavior

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ABSTRACT

Three experiments tested the hypothesis that the anticipation of counterfactual regret influences decision making and behavior. This hypothesis was examined under conditions of uncertainty in which the behavioral alternatives were equally desirable (or undesirable) and there was no clear default alternative. In Experiment 1, participants read a scenario in which the salience of anticipated counterfactual regret associated with two behavioral options was manipulated. Their behavioral intentions demonstrated avoidance of the option associated with salient counterfactual regret. Experiment 2 examined behavior in a gaming situation in which participants chose whether or not to purchase insurance to protect their treasure. Participants who anticipated counterfactual regret made insurance purchase decisions in a way that minimized the chances of experiencing this regret. To rule out several alternative explanations for the results of the first two experiments, the content of the anticipated counterfactual and the salience of anticipated regret were orthogonally manipulated in a third experiment. As expected, the influence of the anticipated counterfactual on

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insurance-buying behavior was significantly stronger when the associated regret was salient than when it was not. These findings are discussed in terms of both their positive and negative implications for the self in decision-making contexts. ©2000 John Wiley & Sons, Inc.

> Suppose we told you . . . You were recently assigned the winning superprize number, but you didn't enter so we gave the $10,000,000 prize to somebody else! Deciding not to enter our sweepstakes is very serious business.
>
> (Direct Mail Campaign, Publishers' Clearing House Sweepstakes)

The executives at Publishers' Clearing House apparently think that the slim possibility of winning ten million dollars is not enough of an incentive to get people to enter their sweepstakes. Thus, they have incorporated an additional, subtler incentive to enter: to avoid the possibility of imagining, "If only I had entered, then I would have won." This strategy attempts to capitalize on the tendency to imagine alternative outcomes to events and on the effects that such imaginings have on behavior. Imagining how things "could have been otherwise" is a ubiquitous, pervasive mode of thought, particularly following negative events (Roese, 1997; Sanna & Turley, 1996).

The consideration of alternatives to reality, called *counterfactual thinking* (Kahneman & Tversky, 1982), influences judgments of causality, responsibility, and blame for events (Branscombe & Coleman, 1991; Miller & McFarland, 1986; Wells & Gavanski, 1989). Counterfactual thinking also influences affect: Emotional responses to negative events are intensified to the extent that one can easily imagine how the outcome might have been different (Gleicher, Kosit, Baker, Strathman, Richman, & Sherman, 1990; Kahneman & Miller, 1986; Kahneman & Tversky, 1982; for a review, see Roese, 1997). Although all negative events elicit negative affect, negative events that elicit salient counterfactuals are accompanied by an additional, poignant kind of unhappiness associated with knowing that the negative outcome could have been avoided (Boninger, Gleicher, & Strathman, 1994; Kahneman & Miller, 1986).

Recent research suggests that, in addition to telling people what they have done wrong, counterfactuals also tell them what they can do right in the future (Boninger, et al., 1994; Gleicher, Boninger, Strathman, Armor, Hetts, & Ann, 1995; Markman, Gavanski, Sherman, & McMullen, 1993; Roese, 1994). The present research takes this reasoning a step further by suggesting that people may also *anticipate* potential counterfactuals. That is, prior to an event or decision, individuals may consider counterfactual alternatives to possible outcomes and their emotional costs.

The marketing division at Publishers' Clearing House is hoping to

take advantage of just such a process. They hope that people will enter their sweepstakes (and, maybe, buy a magazine or two) in an effort to avoid the self-recrimination that would come with the realization, "If only I had entered, I would have won." Consistent with their expectations, we propose that the anticipation of future counterfactual thinking, along with the regret such thinking generates, influences relevant behavioral responses.

Counterfactual Anticipation as Influence Agent

Why might the anticipation of counterfactual alternatives influence behavior? As noted earlier, counterfactuals elicit a poignant kind of negative emotion made up of a mixture of self-blame and regret. Therefore, when thinking about counterfactuals in the aftermath of a negative event *or* when anticipating potential counterfactuals prior to an event, a person is likely to be strongly motivated to engage in future behaviors that minimize the chances of experiencing this regret (Gleicher et al., 1995; Miller & Taylor, 1995; Tykocinski, Pittman, & Tuttle, 1995, Experiment 6). Thus, Publishers' Clearing House is not only trying to warn you about the negative consequences of not entering (you won't win millions of dollars) but also about the "serious" future regret associated with imagining how easily you could have avoided that negative outcome by slipping your entry in the mail.

The notion that the anticipation of negative emotions can motivate behavior is consistent with Weiner's (1980) model of social motivation, which points to affect as a proximal determinant of behavior. It is also consistent with models of anticipatory regret (e.g., Bell, 1982; Loomes & Sugden, 1982). These models suggest that when deciding between possible options, individuals include in their decision making the potential regret associated with each option. In support of these models, there is now a growing body of empirical evidence that the salience of potential regret is correlated with and plays a role in determining relevant behavioral choices (Bakker, Buunk, & Manstead, 1997; Richard, van der Pligt, & de Vries, 1995; 1996a, 1996b; Zeelenberg & Beattie, 1997; Zeelenberg, Beattie, van der Plight, & de Vries, 1996.)

Importantly, counterfactuals not only arouse strong emotional responses, but they also provide behavioral prescriptions for avoiding these emotions (Roese, 1997). Counterfactuals include an antecedent (i.e., "If only I had done X . . .") *and* an outcome (i.e., "Y never would have happened"), thus providing both an alternative outcome and a plan to achieve it. Two lines of research suggest that this combination of negative emotions and a behavioral plan may be particularly effective at inducing behavioral change. First, persuasive messages that arouse fear are most effective when, in addition to arousing fear, they provide specific steps that can be taken to avoid the danger (Leventhal, 1970; Maddux & Rogers, 1983). Second, in their research on mental simula-

tion, Taylor and Pham (1996) found that although students who simulated the desired *outcome* of getting an A reported greater motivation to study for and do well on an exam, students who simulated the *process* of getting an A were more confident in their ability to succeed on the test, studied longer, and performed better. Thus, the characteristics of counterfactual thinking, accentuating negative emotions that people are motivated to avoid *and* simultaneously providing a plan by which to avoid them, may combine to form a particularly potent influence on behavior.

Empirical Evidence

Several programs of research support this hypothesis. First, in research on the functions of counterfactual thinking, Roese (1994) found that, compared with other participants, participants who generated "upward" counterfactuals (i.e., alternatives with more positive outcomes) in response to failure displayed greater intentions to perform behaviors that would enhance the probability of future success (Roese, 1994, Experiment 2) and performed better on a surprise second task similar to the first (Roese, 1994, Experiment 3). Although these findings are consistent with our hypotheses, the counterfactuals in this study were generated in response to a recent failure. Although direct experience may enhance the impact of anticipated counterfactuals, we do not believe that it is a necessary condition for their impact or generation.

Several other studies have manipulated characteristics of the situation to influence the salience of anticipated counterfactual regret. For instance, Miller and Taylor (1995) found that participants playing blackjack were less likely to take a card when the act was framed as an action than when it was framed as an inaction. Because prior research has suggested that counterfactual generation is easier following actions than inactions (Gleicher et al., 1990; Kahneman & Miller, 1986; Landman, 1987), Miller and Taylor reasoned that anticipated regret was more salient when the act of taking a card was framed as an action, reducing the likelihood of taking a card.

Miller and Taylor (1995) also reasoned that the closer the temporal distance between a decision and a potential outcome, the more likely that counterfactual alternatives and their associated regret would be considered (see also Kahneman & Tversky, 1982). They asked participants to consider two individuals, Mr. K and Mr. T, who had purchased a lottery ticket and then had the opportunity to sell their ticket before the drawing. Mr. K was asked to sell his ticket two weeks before the drawing and Mr. T was asked one hour before the drawing. Participants concluded that Mr. T, compared to Mr. K, would be more reluctant to sell his ticket and would feel more regret if he did so and the ticket won (see also Meyers-Levy & Maheswaran, 1992).

Finally, in a consumer-behavior context, Simonson (1992) used the

exceptional versus normative (i.e., the default option) nature of decisions (see Kahneman & Miller, 1986) to bring about variance in anticipated counterfactual regret. Participants induced to consider how they would feel if their purchase decision turned out badly were more likely to buy an item currently on sale (rather than wait for a possible better sale) and to buy a well-known, but more expensive brand (rather than an unknown, less expensive brand) than were control participants. Having anticipated alternative outcomes, participants selected the more conservative, default option.

Although the findings reviewed in the preceding text are consistent with our hypotheses, in each case the anticipation of counterfactual regret was *not* directly manipulated. Instead, the anticipation of counterfactual regret was influenced via manipulations of the framing of the decision (action vs. inaction) or of the decision itself (exceptional vs. conservative, or temporally close to vs. distant from the negative outcome). These manipulations may also influence variables other than anticipated counterfactual regret or may pit a default decision against a less normative alternative, limiting their interpretation. Simonson (1992, p. 117), for example, recognized this limitation when he raised the question of "whether anticipating regret and responsibility can influence choices only when there is a default option." Consequently, the goal of the present research was to test the proposition that the anticipation of counterfactual regret influences decision making and behavior, even in situations that do not have clear default options. Moreover, we tested this proposition through direct manipulations that would allow for clearer causal evidence of the influence of anticipated counterfactual regret.

Present Research

We report three experiments that test the hypothesis that the anticipation of counterfactual regret will have a significant impact on intentions and behaviors. We test this hypothesis under conditions of uncertainty in which the alternatives are equally desirable (or undesirable) and there is not a clear normative or default alternative. In these cases, decisions may involve the imagination of several possible alternative outcomes. Consequently, the counterfactual that is the most salient, or most recently activated, would be expected to exert the greatest influence on behavioral intentions and on the decision itself. The present research set out to examine these hypotheses by directly manipulating the salience of potential counterfactuals and their associated regret.

EXPERIMENT 1

In Experiment 1, college students were asked to imagine arriving on campus the morning of an important quiz. On the way to class, they

realize that they may have left their car door unlocked. Do they go back to check the car (and risk being late to the quiz) or do they go on to the quiz (and risk having their car burglarized)? Thus, either decision could lead to a negative, counterfactual-generating outcome. We manipulated the salience of different anticipated counterfactual regrets by inducing some participants to imagine a counterfactual regret following a decision to check their car door and other participants to imagine a counterfactual regret following a decision to go straight to class. Control participants were not asked to imagine any alternatives.

We expected *control* participants' intentions to be influenced by the spontaneous anticipation of one or possibly both of the counterfactual alternatives. With no a priori expectation that one alternative would be more available than the other would, we expected control participants to be roughly divided between the two alternatives. Regardless, the control condition allowed us to assess baseline preferences for the two options. We expected that participants in the experimental conditions, on the other hand, should be less likely to choose an alternative if they have considered possible counterfactuals for that alternative. That is, increasing the salience of potential counterfactual regret should influence participants' behavioral intentions in a way that would ostensibly reduce their chances of experiencing the anticipated regret.

METHOD

Participants

Participants were 164 undergraduate men and women enrolled at UCLA. Participants received credit toward the partial fulfillment of course requirements in introductory psychology.

Materials and Procedure

Participants received one of three versions of a scenario within a packet of surveys administered at the beginning of the course. They were instructed to read the scenario slowly and carefully, and were encouraged to imagine that the scenario was happening to them. In all versions, participants were asked to imagine that they had just arrived on campus the morning of an important quiz:

> Imagine that you commute to school and that you park your car in one of the lots on campus. Further imagine that, on this day, you are walking to class in a bit of a rush because you have a quiz that you do not want to be late for. On the way to class, however, you get a strange feeling that you may have left your car door unlocked. Try as you might, you cannot be absolutely certain whether or not you locked your door.

Control participants received the scenario exactly as it appears here. Half of the experimental participants (Car Regret) were asked to imagine the following end to the scenario:

> Think for a minute about how upset you would be if you didn't go back to check your car, and later that day your car was burglarized.

The other half of the experimental participants (Quiz Regret) were asked to imagine this end to the scenario:

> Think for a minute about how upset you would be if you went back to check your car, found out that it was locked all along, and ended up being late for your quiz.

After imagining themselves in this situation, all participants were asked to report whether they would go back to check their car or go straight to class for the quiz.

RESULTS AND DISCUSSION

We conducted a one-way analysis of variance (three levels of anticipated counterfactual regret: Car Regret, Control, Quiz Regret) on behavioral choice, finding a significant effect of the regret manipulation, $F(2, 161) = 7.26$, $p < .01$.[1] Furthermore, a planned linear contrast conducted on these three groups was significant, $F(1, 161) = 14.05$, $p < .001$, with little evidence for deviations from the linear trend ($F < 1$, *ns*), despite sufficient power to detect such deviations (beta = 0.91). Consistent with our expectations, paired comparisons revealed that participants in the Car Regret condition (69.1%) were more likely to say that they would go back and check their car than were control participants (46.3%)[2], $t(161) = 2.46$, $p < .02$, and participants in the Quiz Regret condition (34.5%), $t(161) = 3.75$, $p < .001$. Although participants in the Quiz Regret condition were less likely to say that they would go back to check their car than were control participants, this difference was not significant, $t(161) = -1.27$, $p = .21$.

These results suggest that the anticipation of counterfactual regret can influence behavioral intentions. Prior to a decision with no clear

[1]Nonparametric analyses were also performed on these data. Given current understanding of the relation between parametric and nonparametric analyses (see, for instance, Rosenthal & Rosnow, 1991), it was not surprising that the nonparametric analyses yielded results similar to ANOVA results reported here. Analyses of variance are reported in the text due to their ease of presentation and ease of comparison to the results reported in Experiments 2 and 3.

[2]Consistent with our expectations regarding the absence of a clear default option, control participants divided almost evenly between the two behavioral choices: 25 (46.3%) said they would go back to check their car and 29 (53.7%) said they would go straight to class.

default option, participants induced to consider a potential counterfactual regret were more likely to choose behaviors that minimized the chances of experiencing that regret. Although these data are encouraging, they were obtained with the use of a scenario methodology and on self-reported measures of behavioral intention. Though useful in the early stages of research, data obtained in this context may be influenced by participants' naive theories and may not reflect actual behavior. Thus, we sought further support for our hypotheses in a second experiment that allowed for a measure of actual behavior.

EXPERIMENT 2

When considering whether or not to insure one's possessions or person, one necessarily anticipates a possible future negative event. Such considerations are likely to lead to the anticipation of a number of counterfactuals that may influence both the decision to purchase insurance and the amount of insurance purchased. For example, individuals might consider how they would feel if they did not purchase insurance and were uninsured when disaster struck. Alternatively, they might imagine how they would feel if they spent a great deal of money on insurance that they never ended up needing. For example, life insurance advertisements often encourage people to think about how badly they would feel if they died and failed to leave behind enough money to support their loved ones. Interestingly, this strategy rests entirely on *anticipated* regret; the actual regret could only occur after the parent is dead!

To explore the potential impact of anticipated counterfactual regret on insurance decisions, participants were placed into a computer gaming situation. They were told that they would be given a $10.00 treasure and that the object of the game was to move the treasure along a path laden with obstacles in which part of the treasure could be lost. Participants had the opportunity to spend part of their treasure to buy insurance. As in Experiment 1, we expected that a manipulation of the salience of counterfactual regret would lead participants who anticipated counterfactual regret after purchasing insurance (Anti-Insurance Regret condition) to purchase less insurance than control participants (No Counterfactual). Likewise, we expected participants who anticipated counterfactual regret after *not* purchasing insurance (Pro-Insurance Regret condition) to purchase more insurance than control participants. We also included an additional condition, modeled on the manipulation used by Simonson (1992), in which participants were induced to consider a *nondirectional* counterfactual regarding the failure to adequately think about their decision to purchase insurance or not (Thought Regret). We included this condition to explore the influence of anticipated counterfactuals when the content of the counterfactual (i.e.,

why the decision turned out badly) does not highlight a particular behavioral option.

METHOD

Participants

Participants were 271 undergraduate men and women enrolled in introductory psychology at UCLA. Participants received credit toward the partial fulfillment of course requirements. Eleven participants were eliminated from the analyses: five because of experimenter error, four because of suspicion regarding the manipulation, and two because of failure to follow instructions.

Materials

All participants received a description of a game to be played on the computer. Participants read that they would start with $10 worth of treasure that they would have to safely navigate from a starting point to a final destination. They were told that obstacles would be scattered randomly along the available routes between the two points. Encountered obstacles would lead to the loss of part or all of their treasure, although it was possible that no obstacles would be encountered. Participants were explicitly informed that the game was fixed so that the odds of doing well (keeping most or all of the treasure) or doing poorly (losing most or all of the treasure) were even (50–50).

Participants were then informed that they had the option to use part of their treasure to purchase insurance. A $1.50 premium would return 25% of any losses of the remaining $8.50 whereas a $3.00 premium would return 50% of any losses from the remaining $7.00. Participants could also choose not to purchase any insurance at all. These options were constructed to be similar in their expected utilities given the game's odds. Finally, all participants received an Insurance Contract on which they were asked to indicate their choice of insurance.

The critical manipulation of the salience of anticipated counterfactual regret took place within the insurance contract. First, all participants read the following reminder: "In making your decision, please take some time to consider that the odds are 50–50 that things will go well vs. go poorly." At this point, control participants made their insurance choice. In contrast, participants in the Pro-Insurance Regret condition continued to read that "if you don't get insurance and you lose all of your money, you will end up really wishing you had gotten the insurance." Participants in the Anti-Insurance Regret condition read that "if you spend money to get insurance and then never use it, you will end up

really wishing you had never gotten insurance." Finally, participants in the Thought Regret condition (nondirectional) read that "if you don't think this through carefully and things don't turn out well, you will end up really wishing you had taken more time to make your decision." Participants in these three experimental conditions were then asked to indicate their choice of insurance.

Procedure

Participants signed up in small groups for an experiment on game-playing strategies. Upon their arrival, the experimenter (blind to experimental conditions) explained the purpose of the study, emphasized the importance of understanding the game, and asked participants to read the description of the game very carefully. While participants were reading the game description, the experimenter turned on the computers and called up a program that brought on screen the words "The Treasure Game." After participants finished reading, the experimenter reviewed the description of the game and the available insurance options.

The experimenter then handed out the insurance contracts containing the experimental manipulations and the space in which participants indicated their choice of insurance options.[3] Following completion of the study, participants were probed for suspicion or awareness of any experimental manipulations, they were asked about their beliefs regarding the purpose of the study and about the expectations of the experimenters, and then they were debriefed.

RESULTS AND DISCUSSION

A one-way analysis of variance with four levels of anticipated counterfactual regret (Pro-Insurance Regret, Anti-Insurance Regret, Thought Regret, and No Counterfactual) was conducted on the insurance choice in which there were three options: \$0.00 (decision not to purchase), \$1.50, or \$3.00. This analysis yielded a significant main effect of condition, $F\,(3, 256) = 3.43\; p < .05$. Next, we tested for a linear trend among the three conditions that were comparable to Experiment 1 (Anti-Insurance Regret, Pro-Insurance Regret, and the No Counterfactual control group). As in the first study, a significant linear trend, $F(1, 216) = 4.60, p < .05$, confirmed our predictions: participants in the Pro-Insurance condition were on average willing to pay higher premiums (M = \$1.39) than participants in the Anti-Insurance condition

[3]Following completion of the insurance contract, participants also completed a set of ancillary measures intended to investigate some potential mediating variables. These measures were not informative in either refuting or supporting these mediating processes. Because they were collected after subjects completed the critical dependent measure of insurance choice, these measures could not have influenced the findings we report.

(M = \$1.02), with control participants again falling between those groups (M = \$1.26). As before, analyses revealed no support for deviations from a linear relationship, $F(1, 216) < 1$, *ns.* Although paired comparisons revealed that the two experimental groups were again significantly different from each other, $t(216) = 2.14$, $p < .05$, neither experimental group significantly differed from the control group.

Interestingly, the average premium paid in the Thought Regret condition (\$1.67) was the highest of the four groups and was significantly higher than the average amount in the Anti-Insurance Regret condition, $t(256) = 3.06$, $p < .01$, and the control condition, $t(256) = 1.74$, $p = .08$. These results suggest the possibility that when faced with an opportunity to purchase insurance and prompted to think more carefully, participants become more likely to purchase insurance. Although purchasing insurance is an action and, thus, one might expect it to be more vulnerable to potential regret, our results may suggest that when a person is provided an easy opportunity to act, failing to act may come to hold a greater potential for regret than does acting. Therefore, in this context, purchasing insurance may actually have become more of a default option than not purchasing insurance (see Simonson, 1992). If this is the case, the results for participants in the Anti-Insurance Regret condition (who purchased the least insurance of the four groups) suggest that anticipated regret may be powerful enough to move people away from what may otherwise be default alternatives.

Experiments 1 and 2 provide converging evidence that the anticipation of counterfactual regret influences intentions and behavior. Although the experiments employed different methodologies and examined different decision making contexts, the patterns of data in both cases were consistent with our predictions and were similar across the two experiments. Specifically, when participants anticipated counterfactual regret, they were more likely to act in a way that minimized the chances of experiencing that anticipated regret. Although these results are encouraging, several alternative explanations remain.

First, participants might have perceived the manipulations of the salience of anticipated regret as indicating the experimenter's preferences. Although this demand characteristic interpretation is plausible given the straightforward presentation of the counterfactual, extensive probing of the participants in Experiment 2 suggests that it is most likely an insufficient explanation of the data. Only four subjects showed *any* suspicions at all regarding the purpose of the experiment, the variable being manipulated, *or* the expectations of the experimenter, and, as reported, these subjects were dropped from the analyses.

Second, Miller and Taylor (1995) suggested that anticipating negative events and their associated counterfactuals may increase the salience of the potential negative outcome. Thinking about a negative outcome may increase its availability in memory, and consequently, raise the perceived likelihood of that outcome occurring (Kahneman & Tversky,

1973). Thus, our manipulations of anticipated counterfactual regret may have caused participants to avoid what they perceived to be the more probable of the negative outcomes by adjusting their decision accordingly. Although the repeated emphasis on the 50–50 odds of the game in Experiment 2 should have reduced the tendency to perceive one outcome as more likely than the other, this alternative explanation cannot be completely ruled out.

Third, although the results of Experiments 1 and 2 are consistent with our expectation that anticipated counterfactual regret influences behavior, neither experiment provides direct evidence that anticipated regret is a *necessary* component of the behavioral effects that we have reported. As noted previously, counterfactuals not only arouse strong emotional responses, they also provide behavioral prescriptions for avoiding negative outcomes (Roese, 1997). Thus, the causal inference that the counterfactual provided (and not the regret it engendered) may lead to the behavioral choices we observed in the first two studies. To distinguish between the impact of anticipated regret and the causal inferences provided by the counterfactual, we created two experimental conditions that yield identical causal inferences, but different affective responses.

EXPERIMENT 3

To address these three issues, we employed a 2×2 design, independently manipulating the content of the counterfactual (i.e., the antecedent and outcome specified in the counterfactual that point to specific behavioral prescriptions) and the regret associated with the counterfactual. This methodology reduces the explanatory power of demand characteristics, minimizes potential differences in subjective likelihood estimates, and allows for a better examination of the unique influence of anticipated counterfactual regret on behavior.

We manipulated the salience of potential regret through the use of a self–other manipulation in a gaming situation conceptually similar to Experiment 2. Participants were asked to imagine a scenario in which someone made a decision (to purchase or not to purchase insurance) that led to a negative outcome (loss of money). We manipulated, however, whether the someone in the scenario was the participant him- or herself (as in prior research), or a disliked other. This manipulation ensures that the content of the counterfactual is the same in both these conditions, as is the course of future behavior suggested by the counterfactual. The *affect* generated by the counterfactual, however, should differ as a function of the object of the counterfactual. When the object is the self, thinking about the negative event and its counterfactual should lead to regret. However, when a disliked other is the object, thinking about the negative event may *not* lead to regret but rather to mildly

positive feelings that stem from the disliked other's misfortune.[4] In sum, if the regret associated with a counterfactual (and the desire to avoid experiencing that regret in the future) is an important contributing factor to the influence of counterfactual thinking on behavior, then the influence of an anticipated counterfactual should be significantly attenuated when the counterfactual remains but the associated regret is absent. Consequently, we expected a significant interaction indicating that the effect of an anticipated counterfactual is more pronounced when the counterfactual arouses regret than when it does not.

METHOD

Participants

Participants were 100 male and female students of Western Galilee College in Israel. Participants were recruited in introductory psychology classes and participation was voluntary.

Procedure

In a classroom setting, participants received two maps entitled "Treasure Game," along with instructions that explained that both maps were of mine fields, but that the first was an example, and that the second was the map that would be used for the game itself. On the sample map, the location of mines, mountains, and lakes were marked. Participants were informed that the second map did not show the locations of mines—those would be hidden in the game. They then read that their objective in the game was to transfer a treasure (worth 40 Israeli shekels, or about $12) from Point A, located in the upper-left-hand corner of the map, to Point B, located in the lower-right-hand corner. Using a pencil, they were to mark their course between these two points on the map. The experimenter would then optically scan the course that they drew to determine whether they stepped on any mines, and if so, on how many. For each detonated mine, a portion of their treasure would be lost. Participants were informed that whatever sum of money remained at the end of the game would be theirs to keep.

The instructions emphasized that the game had been carefully calibrated so that the chances of stepping on mines and of either keeping or losing most of the money were 50–50. Given the fact that retaining the money was not guaranteed, players were informed that prior to

[4]This emotion is often referred to by the German word *schadenfreude.* Ben-Ze'ev (1992) defines *schadenfreude* as an individual's delight from another's misfortune. Such delight is limited to situations in which the suffering is relatively minor, and the individual thinks that the sufferer somehow deserves his misfortune (e.g., because he is disliked, or because he is competing for scarce resources, or he has engaged in some distasteful act).

drawing their course on the paper, they could use part of their money to purchase insurance to protect their remaining treasure.

Manipulation of the Object of the Counterfactual. At this stage, the manipulations were introduced. The first manipulation concerned who would be the object of the counterfactual: the participant or a disliked other. In the Self condition, participants were told:

> In prior experiments the game had always been played in two stages. First, each player would draw their path from Point A to Point B, and immediately have his or her map scanned for mines. Then, after getting the results of the first play, each player would then play again. Due to time constraints, you will only be able to play once. However, it is important to us to create an atmosphere similar to our prior experiments so we would like you to imagine that you did already play in the first stage.

Participants then imagined a scenario in which they had lost money either due to their decision to purchase insurance (because they did not land on any mines) or due to their decision not to purchase insurance (because they landed on mines and were not insured). The Self condition was expected to lead participants to anticipated counterfactual regret, as was the case in Experiment 2.

In the Other condition, participants were told:

> In prior experiments the game had always been played in two stages in which there were two players competing against each other. First, one player would draw a path from Point A to Point B, and immediately have his or her map scanned for mines. Then, the second player began playing only after learning how the first player fared. In the present experiment, due to time constraints, you will be the only player. However, it is important to us to create an atmosphere similar to our prior experiments, so we would like you to imagine an opponent playing in the fast round.

To "really create an atmosphere of competitiveness," participants were further instructed to think of someone specific whom they did not like, to imagine that individual as their opponent, and to write this individual's name in the space provided. They were then asked to imagine a scenario in which their opponent had lost money either because of a decision to purchase insurance or because of a decision not to purchase insurance. This Other condition was expected to lead to mild pleasure in the other's misfortune rather than to regret.

Manipulation of the Content of the Counterfactual. As part of the imagination task in *both* conditions, participants were asked to imagine the insurance decision on the part of the first player (either self or other)

and the outcome of the game. In other words, the manipulation of the counterfactual's content (pro- or anti-insurance) was imbedded in the imagination section of the experiment. In the Pro-Insurance condition, participants imagined that the first player chose *not* to purchase insurance prior to the game, designed a course that passed through several mines, and lost most of the treasure as a result. Thus, not purchasing insurance resulted in a loss of money. In the Anti-Insurance condition participants imagined that the first player chose to purchase insurance, but did not hit any mines. Purchasing insurance, then, resulted in a loss of money.

In sum, the design of the experiment was a 2 (Object of the Counterfactual: Self or Other) $\times$ 2 (Counterfactual Content: Pro- or Anti-Insurance) between-subjects factorial design. An additional control group was also included in which participants were asked to make their insurance choice and play the game *without* any imagination manipulation. As in Experiment 2, we expected the control group to fall in between the Pro- and Anti-Insurance conditions.

Dependent Measures. After participants imagined that they or their disliked opponent played the first round of the game and had done poorly, they rated on a 7-point scale how sorry or happy they felt about what they had imagined happening in the first round of the game (1 = "very sorry," 7 = "very happy"). This manipulation check focused on feelings of sorrow and happiness to allow the use of the same question in all experimental conditions. A question specifically addressing regret would have seemed out of place in the "Other" condition. However, because descriptions and definitions of regret focus on feelings of sorrow (e.g., Landman, 1993), this measure was expected to be a satisfactory reflection of participants' regret.

Next, participants were asked to decide whether or not they wanted to insure their treasure. If they decided to purchase insurance, they could choose from three insurance plans, the premiums for which would be subtracted from the initial amount of the treasure:

1. A premium of 10 Israeli shekels guaranteed a refund of 15% of any funds lost in the game.
2. A premium of 12 Israeli shekels guaranteed a refund of 25% of any funds lost in the game.
3. A premium of 15 Israeli shekels guaranteed a refund of 50% of any funds lost in the game.

After participants chose an insurance plan and marked their course, they completed additional measures that examined several alternative explanations and measured an important covariate, individual differences in risk-taking tendencies. Using 7-point scales, participants re-

ported their expectations of success in the game (1 = "very low" and 7 = "very high"), their perceived degree of control over the results of the game (1 = "no control" and 7 = "complete control"), and whether they had learned anything from the imagination task (1 = "very little" and 7 = "very much"). Participants also indicated the percentage of treasure they expected to lose in the game as a result of landing on mines. Finally, as an indication of risk-taking tendencies, participants rated on a 7-point scale the extent to which they characterized themselves as relatively careful or risk-taking (1 = "careful" and 7 = "takes risks").

RESULTS

The Impact of the Self-Other Manipulation on Affect

We first examined the affective impact of the Self–Other manipulation by conducting a 2 (Object of the Counterfactual: Self or Other)× 2 (Counterfactual Content: Pro- or Anti-Insurance) between-subjects ANOVA on participants' ratings of the sorrow or happiness they felt after the imagination task. As expected, we observed only a main effect of Object such that participants who imagined that they lost money in the first round felt much more sad ($M = 2.95$) than did participants who imagined that a disliked other lost money ($M = 5.90$), $F(1,76) = 196.55$, $p < .0001$. The strength of this main effect (the means for the two conditions approached opposite ends of the scale) and the absence of other effects strongly suggest that regret was present in the Self condition and was absent in the Other condition.

Effects on Potential Intervening Variables

Next, we examined the effect of our manipulations on mediating variables suggested by possible alternative explanations for our effects. Participants' expected success in the game, expected losses due to landing on mines, perceived ability to control the outcome of the game, and perceived learning from the imagination task were all subjected to a 2 (Object of the Counterfactual) × 2 (Counterfactual Content) ANOVA. No significant effects were found on any of these variables. In contrast with the expected differences in affect reported above for the Self–Other manipulation, neither that manipulation nor the Counterfactual Content manipulation affected additional variables that could have influenced insurance choice.

Insurance Choice

For our primary analysis, a 2 (Object of the Counterfactual) × 2 (Counterfactual Content) ANOVA was conducted on participants' choice of

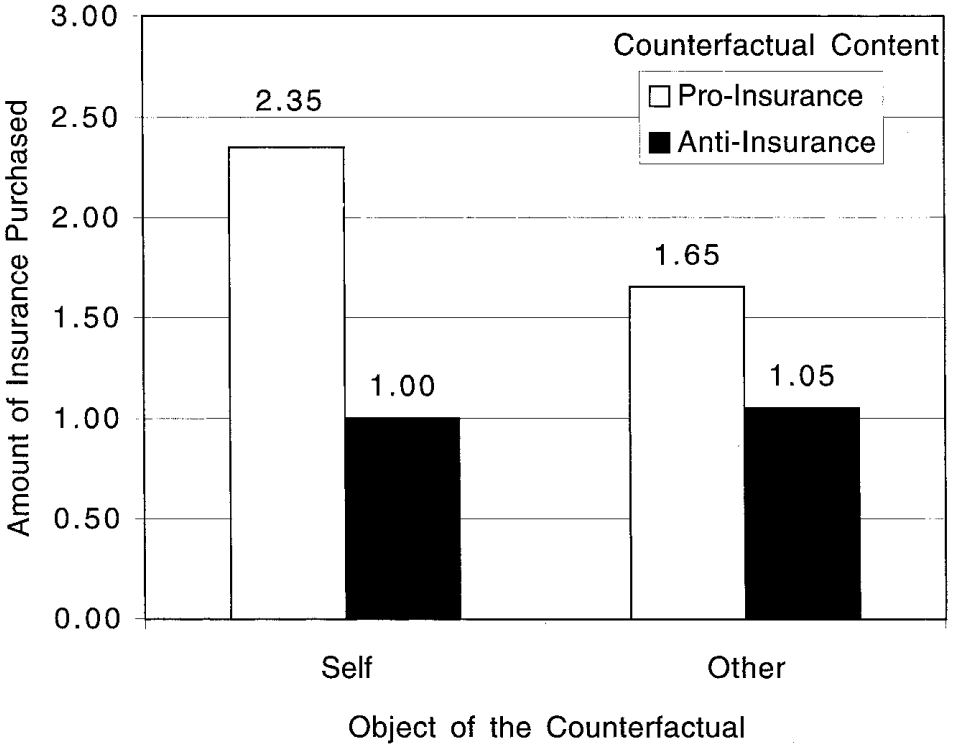

Figure 1. Amount of insurance purchased as a function of the content (Pro- vs. Anti-Insurance) and the object (Self vs. Other) of the counterfactual.

insurance plan, with participants' self-reported risk-taking serving as a covariate. Participants could choose one of four insurance options (0,1,2,3), where 0 = no insurance, and 3 = the most extensive coverage. As hypothesized and consistent with Experiments 1 and 2, a significant main effect was found for Counterfactual Content, $F(1, 76) = 19.70, p <$ 0001). Participants who imagined that the choice *not to insure* caused financial loss took out more insurance ($M = 2.00$) than did those who imagined that the choice *to insure* the treasure caused financial ($M =$ 1.02). The main effect for Object of the Counterfactual was not significant, $F(1, 76) = 2.66, p > .10$.

The critical prediction in the present experiment, however, was that there would be a significant interaction between Object of the Counterfactual and Counterfactual Content. We expected that the main effect described above would be more pronounced for participants in the Self condition, in which the counterfactual aroused regret, than for participants in the Other condition, in which it did not. The predicted interaction was found, $F(1, 75) = 3.64, p < 06$, and the pattern of the interaction exactly matches the hypothesized pattern of results (see Figure 1).

We performed post hoc comparisons (LSD) to examine the differences

among the four experimental groups and the control group. In the Self condition, participants who imagined that they lost most of the treasure because of insurance investments (i.e., anti-insurance counterfactual plus regret, $M = 1.00$) purchased less insurance than those who imagined that they lost most of the treasure because they did *not* invest in insurance (i.e., pro-insurance counterfactual plus regret, $M = 2.35$), replicating our findings in Experiments 1 and 2. In contrast, in the Other condition, the difference between the Anti-Insurance ($M = 1.05$) and Pro-Insurance ($M = 1.65$) conditions was not significant ($p \geq .10$). Unaccompanied by regret, the impact of counterfactuals on insurance purchase was attenuated. Finally, as expected, the control group ($M = 1.50$) fell in between the Pro- and Anti-Insurance conditions (for both Self and Other). However, only participants in the Self, Pro-Insurance condition differed significantly from the control group ($p < .05$). In sum, our results support the hypothesis that a counterfactual that evokes regret will have more influence on behavior than one that does not evoke regret, despite providing identical causal information.

The results in the Self condition represent a third replication of Experiments 1 and 2, obtained with the use of a different experimental design, and with a non-American subject population. More importantly, the results of Experiment 3 eliminate a number of plausible alternative explanations for the effects observed in Experiments 1 and 2. First, our manipulations influenced regret as we expected but did not influence general expectancies of success or specific likelihood estimates of money lost because of landing on mines, seriously weakening the plausibility of the "differences in subjective likelihood" explanation (Miller & Taylor, 1995). Second, both the subjective likelihood explanation and the demand characteristics explanation have difficulty accounting for the interaction obtained in Experiment 3. In both the Self and the Other conditions, the behavior suggested by the imagined scenario (perhaps suggesting the experimenter's preferences) and the outcome (influencing subjective likelihood estimates) were identical. Yet, the pattern of results obtained under these two conditions varied as we predicted. In the regret-evoking Self condition, the direction of the counterfactual significantly influenced the amount of insurance purchased, whereas when regret was absent in the Other condition, the influence of the counterfactual was not significant.

Because differences in regret salience were achieved through a Self–Other manipulation, one might argue that the Self–Other manipulation itself is driving our effects. For example, one might attempt to explain our results through the possibility that participants were less attentive to the information contained in the imagined scenario when they were in the Other condition than when they were in the Self condition. Recall, however, that although the Self–Other manipulation did significantly influence participants' affective response to the scenario, it did *not* affect any of the other variables that were measured following the

imagined scenario: expectations regarding success, expectations regarding monetary losses, perceived control over the outcome of the game, and perceived learning from the imagination task. More importantly, the Self–Other manipulation also did not interact with Counterfactual Content on any of these variables. If there were motivational or processing differences, one would expect, for instance, that Counterfactual Content would influence expectancies more in the Self condition than in the Other condition. Because these effects were not obtained, it seems unlikely that there were significant processing differences that could account for the findings we report in this study.

GENERAL DISCUSSION

The three experiments described in this article demonstrate that the anticipation of counterfactual regret for an event that has yet to occur can influence an individual's behavioral intentions (Experiment 1) and actual behavior (Experiments 2 and 3). In contrast to the research findings reviewed earlier, the results we report here were obtained in the context of direct manipulations of anticipated counterfactual regret and in situations that do not have clear default options. These effects were also demonstrated across different content domains and in different laboratories with different student populations (Americans and Israelis).

We attribute these effects to the unique combination of characteristics that counterfactuals embody. Counterfactuals simultaneously provide a potential course of action and a source of motivation. However, in the absence of motivation provided by the self-recrimination and regret normally associated with counterfactuals, counterfactuals appear to lose much of their influence on behavior. As noted earlier, this reasoning is consistent with the findings of Taylor and Pham (1996), and with fear appeal models that suggest that persuasive messages are most effective when, in addition to arousing fear, they also provide specific steps that can be taken to avoid the danger (Leventhal, 1970; Maddux & Rogers, 1983).

Beyond the Laboratory Game

The studies presented here took place in controlled laboratory settings and involved decisions in either an imagined context (Experiment 1) or in somewhat unfamiliar gaming contexts (Experiments 2 and 3). However, we believe that the influence of anticipated counterfactual regret extends to familiar, personally relevant contexts as well. For example Gleicher et al. (1994) examined the impact of anticipated counterfactual regret on attitudes and behavioral intentions in the context of condom use. As part of an "AIDS Awareness Week," members of Being Alive, an AIDS support organization whose members are HIV-positive, spoke to

college students at a Los Angeles area community college about AIDS. Towards the end of their presentations, some speakers led students to imagine that how badly they would feel if they had decided not to use a condom during sexual intercourse only to later discover that they had contracted HIV. Other speakers led students (the control group) through a review of important facts about AIDS and an appeal to use condoms as an effective way to prevent contracting the AIDS virus.

As expected, the participants who anticipated counterfactual regret had more favorable attitudes toward condoms and reported greater intentions to use condoms in the future than did control participants. These results suggest that the influence of anticipated counterfactual regret extends to nonlaboratory settings and to personally important domains. They also indicate that anticipated counterfactual regret may influence attitudes, as well as behavior, consistent with other recent research on risky sexual behavior (Bakker, et al., 1997; Richard, van der Pligt, & de Vries, 1995; 1996a, 1996b). Although these researchers did not manipulate counterfactual thinking directly, they found that the anticipation of affective responses (including regret) predicts attitudes, intentions, and behaviors related to safe-sex practices such as condom use. These findings are encouraging with respect to the generalizability of the results presented here. That is, we may often "insure" ourselves against the possibility of regret, even against the unlikely possibility suggested by Publishers' Clearing House that we discard the winning entry when we truly "might already be a winner." In this sense, these results suggest that the strategy employed by Publishers' Clearing House does indeed have the potential to influence behavior.

The Dark Side of Anticipating Counterfactuals

> And thus the native hue of resolution
> is sickled over with the pale cast of thought,
> and enterprises of great pitch and moment,
> with this regard their currents turn awry,
> and lose the name of action. —Hamlet (*Hamlet,* III, I, 84–88)

For the most part, we have discussed how the anticipation of counterfactuals may help us avoid negative outcomes and their associated regret. However, there may also be a cost to anticipating regret (Sherman & McConnell, 1995). Because potential actions, extraordinary behaviors, and innovations are likely to increase the salience of anticipated regret (Kahneman & Tversky, 1982; Kahneman & Miller, 1986; Meyers-Levy & Maheswaran, 1992; Miller & Taylor, 1995; Simonson, 1992), anticipated counterfactual regret may often facilitate inaction over action, common behavior over extraordinary behavior, and imitation over innovation.

For example, people are willing to forego vaccinating a child when

the vaccination involves a small risk, in spite of substantially greater risks associated with not vaccinating (Asch et al., 1994; Ritov & Baron, 1990). More generally, we may retain a politician or public policy rather than take a chance with a person or policy that may be superior, choosing to go with "the devil we know, rather than the devil we don't know." Surprisingly, making people accountable for their decisions only exacerbates regret-minimizing tendencies (Tetlock & Boettger, 1994). In fact, to avoid potential regret, individuals may sacrifice some expected utility to avoid knowledge about the outcome of an unchosen alternative (Bar-Hillel & Neter, 1996; Bell, 1983; Larrick & Boles, 1995) or even to avoid thinking about a foregone alternative (Tykocinski & Pittman, 1998; Tykocinski et al., 1995). Thus, anticipated regret may lead individuals to play it safe rather than taking more profitable risks (Kardes, 1994; Zeelenberg & Beattie, 1997; Zeelenberg et al., 1996).

The ultimate irony of such attempts to avoid "mentally kicking ourselves" (Miller & Taylor, 1995) is that, although regrets may be initially painful, those associated with action or change are often repaired by psychological work and remedial actions. In the long run, regrets for what we have left undone remain, as we forget the restrictions that kept us from acting (Gilovich & Medvec, 1994, 1995; Gilovich, Medvec, & Chen, 1995). Thus, avoiding anticipated counterfactual regret may help create precisely the regrets that haunt us most.

Concluding Thoughts

In closing, we return to the brighter side of the results reported here. One important implication of our research is that without changing the probability or severity of an outcome, anticipating counterfactual regret makes the outcome more aversive. More specifically, the anticipation of counterfactuals may help individuals adopt already available steps to avoid highly preventable negative outcomes, whether these outcomes stem from engaging in unhealthy behaviors or from making unwise purchases. Although the use of anticipated counterfactual regret as a social influence tool must be considered within the context of its potentially detrimental effects, we are nevertheless encouraged by its prospects as a positive force for social change, and we look forward to future research that will continue to explore this potential in health, marketing, and educational contexts.

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