

BRIEF REPORT

Learning about unchosen alternatives: When does curiosity overcome regret avoidance?

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Much of the research on emotions and decision making has focused on how desire to avoid regret influences choices and post-decision information search. Recently van Dijk and Zeelenberg (2007) demonstrated that under certain circumstances individuals will seek out information about an alternative even though this information may induce regret about a previous decision. In two experiments, we extend this finding and show that curiosity is least likely to affect information seeking when the initial choice is made from fewer alternatives (a regret-inducing “near miss”) and the outcome of the choice is negative.

Keywords: Curiosity; Regret; Decision-making.

One area of research at the nexus of cognition and emotion is decision making. Making important decisions such as choosing a college to attend, a job to accept, or a medical treatment to begin involves cognitive activities and evokes emotional responses. Selecting between job A and job B requires thought, but it may also generate emotional responses such as joy at the opportunity, fear that a wrong choice might be made, or frustration due to the difficulty of selecting between the alternatives. Although decision making involves both cognition and emotion, the primary focus of research in this area to date has been on cognitive processes such as framing a problem and assessing alternatives. Much less attention has been paid to emotional

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reactions to decision outcomes or to how emotions generated during the decision process affect the way choices that are made.

The emotion that has generated the most interest among decision researchers is regret (Connolly & Zeelenberg, 2002). A large body of research demonstrates that anticipated regret is a powerful motivator of human behaviour (Gilovich & Medvec, 1995; Roese, 1997). In fact, anticipating that an action or failure to act will cause us to miss out on an opportunity or lead to otherwise avoidable bad outcomes often generates more powerful emotions than experiencing the actual outcomes (Gilbert, Morewedge, Risen, & Wilson, 2004). The primary focus of research to date has been on how anticipated regret from making a suboptimal choice will affect the choice made. In a review of research on anticipated regret, Zeelenberg (1999) concludes:

... people are motivated to make choices that shield them from threatening feedback on foregone courses of action. Thus, people are motivated to avoid post-decisional regret. This *regret aversion* has a profound influence on their decisions, because the possibility of regret is anticipated and subsequently taken into account when making decisions. (p. 101)

To avoid regret, people often avoid information about the outcomes of alternatives not chosen. However, researchers find that how much people seek out or avoid potentially negative information can be affected by a number of variables. For example, individual differences in self-esteem (Dodgson & Wood, 1998) and optimism-pessimism (Nes & Segerstrom, 2006) often affect the extent to which people typically seek out positive information or avoid negative information.

Substantial research has addressed the circumstances under which regret affects decisions (cf. Connolly & Reb, 2003; Simonson, 1992). Within the last few years researchers have begun to develop fuller models of how the relationship between the potential for regret and information search are influenced by other factors (Shani & Zeelenberg, 2007) and how other emotions influence both information search and decision making (Maner & Gerend, 2007). These streams of research all raise questions about the extent to which avoiding regret shapes information seeking and ultimately how decisions are made. One of these questions is how other emotions, in particular curiosity, lead individuals to seek out information even when that information could increase regret about a decision. Although regret has received substantial study in decision making, this is not the case for curiosity. Drawing from Schmitt and Lahroodi (2008), we define curiosity as a desire to know that arises when one's attention is drawn to an object. Although there is some debate about whether or not curiosity is a basic emotion (cf. Ortony & Turner, 1990) there is evidence that some forms of curiosity have a predictable affective

component (Litman, 2008). To our knowledge, only one empirical study has addressed regret and curiosity.

Van Dijk and Zeelenberg (2007) created what they called the "covered beaker paradigm" to test whether curiosity about an unchosen alternative could overpower potential regret over learning about the unchosen outcome. In this simulation, two separate gambles were described, each based on the throw a different die in different die cups. The payoffs of the gambles were structured so that one was relatively safer than the other. Participants read a scenario describing the payoffs for each gamble and were asked which gamble they would take. After making this choice, half the participants read a scenario in which the experimenter shook both die cups and turned them upside down on the table. Participants then learned the outcome of the gamble they had selected and that they had received a low payoff. They then read that they could look under the other die cup if they desired (and therefore learn the outcome of the unchosen gamble). The dependent variable was whether the participant asked to see the results of the unchosen alternative. The other half of the participants read that the experimenter shook only the die cup associated with the gamble that had been selected. As in the other condition, participants read that they had received a low payoff. In contrast to the first condition, participants read that the experimenter would shake the other die cup and reveal the results if desired. The dependent variable was whether the participant would ask for the other die to be thrown and the result revealed.

Van Dijk and Zeelenberg (2007) found that when information was readily available (that is, the die cup had already been thrown) 93% of participants asked to see the results of the unchosen alternative. This was significantly higher than the 61% of participants who requested that the unchosen die cup be thrown and the results revealed. This pattern was found whether the participant opted for the safer or the riskier gamble. Thus, at least in this situation, curiosity was strong enough to overcome the potential for regret over learning about an unchosen option.

The purpose of our research was to extend this general finding by examining other variables that affect the decision to seek out information about unchosen options. In the first experiment, we hypothesised that curiosity about unchosen alternatives would be less likely to affect information seeking when circumstances made regret easy to anticipate. We also hypothesised that this effect would be most pronounced when individuals had a difficult time making the decision. In the second experiment, we hypothesised that the ease-of-anticipation effect would be limited to situations in which the outcome of the initial decision was negative.

EXPERIMENT 1

Several variables affect the extent to which individuals experience and anticipate regret. In particular, how close people come to reaching their goal has a strong impact on regret (Miller & Gunasegaram, 1990; Tykocinski & Pittman, 2001). Missing a flight by a few minutes leads to more regret than being several hours late; losing a guessing game by one number leads to more regret than being off by a large margin. Researchers find more regret in "near miss" situations than in situations in which people miss the desired outcome by a large margin, presumably because it is easier to generate a counterfactual for the near miss, e.g., "If only I had ..." (Roese, 1997). If that is the case, then the potential for anticipated regret should be higher when choosing between two options than when choosing among many. This is because selecting between two options allows for more counterfactual thinking ("If only I had selected the other one"). Because of this higher potential for regret, we hypothesised that when individuals made a choice between two alternatives, they would be less likely to seek out information about the unchosen alternative than if they had made a choice from many alternatives. We also hypothesised that this effect would be most pronounced when individuals had a difficult time making the initial decision. This last prediction was based on the assumption that difficult decisions lead to more counterfactual thinking ("I almost chose the other one").

Method

Participants. Ninety-seven undergraduate students (approximately 60% female) participated in this study as part of a class exercise.

Procedure. Participants read one of four scenarios that varied in the number of alternatives (two or six) and the ease of the decision (easy or difficult). The scenario and condition manipulations follow:

You decide you want to get a dog, and have a particular breed of dog in mind. A friend recommends a breeder who lives in your area and who specialises in this breed. You call the breeder and learn that she has (*two/six*) puppies available. The next day you visit the breeder and look at the dogs. The breeder lets you spend as much time as you like examining and playing with the available puppies. You are looking for a dog with a particular kind of disposition and appearance. (*Easy decision condition: As it happens, one of the puppies has a disposition and appearance exactly like what you are looking for. So, you select this dog. Hard decision condition: As it happens both/all of the puppies have the disposition and appearance exactly like what you are looking for. But you eventually decide on one of them.*) You know that there are medical problems that sometimes surface in this breed of dog, so you are not surprised when the breeder reminds you of this and has you sign a standard agreement that you understand the risks.

Unfortunately, your new pet has a series of medical problems during the first few years you own it. After three years, the dog has required numerous tests, medications and even some small surgeries. In total, this costs you more than \$4000, which is many times more than the amount of veterinary expenses for most dogs.

You have the opportunity to meet with the breeder next week, and you know that she keeps close contact with the owners of all the puppies she sells. She knows all about the medical problems your dog has encountered. And you realise that, if you were to ask her, she could tell you whether the other dogs you did not choose also had medical problems.

Following the scenario, participants rated on an 11-point scale the extent to which they would want to know the medical histories of the unselected dog(s), with 1 = *very unlikely* and 11 = *very likely*.

Results and discussion

A 2 (Number of Alternatives) \times 2 (Decision: easy–difficult) analysis of variance (ANOVA) was used to examine the likelihood of seeking out information about the other choices. A significant main effect for Number of Alternatives was found, $F(1, 96) = 9.13$, $p = .003$, $\eta^2 = .09$. When presented with six choices ($M = 7.42$, $SD = 2.79$), participants were significantly more likely to want to learn about the unselected dogs than when they had only two choices ($M = 5.56$, $SD = 3.19$). There was no significant difference for the ease of decision variable, $F(1, 96) = 0.18$, $p = .67$, nor was there a significant interaction, $F(1, 96) = 0.03$, $p = .86$.

When an individual makes a bad choice, learning that the unchosen alternatives were in fact better options can accentuate regret. Because of the near-miss effect, regret is likely to be especially pronounced when the decision was made between two choices than among a large number of choices. Consistent with this reasoning, our two-choice (near-miss) participants had less interest in learning about their rejected choices than participants who made their choice among six puppies. Although we anticipated that the difficulty of the decision would exacerbate this effect, it did not. It may be that the hypothetical difference in effort between the two conditions was not sufficient to induce an effect. It may also be that effort put into a decision does not influence anticipated regret.

EXPERIMENT 2

Experiment 1 participants who selected from two choices tended to not want to know about the outcome of the unselected choices. We attributed this reaction to the anticipated regret that comes from selecting in a near-miss situation. If this interpretation is correct, the effect should be limited to situations in which the choice results in negative consequences. If the dog

buyer had chosen between two puppies and ended up with a relatively healthy dog, there would be no reason for regret and thus no reason to avoid hearing about the dog not selected. We tested this reasoning in Experiment 2.

Method

Participants. Eighty-seven undergraduate students (approximately 60% female) participated in this study as part of a class exercise.

Procedure. Participants received one of four scenarios that varied the number of alternatives and the nature of the outcome. The basic scenario was similar to the one used in Experiment 1. Participants were told their choice was between either two or six puppies. Half the participants were also told about the same negative outcome used in the previous experiment, i.e., the medical expenses were \$4000, which was “many times more than the amount of veterinary expenses for most dogs from this breed”. The other half were told the expenses came to \$500, which was “typical for dogs from this breed”. The dependent variable was the same as that used in Experiment 1.

Results and discussion

Responses were analysed within a 2 (Choices: two–six) \times 2 (Outcome: negative–not negative) ANOVA. A main effect for outcome was found, $F(1, 83) = 8.29, p = .005, \eta^2 = .09$. Participants were more likely to want to learn about the unchosen dogs in the negative outcome condition ($M = 6.16, SD = 3.63$) than in the not-negative condition ($M = 4.13, SD = 2.88$). No main effect was found for the number of choices variable, $F(1, 83) = 0.09, p = .76$. However, a significant interaction was found, $F(1, 83) = 5.59, p = .02, \eta^2 = .06$. As shown in Table 1, when the outcome was negative, participants were less likely to want information when choosing between two options than when selecting among six choices, $t(41) = 1.69, p = .048$, one-tailed test. However, when the outcome was not negative, participants were less interested in hearing about the unchosen dogs in the six-option condition than in the two-option condition, $t(42) = 1.66, p = .052$, one-tailed test.

TABLE 1
Mean desire for knowledge scores

	<i>Two choices</i>	<i>Six choices</i>
Bad outcome	5.30 (3.56)	7.15 (3.53)
No bad outcome	4.95 (3.08)	3.52 (2.62)

Note: Standard deviations appear in parentheses.

The findings are consistent with the results from Experiment 1 and with our interpretation of those results. The tendency to avoid information about unchosen options in a near-miss (two-choice) situation is found only when consequences are negative. Consistent with the anticipated regret analysis, participants in this situation appear to be trying to avoid potential regret. We also found an interesting tendency for participants in the not bad outcome condition to be less inclined to seek information when selecting among six options than when selecting between two. This tendency makes sense within our conceptual framework. When motives like avoiding regret are removed, people have little interest in hearing about the other dogs. And hearing about five other dogs in this situation is understandably even less interesting than learning about only one other dog. However, by adding the potential for regret to the situation, we actually reversed this tendency, as indicated by the significant interaction.

GENERAL DISCUSSION

These results further our understanding of the complex relationships between decision making, emotions and the desire to acquire information. Recently, Zeelenberg and Pieters (2007) described how people regulate both future and current regret. One of the approaches they described was to avoid seeking out information about unchosen alternatives. We found that individuals were less likely to seek out information about unchosen alternatives when a decision had a negative outcome that resulted from a near miss. Consistent with the findings of Zeelenberg and his colleagues, we demonstrated that making a suboptimal decision does not invariably lead to avoiding information that might increase regret. van Dijk and Zeelenberg (2007) show that curiosity can overcome regret aversion. Our results demonstrate that curiosity in the face of a bad decision is most likely when circumstances make regret less salient. We found this using a different type of scenario than those used in other research. van Dijk and Zeelenberg (2007) used a simulated gamble whereas our scenarios had participants assume that they were responsible for collecting information that led to the decision. In these circumstances, as opposed to pure gambles, learning the results of unchosen outcomes also can be valuable because the individual might make similar decisions in the future.

Limitations

Consistent with much of the research on emotions and decision making, we relied on participants' responses to imaginary scenarios. Building a robust model of the role of emotions in decision making will require researchers to

move beyond scenario-based studies to ones involving real decisions with actual consequences.

Future research should also explore emotions more directly. At a general level, we inferred emotional states from the desire to acquire information. Developing a fuller understanding the effects of emotions in decision making will require more direct measures of emotions and the verification that experimental manipulations actually induce the intended emotions. Credible theory development, especially when a range of emotions is considered, will be enhanced when research includes multiple measures of emotions (including those that go beyond simple self-reports) and checks on manipulations inducing emotions.

At a more specific level, we looked at one way of making regret salient, having a near miss. Clearly, other variables, such as the availability of a vivid counter-factual, may increase or decrease the salience of regret. Including other factors in future research will be important to build a full model of when anticipated regret affects decisions. Consistent with van Dijk and Zeelenberg (2007), we assumed an information gap mechanism for invoking curiosity (Loewenstein, 1994). This approach assumes that motivation to acquire information will be greater when a particular piece of information will close a gap in knowledge in which the person is interested. While this model is consistent with most approaches to curiosity (Schmitt & Lahroodi, 2008), future research should verify that this mechanism is appropriate to the experimental manipulation and include other approaches to measuring or inducing curiosity.

Implications

Researchers have argued that a desire to avoid regret can influence the choices people make about such important things as investments (Shefrin & Statman, 1985) and health care (Connolly & Reb, 2005). Understanding when and how the desire to avoid regret leads to suboptimal decision making may suggest strategies for making better decisions. Individuals are often asked to make decisions that have real consequences for their lives. For example, in the United States, substituting guaranteed pension plans with individual directed retirement accounts requires people to choose from an array of alternatives—often with very different levels of risk and potential return. New medical advances give patients more choices for treatments of disease—again often with different potential outcomes and risks. Emotions generated during decision making as well as from anticipated outcomes can affect these choices. Understanding how these emotions affect decisions can help us develop procedures to present complex information in ways that allow people to make more effective choices. For example, are there ways to present cancer-treatment options that minimise individuals being inappropriately influenced

by anticipated emotion? Or, can advice about financial portfolios be presented in such a way that people will learn from choices, even those that were not optimal?

Together with the results of the van Dijk and Zeelenberg (2007) study, our findings suggest that curiosity can interact with regret to affect how decisions are made. This observation indicates that curiosity needs to receive more consideration from researchers examining the role of emotion in decision making. Our findings also suggest that emotions engendered during the decision-making process may interact. Thus, future models addressing the relationship between affect, cognition and decision making may need to consider emotions in more complex ways than simply focusing on regret avoidance.

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