



## Anticipated Emotions as Guides to Choice

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### Abstract

When making decisions, people often anticipate the emotions they might experience as a result of the outcomes of their choices. In the process, they simulate what life would be like with one outcome or another. We examine the anticipated and actual pleasure of outcomes and their relation to choices people make in laboratory studies and real-world studies. We offer a theory of anticipated pleasure that explains why the same outcome can lead to a wide range of emotional experiences. Finally, we show how anticipated pleasure relates to risky choice within the framework of subjective expected pleasure theory.

### Keywords

anticipated emotions; choice; pleasure

When making decisions, people often anticipate how they will feel about future outcomes and use those feelings as guides to choice. To understand this process, we have investigated the anticipated and actual pleasure of outcomes that follow decisions in laboratory and real-world studies. In this article, we present a theory of anticipated pleasure called decision affect theory and show how it relates to decision

making. We claim that when making decisions, people anticipate the pleasure or pain of future outcomes, weigh those feelings by the chances they will occur, and select the option with greater average pleasure.<sup>2</sup>

Imagine a decision maker who is considering two locations for a summer vacation. The first is perfect in all regards—as long as the weather is nice. Unfortunately, the weather is hard to predict. The second location is quite acceptable, and the weather is almost always good. To make a choice, the decision maker anticipates the pleasure of the first vacation assuming good weather and the displeasure of the vacation at that location assuming bad weather. These feelings are weighted by the perceived likelihood of good or bad weather, respectively, and the resulting feelings are combined to obtain an average feeling of anticipated pleasure. The second location is evaluated in the same manner, and the location with greater average pleasure is selected.

We begin by summarizing several studies and then answer three related questions. First, what variables influence anticipated pleasure? Second, how is anticipated pleasure related to choice? And third, how accurately do people anticipate the pleasure of future outcomes?

In our laboratory studies, we presented participants with pairs of monetary gambles on a computer screen (Mellers, Schwartz, Ho, & Ritov, 1997; Mellers, Schwartz, & Ritov, 1999). Each gamble was displayed as a pie chart with two regions, representing wins or losses. On each trial, respondents chose the gamble they preferred to play. In some conditions, a spinner appeared in the center of the chosen gamble and began to rotate. Eventually it stopped, and participants learned how much they won or lost. In other conditions, spinners appeared in the center of both gambles. The spinners rotated independently and eventually stopped, at which point participants learned their outcome and that of the other gamble. Outcomes ranged from a \$32 win to a \$32 loss. In some studies, the outcomes were hypothetical, and in others, the outcomes were real. If the outcome was hypothetical, participants anticipated the pleasure they would have felt had the outcome been real. If the outcome was real, participants rated their actual pleasure. Both types of judgments were made on a category rating scale from “very happy” to “very unhappy.”

Within this paradigm, participants are likely to find two counterfactual comparisons particularly salient (Bell, 1982, 1985; Loomes & Sugden, 1982, 1986). Comparisons of the imagined outcome with other outcomes of the chosen gamble are called disappointment or elation. Comparisons of the imagined outcome with an outcome of the unchosen gamble are called regret or rejoicing.

In the real-world studies, we used participants who had already made a choice, but did not yet know the outcome of their choice. We asked them to anticipate their feelings about all possible outcomes of the choice. Later,

when they learned what the actual outcome was, they rated their feelings regarding what occurred. The studies involved grades, diets, and pregnancy tests. In the grading study, undergraduates predicted their final grade in introductory psychology and anticipated their emotional reactions to all possible grades. The following quarter, they told us their actual grades and feelings about those grades. In the dieting study, clients participating in a commercial weight-loss program told us their weekly weight-loss goals and anticipated their feelings about various outcomes. They returned the following week, learned how their weight had changed, and reported their feelings. Finally, in the pregnancy study, women waiting for a pregnancy test at Planned Parenthood anticipated their emotions about possible test results. Ten minutes later, they learned the results and judged their reactions. We now present selected results from these studies.

#### **WHAT VARIABLES INFLUENCE ANTICIPATED PLEASURE?**

Our most important findings about pleasure are shown in Figure 1, which presents results from the gambling studies. Our findings can be summarized in terms of three outcome effects, comparison effects, and surprise effects. Outcome effects are illustrated in Figure 1a. As the amount of the imagined outcome increases, so does the anticipated pleasure.

Figures 1b and 1c show comparison effects. Figure 1b plots the anticipated pleasure of an obtained win of \$8 or loss of \$8, separately for trials on which the unobtained outcome was a loss of \$32 or gain of \$32. When the unobtained outcome was more desirable, the anticipated pleasure about the obtained outcome declined. This is because people anticipate disappointment when they imagine getting the worse outcome of two outcomes. Figure 1c plots the anticipated pleasure of an obtained win of \$8 or a loss of \$8, separately for trials on which the outcome of the other gamble was a loss or gain of \$32. A similar pattern appears: When the outcome of the unchosen gamble was more appealing, anticipated plea-

sure decreased. This is because people anticipate regret when they imagine having made the wrong choice.

Comparison effects of both disappointment and regret on anticipated pleasure are asymmetric. The displeasure of getting the worse outcome of two outcomes is typically greater in magnitude than the pleasure of receiving the better outcome. Comparison effects are powerful enough to make an imagined loss that is the better of two losses more pleasurable than an imagined gain that is the worse of two gains, as we found in other studies (Mellers et al., 1999).

The results shown in Figure 1d illustrate the effects of surprise. Participants anticipated more pleasure with a win of \$8 the less likely it was, and they anticipated less pleasure with a loss of \$8 the less likely it was. In other words, both positive and negative feelings are stronger when outcomes are surprising. Surprising outcomes have greater intensity than expected outcomes. Surprise amplifies the emotional experience.

Figure 2 presents selected results from our real-world studies. Figure 2a shows the effects of outcome in the dieting study. As imagined weight loss increased, dieters anticipated greater pleasure. Figure 2b presents the comparison effects in the grading study. Students with lower expectations anticipated greater pleasure from all possible grades. Finally, Figure 2c shows the effects of surprise for women in the pregnancy study who preferred not to be pregnant. Surprising outcomes were associated with more intense anticipated feelings than expected outcomes.

The effects of outcomes, comparisons, and surprise shown in Figures 1 and 2 are predicted by an account of anticipated pleasure called decision affect theory. In this theory, anticipated pleasure depends on the utility (or psychological satisfaction) of the outcome and salient comparisons. Comparisons are weighted by how surprising the outcome is. We have provided formal treatments of this theory elsewhere (Mellers et al., 1997, 1999; Mellers & McGraw, 2001).

#### **HOW IS ANTICIPATED PLEASURE RELATED TO CHOICE?**

In several studies, we have found that anticipated pleasure is closely connected to choice (Mellers et al., 1999). We assume that decision affect theory predicts the pleasure people anticipate for future outcomes of a given option. Then they weigh those anticipated feelings by the perceived chances of their occurrence, and combine them to form an average anticipated pleasure for each option. The option with greater average pleasure is selected. More detailed descriptions of this theory, called subjective expected pleasure theory, are presented elsewhere (Mellers et al., 1999).

Individuals whose choices are consistent with subjective expected pleasure theory can differ in several respects. For example, if the vacationer we described in the introduction anticipates tremendous pleasure with the first location or is optimistic about good weather, he is more likely to select that location than the alternative location. Greater anticipated pleasure or greater optimism tend to produce greater risk seeking, whereas less anticipated pleasure or more pessimism lead to greater risk aversion.

Subjective expected pleasure theory is similar in some respects to subjective expected utility theory (Savage, 1954). In subjective expected utility theory, decision makers are assumed to consider the utility (psychological satisfaction) associated with each outcome, weigh that utility by the perceived chances it will occur, and sum the values for all the outcomes. Utilities are often described in terms of psychological satisfaction, so it seems logical to assume they would not differ from anticipated pleasure. However, utilities do differ from anticipated pleasure. In most theories of choice, utilities depend only on the status quo, but no other reference points. Anticipated pleasure depends on multiple reference points. Furthermore, in most theories of choice, utilities are assumed to be independent of beliefs. In contrast, the anticipated pleasure of outcomes varies systematically with beliefs about their occur-

rence; anticipated feelings associated with surprising outcomes are amplified relative to anticipated feelings associated with expected outcomes. Because the utility of an outcome differs from the anticipated pleasure of that outcome, and, therefore, the predictions of subjective expected utility theory and subjective expected pleasure theory can differ.

We tested subjective expected pleasure theory by examining whether it could predict participants' actual choices in our gambling studies. To do this, we fit decision affect theory to the anticipated pleasure of outcomes. That is, we estimated parameter values that produced the smallest squared deviations between participants' judgments of anticipated pleasure and the theory's predictions. Then, using these predictions of decision affect theory, we calculated the average anticipated pleasure of each gamble. Finally, we predicted choices based on the assumption that participants select the option with the greater average anticipated pleasure. Predicted choices were correlated with actual choices in five different experiments (Mellers et al., 1999). The correlations ranged from .66 to .86, with an average of .74. These values were remarkably high given the fact that subjective expected pleasure theory was never fit directly to choices. That is, choice predictions were obtained by fitting decision affect theory to judgments of anticipated pleasure.

We further tested decision affect theory by investigating whether anticipated pleasure (which contains utilities, comparisons, and surprise effects) added to the predictability of risky choice over and beyond utilities. To answer this question, we computed the correlations between predicted choices and actual choices after removing the predictions of subjective expected utility theory. These correlations were positive and ranged from .64 to .03, with an average correlation of .33. These analyses show that anticipated pleasure, which is sensitive to comparisons and surprise effects, improves the predictability of choice over and beyond utilities.

## HOW WELL CAN DECISION MAKERS ANTICIPATE PLEASURE?

If people make choices by comparing the average anticipated pleasure of options, the accuracy of their predictions becomes a critical concern. Inaccurate predictions could easily lead to peculiar choices. People who overestimate the pleasure of favorable outcomes, for example, would tend to be overly risk seeking. People who overestimate the displeasure of unfavorable outcomes would tend to be overly risk averse.

We examined the accuracy of affective predictions in both laboratory and real-world studies by comparing anticipated pleasure with actual pleasure (Mellers, 2000). In the laboratory studies, predictions were quite accurate. In the pregnancy and dieting studies, however, participants made systematic prediction errors, and those errors were in the same direction. Specifically, participants overestimated the displeasure of unfavorable outcomes. Women who received bad news from their pregnancy tests actually felt better than they expected. These results are surprising because judgments were made only 10 min apart. Likewise, dieters who gained weight or failed to lose it also felt better than they expected. These results are also surprising given the fact that most dieters are quite familiar with attempts to lose weight, and therefore should have experience with their actual reactions to unsuccessful attempts.

Other types of errors in affective forecasts have also been found (cf. Loewenstein & Schkade, 1999). Errors can occur from the emotions experienced during the choice process. These experienced emotions influence perceptions, memories, and even decision strategies. Other errors occur because people may focus on whatever is salient at the moment, what Schkade and Kahneman (1998) call the focusing illusion. In a fascinating demonstration, Schkade and Kahneman asked students at universities in the Midwest and in California to judge their own happiness and the happiness of students at the other location. The comparison high-

lighted the advantages of California—better climate, more cultural opportunities, and greater natural beauty. Both students in the Midwest and those in California predicted that Californians were happier, but in fact, students at the two locations were equally happy.

The focusing illusion can also lead people to base affective predictions on transitions rather than final states (Kahneman, 2000). Gilbert, Pinel, Wilson, Blumberg, and Wheatley (1998) asked untenured college professors to anticipate how they would feel about receiving or not receiving tenure. Not surprisingly, the professors expected to be happy if given tenure and extremely unhappy otherwise. Actually, however, the professors who were denied tenure were much happier than they expected to be. The errors in affective forecasting that Gilbert et al. found were in the same direction as those we found in the pregnancy and dieting studies. People anticipated feeling worse about negative outcomes than they actually felt.

## FUTURE DIRECTIONS

Research in decision making has demonstrated that anticipated pleasure improves the predictability of choice over and beyond utilities. The effects of comparisons and surprise add valuable information to descriptive theories of choice. Disappointment and regret are by no means the only comparisons that influence anticipated pleasure, however. Many other reference points may be salient. When people make a series of gambling choices, for example, the pleasure of a win or loss is affected by previous wins and losses. In competitive situations, people anticipate the pleasure of their success by comparing their performance with that of others, not to mention their own personal expectations.

Many questions remain. Emotions are far more complex than simple unidimensional ratings of pleasure or pain. People can experience pain from sadness, anger, fear, and disappointment. No one would argue that these emotions should be treated as equivalent. Furthermore, some decision outcomes simultaneously give rise to pleasure and pain.

In those cases, people feel ambivalence. Finally, what about the duration of emotional experiences? When is regret a fleeting incident, and when does it last a lifetime? Answers to these questions will deepen social scientists' understanding of emotions, and perhaps lead to better tools for guiding choice.

### Recommended Reading

Gilbert, D.T., & Wilson, T.D. (2000). Miswanting: Some problems in the forecasting of future affective states. In J. Forgas (Ed.), *Thinking and feeling: The role of affect in social cognition* (pp. 178-197). Cambridge, England: Cambridge University Press.

Kahneman, D., & Varey, C. (1991). Notes on the psychology of utility. In J. Elster & J. Roemer (Eds.), *Interpersonal comparisons of well-being* (pp. 127-163). New York: Cambridge University Press.

Landman, J. (1993). *Regret: The persistence of the possible*. Oxford, England: Oxford University Press.

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2. Pleasure can be derived from acts of virtue, the senses, or relief from pain. Similarly, displeasure can arise from an aggressive impulse, a sense of injustice, or frustration from falling short of a goal. Thus, choices based on pleasure need not imply hedonism.

### References

Bell, D.E. (1982). Regret in decision making under uncertainty. *Operations Research*, 30, 961-981.

Bell, D.E. (1985). Disappointment in decision making under uncertainty.

*Operations Research*, 33, 1-27.

Gilbert, D.T., Pines, E.C., Wilson, T.C., Blumberg, S.J., & Wheatley, T.P. (1998). Immune neglect: A source of durability bias in affective forecasting. *Journal of Personality and Social Psychology*, 75, 617-638.

Kahneman, D. (2000). Evaluation by moments: Past and future. In D. Kahneman & A. Tversky (Eds.), *Choices, values, and frames* (pp. 693-708). New York: Cambridge University Press.

Loewenstein, G., & Schkade, D. (1999). Wouldn't be nice? Predicting future feelings. In D. Kahneman, E. Diener, & N. Schwarz (Eds.), *Well-being: The foundations of hedonic psychology* (pp. 85-108). New York: Russell Sage Foundation.

Loomes, G., & Sugden, R. (1982). Regret theory: An alternative of rational choice under uncertainty. *Economic Journal*, 92, 805-824.

Loomes, G., & Sugden, R. (1986). Disappointment and dynamic consistency in choice under uncertainty. *Review of Economic Studies*, 53, 271-282.

Mellers, B.A. (2000). Choice and the relative pleasure of consequences. *Psychological Bulletin*.

Mellers, B.A., & McGraw, A.P. (2001). *Predicting choices from anticipated emotions*. Unpublished manuscript, Ohio State University, Columbus.

Mellers, B.A., Schwartz, A., Ho, K., & Ritov, I. (1997). Decision affect theory: Emotional reactions to the outcomes of risky options. *Psychological Science*, 8, 423-429.

Mellers, B.A., Schwartz, A., & Ritov, I. (1999). Emotion-based choice. *Journal of Experimental Psychology: General*, 128, 332-345.

Savage, L.J. (1954). *The foundations of statistics*. New York: Wiley

Schkade, D.A., & Kahneman, D. (1998). Does living in California make people happy? *Psychological Science*, 9, 340-346.

Fig. 1. Selected results from the gambling studies showing the effects of outcomes (a), comparison (b and c), and surprise (d) on anticipated pleasure. Comparison effects are illustrated by

anticipated pleasure when the unobtained (b) or unchosen(c) outcome was a loss of \$32 versus a gain of \$32. Surprise effects (d) are shown for both a gain of \$8 and a loss of \$8. Prob. = probability.

Fig. 2. Selected results from the dieting, grading, and pregnancy studies showing the effects of outcome (a), comparison (b), and surprise (c), respectively, on anticipated pleasure. Comparison effects are illustrated by anticipated pleasure when the expected grade was an A versus a B versus a C. Surprise effects are shown for both women who found out they were pregnant and those who found out they were not pregnant ("Preg"). Wt. = weight.