The Pleasures of Uncertainty: Prolonging Positive Moods in Ways People Do Not Anticipate

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The authors hypothesized that uncertainty following a positive event prolongs the pleasure it causes and that people are generally unaware of this effect of uncertainty. In 3 experimental settings, people experienced a positive event (e.g., received an unexpected gift of a dollar coin attached to an index card) under conditions of certainty or uncertainty (e.g., it was easy or difficult to make sense of the text on the card). As predicted, people's positive moods lasted longer in the uncertain conditions. The results were consistent with a *pleasure paradox*, whereby the cognitive processes used to make sense of positive events reduce the pleasure people obtain from them. Forecasters seemed unaware of this paradox; they overwhelmingly preferred to be in the certain conditions and tended to predict that they would be in better moods in these conditions.

> We are highly adaptive creatures. The predictable becomes, by definition, background, leaving the attention uncluttered, the better to deal with the random or unexpected.
>
> —Ian McEwan, *Enduring Love*

Most synonyms of the word *uncertainty* have decidedly unpleasant connotations, such as *doubt* and *insecurity*. Uncertainty is the cause of some of people's most debilitating anxieties, so it is not surprising that the human mind is designed to eradicate it. People gather facts, form opinions, and generate theories in an attempt to transform the unknown into the known—to make the world a bit less puzzling and more predictable by reducing their uncertainty about it. This ability has allowed the species to flourish. Because humans have been driven to understand how vegetables grow, when the seasons change, and where babies come from, they have been able to control their destinies more than any other animal.

The benefit of knowledge is that it makes the world more predictable, but the cost is that a predictable world sometimes seems less delicious, less exciting, less poignant. Research has indicated that predictable events evoke less intense emotions than unpredictable events, which means that the reduction of uncertainty can entail the reduction of pleasure. People may be driven to understand the causes of positive events in order to make them more predictable and hence more replicable, but understanding them may also make them less enjoyable.

We call this the *pleasure paradox*, and suggest that people may not always resolve this paradox optimally. In particular, we argue that certainty can reduce the pleasure of positive events but that people tend not to recognize this in prospect and hence, under some circumstances, seek certainties that diminish their pleasure rather than uncertainties that prolong it.

The Emotional Consequences of Uncertainty

There is little doubt that uncertainty is aversive much of the time, especially when an event is negative or when people do not know its valence—for example, whether the results of an HIV test will be positive or negative, or whether they will get a desired job or remain unemployed. Uncertainty has been found to be associated with anxiety, worry, and difficulty in adapting to new environments and cultures (Buhr & Dugas, 2002; Gao & Gudykunst, 1990; Gordon, 2003; van den Bos, 2001).

People who succeed in reducing uncertainty about traumatic events do better, emotionally and physically, than people who do not. Studies of bereavement, for example, have found that people who are able to find meaning in the death of a loved one cope better than people who are unable to find any meaning in their loss (Bonanno et al., 2002; Davis & Nolen-Hoeksema, 2001; Janoff-Bulman, 1992). Pennebaker and colleagues found that people who write about traumatic events (typically for 15 min on 3 consecutive days) experience remarkable long-term benefits. The people who benefit the most are those who begin with disjointed, incoherent accounts of their trauma but end with coherent, organized accounts, presumably because the writing exercise helped them make

sense of their negative experiences (Pennebaker, 1997a, 1997b; Smyth, 1998).

However, is it always desirable to reduce uncertainty by making sense of life events? *Mysticism*, the idea that there is a divine presence beyond human understanding, is a recurrent theme in most world religions and embodies the idea that a tolerance for uncertainty is a necessary part of religious faith. The Taoist philosopher Lao Tzu advised, "Stop thinking, and end your problems" (Mitchell, 1996, p. 20). John Keats, in a letter to his brothers, suggested that artistic achievement occurs when people are "capable of being in uncertainties, Mysteries, doubts, without any irritable reaching after fact & reason" (Bush, 1959, p. 261). Pennebaker (1997a) argued that romantic infatuations last longer when they involve a degree of uncertainty and lack of understanding. Clore and Colcombe (2003) suggested that uncertainty about the source of positive affect leads to a general sense of well-being, whereas "constraining" the affect to a specific source reduces a sense of general well-being. Consistent with these approaches, we argue that uncertainty about the nature of a positive event can prolong the pleasure people derive from it and, further, that people do not recognize this fact.

Sense Making and Emotional Adaptation

The present hypotheses were derived from a model of emotional adaptation outlined by Wilson and Gilbert (2003) and Wilson, Gilbert, and Centerbar (2003). The basic premise is that people make sense of their worlds in a way that speeds recovery from emotional events and that this sense-making process is largely automatic and nonconscious. These processes are described by the acronym *AREA*: attend, react, explain, adapt. People *attend* or orient to novel, relevant events; they *react* emotionally to the events; they *explain* or make sense of the events; and as a result they *adapt* to them, in that they think about them less and have a less intense emotional reaction when they do.

There is substantial evidence that people and other animals attend to novel, unexpected events (e.g., Anderson, 1994; Cheal, Johnson, Ellingboe, & Skupny, 1984; Hilgetag, Lomber, & Payne, 2001; Sokolov, 1963; Vinogradova, 2001; Wechsler, 1992). An orienting response has been found in infants and adults on a wide variety of cognitive tasks and on various measures of brain activity (e.g., Donchin, 1981; Enns, Austen, Di Lollo, Rauschenberger, & Yantis, 2001; Fantz, 1964; Hamann, Ely, Hoffman, & Kilts, 2002; Johnston & Schwarting, 1997; Kimmel, Van Olst, & Orlebeke, 1979; Quinn, Eimas, & Tarr, 2001; Spencer, Dien, & Donchin, 2001). It is not novelty or unexpectedness per se that causes an orienting response; there are always thousands of novel and unexpected events in people's environments that fail to attract attention (e.g., clouds that are in a pattern never seen before). Instead, people orient to unexpected events that are relevant to their goals (e.g., a weather forecaster's attention is more likely to be drawn to a novel pattern of clouds; Ben-Shakhar, Asher, Poznansky-Levy, Asherowitz, & Lieblich, 1989; Bernstein, 1969; Maltzman, 1979). Theories of cognitive expectancies make a similar point, namely, that disconfirmations of important expectancies lead to increased attention to and processing of the inconsistent information (e.g., Olson, Roese, & Zanna, 1996).

Once people attend to unexpected relevant events, they react with relatively intense emotions (Ortony, Clore, & Collins, 1988).

Evidence for this hypothesis comes from several sources. Mellers, Schwartz, and Ritov (1999) found that people had more extreme emotional reactions to winning and losing gambles when the outcome was of low probability. The more unexpected the event, the stronger the emotional reaction to it. At a physiological level, reward pathways in the brain, such as dopaminergic neurons, are activated not by the valence of a stimulus but by its lack of predictability (Berns, McClure, Pagnoni, & Montague, 2001; Schultz, Dayan, & Montague, 1997). Further, unexpected events tend to increase people's physiological arousal (e.g., Berlyne, 1960; Le Poire & Burgoon, 1996; Price & Geer, 1972), and this arousal is likely to intensify emotional reactions to the events (Schachter & Singer, 1962; Zillmann, 1978).

When people orient and react emotionally to an event, they attempt to explain or make sense of it, quickly and automatically. Mandler (1975) equated attention with the analysis of meaning: "Any input to the cognitive–interpretive system is subjected to an analysis of its relation to existing structures" (p. 26). People often make sense by trying to determine the cause of the event; for example, people attempt to explain each other's behavior in order to be able to predict future behavior (Gilbert, 1998; Heider, 1958; E. E. Jones & Davis, 1965; Kelley, 1967). As Heider (1958) noted, people make causal attributions "not only because of intellectual curiosity" (p. 146) but because explaining the causes of events allows them to understand their world and gain a sense that they can predict and control what happens to them. In short, people reduce uncertainty by making sense of events, which can involve causal attribution, assimilation to existing knowledge structures, or altering knowledge structures to accommodate the events.

Once people succeed in making sense of an event, it no longer seems as surprising or unexpected, and as a result people adapt to it emotionally. Research on the hindsight bias, for example, has found that after people have explained an event, it seems more predictable than it did in advance (Fischhoff, 1975; Roese & Olson, 1996). Sense making reduces the emotional power of events by turning extraordinary, attention-demanding events into ordinary ones that are no longer focal in people's thoughts and no longer trigger intense reactions. There are at least two mechanisms by which adaptation occurs (Wilson et al., 2003; Wilson & Gilbert, 2003). First, an emotional event becomes less cognitively accessible to people once it has been transformed from an unexpected, attention-grabbing one into an understandable, predictable one. Second, holding accessibility constant, unexpected, unexplained events trigger more intense emotional reactions than expected, explainable ones for the reasons outlined above (e.g., unexpected events trigger more arousal).

Sense making is desirable when people experience negative events because it speeds recovery from such events. Pennebaker's (1997a) writing exercise, for example, helps people make sense of traumas, such that these events no longer dominate their thoughts or trigger intense emotional reactions. The downside of sense making, however, is that it also speeds "recovery" from positive events.

The purpose of the present studies was not to test the entire AREA model of emotional adaptation but rather to test one clear implication of it: If sense making reduces the pleasure people derive from positive events, then this pleasure could be prolonged by inhibiting their ability to make sense of such events. We tested this prediction in the present studies by manipulating how easily

people could make sense of positive events. We predicted that the pleasure people derived from the events would last longer in the conditions in which people had difficulty making sense of them, which we refer to as the "pleasure of uncertainty" hypothesis. The main goal of the present research was to test this hypothesis in several settings, including field and laboratory studies. We also gathered preliminary evidence for some of the variables that might mediate the pleasure of uncertainty, such as the aforementioned possibility that once people have made sense of an event it seems less surprising and more mundane.

Affective Forecasting: Misunderstanding the Pleasure Paradox

If people understood the pleasure paradox, they might make conscious decisions about how to manage their emotions, such as trading off uncertainty for prolonged pleasure. People might opt to remain uncertain about pleasurable events by, for example, not watching the last few minutes of a movie that they know will have a happy ending. There is reason to believe, however, that people are not very cognizant of how quickly they will "recover" from pleasurable events by making sense of them. In general, people have poor access to the psychological processes by which they regulate their emotions and make sense of the world (Lazarus, 1999; Nisbett & Wilson, 1977; Wilson, 2002); thus, they may be unaware of the extent to which they will engage in uncertainty reduction when faced with unexpected events and the extent to which this uncertainty reduction will moderate their emotional reactions. People have a general sense, of course, that pleasure fades over time; they know that the thrill of a new romance does not last forever and that the excitement of buying a new car fades eventually, but people may not recognize the speed with which such adaptation occurs and the extent to which it results from sense making.

Underestimating sense making may be a major cause of the *impact bias*, the tendency to overestimate the enduring impact that future events will have on one's emotional reactions (Gilbert, Driver-Linn, & Wilson, 2002; Wilson & Gilbert, 2003). When thinking about how happy they will be if they win a major award, for example, and how long they will feel that way, people might not anticipate the speed with which they will make sense of their achievement, creating new knowledge structures to understand it. If so, they will overestimate the duration of the pleasure it will bring and may be at a disadvantage in managing their emotional lives (Kahneman & Snell, 1990; Loewenstein & Schkade, 1999; Mellers & McGraw, 2001; Wilson & Gilbert, 2003).

The present studies examined people's forecasts about the effects of uncertainty as well as the actual effects of uncertainty on the duration of affective reactions to positive events. In addition to predicting that a dose of uncertainty following a positive event will prolong the pleasure it causes, we expected that people would not recognize in advance the role of uncertainty. In fact, given that uncertainty is often associated with negative affect, people might predict the opposite, namely that they will derive less pleasure from uncertain positive events than certain ones.

Study 1A: Random Acts of Kindness in the Library

People often surprise their friends and lovers with gifts, with the assumption that the surprise will add to the recipient's pleasure. In

recent years the idea of surprise gifts has been taken a step further; people do unexpected good deeds for complete strangers as part of a "random acts of kindness" movement. In 1994, the United States Congress passed a joint resolution declaring a national "Random Acts of Kindness Week" (H.J. Res. 357, 1994). Organizations such as the Random Acts of Kindness Foundation (www.actsofkindness .org) have adopted the mission of "practicing kindness" and "passing it on" by engaging in volunteer work and doing good deeds for others, such as giving cookies to city workers and flowers to coworkers. Some of the suggested good deeds are anonymous acts, such as "slip paper hearts that say, 'It's Random Acts of Kindness Week! Have a Great Day!' under the windshield wipers of parked cars" (Random Acts of Kindness Foundation, n.d.).

Do acts such as these make people happy? If so, for how long? The most interesting thing about the random acts of kindness movement might be the first word. Acts of kindness surely make people happy, but do they make people happier for longer when they are random and thus difficult to explain? We hypothesized that a small act of kindness would make people happier for longer if it had some uncertainty associated with it.

We tested this hypothesis in Study 1A by approaching students in a college library and giving them an index card with a dollar coin attached. In the uncertain condition, the card contained a seemingly arbitrary collection of statements such as "The Smile Society" and "We like to promote Random Acts of Kindness." We expected that people would find this information to be puzzling and difficult to make sense of. In the certain condition, the statements were the same but were preceded by the questions "Who are we?" and "Why do we do this?" We hypothesized that this question-and-answer format would appear to make more sense to people and that they would process it relatively mindlessly. This hypothesis was based on work by Langer, Blank, and Chanowitz (1978), who found that people were more likely to comply with a request if it had the semantic form of a reasonable favor, even if it did not convey any information. By the same token, we expected people who received the card in the question-and-answer format would be less likely to question why they had received it, because it was in a form that appeared to provide answers to reasonable questions.

In the control condition, participants did not receive a card. Five minutes later, all students were approached by a different person and asked to complete a survey of their thoughts and feelings. We hypothesized that participants in the uncertain condition would be happiest at this point, because the pleasure of receiving the card would persist longer than in the certain condition.

Method

Participants

Participants were students studying alone at a cubicle in a large library at the University of Virginia with no students in the neighboring cubicles. Three participants were not given the survey by the second experimenter, 2 because they had left the area and 1 because he had seen the two (supposedly unrelated) experimenters talking. Five students refused to fill out the survey when approached by the second experimenter (3 in the uncertain condition and 2 in the control condition), and 1 student was not of legal age to consent to complete the survey. There were 35 remaining participants (19 women, 15 men, 1 unstated), who were between the ages of 18 and 28 years ($M = 19.7$, $SD = 1.8$).

Procedure

The study was conducted between 3:30 p.m. and 9:00 p.m. on different days of the week. Experimenter 1 approached participants, handed them a card with a United States golden dollar coin attached, and said, "Hi! This is for you. Have a nice day." The experimenter carried two additional gift cards (suggesting that others in the library were getting cards as well), to avoid making the participant feel uncomfortable or inappropriately singled out. After handing the card to participants, the experimenter walked away, attempting to look as if she were finding somebody else to whom she could give a card.

Certainty manipulation. Participants received one of two, 3-inch × 5-inch index cards (randomly assigned). Both cards contained information designed to sound rather vague, namely, "The Smile Society," "A Student/ Community Secular Alliance," and "We like to promote Random Acts of Kindness." The phrase, "Have a Nice Day!" was at the bottom of the cards. As seen in Figure 1, the only difference between conditions was the presence of questions to which the above information provided answers. In the certain condition, the question, "Who are we?" preceded the phrases about the Smile Society and the Student/Community Secular Alliance. The question, "Why do we do this?" preceded the phrase about promoting random acts of kindness. We hypothesized that participants in the certain condition (who received the card with questions) would process the information in a relatively mindless fashion and be less likely to spend time questioning who the card was from and why they had received it, because the questions seemed to be adequately answered (Langer et al., 1978; we tested this assumption directly in Study 1C). Participants in the uncertain condition (who received the card without questions) were expected to question whom the card was from and why they had received it, thereby

Figure 1. The cards with dollar coins attached used in Study 1A. The top card was handed out in the uncertain condition, and the bottom card was handed out in the certain condition. The cards were printed in color with a blue and black border, a yellow smiley-face, and black text. The questions on the bottom (certain) card were printed in blue.

prolonging their pleasure associated with receiving the card. The experimenters were unaware of the hypotheses.

Dependent measures. Five minutes after Experimenter 1 gave each participant the card (or, in the control condition, 5 min after participants had been assigned to condition), she signaled Experimenter 2 to approach the person. Experimenter 2, who was unaware of the participant's condition, asked if he or she could fill out a questionnaire as part of a class project. Students who agreed first signed a consent form that stated that the survey was about "community thoughts and feelings"; then the experimenter left the participant to fill out a questionnaire. Participants in the card conditions completed a second questionnaire as well.

The first questionnaire began with filler questions about the participants' status at the university (i.e., whether they were undergraduate or graduate students) and questions about how frequently they used the library. The next question was, "How POSITIVE or NEGATIVE is your mood right now?", which students answered on a 9-point scale (1 = *very negative,* 9 = *very positive*). Participants then rated the extent to which each of six words described their current feelings (*cheerful, pleased, frustrated, confused, alert,* and *agitated*) on a 9-point scale (1 = *don't feel this at all,* 9 = *feel this very much*).

The questionnaire concluded with some exploratory questions (e.g., one about influences on people's mood over the past 48 hr and some word completion tasks to measure accessibility of various thoughts) and demographic questions. Because little of interest was found on the exploratory measures, they are not discussed further.

Participants in the card conditions received a second questionnaire that assessed their thoughts and feelings about the card they had received. Among other questions, participants rated the nature of the person or group who gave them the dollar on 5-point scales, with endpoints labeled *non-religious/religious, local/national, university-related/independent, student-organized/non-student.* Participants then were asked to write exactly what the card said to the best of their recollection and finally to rate how much they had thought about the card since receiving it on a 4-point scale with endpoints *not at all* and *more than five times.* Participants were then probed for suspicion and fully debriefed.

Results and Discussion

Of the 35 participants, 4 (2 certain condition, 2 uncertain condition) were excluded from the analyses because of problems during data collection, 2 because more than 6 min elapsed between receiving the card and the survey, 1 because he left before being given the final questionnaire (and signing the data release form), and 1 because he fell asleep without looking at the card (confirmed by the absence of recall of statements from the card). Gender did not significantly interact with any reported analyses.

Mood

Initial analyses in this and the next study revealed that people's rating of their mood and five of the emotion words (all but *alert*) were highly correlated; thus, we computed an overall mood scale by averaging these items after reverse scoring the ratings of the negative adjectives ($\alpha = .81$). We hypothesized that people in the uncertain condition would maintain their positive mood the longest and thus would report a better mood than people in the certain or control conditions. As seen in Table 1, this hypothesis was confirmed. A planned comparison (that assigned a weight of 2 to the mean in the uncertain condition and −1 to the means in the certain and control conditions) was significant, $F(1, 28) = 8.95, p = .006$. The difference between the means in the certain and control conditions was not significant, $F(1, 28) < 1, ns$.
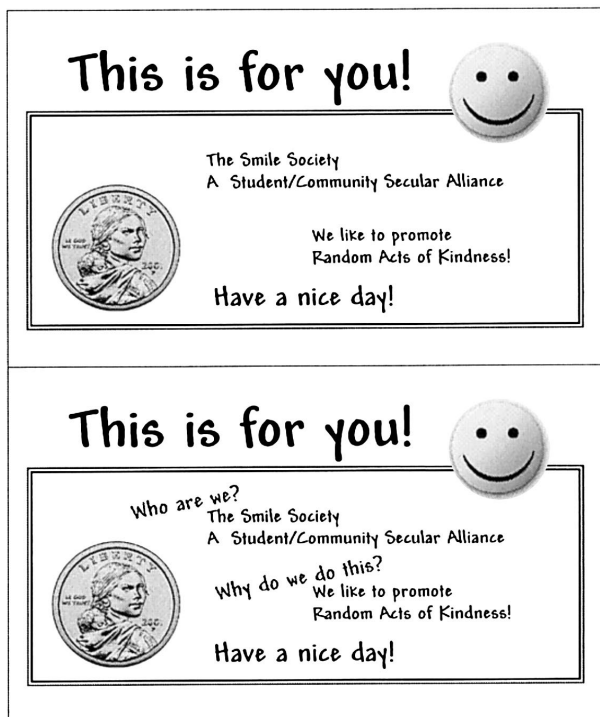
Other Findings

We tested whether the certainty manipulation influenced people's interpretations of the group responsible for the card by asking four questions about the sponsoring organization. There were no significant differences between the certain and uncertain conditions in how religious they thought the sponsoring group was or how much they thought it was affiliated with the university or a student group, $ts(17) < 1$ (these analyses exclude the control condition, which did not receive a card). People in the uncertain condition were less likely to report that the sponsoring group was local ($M = 1.56$, $SD = 0.72$ vs. $M = 2.60$, $SD = 1.08$), $t(17) = 2.45$, $p = .03$. However, there was no relationship between beliefs in how local the group was and people's mood, after controlling for people's certainty condition ($\beta = -.02$, ns). Little of interest was found on the other measures; for example, there were no significant differences between the certain and uncertain conditions in how carefully people said they had read the cards or how much they had thought about them, $ts(18) < 1$.

Participants' memories of each statement on the card were coded on a 3-point scale, with $0 = $ no mention of the statement, $1 = $ partial recall of the statement, and $2 = $ exact recall. Participants in the uncertain condition remembered significantly more statements than people in the certain condition ($M = 5.56$, $SD = 2.26$ vs. $M = 3.55$, $SD = 1.36$), $t(17) = 2.37$, $p = .03$. This result is consistent with one interpretation of the mood findings, namely, that the task seemed less complete for people in the uncertain condition and that they thus had better recall of the experience and thought about it more because of a Zeigarnik effect (Martin & Tesser, 1996; Zeigarnik, 1935). There was no evidence, however, that people's recall mediated the effects of condition on mood. The relationship between memory and people's mood (controlling for certainty condition) was nonsignificant, $\beta = .09$, $t(16) < 1$, ns. Further, we did not find similar differences in recall in our subsequent studies.

The results of Study 1A provide an initial demonstration of the pleasures of uncertainty effect. We deemed it necessary to replicate the effect, however, for two reasons. First, the sample size was relatively small, and we wanted to be reassured that the finding was reliable. Second, there was somewhat more participant attrition in the uncertain than certain condition: 3 people in the former condition refused to complete the survey after receiving the coin, whereas none in the latter condition did. It is possible that people who were in a negative mood were least likely to agree to help the research assistant by completing the survey. If so, people in negative moods were differentially eliminated from the uncertain condition, artificially increasing the mean positive affect of the remaining participants. Therefore, in Study 1B, we replicated the certain and uncertain conditions exactly, except that the card was

Table 1
Study 1A: Mood × Certainty Condition

Mood	Control ($n = 11$)	Certain ($n = 10$)	Uncertain ($n = 10$)
M	5.45	4.93	6.67
SD	1.66	0.89	1.17

Note. Mean of six mood ratings, all on 9-point scales. Higher numbers reflect a more positive mood.

modified to make it more perplexing, and the study was conducted in a university cafeteria instead of a library.

Study 1B: Random Acts of Kindness in the Cafeteria

Method

Participants

Participants were people eating alone in a university cafeteria who appeared to be students and who seemed likely to remain for at least 15 min (i.e., they had just started eating). As it happened, several students finished their meal and left after receiving the card but before being approached by Experimenter 2 (11 in the uncertain condition, 8 in the certain condition). One was joined by a partner, and one was not 18 years of age. Two participants (1 in each condition) declined to fill out the survey; thus, in this study there was not a differential rate of refusal to complete the survey. There were 39 remaining participants (23 women, 16 men).

Procedure

We modified the card that people received to make it more perplexing in the uncertain condition. In both conditions, a United States golden dollar coin and a dime were attached to the card. In the certain condition, the words "Why $1.10? Because we're the 110th National Chapter" were printed at the bottom of the card. In the uncertain condition, the words simply said, "110th National Chapter." Thus, in the uncertain condition, the amount of money people received was an odd amount, and the words "110th National Chapter" were not explained. In the certain condition, the odd amount of money was explained by the fact that it matched the chapter number of the organization. The other information on the cards was identical to the ones used in Study 1A, except that the phrase "This is for you!" was removed from the top of the card.

Dependent Measures

The initial questionnaire was the same, except the filler questions asked how often the student participated in six general activities such as reading the newspaper and buying lunch. The second questionnaire included new questions designed to assess people's surprise and curiosity about receiving the cards, including "How carefully did you read the card?" ($1 = $ *not at all*, $9 = $ *very carefully*), "How many times have you thought about the card since receiving it?" ($1 = $ *none*, $5 = $ *5 or more times*), "To what extent did you wonder why you had gotten the card and coins?" ($1 = $ *not at all*, $9 = $ *very much*), and "How surprised were you to receive the coins and card?" ($1 = $ *not at all*, $9 = $ *very much*).

Results and Discussion

At the same time as we began to collect data for this study, a real student organization dedicated to acts of kindness began to advertise its presence on campus. Because students who had heard about this organization might have attributed the cards to this organization (and thus have a ready explanation for them), we eliminated from the analyses 2 students who reported at the end of the study that they were familiar with this organization. Two participants were eliminated from the analyses because they left before completing the final questionnaire and signing a release form allowing us to keep their data.

Mood

The composite mood measure was computed in the same manner as in Study 1A ($\alpha = .80$). As predicted, participants in the

uncertain condition reported a more positive mood than partici-pants in the certain condition ($M = 6.79$, $SD = 0.95$ vs. $M = 6.10$, $SD = 0.96$), $t(32) = 2.06$, $p = .048$. This analysis did not include 1 student in the uncertain condition who was 3 standard deviations below the mean on the mood measure whereas all other partici-pants were less than 2 standard deviations away from the mean. When this outlier is included, the difference between conditions was significant with a median test, $\chi^2(1, N = 35) = 6.44$, $p = .01$.

Other Findings

As predicted, people in the uncertain condition reported more surprise at having received the card than did people in the certain condition ($M = 7.50$, $SD = 1.23$ vs. $M = 6.55$, $SD = 2.16$). Because the variances on this measure differed significantly across conditions, $F(1, 34) = 4.47$, $p = .04$, we used a nonparametric median test to assess the reliability of the difference between conditions. People in the uncertain condition were significantly more likely to give a rating above the median than people in the certain condition, $\chi^2(1, N = 34) = 4.60$, $p = .03$. Further, there was some evidence that the amount of surprise people reported mediated the effects of condition on mood. Consistent with the effects of condition on mood reported above, a dummy-coded condition variable ($-1 =$ certain condition, $1 =$ uncertain condi-tion) significantly predicted people's mood ($\beta = .34$, $p = .048$). People's condition also predicted whether they were above or below the median in reported surprise ($\beta = .37$, $p = .03$). The surprise variable predicted people's mood, controlling for condi-tion ($\beta = .34$, $p = .055$). In addition, when controlling for surprise, the effects of condition on mood dropped to a nonsignificant level ($\beta = .22$, $p = .22$). The drop in beta was not significant with a Sobel test ($z = 1.49$, $p = .14$). However, these results meet the conditions for partial mediation specified by Kenny, Kashy, and Bolger (1998).

There were no significant differences in the number of times people in the certain versus uncertain condition reported having thought about the card ($M = 2.05$, $SD = 1.14$ vs. $M = 2.07$, $SD = 1.09$), $t(32) < 1$, ns. Contrary to expectations, people in the certain condition reported that they had read the card more care-fully than did people in the uncertain condition ($M = 7.25$, $SD = 1.72$ vs. $M = 5.50$, $SD = 2.26$), $t(32) = 2.77$, $p = .009$; that they were more curious about the card ($M = 5.20$, $SD = 2.51$ vs. $M = 3.64$, $SD = 1.95$), $t(32) = 1.95$, $p = .06$; and that they wondered more about why they had received the card ($M = 5.20$, $SD = 2.40$ vs. $M = 3.71$, $SD = 1.90$), $t(32) = 1.93$, $p = .06$. It should be noted, however, that neither the "read," "curious," nor "wondered why" measures correlated significantly with people's mood, $r(32) = .00$, $-.16$, and $-.25$, respectively (ps $> .15$). The greater amount of information on the card in the certain condition (the questions such as "Who are we?") might have led participants to read the card more carefully and, initially at least, to be more curious about the card. Note that the question about curiosity ("How curious were you as to why you received the coins and card?") does not necessarily assess how much people satisfied their curiosity after initially wondering why they had received the card.

Finally, unlike in Study 1A, people in the uncertain condition did not recall more of the statements on the card. In fact, there was a trend for them to recall fewer statements ($M = 2.69$, $SD = 1.92$

vs. $M = 3.86$, $SD = 2.24$), $t(35) = 1.67$, $p = .10$. As in Study 1A, there was no evidence that people's recall mediated the effects of condition on mood.

Studies 1A and 1B demonstrated that uncertainty is associated with a more positive mood. The next two studies examined whether people predict this effect, to test the hypothesis that people generally do not anticipate the pleasures of uncertainty. Study 1C also tested our assumption that it was easier for people to make sense of the card with questions. People were presented with pictures of both cards used in Study 1A and asked how easy it was to make sense of each card, how surprised and confused they would be if they received each one, and which card would make them happier.

Study 1C: Forecasters about the Coin Cards I

Method

Participants

Thirty University of Virginia students (16 women, 14 men) in a summer school class completed the questionnaire.

Procedure

The two cards used in Study 1A were reproduced in color on a ques-tionnaire, with the left–right position of the cards counterbalanced. Partic-ipants were asked to imagine that a student gave them each card, with a real dollar coin attached, while they were studying alone in the library under the conditions described in Study 1A. They rated how easy it would be to make sense of each card, how easy it would be to explain why they received it, and how surprised and confused they would be if they received each card, all on 9-point scales with appropriate endpoints. Participants then were asked which card they would find easier to make sense of and explain and which would make someone happier.

Results and Discussion

We averaged people's ratings of how easy it was to make sense of the cards and how easy it would be to explain why they received it (for questions card and no-questions card, respectively, αs = .85 and .74). We also averaged people's ratings of how surprised and confused they would be to receive the cards (for questions card and no-questions card, respectively, αs = .44 and .58). Factor analyses with principal-components extractions and varimax rotations on the ratings of each card yielded factors that were consistent with combining the items into these scales.

As predicted, people rated the questions card as easier to make sense of and easier to explain than the no-questions card ($M = 7.93$, $SD = 1.68$ vs. $M = 6.75$, $SD = 2.04$), $t(29) = 4.59$, $p < .001$. Also as predicted, people forecasted that they would be less surprised and confused if they received the questions versus the no-questions card ($M = 6.13$, $SD = 1.54$ vs. $M = 6.62$, $SD = 1.51$), $t(29) = 2.76$, $p = .01$. When asked which card would be easier to make sense of and explain, 24 of 29 participants chose the questions card, which was significantly different from chance with a binomial test ($p < .001$). Thus, consistent with our hypotheses, people found the questions card to be easier to make sense of and explain.

Also consistent with our hypotheses, people believed that the ease of making sense of the questions card would make them

happier if they received it. When asked which card would make someone happier, 22 of 29 said the questions card (*p* = .009; 2 people failed to answer this question). The easier people thought a card was to make sense of, the more likely they were to say that the questions card would make people happier, *r*(27) = .71, *p* < .001. As seen by the results of Studies 1A and 1B, these affective forecasts were incorrect; it was actually the no-questions card that put people in a better mood.

The forecasters in the present study differed in several respects from the experiencers in Studies 1A and 1B. They got to see both cards instead of just one, and they were from a different population from students studying alone in the library. Therefore, in Study 1D, we assessed the affective forecasts of people from the same population as in Study 1A under the same testing conditions. Students studying alone at a university library were shown either the card used in the certain or in the uncertain condition and predicted what their mood would be 5 min later if they had been given the card. We hypothesized that students would not anticipate that they would be in a better mood if they were in the uncertain condition and might even predict that they would be in a better mood in the certain condition.

Study 1D: Forecasters about the Coin Cards II

Method

Participants

Participants were selected at the same location and in the same manner as in Study 1A. Data collection occurred immediately after Study 1A using the same research assistants who were unaware of the hypotheses. Three students declined to participate. Two students were excluded from analyses because they mentioned during the debriefing that they had been approached during Study 1A. Thirty students between the ages of 18 and 27 years were surveyed (15 men, 15 women). Students were not offered any direct compensation for their participation, although they were given a dollar coin at the conclusion of the study.

Procedure

Participants were given a questionnaire in which they were asked to imagine that they had been in Study 1A, that is, that a student had come up to them; said, "Hi! This is for you. Have a nice day"; and handed them a card with a coin on it. An actual card from the certain or the uncertain condition (with a photo of a dollar coin rather than a real one) was attached to the questionnaire. Participants were then asked to imagine that 5 min later a different student had asked them to fill out a survey, and they were asked to complete the survey as if they had received the card with an actual coin earlier.

Results and Discussion

We computed a mood index in the same manner as in Studies 1A and 1B (α = .67). As expected, forecasters in the uncertain condition did not predict that they would be in a better mood than forecasters in the certain condition. In fact, there was a nonsignificant trend for them to predict that they would be in a less positive mood (*M* = 6.76, *SD* = 0.88 vs. *M* = 7.25, *SD* = 0.87), *t*(28) = 1.52, *p* = .14. Combining the results of the experiencers in Study 1A with the forecasters in the present study resulted in a highly significant interaction between experiencers versus predictors and certainty condition, *F*(1, 46) = 16.72, *p* < .001. Thus, students

were not very accurate at predicting their response to receiving the cards.

The first series of studies succeeded in demonstrating the pleasures of uncertainty and people's failure to anticipate it. One possible alternative explanation for the findings is that people in the certain conditions appraised the events in a more negative way. Perhaps people in the certain condition assumed that the coin was from a more disliked group (e.g., a religious cult) than people in the uncertain condition. This possibility seems unlikely, given that the information on the cards was identical, except for the addition of questions in the certain condition. Further, in Study 1A, there were no significant differences between conditions in how religious they thought the sponsoring group was. Nonetheless, it would be reassuring to replicate the pleasures of uncertainty effect in a different domain.

Studies 2 and 3 served two other purposes. First, we were able to assess mood only once in the library and cafeteria field studies. In Studies 2 and 3, we measured people's mood right after the event and a short time later to test the hypothesis that people in certain and uncertain conditions would experience an equal amount of pleasure right after the event but that this pleasure would last longer in the uncertain conditions. In addition, we examined what people would do when given the choice of certain or uncertain conditions. Consistent with our hypothesis that people are generally unaware of the pleasures of uncertainty, we expected most participants to choose the certain conditions.

In Study 2 we showed people a movie with a heart-warming story and then introduced uncertainty about what happened to the main character after the conclusion of the story. Given the choice, most of us would want to know the ending to a good story rather than remaining in perpetual doubt about the outcome. The novelist Elmore Leonard once said, "A *New Yorker* editor used to ask me for stories, and I'd say, 'I don't write your kind of stories. My stories have endings'" (M. Jones, 2002, p. 75). Although Mr. Leonard was undoubtedly correct that many people prefer stories with endings, we hypothesized that as long as people know that the story has a positive outcome, some uncertainty about its denouement would prolong people's pleasure.

Study 2: The Pleasures of Uncertainty About Story Endings

Overview

Participants watched an abridged version of the movie *Rudy* (Anspaugh, 1993), the true story of Daniel Ruettiger, who dreamed of attending Notre Dame and playing on the football team. Rudy does not have much athletic skill, but he makes the team through grit and determination only to warm the bench at every game. At the last home game of Rudy's senior year, his teammates insist that he get to play, so the coach puts him in on defense in the closing seconds—at which point Rudy breaks through the line and makes a spectacular tackle. As one reviewer put it, "The film is so uplifting, I felt like calling up [Notre Dame football coach] Lou Holtz for brunch" (Chad, 1993). After watching the film, participants read two versions of what happened to Rudy after he graduated from college, which described positive outcomes that differed in their details. Participants in the certain condition were told which version was true of Rudy, but participants in the uncertain

condition were not. We predicted that people in both conditions would be in a positive mood immediately after watching the film but that this positive affect would last longer in the uncertain condition.

Method

Participants

Participants were 91 students who received credit in their undergraduate psychology courses and who reported that they had not previously seen the movie *Rudy*. The video player malfunctioned for 2 participants, resulting in a sample of 89 people (65 women, 23 men, and 1 unspecified).

Procedure

Participants, run in groups of up to 4, were told that the researchers were interested in dramatizations of real-life stories and that the story for that session was the movie *Rudy*, the true story of a man named Daniel Ruettiger. The experimenter gave a short summary of the film and then showed an abridged, 30-min version on video that contained the entire ending in which Rudy got to play in the final game.

Certainty manipulation. Participants then read paragraphs describing two versions of what happened to Rudy after he graduated from college (in counterbalanced order). One, labeled "Community Speaker," indicated that Rudy moved to New York City and married the director of a community development agency. He began speaking to community groups and schools to encourage them to work toward their dreams and soon had a lucrative career as an inspirational speaker. He and his wife enjoyed attending Notre Dame football games, and an official at Notre Dame conceded off the record that Rudy was an anonymous donor who had been instrumental in supporting the athletic program. The other description, "Family Man," said that Rudy returned to Michigan and became vice president of a real estate company. He married a woman after a 2-year courtship and had three sons. He helped coach his sons' football teams, and all three earned scholarships to college. According to this version, Rudy is close to his family and hosts many holiday parties but prefers not to be in the public eye. Pilot participants rated the two stories about Rudy as about equal in positivity.

The experimenter explained that there was conflicting information about what had happened to Daniel Ruettiger but that one of the versions was true, whereas the other was true of a teammate. After reading the two versions, participants in the certain condition read that since beginning the study, we had learned which account was about Rudy, and they were told that it was either the Community Speaker or Family Man story (counterbalanced). Participants in the uncertain condition were not given any further information.[1]

Dependent measures. Participants then indicated the extent to which seven adjectives described their mood (*happy*, *pleased*, *cheerful*, *bored*, *irritated*, *frustrated*, and *agitated*) on 21-point dot scales with endpoints labeled *not at all* and *extremely*. They also reported their liking for the movie on three 21-point scales: how much they liked the main character, how interesting the movie was, and how curious they were about the story or the people in the movie. Next, participants worked for 5 min on a filler task in which they generated words in each of seven categories, ostensibly to give the researchers an idea of what students thought about when given those categories. Two of the categories, "Words that start with the letter *S*" and "Words that could describe a forest," were designed so that participants might list words with positive or negative affective content. The other five were filler categories, such as colors and professions.

Following the filler task, students completed the mood and liking questions again. They were told that some of the questions would be the same as they had received earlier but that they should respond according to how they felt currently. They also answered questions about their thoughts, the movie, and the study. For example, they reported how often they thought

about Rudy and his story and how much they had thought about the two accounts of what happened to him during the filler (category-rating) task (1 = *never*, 9 = *very often*). They also recalled as much of the two story endings as they could. Participants were then fully debriefed.

Forecasters. Forty-five participants who had not previously seen the movie followed the same procedure as described above, up to the point at which they finished reading the two story endings. Forecasters in the certain condition were then asked to imagine that they were told that one of the stories was true of Rudy, and forecasters in the uncertain condition were asked to imagine that they were not given any further information about which story was true. All forecasters then completed the dependent measures according to how they thought they would feel at that point, read a description of the 5-min filler task that experiencers completed, and then rated how they thought they would feel after completing the filler task.

Results and Discussion

Mood

People's ratings on the seven mood items were separable into a positive and negative mood index, as indicated by a principal-components factor analysis with a varimax rotation, which yielded a two-factor solution on the ratings at both Time 1 and Time 2. The positive mood items (*happy*, *pleased*, *cheerful*) loaded highly on the first factor and had high internal consistency when averaged ($\alpha = .87$ at both Times 1 and 2). The negative mood items (*bored*, *irritated*, *frustrated*, *agitated*) loaded highly on the second factor and also had high internal consistency when averaged (αs = .82 and .89 at Times 1 and 2).

We predicted that people in the certain and uncertain conditions would be in equally positive moods right after seeing the movie but that people in the uncertain condition would remain in a positive mood longer. This hypothesis was confirmed, as seen by the means of the positive mood index in Table 2. A 2 (certainty condition) $\times$ 2 (time) between–within analysis of variance (ANOVA) on the positive mood index revealed the predicted interaction, $F(1, 87) = 3.92$, $p = .05$. The simple effect of time in the certain condition was highly reliable, $F(1, 87) = 23.20$, $p < .001$, but was not reliable in the uncertain condition, $F(1, 87) = 1.79$, $p = .18$, reflecting the fact that people's moods dropped more in the certain than the uncertain condition.

There were no significant effects of certainty condition on people's average ratings of the negative mood items; main effect and interaction Fs$(1, 87) < 1$. In general, people expressed little negative affect on the 21-point scales, though they were more likely to do so at Time 2 than Time 1 ($M = 4.50$, $SD = 4.13$ vs. $M = 3.22$, $SD = 2.71$); main effect of time, $F(1, 87) = 14.09$, $p < .005$.

Between the two mood measures, people completed a category-listing task. Responses to two of the categories, words that begin

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[1] Initially, participants in the uncertain condition were given a similar statement after reading both versions, indicating that there was no further information about which was true of Rudy. After running several participants, we decided to remove that statement because it was redundant and seemed to confuse some people. We also slightly modified the "Community Speaker" ending to have Rudy focus on kids rather than adults because of some indications that participants found "Family Man" to be preferable. Initial analyses indicated that these changes did not interact significantly with the certainty manipulation.

Table 2
Study 2: Experienced and Predicted Mood $\times$ Certainty Condition

Mood	Experiencers		Forecasters	
	Certain ($n = 54$)	Uncertain ($n = 35$)	Certain ($n = 22$)	Uncertain ($n = 16$)
Time 1				
M	14.24	14.41	14.70	13.33
SD	3.03	2.89	2.47	3.28
Time 2				
M	12.75	13.90	12.41	12.94
SD	2.90	3.19	3.17	3.09

Note. Means are ratings of how happy, pleased, and cheerful people felt, all on 21-point scales. Higher numbers reflect a more positive mood.

with *S* and words that could describe a forest, were coded as positive or negative. For example *silly* and *peaceful* were coded positively on *S* words and forest words, respectively, whereas *stupid* and *dark* were coded negatively. Interrater reliability ranged from $r = .72$ to $r = .87$ (all $ps < .001$). There were no significant differences between the uncertain and certain conditions in the proportion of positive words listed ($M = .16$, $SD = .17$ vs. $M = .18$, $SD = .15$), $t(81) < 1$, *ns*. However, people in the uncertain condition listed a smaller proportion of negative words ($M = .09$, $SD = .15$ vs. $M = .15$, $SD = .11$), a difference that was significant, $t(81) = 2.31$, $p = .02$. This result provides additional evidence that people in the uncertain condition were in better moods over time.

Reported Thought

Consistent with predictions, people in the uncertain condition reported thinking more about the accounts of what happened to Rudy after he graduated from college ($M = 3.66$, $SD = 2.04$ vs. $M = 2.44$, $SD = 1.57$), $t(87) = 3.15$, $p = .002$. There was no significant difference in how much people reported thinking about Rudy during the filler task in the uncertain and certain conditions ($M = 2.80$, $SD = 2.06$ vs. $M = 3.11$, $SD = 2.03$), $t(87) < 1$, *ns*. There were no significant differences in the number of sentences of the two accounts people recalled or the accuracy of this recall, $ts(54) < 1$, *ns* (the recall task was added after the study was underway, so the *n*s were lower on these measures).

Mediation

None of the variables we measured, such as the amount people reported thinking about the story endings or people's recall of the endings, was a reliable mediator of the effects of uncertainty condition on mood. However, there was evidence that amount of thinking partially mediated the effect when people's condition was configured differently. People in the certain condition who were told that the first story they had read was true showed the biggest drop in mood over time and reported the least amount of thinking about the story. They may have generated explanations for why the first story they read could be true, making it easier to accept that this version was, in fact, the true one. People in the certain condition who were told that the second story they read was true seemed to find it more difficult to readjust their thinking; they

reported thinking more about the story endings and did not show as much of a drop in mood over time. Put differently, people may have assumed that the first story they read was true and found it more difficult to "unaccept" this fact when told that the second story was true (Gilbert, 1991).

When we combined the uncertain condition with this latter group (certain condition–second story true condition), the amount of reported thinking about the story endings was significantly higher than in the certain–first story true condition ($M = 3.28$, $SD = 2.01$ vs. $M = 2.17$, $SD = 1.23$), $t(87) = 2.74$, $p = .008$, and there was less of a drop in mood from Time 1 to Time 2 ($M = 0.61$, $SD = 1.89$ vs. $M = 2.13$, $SD = 2.76$), $t(87) = 3.04$, $p = .003$. Further, there was evidence that reported amount of thinking about the stories partially mediated people's moods at Time 2. This breakdown of conditions significantly predicted amount of thinking ($\beta = .28$, $p = .01$), and the amount of thinking significantly predicted mood at Time 2, after controlling for condition ($\beta = .25$, $p = .01$). Condition predicted mood at Time 2 at a significant level ($\beta = .27$, $p = .01$), which dropped to $\beta = .21$ ($p = .07$) when controlling for amount of thinking. A Sobel test of this drop in beta was nearly significant ($z = 1.90$, $p = .06$). These results satisfy the conditions necessary to show partial mediation (Kenny et al., 1998).

Forecasters

Seven forecasters were eliminated from the analyses because they answered a manipulation check about their condition incorrectly. As seen in Table 2, forecasters predicted that they would be in a more positive mood at Time 1 if they were in the certain condition, but this difference disappeared by Time 2. The Certainty $\times$ Time interaction was significant, $F(1, 36) = 4.26$, $p < .05$. Thus, forecasters were wrong about when there would be a difference between certain and uncertain conditions (they predicted it would be at Time 1 whereas it was at Time 2) and what this difference would be (they predicted they would be in a better mood if they were in the certain condition, whereas experiencers were in a better mood if they were in the uncertain condition). We also asked forecasters whether they would want to know which ending about Rudy was true. Thirty-two of 35 (91%) said they would, which was significantly different from a chance level of 50% with a binomial test ($p < .001$).

In Study 3, we explored the generalizability of the pleasure of uncertainty effect by examining it in an interpersonal domain. In everyday life, it is not uncommon to receive positive feedback from others, with some uncertainty about the source of those comments. College teachers often receive anonymous feedback from students on teaching evaluations, researchers receive anonymous reviews of their professional articles, and employees sometimes receive written performance evaluations that could have come from one of several supervisors. Given the choice, we suspect that most people would like to reduce uncertainty in these situations by knowing who wrote the feedback (e.g., "Was it Sally or Janet who said such nice things about my report?"). According to the pleasures of uncertainty hypothesis, however, the delight of receiving positive feedback may last longer if there is some uncertainty about who it came from.

Study 3: The Pleasures of Uncertainty About Positive Feedback From Peers

Method

Overview

Participants believed they were one of six students at different universities (three women, three men) participating in an on-line impression formation study (in fact, they were the only real participant). They exchanged information with the students (e.g., about their interests and values), picked the one opposite-sex participant they believed would make their best potential friend, wrote a paragraph explaining their choice, and sent this information to the other students. Participants then learned that all three opposite-sex students had chosen them as their best potential friend and read flattering paragraphs explaining why. In the certain condition, participants were told which of the opposite-sex students had written each paragraph, whereas in the uncertain condition they were not given this information. All participants then rated their mood, completed a 15-min filler task, and rated their mood again. We hypothesized that participants in both conditions would be happy right after receiving the positive feedback but that the uncertain group would remain happier longer. Predictor participants imagined how happy they would be if they received the positive feedback. We hypothesized that they would not anticipate that they would feel happier in the uncertain condition.

Participants

Participants were 270 students (181 women, 89 men) who received credit as part of undergraduate psychology courses. The computer program malfunctioned for 12 participants, and their data were lost. Five participants in the forecaster condition failed to correctly answer at least one of two manipulation check items (described below); thus, their data were not analyzed. Finally, participants received positive feedback from three opposite-sex students, one described as African American and two as White. Similar to previous studies (e.g., Wilson, Wheatley, Kurtz, Dunn, & Gilbert, 2004), initial analyses revealed that participants reacted most favorably to the feedback when it came from at least one student of the same race (e.g., when participants were African American or White) than when they were of different races than the students (e.g., Asian). To test our hypotheses, it was necessary for the feedback manipulation to improve participants' mood; therefore, the data for 42 participants (27 women and 15 men) who identified themselves as a member of a race other than White or African American were not analyzed further (these participants were distributed evenly across the six conditions described below). The resulting sample consisted of 211 participants (143 women and 68 men).[2]

Procedure

Participants were run individually in a study that ostensibly concerned impression formation on the Internet. Researchers at several other universities were collaborating, the experimenter explained, using an Internet messaging program to allow students at each university to communicate with and form impressions of one another. After signing a consent form, participants were told that they had been randomly assigned to a version of the study in which there would be three men and three women at different universities who would evaluate the students of the opposite sex on several attributes, select one as their best potential friend, and write a few comments to the opposite-sex students about why they chose the person they did.

The experimenter took a Polaroid photo of the participant, scanned it, and uploaded it to a computer, as the participant watched. She then explained how to use the computer program and left the room. The program, developed for this study, asked the participant to sign in using a first name only (their own or a pseudonym). The program then "connected" the participant and five other (fictitious) students. As each student supposedly signed on, his or her photo and university affiliation appeared on the screen next to the participant's. The photos of the opposite-sex students were preselected from photos of undergraduate students who had agreed to allow their photos to be used in a psychology study and who were rated by other students as above average in attractiveness. These photos always included two White students and one African American student. The photos of the same-sex students were of White undergraduates rated as below average in attractiveness.

Next, participants provided information about themselves to be sent to the opposite-sex students, including how they would describe themselves if they were having a conversation with someone for the first time; their interests and career goals; which of the following values was most important to them: family, making a difference in the world, helping others, and being the best they could be; and what they looked for in an opposite-sex friend. Participants then read the opposite-sex students' answers to the same questions, which appeared on the screen as they were (supposedly) received. The answers were based on responses that real students gave in a pretesting session and were generally positive. Typos and misspellings of words were incorporated into the messages to make them appear authentic. The specific answers given by each opposite-sex student were counterbalanced.

Participants then rated how much they had in common with each opposite-sex student (1 = *very little*, 7 = *a great deal*), how likeable they found each student to be (1 = *not very likeable*, 7 = *extremely likeable*), and how much they would like to work with each person on a class project (1 = *not at all*, 7 = *very much*). Next, they selected the opposite-sex student who they thought they were "most compatible with and who is most likely to become a good friend" and wrote a few sentences explaining their choice. They were told that what they wrote would be sent to all of the opposite-sex students and that they should include "a few polite words about why you did not choose the other people."

Control condition. If participants were randomly assigned to the control condition, a message appeared on the screen instructing them to remove a questionnaire from an envelope on the table. In addition to answering some filler questions, control participants answered the same mood questions as participants in other conditions (described below). After completing the questionnaire, control participants were fully debriefed.

Certain and uncertain conditions: Experiencers. At this point, experiencer participants received feedback on the supposed choices of the three opposite-sex students. In approximately 15-s intervals, the messages from the three students appeared, and each indicated that he or she had selected the participant as his or her best potential friend. Participants also saw paragraphs that the other students supposedly wrote explaining their choices, which were flattering though distinctive. For example, one person's paragraph included the comment, "I just felt that something clicked between us when I read your answers. [Participant's name], it's too bad we're not at the same school!" Another included the comment, "I think I could be friends with all of you, but [participant's name] stood out as the one I would like the most. I was especially interested in the way you described your interests and values." The third said (among other things), "I wish I could talk with you [all] directly because it's important that I have a lot in common with my friends. I'd ask you if you like being around water (I love water skiing) and if you like Italian food (it's my favorite)." Again, typos were incorporated into the answers to make them appear authentic.

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[2] When participants of all races are included, the results do not change dramatically. The significance of the Experiencer (certain vs. uncertain) × Time (first vs. second mood measurement) interaction drops from $p = .04$ to $p = .10$. The simple effect analyses are similar to those reported in the *Results and Discussion* section: The effect of certainty condition is significant at Time 2, $F(1, 165) = 6.54$, $p < .01$, as predicted, but is less reliable at Time 1, $F(1, 165) = 3.20$, $p = .08$, also as predicted.

In the certain condition, the participant could see which student wrote which paragraph explaining his or her choice. The name, university affiliation, and photo of each opposite-sex student were displayed next to the paragraph he or she had supposedly written. In the uncertain condition, participants were told that for privacy reasons they would not be told which student had sent which message. Neither the students' name, affiliation, nor picture was displayed. In both the certain and uncertain conditions, the order in which the paragraphs were displayed was counterbalanced.

Forecasting condition. Forecasters participated in the study up until the point at which they sent their choice of best potential friend to the other students. They read the three sets of choices and comments that experiencers received and were asked to imagine that they had received them. Half the forecasters were asked to imagine that they knew which opposite-sex student had authored each paragraph, and half were asked to imagine that they did not know. Thus, half were asked to imagine that they were in the certain condition and half that they were in the uncertain condition. They made their forecasts on the same scales as control and experiencer participants rated their actual mood (described below). Participants then answered manipulation check questions to see if they understood the kind of feedback they were to imagine (i.e., certain vs. uncertain conditions).

Choice condition. Finally, another group of participants was randomly assigned to a condition in which they could choose whether to know who wrote the flattering paragraphs. These participants were treated identically to experiencers in the uncertain condition up until the point at which they had learned that all three opposite-sex students had selected them and had read the flattering paragraphs explaining why. At this point, a message appeared saying that some people preferred to know which students wrote which paragraph whereas others did not. They were asked to click one of two buttons labeled "Yes, I want to know who said what" or "No, I prefer not to know who said what."

Dependent measures. After receiving the feedback, experiencers logged off the computer and completed an initial questionnaire. They rated two filler questions about their impressions of the computer program and then answered five mood questions: (a) "How happy do you feel right now?" (1 = *not happy at all*, 9 = *extremely happy*), (b) "How POSITIVE or NEGATIVE is your mood right now?" (1 = *extremely negative*, 9 = *extremely positive*), (c) "How CALM do you feel right now?" (1 = *not at all calm*, 9 = *extremely calm*), (d) "How FRUSTRATED do you feel right now?" (1 = *not at all frustrated*, 9 = *extremely frustrated*), and (e) "How AGITATED do you feel right now?" (1 = *not at all agitated*, 9 = *extremely agitated*). Control participants answered the same questions without receiving any feedback about who chose them as their best potential friend.

Experiencers then completed additional filler questions and were given a mildly distracting filler task for approximately 15 min (a word search puzzle in which they tried to identify words in a grid of letters), supposedly to determine how interesting and challenging the task was for use by another researcher. They then completed a second questionnaire that included three filler questions about their impressions of the filler task (word search puzzle) followed by the same mood questions they had answered earlier. Several exploratory questions followed, including participants' expectations about how many of the students would pick them as their best potential friend, how surprised they were by how many actually picked them, how much they had thought about various parts of the messaging interaction, and their attributions about why the other students made the choices they did. Finally, participants were asked to try to recall as much of the comments of the three opposite-sex participants as they could, after which they were carefully debriefed.[3]

Results and Discussion

Mood

We averaged participants' responses to the five mood questions at Times 1 and 2 and performed a principal-components factor analysis with a varimax rotation. This analysis produced a single factor, with the first three items (*happy*, *positive*, and *calm*) loading positively and the latter two items (*frustrated* and *agitated*) loading negatively. We thus created a single mood index by averaging the five items (with the latter two items reverse scored). This index had reasonable internal consistency (αs = .73 and .86 for experiencers at Times 1 and 2, respectively).

Experiencers versus controls. As predicted, the feedback manipulation improved people's mood at Time 1. The experiencers in the certain and uncertain conditions, who learned that all three opposite-sex students had selected them as their best potential friend, reported a more positive mood than did control participants, who did not receive any feedback (see means in Table 3). A one-way ANOVA was significant, $F(2, 165) = 18.94$, $p < .001$, and planned contrasts revealed that the average of the means in the certain and uncertain conditions was significantly higher than the mean in the control condition, $F(1, 165) = 50.63$, $p < .001$. The means in the certain and uncertain conditions at Time 1 did not differ from each other, $F(1, 165) = 1.49$, $p = .22$. This latter result confirms our hypothesis that the positive feedback would initially result in an equivalent amount of positive affect in the certain and uncertain conditions.

Change in mood over time. We predicted that participants in the uncertain condition would maintain their positive mood longer than participants in the certain condition. As seen in Table 3, this prediction was confirmed. A 2 (experiencer: certain vs. uncertain) × 2 (time: first vs. second mood measurement) between–within ANOVA revealed a significant interaction, $F(1, 144) = 4.47$, $p < .04$. The simple effect of certainty condition did not reach significance at Time 1, $F(1, 144) = 2.58$, $p = .11$, but was highly significant at Time 2, $F(1, 144) = 8.77$, $p < .005$.

Forecasters. Forecasters predicted what their mood would be if they had received the positive feedback in the certain or uncertain conditions. As seen in Table 3, forecasters were not very accurate in predicting the effects of the certainty manipulation. We compared forecasters with experiencers in a 2 (role: forecaster vs. experiencer) × 2 (condition: certain vs. uncertain) × 2 (time: 1 vs. 2) between–within ANOVA. There was a significant Role × Condition interaction, $F(1, 169) = 5.77$, $p < .02$. Forecasters

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[3] We conducted waves of the study that differed in various ways. Because initial analyses revealed that the version of study did not significantly interact with the certainty manipulation, we collapsed across versions in subsequent analyses. The versions differed as follows. (a) In the first wave, participants were randomly assigned to the certain or uncertain experiencer conditions, control condition, or choose condition. In the second and third waves, participants were randomly assigned to one of the experiencer conditions, and the fourth wave included only forecasters. (Some people were randomly assigned to be forecasters in the first wave but were only asked to predict their feelings on a subset of the mood scales. Therefore, we opted to run forecasters again with the full complement of dependent measures. The results of the earlier forecasters closely matched the latter ones we report below.) (b) We made minor modifications to the comments the opposite-sex students gave as to why they chose the participant as their best potential friend; copies can be obtained from the authors. (c) Some participants received additional dependent measures on an exploratory basis, such as a problem assessing the conjunction fallacy used by Tversky and Kahneman (1983), completed after the word search puzzle. These measures were either not fruitful or had too low a sample size to yield significant results.

Table 3
Study 3: Reported Mood × Condition

Mood	Experiencers			Forecasters	
	Control ($n = 22$)	Certain ($n = 73$)	Uncertain ($n = 73$)	Certain ($n = 14$)	Uncertain ($n = 13$)
Time 1					
M	6.76	7.76	7.98	7.63	7.29
SD	0.74	0.86	0.79	1.12	1.00
Time 2					
M		6.39	7.06	6.56	5.91
SD		1.29	1.44	1.13	0.99

Note. Means are the average of five mood items rated on 9-point scales, with higher numbers reflecting a more positive mood.

predicted that they would be in a better mood if they were in the certain condition, whereas experiencers were in a better mood if they were in the uncertain condition. The simple effect of certainty condition was not significant among forecasters, $F(1, 170) = 1.64$, $p = .20$, though it was among experiencers, $F(1, 170) = 8.11$, $p = .005$. Thus, forecasters were incorrect about the effect of certainty condition on mood, though the trend to predict the opposite effect of certainty was not significant.

Choosers. Right after learning that they had been selected as the best potential friend by all three opposite-sex students and reading the students' explanations as to why, choosers were asked whether they wanted to know which student had authored which comment. All 16 participants in this condition elected to find out who had written the three comments, which was significantly different from a chance level of 50% with a binomial test ($p < .0001$). Thus, all choosers wanted to be in the certain condition, and forecasters who imagined the certain condition predicted they would be happier than forecasters who imagined the uncertain condition. As seen in Table 3, however, experiencers in the certain condition were actually less happy at Time 2 than experiencers in the uncertain condition.

Other Findings

We included a number of exploratory measures after the measurement of mood at Time 2, including recall and reported thought about the opposite-sex students. The certainty manipulation had no significant effects on most of these measures. There was a nearly significant difference in performance on the word search task (which participants completed between the first and second mood measures), with participants in the uncertain condition finding a higher proportion of words than participants in the certain condition ($M = .58$, $SD = .22$ vs. $M = .52$, $SD = .17$), $t(144) = 1.77$, $p = .08$. This finding is consistent with prior work showing that people in positive moods solve problems more creatively (e.g., Isen, Daubman, & Nowicki, 1987). Further, there was some evidence that performance on the word search task mediated the effect of uncertainty condition on prolonged mood. The more words participants found, the smaller the drop in their mood between Times 1 and 2 ($\beta = .27$, $p = .001$, adjusting for the effects of certainty condition on mood). The relationship between certain condition and drop in affect was weakened after adjusting

for the proportion of words found ($\beta = .17$, $p = .04$ and $\beta = .15$, $p = .07$), though this drop was nonsignificant ($z = 1.57$, $p = .12$).

We should note that the proportion of words found is not necessarily a mediator in the sense that it was a measure of a psychological process responsible for the effects of the manipulation on mood. Rather, it is probably better thought of as an indirect measure of participants' mood between Times 1 and 2. Thus, the better participants in the uncertain condition did on the word search puzzle (possibly reflecting their positive mood), the more they were likely to report being in a good mood at Time 2.

Participants in the certain condition recalled more about the comments of the three opposite-sex students than did participants in the uncertain condition (total number of words recalled, $M = 48.81$, $SD = 31.10$ vs. $M = 38.89$, $SD = 28.65$), $t(144) = 2.00$, $p = .047$. They also were more accurate in their recall of the comments (number of items recalled accurately minus the number of items recalled inaccurately, $M = 2.90$, $SD = 2.61$ vs. $M = 1.38$, $SD = 2.50$), $t(144) = 3.59$, $p < .001$. The superior recall for participants in the certain condition may have been due to the fact that they could organize the comments they read by who said them, whereas participants in the uncertain condition could not.

Moderating Variables

We attempted to make the three opposite-sex students likeable, with the assumption that the more participants liked the other students, the happier they would be after being selected by all three as their best potential friend. Overall, participants evaluated the students favorably before receiving the feedback ($M = 5.4$ on a 7-point scale). In addition, the more participants liked the opposite-sex students, the better their mood at Time 1, $r(144) = .35$, $p < .001$, and Time 2, $r(144) = .40$, $p < .001$. Further, participants' liking for the opposite-sex students moderated the effects of the certainty condition on the duration of participants' good mood. We performed a median split on experiencers' liking for the opposite-sex students and performed a 2 (certainty condition) × 2 (level of liking for opposite sex students) × 2 (time) between–within ANOVA on the mood ratings. The three-way interaction was significant, $F(1, 142) = 5.68$, $p = .02$, reflecting the fact that only participants who liked the opposite-sex students showed the predicted effect of uncertainty on the duration of mood. That is, when participants liked the opposite-sex students, participants in the uncertain condition maintained their mood longer than participants in the certain condition did: Condition × Time interaction, $F(1, 74) = 12.62$, $p = .001$. When participants did not like the opposite-sex students, there was no difference in duration of mood in the uncertain versus certain conditions, $F(1, 68) < 1$, *ns* (see means in Table 4). Put differently, the people who were most likely to remain in a good mood over time were those in the uncertain condition who initially liked the opposite-sex students. This finding is consistent with our hypothesis that uncertainty is only pleasurable when people experience positive events (e.g., positive feedback from people one likes).

Alternative Explanations

An alternative explanation of the mood results is that participants in the uncertain condition made different assumptions about the source of the positive feedback than did participants in the

Table 4
*Change in Affect Over Time as a Function of Certainty
Condition and High and Low Liking of the
Opposite-Sex Students*

| | Low liking | | High liking | |
| | Certain ($n = 38$) | Uncertain ($n = 32$) | Certain ($n = 35$) | Uncertain ($n = 41$) |
Mood				
Time 1				
M	7.47	7.59	8.07	8.28
SD	0.93	0.72	0.65	0.71
Time 2				
M	6.24	6.26	6.56	7.69
SD	1.44	1.27	1.09	1.26

Note. Means are the average of five mood items rated on 9-point scales, with higher numbers reflecting a more positive mood.

certain condition. Perhaps participants liked one of the other students substantially more than the others and also preferred the written feedback they received from the one student much more than the other comments. Because participants in the uncertain condition were not told who had written which set of comments, they were free to assume that their favorite person had authored their favorite comments. By contrast, some participants in the certain condition might have been disappointed to learn that their favorite person did not author their favorite comments, thereby lowering their mood.

There are several reasons to doubt this "disappointment" hypothesis. First, it should be recalled that at Time 1, participants in the certain and uncertain condition were in equally good moods (see Table 3). Thus, there was no hint of immediate disappointment on the part of participants in the certain condition. Further, the disappointment hypothesis implies that participants in the certain condition (who were told the identity of the author of each feedback comment) would be less pleased by the comment made by the student they chose as their best potential friend than with the comments made by the two students they did not choose as their best potential friend. In fact, they were more pleased by the comment made by their selected student than the average of the two nonselected students' comments ($M = 8.22$, $SD = 1.03$ vs. $M = 7.82$, $SD = 1.24$), $t(72) = 3.90$, $p < .001$. That is, rather than being disappointed by the comment made by the opposite-sex student whom they had selected as their best potential friend, certain condition participants were actually more pleased with that student's comment. Finally, we asked participants directly how disappointed they were by who made each comment (or, in the case of uncertain participants, who they thought had made each comment). Participants in the certain condition did not report more disappointment than participants in the uncertain condition ($M = 1.92$, $SD = 1.88$ vs. $M = 1.93$, $SD = 1.62$), $t(142) < 1$, *ns*.

General Discussion

The present studies tested some implications of a pleasure paradox whereby the cognitive processes that are triggered to understand and make sense of positive events are hypothesized to reduce the pleasure people obtain from them. We predicted that people who could make the most sense of positive events (in our

certain conditions) would have positive reactions of shorter duration than people who could not make as much sense of the events (in our uncertain conditions). We found evidence for this pleasure of uncertainty effect in three settings. In Studies 1A and 1B, people who received an unexpected gift of a dollar were happier, 5 min later, if the description on the gift card was harder to make sense of (as verified in Study 1C). In Study 2, people who did not know which of two possible life stories were true of the protagonist in a film stayed in a good mood for longer than people who knew which story was true. In Study 3, people who could not match the positive comments with the students who had authored them remained in a better mood for longer than did people who could match the comments with the students.

Some readers may be concerned with the number of participants we eliminated from the analyses in some of the studies. In Study 1B we eliminated a statistical outlier, for example, and in Study 3 we eliminated participants who were not African American or White. It is thus worth noting that the major findings are reliable across studies when we include all of these participants. For example, the critical difference in mood in Studies 1A and 1B and at Time 2 in Studies 2 and 3 is highly significant averaged across studies ($z = 3.87$, $p = .0001$). The interaction between time and mood, collapsing across Studies 2 and 3 (the only ones in which we measured mood twice), is also significant ($z = 2.38$, $p = .02$).

Forecasters made incorrect predictions about the effects of uncertainty on their mood in all three studies. In fact, there was a trend for people to predict that they would be in better moods in the certain conditions of each study. Combining across Studies 1D, 2, and 3, this trend was significant ($z = 2.11$, $p = .03$). It was also significant in Study 1C, in which 76% of participants (22 of 29) said that the card given in the certain condition would make people happier than the card given in the uncertain condition.

Participants also indicated that given the choice, they would prefer to have their uncertainty resolved (i.e., know which ending was true of Rudy in Study 2, know who authored the comments in Study 3). Thus, participants overwhelmingly preferred to have their uncertainty reduced and forecasted that this would improve their mood. The results of the experiencers in all three settings indicate that the forecasters were wrong; they were happier for longer in the uncertain conditions.

We argue that uncertainty will only prolong positive moods if people know that the event is positive. Evidence for this was obtained in an internal analysis in Study 3, which found that only participants who liked the opposite-sex students showed the predicted effect of uncertainty on the duration of mood. If people are uncertain about the valence of an event—whether a friend will survive an illness, say, or whether they will get a desired job—they are unlikely to be in a sustained good mood. If people know that the outcome will be positive—their friend will recover, they will get the job—some uncertainty over the nature of that event may prolong their pleasure.

Alternative Explanations and Unanswered Questions

A possible alternative explanation of the findings is that people in the certain conditions appraised the meaning of the events in a more negative way. For example, if people in the certain condition of Study 1A assumed that the coin was from a group they disliked (e.g., a religious cult) whereas people in the uncertain condition

assumed that the coin was from a group they admired, the difference in mood could be due to these different appraisals of the event and not to a difference in how easily the event was to explain or resolve.

If people appraised the events in different ways, however, they should have had different initial reactions to them. As seen in Studies 2 and 3, people's initial reactions were equally positive in the certain and uncertain conditions. These positive reactions lasted longer in the uncertain conditions, which is consistent with our hypothesis that sense making in the certain conditions reduced people's pleasure over time. Further, there was no evidence that participants in the certain and uncertain conditions interpreted the valence of the events differently. In Studies 1A and 1B, the information on the coin cards was identical except for the addition of questions in the certain condition. There is no reason to assume that the questions caused people to appraise the event differently; in Study 1A, for example, there were no significant differences between conditions in how religious they thought the sponsoring group was. In Study 2, people in both conditions received the same two stories about what happened to Rudy after the movie; the only difference was that people in the certain condition found out which story was true. In Study 3, participants in both conditions learned that three opposite-sex students chose them as their best potential friend and read the same paragraphs from the students explaining their choice. The only difference was that people in the certain condition knew which student had written which paragraph.

It is possible, of course, that people's appraisals of the meaning of the events differed in some way we did not measure. An advantage of testing our hypotheses in different settings, however, with different manipulations of uncertainty, is that any such alternative explanation of one study is unlikely to apply to another. We believe that the most parsimonious interpretation of the results is that people in the certain conditions made sense of the events more easily, leading to quicker emotional adaptation.

We found some direct support for this interpretation in Study 1C, in which people in the uncertain condition reported more surprise over having received the card. The fact that the event still seemed surprising to these participants and that this retrospective surprise partially mediated the effect of uncertainty condition on their positive mood is consistent with the idea that the event was more "alive" in their minds and to some extent still unresolved.

If a positive event is unresolved, it might remain more accessible in memory, thereby prolonging the pleasure people experience from it. We found evidence for this hypothesis in Study 2, in which people in the uncertain condition reported thinking about the story endings more, and the amount of thinking partially mediated the effects of uncertainty on happiness at Time 2 (at least when we reconfigured the conditions as described earlier). The accessibility hypothesis must remain tentative, however, because we did not find differences between conditions in how much people reported thinking about the event in our other studies. Further studies should examine the role of accessibility in more detail.

We were able to rule out another possible mediator of the results, namely, that people in the uncertain conditions would have better recall for the events, similar to a Zeigarnik effect (Zeigarnik, 1935). Recall for the pleasurable event was significantly higher in the certain condition of Study 3 (contrary to a Zeigarnik interpretation), whereas in Study 2 there were no significant differences in recall. The results of Studies 1A and 1B were inconsistent; people

in the uncertainty condition recalled significantly more information on the coin card in Study 1A but marginally less in Study 1B. There was no evidence in any study that recall mediated the effects of condition on mood.

Recall can be independent of accessibility; two groups with equal recall for events can still vary in how accessible in memory those events are (Higgins, 1996). Our hunch is that even though people in the uncertain conditions could not always recall the events better, those events were still more accessible in their memories. But again, direct evidence for this hypothesis was found only in Study 1A.

There is another possible mediator of the pleasures of uncertainty that remains to be tested. As noted earlier, sense making can lead to emotional adaptation in two ways. One way, as just discussed, is to reduce the accessibility of the event; the event may recede in accessibility once it has been explained and resolved. Second, holding accessibility constant, unresolved events may trigger emotional reactions of greater intensity than ones that have been resolved. Imagine, for example, a graduate student who learns that she has been offered her dream job as an assistant professor at a prestigious university. When she first hears the news, she experiences a relatively intense emotional reaction, perhaps energized by physiological arousal. Inevitably her sense-making apparatus kicks in, and before long the knowledge that she will be an assistant professor seems ordinary, part of the background of her life. Because of the hindsight bias, her achievement seems more predictable now than it did in advance. Consequently, her new job does not trigger an intense emotional reaction, even when she is thinking about it. That is, even though her achievement might be highly accessible at some later date and might cause some pleasure, it will not trigger an emotional reaction of the same intensity as it did when it was fresh, novel, and unanalyzed. As compelling as such thought experiments may be, the mediating role of such variables as arousal in the pleasure of uncertainty remains to be explored.

Another issue concerns the myriad ways in which we manipulated uncertainty in our studies. We deliberately tested the pleasure of uncertainty hypothesis in a variety of settings with different instantiations of uncertainty for two reasons: First, doing so helps establish the generalizability of the findings. It is interesting that we found similar results in laboratory and field settings with diverse positive events and with different kinds of uncertainty. Second, we believe that humans are equipped with multiple ways of reducing uncertainty (such as categorizing novel events into preexisting knowledge structures and making causal attributions) and that these different approaches have the same effect on emotional adaptation as discussed in the introduction. Clearly, however, future research should examine whether some types of uncertainty reduction lead to quicker adaptation than others.

Uncertainty Reduction, Curiosity, and Emotional Adaptation

The fact that "choosers" in our studies preferred to avoid uncertainty seems inconsistent, on the face of it, with some examples from everyday life. After genetic testing during pregnancy, many couples prefer not to learn the gender of the fetus. When people read mystery novels, they generally do not read the last page first, preferring to remain uncertain about the identity of the murderer.

And most people prefer not to know in advance what their best friend is getting them for their birthday.

In each of these examples, however, people opt for uncertainty when they know that it will eventually be reduced—when the baby is born, when they finish the novel, when their birthday arrives. Loewenstein (1994), in an insightful review of the literature on curiosity, proposed a model that is consistent with the examples of uncertainty seeking just given. He suggested that curiosity is itself an aversive state and that it is the act of satisfying curiosity that is pleasurable. Thus, Loewenstein (1994) argued, voluntarily exposing oneself to curiosity is a kind of gamble whereby people are willing to tolerate an aversive state (uncertainty) if they expect to gain pleasure from reducing it. If the odds of reducing uncertainty are too low, people will not choose to be curious. For example, few mystery lovers would want to read a novel in which the last chapter was torn out, because they would never be able to satisfy their curiosity about whether the murder was committed by the butler or the brother-in-law.

This reasoning explains the behavior of our choosers, who chose to reduce their uncertainty (e.g., by finding out who authored which paragraphs in Study 3), and our forecasters, who predicted that their mood would be better when uncertainty was reduced. Their lay theory seemed to be, as Loewenstein (1994) suggested, that the main pleasure of curiosity comes from reducing it. This theory is undoubtedly correct much of the time, especially when people do not know the valence of an outcome (e.g., whether a medical test will indicate that they are healthy or have a serious disease). The present studies suggest, however, that people's theories and actions about uncertainty reduction are off the mark when the outcome is known to be positive. People might be better off choosing not to know every detail about such outcomes, because in that case their pleasure will be prolonged. In our studies, for example, people had no expectation that the uncertainty would ever be resolved (e.g., that they would ever find out who authored which comments in Study 3). Yet their positive mood lasted longer than it did in the certain condition.

There are undoubtedly boundary conditions on the pleasure of uncertainty effect. Too much uncertainty might be aversive, even about positive events. If a hundred-dollar bill dropped out of the sky into a passerby's hand, for example, the person's pleasure might be tempered by the complete inability to make sense of his or her good fortune. Perhaps people need at least some framework in which to understand the event (e.g., a campus group just gave me a dollar coin) but some uncertainty within that framework (but I'm not sure who they are or why they are giving it to me). This possibility is reminiscent of Hebb's (1955) and Berlyne's (1960) idea that people find moderate levels of novelty and curiosity pleasurable but not levels that are too low or too high.

Loewenstein (1994) questioned the Hebb (1955) and Berlyne (1960) models, arguing that they are inconsistent with what people typically do:

> Such an account of curiosity seeking . . . is wrong because it is inconsistent with commonly observed behavior. If people like positive levels of curiosity, why do they attempt to resolve the curiosity? Why do they not put mystery novels down before the last chapter or turn off the television before the final inning of a close ball game? (p. 85)

The key, we suggest, is to distinguish between people's forecasts and experiences. Consistent with Loewenstein's arguments, people's forecasts and choices do not follow a U-shaped function of uncertainty. People typically do not choose to remain in states of moderate curiosity but rather prefer to satisfy them. As Keats suggested, people are often "incapable of remaining content with half-knowledge" (Bush, 1959, p. 261).

Whether they are correct in these choices, however, is another matter. The present studies suggest that people's actual experiences will be more pleasurable if they know that an event will be positive but there is some uncertainty associated with it (a moderate amount of uncertainty, perhaps). People should not walk out of a movie theater before the film ends if they are not sure whether the ending will be happy or sad; as we have argued, uncertainty about valence is not pleasurable. Once they have determined that the hero and heroine will end up together, however, and live happily ever after, perhaps they should head for the exit before they find out exactly how the couple made it to the altar.

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