

# The Time Course and Impact of Consumers' Erroneous Beliefs about Hedonic Contrast Effects

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Results from four experiments indicate that people expect to enjoy an experience more when it will follow a worse experience. We find that consumers expect hedonic contrast effects even when they do not experience such effects. Whereas individuals remember the absence of contrast effects after a short delay (study 1), individuals reporting retrospective judgments after a long delay (study 2) recalled that they had experienced contrast effects. These biased memories about contrast effects are eliminated when individuals focus on enjoyment during the experience. The present experiments document the time course of erroneous beliefs about contrast effects, mechanisms underlying their resistance to change, and the impact of these expectations about contrast effects on consumer choice.

Will you enjoy a glass of wine more after sampling an expensive estate-bottled wine or a cheap table wine? This question likely prompts you to consider whether the enjoyment you derive from an initial sample carries over to your evaluation of a subsequent experience (an assimilation effect) or serves as a frame of reference against which the second experience is judged (a contrast effect). Indeed, your implicit theory about the extent to which you will experience contrast effects may have important consequences for the experiences you select and the order in which you choose to experience them.

For example, consumers trying to decide in which order they should drink two bottles of wine might consider whether they would enjoy the cheaper bottle more or less if it follows the expensive bottle. If they think that they would enjoy the cheap bottle less following the fancy one, they may choose to open the cheaper bottle first. This result would be consistent with the finding that people prefer sequences that are improving to those that are declining (Loewenstein and Prelec 1993; Ross and Simonson 1991). Other research has found that consumers often choose to include some less-enjoyable experiences in concerts they

construct for themselves rather than restricting selections to their favorites (Kahn, Ratner, and Kahneman 1997; Ratner, Kahn, and Kahneman 1999). Might consumers select some less-pleasing experiences because they think that if they choose those items they will benefit later from contrast effects?

The key hypothesis of this article is that individuals expect to experience hedonic contrast effects—and that the decisions they make are guided by this expectation—even when consumers do not in fact experience such effects. We present the results of several experiments that provide support for this central hypothesis.

## BACKGROUND

The notion that individuals' judgments of a stimulus depend on comparisons of that stimulus to preceding or surrounding stimuli is not new. For example, contrast effects have emerged in perceptual judgments of size for squares presented sequentially on a computer screen (Wedell 1995), in judgments of weight of various objects (Nakatani 1985), and in judgments of color for objects presented simultaneously (Webster, Crassini, and Willenberg 1987). Contrast effects have been found in many types of judgments, ranging from simple perceptual judgments to complex and ambiguous social judgments of unfamiliar people (Martin 1986; Parducci 1992; Schwarz and Bless 1992).

Far less research has been conducted to examine whether contrast effects occur among hedonic experiences (i.e., experiences of pleasure or pain). Several researchers have proposed that contrast effects will occur when pleasing and

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less-pleasing experiences unfold over time. For example, Tversky and Griffin (1991) argued that contrast effects occur among similar hedonic experiences that are experienced sequentially, because any given experience (e.g., a gourmet meal at a fancy restaurant) now serves as a standard of comparison against which future experiences are judged. Their evidence for contrast effects comes from a pattern of more favorable evaluations for improving sequences than for declining sequences. Similarly, Hogarth and Einhorn (1992) used a paradigm in which they focused on summary evaluations at various points in a sequence rather than on evaluations of specific, individual experiences within the sequence. Therefore, these previous results could derive from savoring, dread, evaluations based on trend, or other sequence effects rather than a contrast effect.

Testing for the presence of hedonic contrast effects requires measuring the enjoyment derived from a single target experience and determining whether that enjoyment is greater if the experience was preceded by something less favorable. Several recent experiments have included such comparisons by collecting real-time ratings during consumption (Novemsky 2000; Ratner et al. 1999; Schreiber and Kahneman 2000). For example, one study examined the real-time experience of listening to sounds that were preceded by a number of different sounds (Schreiber and Kahneman 2000). Real-time ratings of the second sound did not differ when preceded by sounds of different degrees of pleasantness. Participants in another study provided real-time ratings while listening to sequences of songs (Ratner et al. 1999, study 2). The results provided no evidence of contrast effects: participants did not derive more enjoyment from listening to a middle-ranked song immediately following a less-enjoyable song than from listening to a middle-ranked song following a more-enjoyable song. The failure to find systematic evidence for real-time hedonic contrast effects suggests that when an individual is involved in an experience, that experience, rather than the valence of the preceding experience, consumes the individual's attention.

Does this absence of hedonic contrast effects in real-time ratings indicate that contrast plays no role in consumers' decisions about sequential hedonic experiences? A growing body of evidence suggests that people make choices that do not necessarily maximize their enjoyment but, instead, are based on their sometimes erroneous beliefs about what will make them happy (Kahneman 1994; Kahneman et al. 1993; Kahneman and Snell 1992; Read and Loewenstein 1995; Simonson 1990). For example, consumers in several studies chose more variety than they later wanted in part because they overestimated the extent to which they would get tired of their favorites (Read and Loewenstein 1995; Simonson 1990). In another study, participants predicted that their consumption of plain yogurt each day for a week would become less enjoyable over time when, in fact, it became more enjoyable (Kahneman and Snell 1992). In other experiments, participants failed to predict their rapid adaptation to the negative effects of romantic breakups and negative feedback (Gilbert et al. 1998), the effects of cognitive dissonance and

mere exposure (Snell, Gibbs, and Varey 1995), the dampening effects of momentary disappointments and hassles on otherwise positive vacations (Mitchell et al. 1997), and their greater satisfaction with irreversible than reversible outcomes (Gilbert and Ebert 2002).

Given the recent findings of erroneous predictions regarding hedonic experiences, it seems plausible that contrast effects might emerge in consumers' predictions even though these effects do not emerge in concurrent ratings. Having experienced contrast effects with perceptions of physical objects may lead people to expect that enjoyment also is affected by immediately preceding events. It is worth noting that some previous findings suggest instances in which people anticipate assimilation rather than contrast effects (Petty and Wegener 1993; Schwarz and Bless 1992). These seem to be situations in which two items are considered as different dimensions or attributes of a larger experience. For example, thinking about the favorable weather of a vacation spot increases anticipated satisfaction for a job in that same spot (Petty and Wegener 1993). When two items are considered as distinct experiences of the same type in which one serves as a comparison point for the other, individuals may tend to anticipate contrast effects. For example, thinking about the weather of a favorable vacation spot decreased satisfaction for weather in a different location (i.e., a mid-western city; Petty and Wegener 1993). In our research, we focus on sequences of distinct items within the same product category and, therefore, expect individuals' lay theories to reflect beliefs in contrast rather than assimilation.

The present article has several key objectives. First, we examine whether individuals expect contrast effects in sequences of hedonic experiences even in contexts where concurrent ratings do not reveal contrast effects. In addition to documenting the existence of erroneous beliefs about contrast effects, the present research examines mechanisms that may sustain such erroneous lay beliefs over time. One proposed mechanism is the reconstruction of hedonic memories such that individuals recall contrast effects even when they did not experience such effects. Another proposed mechanism is the failure to generalize a lack of contrast effects in one domain to other domains. We also examine the consequences of erroneous beliefs about contrast effects for consumer decision making. If consumers hold the belief that they will enjoy an experience more following a less-pleasing experience, then regardless of whether they actually experience hedonic contrast effects, they likely make some decisions (e.g., to choose improving sequences) that reflect this belief. For this reason, we believe that individuals' beliefs about contrast effects in sequential experiences warrant careful study.

Study 1 investigates individuals' expectations about the extent to which they will experience hedonic contrast effects. This study examines whether participants report greater contrast effects in predictions and immediate retrospective judgments than during consumption. Study 2 examines whether individuals' lay beliefs in hedonic contrast effects emerge in retrospective judgments after a longer de-

lay and whether people continue to expect contrast in other domains when confronted with the fact that they did not experience contrast in a given domain. Studies 3 and 4 examine the impact of consumers' beliefs about contrast effects on their preferences for the order in which to experience events over time. Further, study 4 extends the present investigation to more complex experiences not consumed in immediate succession. The results of these four experiments suggest that although hedonic contrast effects do not systematically emerge in concurrent judgments, consumers have a robust belief in contrast effects that emerges in predictions and in retrospect and guides the choices that they make.

## STUDY 1

The first objective of study 1 is to determine whether participants overpredict contrast effects. Second, study 1 investigates whether contrast effects emerge more in retrospective judgments than in concurrent evaluations. Previous research demonstrates that individuals' memories of experiences are sometimes guided by their schemas or implicit theories (e.g., Alba and Hasher 1983; Ross 1989). We predict that after an experience is over, consumers may remember having experienced contrast effects, even when contrast effects do not emerge among participants who make concurrent ratings of enjoyment. In cases where concurrent reports diverge from retrospective reports of enjoyment, we will consider the concurrent reports to capture consumers' actual experience more accurately. Because of forgetting and reconstructive processes, retrospective reports provide less direct evidence about consumers' true real-time experience than do reports provided during consumption (Ericsson and Simon 1980; Kahneman 1994).

## Method

One hundred and thirty-six undergraduates at a northeastern university participated in a one-hour-long experimental session in which this study was embedded. Participants were shown a list of eight flavors of jelly beans from which they were asked to pick three flavors: one they like a lot ("flavor 1"), one they like less ("flavor 2"), and one they like less than the other two ("flavor 3"). After completing a number of unrelated tasks, participants were asked to make judgments about two sequences of jelly beans. The type of judgment (prediction, concurrent, retrospective) was manipulated between participants. All participants were asked to consider the following two sequences: flavor 1 (top ranked) followed by flavor 2 (middle ranked), and flavor 3 (bottom ranked) followed by flavor 2 (middle ranked). The order of the two sequences was counterbalanced across participants.

Respondents were asked to rate their enjoyment of flavor 2 in each sequence by making a vertical mark along an unnumbered scale with end points labeled "not at all" and "very much." The specific instructions varied for participants in the three conditions. Participants in the prediction

task were asked, "How much will you enjoy the second jelly bean?" Participants in the concurrent condition were asked to eat the jelly beans in the same two sequences. While they were eating the second jelly bean in each sequence, they were asked to rate how much they "are enjoying" this jelly bean. Finally, participants in the retrospective condition were asked to eat jelly beans in the same sequences, but they were not asked to make any ratings while consuming the jelly beans. After consuming the jelly beans, they completed a short filler task for several minutes. They were then asked to record how much they enjoyed the second jelly bean in each sequence. Finally, all participants also were asked to rate how much they enjoyed the flavor 1 and the flavor 3 jelly beans on unnumbered scales identical to the ones used to rate the flavor 2 jelly beans.

## Results

Participants' ratings along the unnumbered scale were measured and assigned numbers from zero to 100, where higher numbers indicate greater enjoyment. We compared participants' ratings of flavors 1 and 3 to ensure that the two target jelly beans (i.e., flavor 2) were preceded by jelly beans that differed in hedonic value. As expected, participants' ratings of the flavor 1 jelly bean were significantly higher than ratings of the flavor 3 jelly bean ( $M$ 's = 84.7 and 29.0, respectively,  $t(130) = 19.8, p < .001$ ). This difference did not vary by condition ( $F < 1$ ).

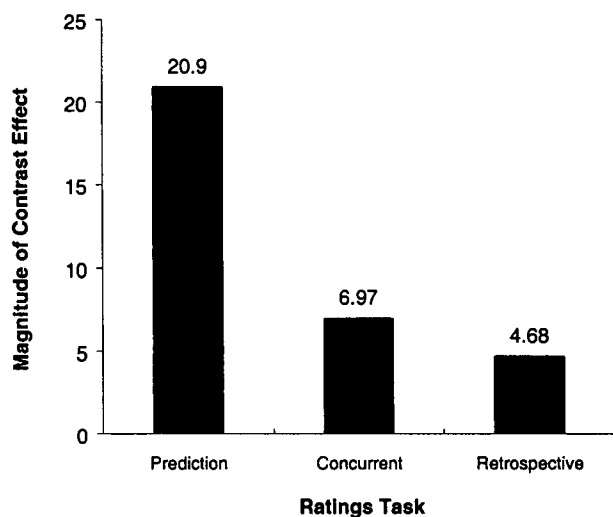
The main dependent measure in this study is the difference between the two ratings each participant assigned to the flavor 2 (middle-ranked) jelly beans. Recall that each participant rated flavor 2 twice: once following flavor 1 and once following flavor 3. We computed a difference score for each participant such that a positive score would be evidence of a contrast effect and a negative score would be evidence of assimilation. These scores appear in figure 1.

An ANOVA revealed a significant main effect of the type of judgment on reported contrast effects ( $M$ 's = 20.9, 6.97, and 4.68 in the prediction, concurrent and retrospective conditions, respectively;  $F(2, 133) = 4.57, p < .05$ ). Simple effects tests indicated that reported contrast was significantly higher in the prediction condition than in the concurrent condition ( $t(90) = 2.74, p < .01$ ) and retrospective condition ( $t(73) = 2.66, p < .01$ ). Ratings given by participants in the concurrent and retrospective judgment conditions did not differ ( $t(103) = .473, NS$ ).<sup>1</sup> The amount of contrast indicated by participants who gave ratings while eating the jelly beans ( $M = 6.97$ ) was significantly greater than zero ( $t(60) = 2.43, p < .05$ ), but this result did not replicate in

<sup>1</sup>The percentages of participants who reported contrast were 87%, 69%, 66% for the prediction, concurrent, and retrospective conditions, respectively. The percentage of participants reporting contrast was higher in the prediction condition than in the retrospective condition ( $\chi^2(1) = 4.32, p < .05$ ) and marginally higher than in the concurrent condition ( $\chi^2(1) = 3.65, p < .06$ ).

FIGURE 1

MAGNITUDE OF PREDICTED, CONCURRENT, AND RETROSPECTIVE CONTRAST EFFECTS (STUDY 1)



study 2.<sup>2</sup> The retrospective ratings ( $M = 4.68$ ) did not differ significantly from zero ( $t(43) = 1.15$ , NS).

## Discussion

As hypothesized, participants involved in a prediction task in study 1 reported that they would experience sizable contrast effects even though participants in the concurrent-ratings condition did not show such effects. Contrary to our hypothesis, contrast effects reported in retrospect were much closer to the concurrent ratings than to participants' predictions. This suggests that the experience itself—rather than lay beliefs about contrast effects—guides retrospective judgments, at least when the memory measures are taken shortly after the consumption experience.

In a replication of study 1, we increased the delay between consumption and retrospective ratings to as much as 30 minutes. The goal was to test whether remembered contrast would emerge after some time had elapsed during which participants were engaged in an unrelated task. Participants ( $n = 77$ ) completed a procedure identical to that used in the retrospective condition of study 1 with one exception: the memory measures were taken at varying intervals after the consumption of the jelly beans. Participants recorded their retrospective ratings three to 30 minutes after eating the jelly beans. The mean retrospective contrast reported by participants was not significantly different from zero ( $M = 4.16$ ,

$t(74) = 1.45$ , NS).<sup>3</sup> We regressed the retrospective contrast judgments onto the length of delay and found no systematic effect of delay on the amount of retrospective contrast reported ( $\beta = -.11$ ,  $p > .3$ ). One of the primary objectives of the next study is to examine whether people mistakenly remember contrast effects when asked to make a retrospective judgment after an even longer delay.

## STUDY 2

Study 2 has three primary objectives. First, this experiment tests whether individuals, several days after the consumption experience, recall having experienced contrast effects even if they did not experience these effects during consumption. Previous research shows greater memorial distortions after a delay than when memory measures are taken immediately after exposure to stimuli (e.g., Barclay and Wellman 1986; Jacoby et al. 1989; Neisser 1967). For example, individuals given recognition memory tests for sentences contained within passages of prose showed more schema-consistent errors as the time between the initial reading of the passage and the memory test increased from five minutes or two days to one week (Dooling and Christiaansen 1977; Sulin and Dooling 1974). Therefore, we hypothesize that individuals' strong expectations about contrast effects might seep back into their retrospective judgments if those memory measures are collected after a longer delay than that used in study 1.

Second, study 2 examines whether participants prompted to report concurrent ratings during the consumption experience report smaller contrast effects after a delay. If they make concurrent ratings during consumption, they should have an easier time recalling exactly how much they liked the target experience in each sequence (Feldman and Lynch 1988). As a result, we expect that being prompted to provide concurrent ratings will reduce or even eliminate individuals' bias toward remembering contrast effects.

Finally, this study tests whether participants who learn that they did not experience contrast effects in the target domain (i.e., jelly beans) will continue to predict contrast effects in other domains. One reason that individuals' erroneous beliefs about hedonic outcomes may persist over time is that even when they are confronted with an experience of no real-time contrast in one domain, they may not generalize this to other domains. Such a finding would be consistent with previous research indicating that individuals do not completely correct their predictions following affective experiences (Wilson, Meyers, and Gilbert 2001) or after receiving information incongruent with existing schemas (Weber and Crocker 1983). We hypothesize that individuals will continue to expect contrast effects in an unrelated domain (i.e., songs) even after they recall not experiencing contrast effects in a given domain (i.e., jelly beans). We suspect that they might even continue to expect contrast effects in a more similar domain (i.e., ice cream) after ex-

<sup>2</sup>In study 2, which used the identical procedure in the concurrent condition, the concurrent average was slightly negative and not significantly different from zero. When the concurrent conditions of studies 1 and 2 are pooled, there is no reliable contrast effect ( $M = 3.68$ , which is not significantly different from zero,  $t(94) = 1.47$ , NS).

<sup>3</sup>The percentage of participants who recalled some degree of contrast was 55%.

periencing no contrast effects in the target domain (i.e., jelly beans).

## Method

Seventy-seven undergraduate business students at a southeastern university participated in this study as part of an hour-long experimental session. As in study 1, participants were asked to pick a top-, middle-, and bottom-ranked jelly bean from a set of eight flavors. After completing a number of unrelated tasks, participants were asked to eat four jelly beans in the same two sequences used in study 1. As before, the order of the two sequences was counterbalanced across participants. The type of judgment made (concurrent and retrospective vs. retrospective only) was manipulated between participants.

As in study 1, participants in the concurrent-ratings condition rated their enjoyment of flavor 2 in each sequence. After providing ratings of the two flavor 2 jelly beans, participants in the concurrent-ratings condition also indicated how much they had enjoyed the flavor 1 and flavor 3 jelly beans. Participants in the retrospective-only condition ate the jelly beans but were not asked to make any ratings of the jelly beans on the day they consumed them.

In a follow-up session several days later, participants in both conditions were asked to indicate how much they had enjoyed the two target (i.e., flavor 2) jelly beans. Next, participants reported contrast beliefs about songs or ice cream flavors (varied between participants). They were asked to think of a song or ice cream flavor they like a lot, one they like moderately well, and one they like less than the other two. Participants reported how much they thought that they would enjoy the middle-ranked song (flavor) in each of two sequences: (1) following the more-preferred song (flavor) and (2) following the less-preferred song (flavor).

## Results

As expected, participants' ratings of the flavor 1 jelly bean ( $M = 83.7$ ) were significantly higher than ratings of the flavor 3 jelly bean ( $M = 34.5$ ;  $t(130) = 19.8$ ,  $p < .001$ ). As in the previous experiment, the main dependent measure in this study is the difference between each participant's two ratings of flavor 2. As before, a contrast effect would emerge as a positive score, whereas assimilation would yield a negative score. Overall, participants did not show concurrent contrast effects ( $M = -2.21$ , which is not significantly different from zero,  $t(33) = -.47$ , NS). As predicted, the between-participant comparison of concurrent ratings ( $M = -2.21$ ) and retrospective ratings ( $M = 14.47$  for retrospective-only participants) suggests that participants in this study remembered having experienced contrast effects even though they did not experience such effects ( $F(1, 64) = 4.10$ ,  $p < .05$ ).

As hypothesized, the participants who gave both concurrent and retrospective ratings did not remember larger contrast effects than they actually experienced ( $M = -2.21$  in concurrent ratings vs.  $.91$  in retrospective ratings,  $t(33) =$

$1.03$ , NS). The retrospective judgments of contrast correlated very highly with the concurrent judgments ( $r = .83$ ,  $p < .001$ ).<sup>4</sup>

Analyses were performed on the predictions for ice cream and songs to test whether participants continue to predict that they will experience contrast in other domains even after they have experienced no contrast effects in the domain of jelly beans. There was no main effect for ice cream versus songs,  $F(1, 62) = 1.35$ , NS, or interaction with our manipulation,  $F < 1$ ; therefore, we have collapsed across them in the analyses that follow. Participants who had given retrospective but not concurrent ratings expected more contrast effects to occur with ice cream and songs ( $M = 24.06$ ) than they had recalled experiencing with jelly beans ( $M = 14.47$ ,  $t(31) = 2.46$ ,  $p < .05$ ). Participants who made concurrent ratings as well as retrospective ratings also expected more contrast to occur with ice cream and songs ( $M = 16.76$ ) than the nonsignificant contrast ( $M = .91$ ) they had just recalled experiencing with jelly beans ( $t(33) = 3.13$ ,  $p < .01$ ). Expected contrast for ice cream and songs did not differ significantly between participants who gave concurrent ratings and those who did not ( $M$ 's =  $16.76$  vs.  $24.06$ ,  $t(64) = 1.45$ ,  $p = .15$ ).

## Discussion

The results of study 2 support predictions about the memorial and learning mechanisms that sustain consumers' erroneous beliefs about contrast effects. Participants who did not give concurrent ratings during consumption recalled having experienced greater contrast than was observed in the concurrent ratings of the same experiences by other participants. Thus, consistent with our hypotheses, large contrast effects emerged in participants' memories of their experiences, even though ratings from another group of participants suggest that they did not in fact experience contrast effects during consumption. Together with the results of study 1 and the follow-up to study 1, study 2 provides evidence that at some point between 30 minutes and several days after consumption, participants' memories of their hedonic reactions to the jelly beans appear to have faded sufficiently for a belief in contrast to affect their retrospective judgments of the experience.

As predicted, the participants who gave concurrent ratings in addition to retrospective ratings did not report contrast effects either during consumption or in retrospect. This suggests that hedonic reactions can be turned from a vague sense of enjoyment into a more memorable evaluation by encouraging individuals to evaluate their experiences at the time they occur. When individuals are encouraged to evaluate their experiences in real time, the accuracy of their

<sup>4</sup>The percentages of participants reporting contrast were 56% in the concurrent condition, 53% in retrospect for those who gave concurrent ratings, and 84% in retrospect for those who did not give concurrent ratings. The percentage reporting contrast in the retrospective-only condition is significantly higher than in the concurrent ratings ( $\chi^2(1) = 6.43$ ,  $p < .01$ ) and in the retrospective ratings of those who also made concurrent ratings ( $\chi^2(1) = 7.51$ ,  $p < .01$ ).

memories of their hedonic reactions appears to improve substantially. In a follow-up study, we instructed some participants to think about their concurrent evaluations without reporting written ratings. These participants did not show retrospective contrast several days later ( $M = -1.73$ , which is not significantly different from zero,  $t(21) < 1$ ). Therefore, thinking about hedonic evaluations without reporting them in writing appears sufficient to improve the accuracy of individuals' memories.

Even when the participants recalled that they experienced little sequential hedonic contrast in the domain of jelly beans, they expected large contrast effects with other products. These results demonstrate two reasons why people's belief in contrast effects persists even in the absence of real-time contrast effects: (1) people do not usually remember that they did not experience contrast, and (2) even if they do remember that they did not experience contrast effects, they continue to expect to experience contrast effects in other situations. The results of studies 1 and 2 suggest the time course of erroneous lay beliefs in contrast effects (i.e., emerging in predictions and after a time delay) as well as mechanisms that sustain these beliefs (i.e., a memory bias and a failure to generalize learning to other domains).

### STUDY 3

Do consumers' erroneous beliefs about sequential hedonic contrast effects guide the decisions they make? In study 3, we seek to demonstrate a relationship between beliefs about contrast and consumers' preferences. Specifically, we examine here the link between a belief in contrast effects and individuals' preference for improving sequences. If an individual's belief in contrast is related to her preference for improving sequences, then we should find a positive correlation between beliefs and preferences: the more people expect to experience contrast effects, the more they should prefer improving rather than declining sequences. Furthermore, if contrast beliefs play a causal role in generating this preference, then making participants' beliefs about contrast effects more salient before they express a preference for improving sequences should increase their preference for improving sequences. Our reasoning is consistent with previous research indicating that accessible attitudes are more likely to impact consumers' choices than are less-accessible attitudes (Fazio et al. 1982; Fazio, Powell, and Williams 1989).

#### Method

Ninety-one undergraduate business students at a southeastern university filled out a short questionnaire as part of a class exercise. As in studies 1 and 2, participants first were presented with a list of eight flavors of jelly beans. As before, participants were asked to choose a flavor they liked a lot (flavor 1), one they liked less (flavor 2), and one they liked less than the first two (flavor 3).

Next, all participants were asked two questions. One of these questions assessed their expectations about contrast

effects: "Suppose you were to eat either of the following two sequences of jelly beans: Your top-ranked jelly bean and then your middle-ranked jelly bean or your bottom-ranked jelly bean and then your middle-ranked jelly bean. Would you enjoy your middle-ranked jelly bean equally in the two cases, or would you enjoy the middle-ranked jelly bean more in one case than another?" The order in which these two sequences were listed was counterbalanced. Participants responded on a seven-point scale, where the end points were labeled "would enjoy flavor 2 more following flavor 1" and "would enjoy flavor 2 more following flavor 3"; the midpoint was labeled "would enjoy flavor 2 equally in the two cases." Which label appeared on which end point also was counterbalanced.

The other question assessed participants' preference for improving sequences. Participants were asked the following: "Suppose you were going to eat the top- and bottom-ranked jelly beans one after the other. Which order would you prefer to eat them in?" They responded on a seven-point scale, with one end point labeled "strongly prefer flavor 1 then flavor 3," and with the other labeled "strongly prefer flavor 3 then flavor 1"; the midpoint was labeled "no preference."

Finally, we manipulated the order in which we asked participants these two questions. Our assumption was that beliefs about contrast effects will be more salient to participants after they are prompted to report the extent to which they will experience contrast versus assimilation effects. This is consistent with previous research indicating that asking individuals to express an attitude makes that attitude more salient (Powell and Fazio 1984).

#### Results and Discussion

There are two ways to examine the relationship between the contrast and preference measures: (1) correlations between the two measures and (2) effects of the order of the two measures on preferences for improving sequences. As predicted, individuals' responses to the two measures showed a significant correlation ( $r = .23$ ,  $p < .05$ ). Those who predicted more contrast had stronger preferences for improving sequences than did those who predicted less contrast. Among the 75% of participants who expected some amount of contrast to occur, 80% preferred the improving sequence, whereas among the 25% who did not expect to experience a contrast effect, only 57% preferred the improving sequence ( $\chi^2(1) = 4.64$ ,  $p < .05$ ).

As hypothesized, participants who were asked to complete the preference item after the contrast item showed a greater preference for improving sequences ( $M = 6.04$ ) than did those who were asked to complete the preference item before indicating their beliefs about contrast effects ( $M = 4.92$ ;  $t(89) = 3.49$ ,  $p < .05$ ). This result suggests that people use contrast beliefs to guide their choices and that they do so more when those beliefs are made salient.

To rule out the alternative explanation that this effect of order resulted from participants' desire to give consistent answers to the two questions, we examined whether participants' answers to the contrast question were affected by

the order in which it was asked. If participants were merely striving for consistency in their second response, the contrast belief should be enhanced when it follows the preference elicitation (i.e., they should indicate a greater belief in contrast effects when their preference for an improving sequence was made salient). Supporting our interpretation that a desire for consistency does not account for our results, the contrast question was not significantly affected by the order manipulation ( $M = 5.15$  preference item first,  $M = 5.53$  contrast item first,  $t(89) = 1.05$ , NS).

Study 3 suggests that individuals' beliefs about hedonic contrast effects are related to their preferences about how to order experiences over time. Those who expected greater contrast effects had a stronger preference for improving sequences. Further, those who were reminded of their contrast beliefs showed a stronger preference for improving sequences; making beliefs about contrast salient increased preferences for improving sequences by 1.12 points on a scale where the preference for improving sequences was marked by only three points. This is not to say that contrast beliefs are the sole cause of this preference for improving trends. A slight majority of our participants who did not indicate a belief in contrast also exhibited a preference for improving sequences. However, these results suggest that participants' beliefs about contrast effects may be one important determinant of their preferences for improvement in hedonic sequences.

#### STUDY 4

The fourth experiment extends our investigation to complex experiences and to experiences that are separated in time. We expect the results of the earlier studies using jelly beans to generalize to more complex experiences, such as a meal at a restaurant. However, this is worth testing empirically, because it could be that for more complex experiences, people anticipate that the experience itself rather than comparisons with a preceding experience will be the focus of attention. This study also examines whether individuals expect contrast to occur for events not experienced in immediate succession (e.g., events separated by one week). We expect that contrast beliefs are sufficiently strong that they will emerge even when individuals are considering experiences that are separated in time. Finally, this study seeks to extend the results of study 3 by showing that expectations about contrast effects with more complex stimuli relate to consumers' preferences for improving sequences with these stimuli (Loewenstein and Prelec 1993).

#### Method

One hundred and eighty-two undergraduate business students at a southeastern university completed a short questionnaire as part of an hour-long study for course credit. The questionnaire study included a 2 (delay: consecutive nights vs. consecutive weekends)  $\times$  2 (order: contrast question first vs. contrast question second) between-participants design. Similar to study 3, this study included a question

focusing on participants' beliefs about contrast effects and another question on their preferences for improving versus declining sequences. Whether participants were asked to consider experiences (i.e., restaurant meals) on consecutive days versus one week apart was manipulated between participants. As in study 3, the order in which the contrast and preference questions were asked was varied between participants.

The preference question asked participants in what order they would like to go to dinners at two restaurants: one "a fancy Italian restaurant" and the other "a rather plain Italian place." Participants in the consecutive-nights condition were asked in which order they would like to go to these two places during the following weekend (1 = "strongly prefer to go to the fancy one the first night and the plain one the second night," 7 = "strongly prefer to go to the plain one the first night and the fancy one the second night"). Participants in the consecutive-weekends condition were asked how they would schedule two meals, one for this weekend and the other for the following weekend (1 = "strongly prefer to go to the fancy place this weekend and the plain one the following weekend," 7 = "strongly prefer to go to the plain place this weekend and the fancy one the following weekend").

The contrast question asked participants to consider "three local Italian restaurants": one very fancy, with delicious food; the second fairly good, although not as good as the first place; and the third quite simple, with food that is nothing special. Participants in the consecutive-nights condition were asked how much they would enjoy the moderately nice place in each of these two sequences: (1) dinner one night next weekend at the fancy Italian restaurant and dinner the following night at the moderately nice place, and (2) dinner one night next weekend at the simple place and dinner the following night at the moderately nice place. Participants in the consecutive-weekends condition were asked to consider the same sequences, but the meals were described as separated by one week rather than one day. All participants then were asked, "Would you enjoy the moderately nice place equally in the two cases or would you enjoy it more in one case than another?" (1 = "would enjoy the restaurant more after the plain restaurant," 4 = "would enjoy it equally in the two cases," and 7 = "would enjoy the restaurant more after the fancy restaurant").

#### Results and Discussion

Responses to the contrast question were recoded such that higher numbers indicate greater belief in contrast. An ANOVA revealed no significant effects of delay between dinners or question order on respondents' expectations about contrast effects. It is noteworthy that for both consecutive nights and consecutive weekends, participants expected to like the restaurant dinner more following the less-pleasant dinner than the more-pleasant dinner ( $M$ 's = 6.06 for consecutive nights and 6.09 for consecutive weekends). These responses indicate participants' expectations that contrast effects would emerge in this more complex restaurant con-

text (overall  $M = 6.07$  vs. 4.00 midpoint of scale,  $t(181) = 24.90, p < .0001$ ).

As in study 3, the correlation between participants' belief in contrast effects and their preference for improving sequences was significant ( $r = .34, p < .0001$ ). Of the 88% who expected contrast, 78% preferred an improving sequence, whereas among the 12% who did not expect contrast, significantly fewer (45%) preferred an improving sequence ( $\chi^2(1) = 10.78, p < .001$ ).

An ANOVA performed on the improving-sequence item revealed a marginally significant effect of question order, such that participants' preference for improvement was stronger when asked the contrast question first ( $M = 5.49$ ) than when asked the contrast question second ( $M = 5.29$ ;  $F(1, 178) = 3.32, p = .07$ ). This main effect was qualified by a significant order  $\times$  delay interaction,  $F(1, 178) = 5.04, p < .05$ . Whereas participants in the consecutive-nights condition preferred improving sequences regardless of whether they had been prompted to think about contrast effects ( $M$ 's = 5.40 vs. 5.51,  $F < 1$ ), participants in the consecutive-weekends condition expressed a stronger preference for improving sequences when they had been prompted to think about their contrast beliefs ( $M$ 's = 5.58 with the contrast question first vs. 4.52 with the contrast question second,  $F(1, 178) = 6.78, p < .05$ ). It is possible that the null effect of question order within the consecutive-nights condition occurred because contrast effects were already quite salient to participants in that condition. Participants may be more likely to consider contrast effects spontaneously for events that are closer in time. However, when prompted to consider whether contrast or assimilation effects would occur, participants reported an expectation that contrast effects would emerge even for events that are separated by one week.

These results extend the findings of our first three studies by documenting that individuals expected contrast effects with more complex stimuli (i.e., restaurant meals) even when the events were to be separated in time (e.g., by one week). Further, the findings of study 4 offer additional evidence that individuals' lay beliefs about contrast effects are related to the choices they make about how to order experiences over time.

## GENERAL DISCUSSION

Participants in all four experiments expected that hedonic contrast effects would emerge in sequential consumption. A comparison of respondents' predictions to concurrent ratings revealed that they overestimated the extent to which their enjoyment of one experience would depend on how much they had enjoyed the preceding experience (study 1). After a sufficient delay, participants remembered having experienced large contrast effects even when it appears that they did not in fact experience such effects (study 2). When participants provided concurrent ratings during consumption, the bias to remember contrast effects was virtually eliminated (study 2); however, even when participants recalled that they had not experienced contrast effects with

jelly beans, they continued to expect contrast effects in other domains (study 2). Finally, studies 3 and 4 demonstrate that individuals' beliefs in contrast effects were related to their preferences about how to order consumption experiences over time.

Some of the key findings of these studies pertain to the robustness of consumers' lay beliefs in contrast effects despite disconfirming evidence. Why do individuals fail to revise their theories based on experience? One possibility is that individuals do not pay sufficient attention to their hedonic experiences to realize that their lay beliefs are in error. Evidence for this comes from the finding in study 2 that participants recalled having experienced contrast effects unless they had been prompted to make ratings of their experience during the consumption episode. Outside of the laboratory, it is likely even harder for individuals to learn that their beliefs about contrast effects are erroneous. For example, a test for contrast effects might require comparing how one felt at a given restaurant following an experience at a less-pleasant one to how one felt at the same restaurant following an experience at a more-pleasant one, controlling for any other differences in their dining partners, mood, and so on, between the two visits to that target restaurant.

We interpret our findings as indicating that individuals' lay beliefs exaggerate the extent to which contrast effects naturally emerge. Another possibility is that individuals anticipate contrast effects but think that such a bias is inappropriate and, therefore, correct for that bias somehow in their concurrent ratings (Petty and Wegener 1993). We believe that such a result is unlikely, given the findings in studies 3 and 4 that when contrast beliefs became more salient, respondents reported that they would make decisions guided more—rather than less—by an expectation about contrast effects. In addition, previous research has shown the absence of real-time contrast effects even in a situation where people who have just had a less-pleasing experience are not expecting enhanced enjoyment of the next experience (Ratner et al. 1999, study 2).

Our findings suggest a number of avenues for future research. For example, when will contrast beliefs naturally be accessible? Consumers may spontaneously anticipate contrast effects for experiences consumed in immediate succession more than for experiences that are separated in time, as suggested by the results of study 4. Can any experiences be framed as temporally related or unrelated to affect the salience and use of contrast beliefs? In study 4, meals separated by an entire week were expected to exhibit contrast effects. The extent to which experiences are perceived as similar likely moderates the extent to which people will anticipate contrast effects. Consistent with previous work suggesting that items need to appear comparable to obtain contrast effects (Ragunathan and Irwin 2001; Tversky and Griffin 1991), we have preliminary results indicating that people's strong beliefs in contrast effects do not extend to experiences between products in different categories (i.e., individuals do not anticipate contrast effects for a moderately liked jelly bean following either a top- or bottom-

ranked song). This suggests that our effects likely depend not only on the salience of the temporal ordering of the experiences but also on the perceived similarity of the target and context experiences.

Further, consumers may need to have more than one possible sequence made salient (as in our experimental materials) for contrast expectations to emerge. Previous research indicated that consumers who had just experienced either a liked or disliked song did not differ in how much they expected to like the moderately ranked song they would hear next (Ratner et al. 1999, study 2). It is likely that participants in that study were not thinking about how much they would enjoy the next song following the song they had just heard compared with some other song they had not just heard. Perhaps individuals need to think about the effects of different experiences on a single subsequent experience for contrast beliefs to become activated and used in judgments (Fazio et al. 1989).

Additional questions for future research pertain to factors that will enhance or inhibit individuals' ability to learn from their real-time experience. For example, will individuals highly involved in the task or for whom the product categories are highly self-relevant be more likely to learn that they do not experience contrast effects? It will be useful to gain a better understanding of both situational and individual factors that help consumers learn when their lay theories about hedonic outcomes are in error.

This investigation into consumers' lay beliefs about hedonic contrast effects was undertaken in part to understand whether such beliefs might guide consumer decision making. The results of studies 3 and 4 suggest that individuals' expectations about contrast effects are linked to their preference to obtain improving sequences. Future research could fruitfully explore the extent to which lay beliefs about contrast effects guide other types of consumer decisions. For example, we have speculated that individuals' beliefs about contrast effects might sometimes lead them to select some less-pleasing experiences to produce greater enjoyment later. Previous research documenting consumers' decisions to choose less-pleasing experiences did not find that individuals expected to enjoy the subsequent experience more if they had just experienced something less pleasant (Ratner et al. 1999, study 2). However, as noted earlier, participants in that study were not asked explicitly to compare how much they thought that they would enjoy an experience (i.e., song) if it came after a disliked rather than a liked song. We have preliminary results, consistent with the other results reported here, indicating that individuals making that comparative judgment do predict contrast effects. This suggests that individuals' expectations about contrast effects may contribute to their decisions to choose less-preferred experiences, which is consistent with other research showing that people's erroneous beliefs about hedonic outcomes can lead them to make decisions that end up being less satisfying (Gilbert and Ebert 2002; Read and Loewenstein 1995; Simonson 1990).

In conclusion, we note that our research suggests a way

to increase the accuracy of personal hedonic memories. Individuals who evaluate carefully how much they are enjoying an experience while it is happening should have more veridical memories of the experience. It is likely that individuals do not usually make an effort to determine exactly how much they are enjoying an experience and are therefore usually left with only a vague sense of their own enjoyment. Making a deliberate attempt to evaluate or even record one's hedonic reactions may lead to more accurate predictions about what one will enjoy in the future.

[Received September 2000. Revised July 2002. David Glen Mick served as editor and Frank R. Kardes served as associate editor for this article.]

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