

**'Twixt Cup and Lip:
The Role of Memory Distortion and Temporal Change in Hedonic Product
Evaluations**

There's many a slip 'twixt cup and lip.— English Proverb.

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Draft: May, 2005
Under revision for 2nd review at JMR.

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Abstract

In this article, three experiments examine how memory distortion and temporal change affect the evolution of hedonic product evaluations. The results show that, contrary to intuition, characteristics of a picture given after the purchase decision can systematically affect how mental representations and satisfaction evolve, resulting in a change in the level of satisfaction at delivery. The results also indicate that the effect persists over time and influences behavior, as evidenced by word of mouth and repeat purchase.

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Imagine that a consumer decided to purchase a headboard for her bed. After searching the Internet and catalogs, finally she found a headboard style that she liked. She then chose to have the headboard made in pine and wrought-iron. After purchasing the product, she was told that the headboard would be delivered in about six weeks. While waiting for delivery, she often watched a the television show that contained a headboard that was very similar to the one which she had ordered, so whenever she saw it, she thought about her purchase and looked forward to the delivery. Two months later, the headboard arrived and she eagerly opened the box. However, upon seeing the product, she was disappointed: she thought the wrong product had been delivered. However, when she looked at her order, she saw the same headboard that was sitting in her kitchen. It seems that the correct product had been delivered, but her mental representation of her purchase had been distorted during the temporal delay.

The broad goal of this paper is to provide a framework for understanding how memory distortions and temporal change affect hedonic product evaluations. The opening story suggests that viewing a product that was similar but not identical to her purchase distorted the consumer's memory for the product over time. Thus, her expectations for her purchase were modified as the mental representation changed as the memory distortion occurred. The mismatch between her distorted mental representation and the actual product produced disappointment. Disappointing customers can lead to loss of repeat business, returned goods, and deterioration of brand equity.

In this article, we use experiments in which the consumer actually pays for a product and then must wait one week for delivery to examine the effects of memory distortions and temporal change on product evaluations. The results show that, contrary to intuition, characteristics of a product representation experienced after the purchase decision can systematically affect how expectations and satisfaction evolve, resulting in a change in the level of satisfaction at delivery. Specifically, there is a U-shaped relationship between the degree to which the intervening representation truthfully and completely represents the purchased product (what we call veridicality) and resultant satisfaction with the product. The more abstract representations do not evoke disappointment with the product, and the most realistic ones reinforce the product experience. Moderate distortions, by contrast, reduce satisfaction by engendering specific representations that are betrayed by the actual product. Moreover, this paper examines the process through which the evolution occurs and finds that the effects are partially mediated by consumer expectations. Finally, this research shows that the attitudinal effects persist over time and that they influence behavior, as evidenced by word of mouth and repeat purchase.

Following the theoretical background, a pre-test and three experiments will be presented. The first experiment demonstrates that intervening representations can influence the evaluation process. The second experiment eliminates two possible alternative explanations. The third experiment explores the qualities of the stimulus and its effects and shows that the process is partially mediated by consumer expectations. Finally, we discuss the overall findings and their implications.

THEORETICAL BACKGROUND

Mental representations are based on what we remember. Failure to accurately remember information is common. The proposed research will examine two specific factors, veridicality and accessibility, which may systematically influence the accuracy of memory for purchased products, thereby changing the mental representation of what is expected.

Intertemporal product evaluations are hypothesized to be influenced by every product experience that a consumer has, whether the experience is actually with the physical product or some representation of the product. An intervening stimulus is defined as something that inspires the consumer to think about the purchased product. Over time, the intervening stimulus may either alter or reinforce the mental representation of what is expected; this evolution will depend upon the veridicality of the intervening stimulus. Veridicality refers to the degree to which the intervening stimulus matches the purchased product in terms of completeness and truthfulness. When a moderate veridicality stimulus (complete but misleading) is presented to a consumer, the accuracy of the consumer's mental representation may be affected.

Work pioneered by Elizabeth Loftus and her associates shows that misleading postevent information can influence the accuracy of memory (e.g. Belli, Loftus 1996; Braun, Loftus 1998; Loftus 1979; Toland, Hoffman, Loftus 1991). In this research, people are exposed to an event or a situation. Then, a subset of the participants receive misleading postevent information about the event. Afterward, all the participants are asked to recall the original event. The findings indicate that the memory of the

participants who receive the misleading postevent information is biased in the direction of the postevent information.

For example, in a classic study by Loftus, Miller, and Burns (1978) participants viewed a series of 30 slides showing a red Datsun as the car makes a turn and hits a pedestrian. Half the participants saw a yield sign at the intersection and the other half saw a stop sign. Among the questions about the incident was one that contained either consistent or misleading information: "Did another car pass the red Datsun while it was stopped at the _____ sign?" Half the participants received consistent information: that is, they saw a stop sign or yield sign, and the question asked about that same sign. The other half of the participants received misleading information: that is, if they saw a yield sign, they were asked about a stop sign, and visa versa. Twenty minutes later, the participants were shown two photographs; one contained a stop sign and the other had a yield sign, and the participants were asked which sign they had seen. The participants who received consistent information were accurate 75% of the time, whereas the participants who received the misleading information were only accurate 40% of the time. The results indicate that information to which a participant is exposed after an event, whether that information is consistent or misleading, is integrated into the participant's memory of the event. In this situation, the misleading information did not truthfully represent the actual scene. A similar result was obtained when other details, such as the color of the car, were changed (Loftus 1979). Thus, the accuracy of memory is significantly affected by whether the postevent information is truthful. However, previous research considers only the binary aspect of truthful post-event information: is it truthful or not.

In the present research, the post-event information is an intervening stimulus that we characterize using the concept of veridicality. Veridicality is the truthfulness and completeness of the intervening stimulus as it relates to the actual product. Loftus (1992) shows that if people do not immediately detect a discrepancy between the post-event information and the experience, then they are more likely to incur errors in recollections. Conversely, this implies that if consumers are able to detect immediately that there is a discrepancy between the post-event information and the experience, then they will be less likely to make recollection errors. Therefore, assuming that a similar process occurs in the evolution of mental representations, it is expected that a representation that closely matches the purchased product (high veridicality picture) would not result in a drop in satisfaction because it does not contain information that would lead to inaccurate expectations. Likewise, if a consumer is given a representation that is clearly dissimilar to the purchased product (low veridicality picture), the consumer will not experience a drop in satisfaction at delivery because he or she will reject the information as a basis for expectations. However, when a consumer is given a moderate veridicality representation (moderate veridicality picture), the inconsistencies between the picture and the product can produce memory distortions that produce disappointment at delivery.

The classic view in the satisfaction literature is that the confirmation or disconfirmation of expectations determines the satisfaction level of the consumer (Oliver 1977, 1980, 1999). When an expectation is confirmed, the result is a moderate level of satisfaction; if the expectation is disconfirmed in a positive direction (i.e., the result exceeds the expectation) then a higher level of satisfaction results. If the expectation is disconfirmed in a negative direction (i.e., the result underachieves the expectation) then

dissatisfaction results (Oliver 1999). Similarly, Boulding, Kalra, Staelin, and Zeithaml (1993) show that a mismatch between expectations and the actual product or service may produce disappointment. Thus, it is critical for marketers to understand the process through which specific factors may systematically result in a mismatch between expectations and the actual product or service. This paper examines how the memory distortion effects of an intervening stimulus and temporal change impact evaluations.

In addition, we examine whether the memory distortion effects impact subsequent behavior. Two types of post-purchase behavior are often considered important to successful marketing: word-of-mouth and repeat purchase. The highest levels of word of mouth occur when consumers are either extremely satisfied or extremely disappointed (Wilson 1991). Consequently, because we expect the picture conditions to influence satisfaction, the degree and valence of the word of mouth after delivery should differ according to the picture condition, i.e., the moderate veridicality condition will result in more negative word of mouth than in either the high or low veridicality conditions.

Customer retention is also an important goal of marketers (e.g. Bolton 1998), because the cost of acquiring a new customer is much higher than the cost of maintaining an existing customer (Reichheld 1996). We expect that repurchase behavior will be in line with the satisfaction levels seen at delivery, e.g., the lower level of satisfaction that consumers are hypothesized to experience when they receive a moderate veridicality picture will be followed by a lower level of repeat purchase after delivery. Likewise, the expectation that no disappointment will be experienced when consumers receive a low-veridicality or high-veridicality picture suggests that there will be no decrease in repeat purchase after delivery.

The effects of the intervening stimulus on mental representations and satisfaction will depend not only on veridicality, but also upon the degree of processing, as influenced by the accessibility of the intervening stimulus. Prior research shows that information is used more by consumers when it is more accessible (Lynch, Marmorstein, and Weigold 1988; Campbell and Kirmani 2000), and accessibility affects brand choice (Biehal and Chakravarti 1983), judgments of behavioral frequencies (Menon 1993), and advertising effectiveness (Baker and Lutz 2000).

In the situation we examine, consumers have made a purchase, are awaiting delivery, and have a pictorial representation of the product. The relative accessibility of the pictorial representation of the product may differ in such a scenario. Over time, the more accessible the pictorial representation, the more the consumer's mental representation may evolve to become like the pictured product. When the pictured product departs from the purchased product, the ensuing evaluation of the delivered product may change. In sum, the change in satisfaction will depend upon two characteristics of the picture: veridicality and accessibility. Three primary levels of veridicality, low, moderate, and high, will be used to examine the evolution of mental representations. The accessibility of the picture is expected to moderate the effect that veridicality has on altering expectations for the product. These concepts are presented in a model, shown in Figure 1.

<Insert Figure 1 Here >

These concepts are presented formally in the following hypotheses.

H1: Stimulus Veridicality x Time interaction will affect the evolution of an evaluation and result in differences before and after delivery in satisfaction, and

differences persisting after delivery for both word of mouth and repeat purchase such that:

- Moderate veridicality will produce the lowest satisfaction, word of mouth, and repeat purchase,
- High veridicality will produce the highest satisfaction, word of mouth, and repeat purchase, and
- Low veridicality will produce no change in satisfaction and with moderate levels of word of mouth and repeat purchase.

Thus, the combination of the results hypothesized in H1 implies that the effect of veridicality on consumer satisfaction is a U-shaped function. Because the process by which veridicality alters a consumer's expectations is not likely to be transparent to the consumer, we expect that these effects on satisfaction will persist over time. Moreover, our argument implies that the process through which veridicality affects satisfaction is mediated by expectations.

H2: The effect of picture veridicality on satisfaction will be mediated by the confirmation/disconfirmation of expectations.

The duration that the consumer is exposed to the picture will moderate the effect that veridicality has on the product evaluation: if the picture is available for a longer duration, it will be more accessible and will have a stronger effect on altering evaluations than if it is available for only a short duration. Accordingly, the following hypothesis is presented:

H3: The effect of a moderate veridicality picture on satisfaction will be lower with a short duration of exposure.

These hypotheses were tested with a pretest and two experiments. The pretest was used to determine the stimuli corresponding to the three levels of veridicality. The

primary objective of the first experiment is to determine whether the evolution of product evaluations depends on the nature of a visual representation of the product that is given just after the purchase but before the delivery. The study focused on the effect of a moderate veridicality picture on satisfaction, word of mouth and repeat purchase, thereby testing parts of the first hypothesis.

The second experiment replicates the findings of the first experiment and tests the three levels of veridicality, the mediating role of expectations in the process, the accessibility of the intervening stimulus, and whether the effects result in any behavioral differences in word of mouth and repeat purchase.

PRETEST

The three levels of picture veridicality (low, moderate and high) were determined by pre-testing the pictures in a two-stage study. In the first stage, 17 participants were shown a coffee mug and asked to imagine that they had just purchased the mug. In the second stage, the participants were given a packet of four randomly ordered pictures of varying levels of veridicality. These levels included 1) a full-color, photo-quality picture of the finished mug, 2) a full-color pastel version of the finished mug, 3) a black and white, photo-quality picture of the finished mug, and 4) a computer-generated line drawing of the finished mug. The participants then rated the degree to which each picture reliably and truthfully represented the coffee mug shown in stage one on a seven-point scale, with an anchor at zero of “not at all reliable and truthful” and an anchor at six of “extremely reliable and truthful”.

Using Fisher’s least-significant difference test, the results ($X_{\text{full color}} = 4.76$, $X_{\text{pastel color}} = 2.59$, $X_{\text{B \& W photo}} = 2.41$, $X_{\text{line drawing}} = 1.76$) indicate that the veridicality of the

representations was significantly different ($F(3, 47)=23.29, p<.001$) while the order of presentation was, as expected, not significant, $p>.16$. The black and white picture was not significantly different in veridicality as compared to the pastel picture. Thus, the line drawing, the pastel picture and the full-color picture were used as stimuli representing the three levels of veridicality (low, moderate, and high) used in the experiments.

STUDY 1

The primary objective of the first experiment is to determine whether satisfaction depends on the nature of a visual representation of the product that is given just after the purchase but before the delivery. The study focused on the effect of a moderate veridicality picture on satisfaction. Specifically, it is hypothesized that the addition of a moderately veridical picture during the waiting period between purchase and delivery will reduce satisfaction at delivery (H1). Moreover, the picture's detrimental impact is expected to persist over time and be accompanied by corresponding behavior, as evidenced by word of mouth and repeat purchase. In order to examine the cognitive processes that occur with purchase and delivery, we chose a focal product that engaged people and inspired them to think about the product during the waiting period. Thus, the product chosen for the experiments was a coffee mug that the participants custom-designed according to their own aesthetic preferences.

Design and Method

Fifty-one people¹ participated in the study. Their ages ranged from 21 to 57, with an average age of just over 33. Because the theoretical processes hypothesized related to actual consumers, the participants were required to pay for the product used in the study. Participants came from a number of groups in the community. The data analysis included 41 women and 10 men. The participants were recruited with flyers and encouraged to participate with a substantial discount on the purchase price of the product (\$5 instead of \$15). The flyers stated that the purpose of the research project was to study people's satisfaction with their creative designs. The study design was a two (picture present or not) x four (Time) mixed factorial design with between-subjects treatments of the picture factor and within-subjects measures on the time factor. The participants were randomly assigned to one of the two experimental conditions.

Participants went to a business (Glaze n' Blaze) to design and paint a coffee mug with the goal of creating something that they would enjoy using. The subjects participated in groups that ranged in size from 2-15, which were mixed across cells. Participation involved filling out a 5-minute background survey, designing a coffee mug (about 1hr), and filling out a Satisfaction Survey at four time periods: 1) T1: Immediately after Design and Purchase, 2) T2: About 2 days later, 3) T3: Just Before delivery, and 4) T4: Just After Delivery. Two-three weeks after delivery, the participants received a note by email or regular mail requesting more information regarding their mug-T5: Follow-up Survey. This time line is illustrated in Figure 2.

<Insert Figure 2 Here>

¹ Six subjects who indicated that they were displeased with their product immediately after the design stage were eliminated from the data analysis because product disappointment at purchase would not normally result in a sale. The excluded subjects were split evenly across the two conditions. This procedure for obtaining the appropriate consumer population is used in both of the design studies.

Four measures of satisfaction were taken to allow insight into the process. That is, the multiple measures allowed the point at which the changes occurred to be specified.

Although measurements were taken at five different time periods, the multi-item scale measuring satisfaction was given only at four time periods (T1, T2, T3, and T4).

Participants first filled out a short background survey. Next, they all received training regarding the design and painting process. During the training, special attention was devoted to instruction regarding the transformation that the product would undergo before delivery. This included a detailed discussion about the changes after firing that would happen to the colors and the surface of the mug. Essentially, the colors would be muted pastel shades before they were fired and would become brighter and bolder after firing. The surface would change from a textured matte finish to a smooth shiny finish. To illustrate these changes, the participants were shown examples of both an unfired mug and a fired mug, which were otherwise identical.

Although questions regarding the design and painting process were answered both before and during the design phase, participants were asked not to seek advice or feedback on their design from either the other participants or from the people working in the store, so that their product decisions would not be influenced by the aesthetic values of others. The participants were also reminded that the study required that the mug be designed for their own use as opposed to a gift.

Following the training, the participants selected one of two or three mug shapes: this was the initial product. They then chose the colors for their design from a selection of a post-fired palette of about fifty shades. Exposure to the palette of colors was constant across conditions. The participants then completed the designing and painting

of their mugs. The participants were given as much time as they desired to complete the design and painting of their mug.

After designing and painting their coffee mug, the participants paid \$5 for their mug. They then filled out the first satisfaction survey (T1). The next day, the participants received a receipt for their mug. Depending upon the experimental condition, the receipt included either a moderate veridicality picture or no picture. The receipt stated that the coffee mug would be available for pick-up at a specific time and date one week after the purchase. During the following week, a professional glazed and fired the painted mug.

The next satisfaction measure occurred two days after the design and purchase of the mug (T2). One week after designing and purchasing their mug, the participants returned to the store for the pick up. Just before delivery, the participants filled out another satisfaction survey (T3). Then, after being instructed not to comment on anyone else's design, they received their finished mugs. Immediately after receiving their mug, they filled out the fourth satisfaction survey (T4) and were thanked for their participation. Two weeks later, the participants² were sent a follow-up survey measuring overall satisfaction, word of mouth, and repeat purchase by email, phone, or regular mail (T5).

Independent Variable

The critical experimental manipulation involved whether or not the participants received a moderate veridicality picture. After the purchase, half the receipts given to the participants included a color picture of their pre-fired coffee mug; the receipts for the other half did not include any picture. The instructions on all the receipts asked the

participant to display the receipt in a place where it would be seen often, such as on their desk or on their bedside table.

Dependent Measures

Satisfaction, the primary dependent variable for the study, was obtained using a multi-item satisfaction scale adapted from Oliver (1980). The measures were obtained by asking participants to evaluate six statements on a seven-point scale (-3 = Strongly Disagree, +3 = Strongly Agree): 1) I am satisfied with my mug design; 2) If I had it to do all over again, I would design the mug differently; 3) My choices concerning how to design the mug were wise; 4) I feel bad about my decisions concerning the mug design; 5) I think that I did the right thing when I decided to design the mug this way; 6) I am not happy with my mug design. Satisfaction was obtained by averaging the responses to the six items for each of the four time periods (T1-T4), reverse-coded where necessary. These measures were used for testing the moderate veridicality hypothesis (H1).

Two to three weeks after the delivery of the mug (T5), a measure of overall satisfaction³ with the purchase and two behavioral measures, word of mouth and repeat purchase, were collected to determine whether the effects of the picture have attitudinal and behavioral effects that persist over time. The word of mouth hypothesis is tested using following two questions: 1) Have you talked to anyone within the last week about your mug? and 2) Overall, how satisfied are you with your mug?, which was measured on an seven-point scale ranging from -3 to +3. The repeat purchase hypothesis is tested using the results to the following question: Have you designed/painted any other pieces since

² Due to logistical difficulties, the first group of 13 participants was not asked to fill out the final survey. Of the remaining 38 participants, all but one returned the Follow-up Survey.

³ The overall satisfaction question was a single item.

completing the research study? A manipulation check designed to ensure that the experimental manipulation of the picture did not cause unintended rehearsal differences between groups was collected in the surveys at T2 and T3. Using the question, “During the last few days, estimate how many times you have thought about the mug you designed?”, participants circled either zero, one-two, three-four, five-six, seven-eight, or nine or more.

Covariate Measures

Four measures were collected and used as covariates in the analyses: duration of exposure to the initial product, ability to image, prior knowledge, and gender. Because it was determined that each participant should have as much time as needed in order to design and purchase their coffee mug, it is possible that differences in either the level of accessibility of the initial product or individual motivation could affect the results. Thus, the duration of exposure to the initial product is measured and used as a control variable in the analysis. Duration of exposure was measured for each subject by the number of minutes between the time that the mug shape (initial product) was chosen and the time that the design and painting stage was completed.

In addition, because the manipulations rely on pictorial images, it is possible that the participant’s ability to image could influence the results. Thus, the ability to image will be measured in all of the design experiments using a selection from Marks' (1973) visual imagery scale. The visual imagery scale asks participants to visualize both the front of a shop that they frequent and a country scene. The participants are then asked to rate the clarity of four specific parts of each of two visualized scenes on a five-point scale (1=no image at all, you only “know” you are thinking of the object, 5 = Perfectly clear

and as vivid as normal vision). The measure, ability to image, is an average of the eight responses.

Prior knowledge has been hypothesized to affect memory accuracy. In addition, market research from the contemporary bisque pottery industry revealed that the product tended to appeal to women more than to men. Consequently, the analysis included prior knowledge (i.e., Have you ever painted a contemporary bisque piece of pottery before today?) and gender to account for any spurious correlation that might have been incorrectly attributed to the variables of interest. However, because only one of the covariate measures (gender) accounted for significant variance in the subjects' responses to the dependent measures of satisfaction, it will be the only one discussed explicitly in the results section.

Results

The effects reported below were tested using a repeated measures analysis of variance (ANOVA) in SAS⁴.

Manipulation Check: To ensure that the experimental manipulation of the picture did not cause unintended rehearsal differences between groups, participant's reports of the number of thoughts that they had about their purchase during 1) the first half of the waiting period (T1 to T2) and 2) the second half of the waiting period (T2 to T3) were collected and analyzed. As expected, the results show that there were no differences between the groups in either the first half of the waiting period ($X_{\text{picture}}=3.4$, X_{no}

⁴ Analysis revealed that the data did not pass Mauchly's Test for Sphericity. The correction of the degrees of freedom was done with the Huynh-Feldt epsilon value: $\epsilon=.942$. Applying this correction changes the degrees of freedom from 1,126, to 1,119.

picture=3.5), $p > .2$) or the second half of the waiting period ($X_{\text{picture}}=4.2$, $X_{\text{no picture}}=3.8$), $p > .2$).

Covariate. Analysis reveals that there is a difference in the way that the male and female participants responded to the picture ($F(1, 119)=16.86$, $p < .05$). The women in the picture condition tended to be more disappointed with their purchase than were the men, although both show significant decreases. Because this factor is included in the model, this effect is controlled and therefore does not affect the interpretation of the following results.

Hypothesized Results

H1: Intervening Stimulus Veridicality Over Time. Study 1 was designed to test whether a moderate veridicality picture had a detrimental effect on the level of satisfaction at the time of delivery. The stimulus x time omnibus test is significant ($F(3, 132) = 7.34$, $p < .001$). Hypothesis 1 says that when a consumer is given a moderately veridical picture to examine during the waiting period, the consumer will experience a drop in satisfaction at delivery. The results of a planned contrast confirmed that differences exist between the stimulus groups in the change in satisfaction between just before delivery (T3) and just after delivery (T4) using the best estimate of the error, which was obtained from the model omnibus test, ($\Delta_{\text{moderate veridicality stimulus}} = -.58$, $\Delta_{\text{no stimulus}} = .27$, $F(1, 119) = 10.15$, $p < .05$), which supports H1 (Figure 3). The result of the planned contrast examining the change between T4 and T5 indicates that results seen at delivery persist over time ($\Delta_{\text{moderate veridicality stimulus}} = .54$, $\Delta_{\text{no stimulus}} = .36$, $F(1, 27) = .01$, $p > .2$).

H1: Word of Mouth. This part of the first hypothesis contends that the effects attributed to the veridicality of the picture at delivery will be evidenced by similarly valenced levels of word of mouth after delivery. The results indicate that there is a significant difference in the degree and valence to which people talk about the mug to others (word-of-mouth) depending on the veridicality of the picture ($X(\text{picture}) = .47$, $X(\text{no picture}) = 1.71$, $F(1, 34) = 68.83$, $p < .05$), thus providing additional support for H1.

H1: Repeat Purchase. This part of the first hypothesis contends that when consumers receive a moderate veridicality picture during the waiting period, the lower level of satisfaction that ensues will result in a lower level of repeat purchase after delivery. The results indicate that the 23% of the people in the no picture condition repeated purchase within two weeks of delivery, whereas 0% of the people in the picture condition repeated purchase. The Likelihood Ratio Chi-square test, which is able to handle small sample sizes⁵, was examined: the results of this test reveal that the difference is statistically significant ($\chi^2 = 4.04$, $p < .05$), thus providing additional support for H1.

Discussion of Study 1

This study examined how memory distortions and temporal change affect a consumer's evaluation of a purchase. The results show that, contrary to intuition, a picture presenting information about the product can sometimes lead to a lower level of satisfaction at delivery. Thus, even though the consumers were aware that the moderate veridicality picture was not a good representation of the purchased product, it appears that it influenced their mental representations upon which expectations are based.

The overall satisfaction measure taken during the follow-up survey shows that the satisfaction results persist at least two weeks after delivery. However, this measure differs from the satisfaction measures taken at the other time periods. In the second study, the satisfaction measures taken in the follow-up study will be the same as are used at the other four time periods. Importantly, the study also demonstrates behavioral differences in line with the differences in satisfaction observed at delivery. These behavioral differences are evident in the word of mouth generated and in the repeat purchase. People who did not receive a moderate veridicality picture talk more positively about their purchase than people who did receive the moderate veridicality picture, and when people are given a moderate veridicality picture of their purchase, they are less likely to make a repeat purchase than those who did not receive a picture.

Study 2

Two alternate explanations for the results are possible. One of the alternative possibilities contends that if the unfired mug were generally considered to be much nicer than the fired mug, then this might explain why people who have a picture of the unfired mug feel less satisfied when the fired mug is delivered. The second alternative possibility suggests that if the display of the mugs in two-dimensional picture form were generally preferred to the three-dimensional mug, then that might also explain why people who have a picture of the unfired mug feel less satisfied when the fired mug is delivered. A second study using one-hundred and eight graduate students tested these alternate explanations.

The first stage of the study used a 2 (order) x 2 (stage- unfired or fired) Latin square design with within-subject treatments of both factors. The design was based upon

⁵ This question was inadvertently left off many of the surveys; only 24 participants received the question .

Winer, Brown, and Michels' repeated measures plan 5 (1991, p.703). The participants were randomly assigned to one of the two groups. The study was designed to determine whether people have an overriding preference for a product based on its stage in the firing process; that is, the alternate explanation is possible if people prefer the unfired mug to the fired mug.

A check to examine whether the order of presentation affected the results reveals no significant difference between the groups ($X_{\text{order1}} = 1.55$, $X_{\text{order2}} = 1.45$, $F(1, 105) = .04$, $P > .8$). The results of the primary analysis reveal that participants have a marginally lower level of satisfaction with the unfired mug than with the fired mug ($X_{\text{unfired}} = -1.54$, $X_{\text{fired}} = -.97$, $F(1, 105) = 3.08$, $P < .08$). Moreover, the results of the behavioral intentions show significantly more positive behavioral intentions toward the fired mug than toward the unfired mug ($X_{\text{unfired}} = 2.87$, $X_{\text{fired}} = 3.30$, $F(1, 105) = 5.76$, $P < .018$). Overall, the fired coffee mug is generally preferred to the unfired coffee mug. The results clearly rule out the alternative explanation that people preferred the unfired mug and that this preference could have been the cause of the lower satisfaction at mug delivery for the moderate veridicality picture condition shown in the first study.

The second stage of the study followed the previous one, using the same one hundred and eight participants, and was designed to test whether people prefer a picture as opposed to the actual object. The design consisted of a 2 (order) x 2 (form- picture or mug) x 2 (color- pink or yellow) Latin square design with within-subjects treatment of the three factors. The design was based upon Winer, Brown, and Michels' repeated measures plan 11 (1991, p.726). The participants were randomly assigned to one of the four groups.

The results of the primary analysis regarding the form of representation reveal no difference between the two groups ($X_{\text{picture}} = 3.79$, $X_{\text{actual}} = 3.84$, $F(1, 104) = \text{NS}$, $P > .64$). The results show that people feel indifferent between the possibility of using or owning either the picture representation or the actual product representation. The results of this study do not suggest that there is any support for the alternative explanation that people preferred the pictorial representation of the mug to the actual mug. Thus, it is unlikely that this preference could have been the cause of the lower satisfaction at mug delivery for the moderate veridicality picture condition in the first study. Therefore, the findings from this second study provide the perspective that the results of the first study support the central hypothesis of the theoretical framework that an intervening stimulus can affect the evolution of product evaluations.

STUDY 3

One of the central goals of the third study is to more fully investigate how veridicality affects the mental representation of the product, thereby affecting the evolution of product evaluations. To do this, three basic levels of veridicality, as determined during the pre-test, will be used as the intervening visual representation so that we can directly compare the results of these factors. A second goal of the study is to determine the role that expectations play in the evolution process. Toward this end, specific measures of expectations will be collected. Finally, the third goal of the study is to determine whether the picture's accessibility modifies the effect of the picture. The effect of picture accessibility will be examined with the addition of another moderate veridicality picture condition in which the picture will be accessible for only the final two days before delivery.

Design and Method

Seventy-two⁶ participants, both graduate students and members of the community, were recruited for the study with flyers and encouraged to participate with a substantial discount (\$5 instead of \$15) on the purchase price of the product. The participants, including 16 men and 56 women, ranged in age from 21 to 50, with an average age of 26.

The study design was a four (picture veridicality- low, moderate, high, & moderate with short picture accessibility) x five (Time) mixed factorial design with between-subjects treatment of the picture factor and within-subjects treatment of the time factor. The participants were randomly assigned to one of the four experimental conditions and they participated in groups that ranged in size from 3 to 27. As discussed in the pre-test, the line drawing, the pastel picture and the full-color picture were used as stimuli representing the three levels of veridicality (low, moderate, and high). The short picture accessibility group received a moderate veridicality picture for only the final two days of the waiting period.

Procedure

The experimental procedures were consistent with those reported in Study 1, with the following modifications. For the participants in the three veridicality groups, the receipts also included a picture of their mug. The low veridicality picture was a computer-generated line drawing; the moderate veridicality picture was of the pastel, pre-

⁶ Eight participants who indicated that they were not satisfied with their purchase immediately after purchase were eliminated from the analysis (3 from the low-veridicality picture, 2 from the moderate veridicality picture, 2 from the high veridicality picture and 1 from the short-accessibility picture group). Including those participants does not substantially change the findings.

fired mug; the high veridicality picture was a picture of the mug that had already been fired. Participants in the short accessibility condition were given a receipt without a picture. Two days before the scheduled product delivery, the participants in the short-accessibility condition were given a duplicate receipt with the explanation that an error in the receipt generation process had occurred and that the second receipt reflected the correction. None of the participants made any additional queries regarding the receipt. The instructions on all the receipts asked the participant to display the receipt in a place where it would be seen often, such as on their desk or on their bedside table.

Dependent Variables

As in Study 1, the primary dependent variable for the study was obtained from a multi-item satisfaction scale adapted from Oliver (1980). These measures were used for testing the picture veridicality hypothesis (H1), the expectations mediation hypothesis (H2), and the accessibility of the picture hypothesis (H3). The same measure used in Study 1 was used to examine rehearsal differences for the manipulation check. Also as in Study 1, two behavioral measures, word of mouth and repeat purchase, were collected two to three weeks after the delivery of the mug (T5) to determine whether the effects of the picture have behavioral effects that persist over time.

Covariate Measures

As in Study 1, four measures were collected and used as covariates in the analyses: ability to image, exposure to initial product, prior knowledge, and gender. However, because only one of these covariate measures (ability to image) accounted for significant variance in the subjects' responses to the dependent measures of satisfaction, it is the only one that will be explicitly discussed in the results section.

Results

The effects reported below were tested using repeated measures analysis of variance (ANOVA) in SAS⁷.

Manipulation Checks. To ensure that the experimental manipulation of the picture did not cause unintended rehearsal differences between groups, participant's reports of the number of thoughts that they had about their purchase during 1) the first half of the waiting period and 2) the second half of the waiting period were collected and analyzed. The results show that there were no differences between the groups in either the first half of the waiting period ($X_{\text{low veridicality picture}} = 3.44$, $X_{\text{moderate veridicality picture}} = 3.63$, $X_{\text{high veridicality picture}} = 3.25$, $X_{\text{low accessibility picture}} = 3.00$, $(F(1,49) = .12; p > .2)$) or the second half of the waiting period ($X_{\text{low veridicality picture}} = 5.33$, $X_{\text{moderate veridicality picture}} = 4.37$, $X_{\text{high veridicality picture}} = 3.81$, $X_{\text{low accessibility picture}} = 3.74$, $(F(1,49) = .09, p > .2)$).

Covariate. The ability to image is an average of eight items measured on a 5-point scale ranging from 1 to 5, with 1 representing "No image at all, you only "know" you are thinking of the object" and 5 representing "Perfectly clear and as vivid as normal vision". Although the participants were randomly assigned, differences between the groups do exist ($X_{\text{low veridicality picture}} = 3.70$, $X_{\text{moderate veridicality picture}} = 4.02$, $X_{\text{high veridicality picture}} = 3.70$, $X_{\text{low accessibility picture}} = 3.61$, $F(1,49) = 5.43; p < .05$) Because this factor is included in the model, this effect is controlled and therefore does not affect the interpretation of the following results.

Hypothesized Results.

⁷ Analysis revealed that the data did not pass Mauchly's Test for Sphericity. The correction of the degrees of freedom was done with the Huynh-Feldt epsilon value: $\epsilon = .872$.

H1: Intervening Stimulus Veridicality Over Time. This hypothesis contends that the picture's veridicality will affect the satisfaction level at delivery, with moderate veridicality pictures resulting in lower satisfaction, whereas no decrease in satisfaction will be seen in the low and high veridicality conditions. The stimulus x time omnibus test is significant ($F(3, 237) = 6.40, p < .0001$). A planned contrast confirmed that differences exist between the stimulus groups in the change in satisfaction between just before delivery (T3) and just after delivery (T4) ($\Delta_{\text{low veridicality picture}} = -.01, \Delta_{\text{moderate veridicality picture}} = -.57, \Delta_{\text{high veridicality picture}} = .42, F(2, 237) = 4.33; p < .05$)(see Figure 4). The result of the planned contrast comparing the movement from T4 and T5 for the three picture veridicality groups reveals that the results seen at delivery persist over time ($\Delta_{\text{low veridicality picture}} = -.04, \Delta_{\text{moderate veridicality picture}} = .12, \Delta_{\text{high veridicality picture}} = -.01, F(2, 237) = .39; p > .2$).

<Insert Figure 4 Here>

Examination of satisfaction after delivery as a function of veridicality indicates that satisfaction is a U-shaped function of veridicality (the quadratic trend is significant ($F(1,237) = 4.41, p < .05$) (see Figure 5).

<Insert Figure 5 Here>

H1: Word of Mouth. This hypothesis contends that the attitudinal effects attributed to the veridicality of the picture (low, moderate, high) at delivery will be evidenced by similarly valenced levels of word of mouth after delivery. The results indicate that there is a significant difference in the degree and valence to which people talk about the mug to others (word-of-mouth) depending on the veridicality of the picture ($X(\text{moderate})=.5, X(\text{high})=1.63, X(\text{low})=1.01, F(3, 60) = 3.35, p < .05$), thus providing additional support for the behavioral part of H1.

H1: Repeat Purchase. This hypothesis contends that levels of repeat purchase will evidence the effects attributed to the picture at delivery. However, no repeat purchase occurred between the delivery and the follow-up survey sent out 2 weeks later in any of the groups, thus providing no data for analysis.

H2: Mediation. This hypothesis contends that expectations mediate the picture by time interaction on satisfaction. To test this hypothesis, a mediation analysis was performed according to the steps indicated in Baron & Kenny (1986). The first step requires showing that the picture x time interaction is significantly correlated with satisfaction ($F(3, 320) = 33, p < .05$). The second step requires showing that the picture by time interaction is significantly correlated with expectations ($F(3, 320) = 11.63$). The third step requires showing that the picture by time interaction on satisfaction while controlling for expectations is reduced ($F(3, 320) = 13.88, p < .05$). Thus, the results indicate that expectations partially mediate the veridicality of the picture's effect on satisfaction.

H3: Intervening Stimulus Accessibility. This hypothesis contends that the effect of a moderate veridicality picture on satisfaction will be lower with a short duration of exposure. The stimulus x time interaction for the long and short accessibility conditions was not significant ($1, 237) = .53, p > .2$). However, the results of the planned contrast comparing the movement from T3 and T4 for the two moderate veridicality picture groups that varied in the time that the picture was accessible (long or short) reveals that the effect for the two conditions is different. The moderate veridicality picture produces a significant decrease when available for a long time period ($X_{\text{long T3}} = 1.04, X_{\text{long T4}} = .47; \Delta = .57, F(1, 237) = 5.98, p < .05$), but when the time period is short, the decrease is not

significant ($X_{\text{short T3}} = 1.22$, $X_{\text{short T4}} = .89$; $\Delta = .33$, $F(1, 237) = 2.08$, $p > .2$), which provides moderate support for H3 (Figure 6).

<Insert Figure 6 Here>

Discussion of Study 3

This study is designed to understand more about how qualities of the intervening stimulus, such as veridicality and accessibility, affect consumer's evaluations and behavior. The veridicality results replicate the finding that a moderate veridicality picture results in a disappointment effect (H1). Also, the data indicate that a low-veridicality picture maintains satisfaction levels while a high-veridicality picture enhances satisfaction. These results follow a U-shaped function in regard to satisfaction. In addition, the effect of picture veridicality on satisfaction is partially mediated by expectations (H2). This indicates that the veridicality of the picture does seem to change the mental representation upon which expectations are based. The picture's effects are still evident two weeks after delivery, indicating that the picture's effects on satisfaction persist over time. Finally, the results indicate that there is moderate support for the contention that the veridicality effect is moderated by accessibility (H3).

The word of mouth results indicate that the degree and valence of the word of mouth after delivery are in accord with the attitudinal effects of the stimulus condition. Thus, if a consumer has accessible a picture of moderate veridicality during the waiting period, it will not effect only that consumer's opinion but, through word of mouth, the opinions of those to whom the consumer speaks. One deviation from the first study is that no repeat purchase occurred in any of the conditions. Because the vast majority of the participants (67 of 72) were graduate students who were about to take midterms or

finals during the post-delivery period, external factors may have suppressed the repeat purchase manifestations due to the changes in satisfaction. Overall, the results of this study provide additional support for the central hypothesis of the framework, suggesting that stimulus veridicality can affect the evolution of evaluations.

General Discussion of all Experimental Results

In this article, we use experiments in which the consumer actually pays for a product and then must wait one week for delivery to examine the expectation evolution process over time. The results show that, contrary to intuition, characteristics of a picture given after the purchase decision can systematically affect how expectations and satisfaction evolve, resulting in a change in the level of satisfaction at delivery. Specifically, there is a U-shaped relationship between the degree to which the intervening picture truthfully and reliably represents the purchased product (what we call veridicality) and resultant satisfaction with the product. The more abstract representations do not evoke disappointment with the product, and the most realistic ones reinforce the product experience. Moderate distortions, by contrast, reduce satisfaction by engendering specific expectations that are betrayed by the actual product. Moreover, this paper examines the process through which the evolution occurs and finds that the effects are mediated by consumer expectations. Finally, this research shows that the effects persist over time and that they influence behavior, as evidenced by word of mouth and repeat purchase.

In the first study, the results show that, contrary to intuition, a picture presenting information about the product can sometimes lead to a lower level of satisfaction at delivery. This result suggests that for products, a moderate veridicality picture can

change consumers' evaluations for purchased products. Moreover, this change in evaluation is significant enough to cause consumers' product satisfaction level to be lower at delivery.

In the second study, two alternative explanations for the results of Study 1 were explored. The results of the first stage of the Study 2 eliminated the possibility that the unfired mug was preferred to the fired mug. The results of the second stage of Study 2 eliminated the possibility that the two-dimensional form was preferred to the three-dimensional form.

Study 3 explored the veridicality construct and found that picture veridicality follows a U-shaped function with respect to the picture's effect on satisfaction. The results indicate that the low and high veridicality pictures do not decrease evaluations, whereas the moderate veridicality pictures do significantly change evaluations, thereby replicating the results shown in Study 1. Moreover, when participants have less exposure to a moderate veridicality stimulus, then the picture's effect on evaluations will be lower and the participants will be more likely to feel satisfied with their purchase at delivery. Behavioral differences in line with the differences in satisfaction observed at delivery are evident for a period of at least two weeks following delivery. These behavioral differences are evident in the amount of word of mouth generated and in repeat purchase.

The proposed model of the evolution of evaluations informs the expectations literature by demonstrating that two components, veridicality and accessibility, play a pivotal role in shaping expectations. Collectively, the findings from these studies suggest that the evolution of evaluations may operate in an automatic, non-conscious manner, because it is difficult to avoid even when participants were forewarned. The warnings in

the present studies consisted of detailed training regarding the changes to expect in the products after the firing process. Despite this forewarning, the participants who had a picture were still surprised when their product arrived. Similar findings detailing misinformation effects despite warnings exist for short retention intervals (Belli et al. 1994) and for details of an event (Lindsay 1990). Our research elaborates on these findings by showing that the resistance to warnings also occurs for the central object of memory attention. This suggests that understanding the factors involved in creating lower levels of satisfaction at delivery is even more important because attenuating the effect is not a simple process.

The results of these studies also inform the practice of marketing. This research suggests that having an apparently veridical but flawed image of a purchased product while anticipating delivery leads to significantly less satisfaction at delivery and, for a period of at least two weeks, the veridicality of the picture has an enduring effect on product evaluations. This finding is contrary to many current marketing practices. For example, after purchasing a car that must be ordered from another location, it is customary for the sales agent to give the customer a color brochure featuring the purchased vehicle. To the extent that the image of the car portrayed in the brochure is different from the delivered product, this practice may actually cause the customer to feel less satisfied with the delivered car. Consequently, managers need to consider carefully the types of representations that are available to consumers because the practice could result in negative word of mouth, lower repeat purchase, and a higher level of costly product returns.

The results of the described process apply to a wide range of consumer circumstances, including most Internet and catalog shopping, furniture, and clothing that requires alterations before delivery, such as a suit⁸. The fact that the findings of decreased satisfaction persist over time suggests that a better understanding of how the period between purchase and delivery can influence satisfaction will have substantial managerial relevance. For example, for Internet purchases, the retailer does not have control over the printing process. The results from Study One and Study Three indicate that one of the most common home printing formats, moderate color quality, can be detrimental to the customer's satisfaction experience and can lead to negative word of mouth and lower repeat purchase. It is likely that it will also result in a higher level of product returns. Fortunately, Study 3 also provides a solution to this problem: format pictures to be printed using a sophisticated line drawing program. Using a line drawing program would allow the consumer to print a picture of his purchase without the risk that the picture would alter the consumer's expectations for the product. For other durable goods for which there is a delay between purchase and delivery, the results of this research provide evidence supporting the creation of multiple brochure formats so that the takeaway at purchase does not significantly differ from the purchased product.

Because older adults have been shown to be more susceptible to memory errors due to misinformation than younger adults (Norman and Schacter 1997; Schacter, Israel, and Racine 1999), the implications of this research are particularly important for retailers dealing with an aging clientele. Current demographics relating the aging of the baby boomers suggest that the years to come will see this research become even more important for marketing success.

⁸ Thanks to Preyas Desai for this last example.

Although this research dealt specifically with the effect of pictures when there is a time delay between purchase and delivery, the effect is easily generalized to a larger set of phenomena in which expectations can be affected by pictures. For example, it could also apply to situations prior to purchase in which the consumer receives product information, which results in the formation of expectations. Likewise it could also apply to situations in which there is a delay between delivery of the product and the use/consumption of the product.

Furthermore, when there is a delay between purchase and delivery, the information affecting the evolution of expectations could originate in a conceptualized ideal, rather than a picture. For example, consider the situation in which a consumer sees a product either on a television show or in her mind's eye that she would like to own. After searching for the product, the consumer settles for one that is similar but not identical to the conceptualized ideal. During the waiting period, the consumer may either continue to see the product on television or imagine it in her mind's eye. The same distorting effect presented in this article on the evolution of evaluations is possible. A similar case of distortion might occur when the consumer has owned a product for a long time and is now searching for a replacement product. Thus, these examples illustrate the potentially far-reaching implications of the effects illustrated in this research.

Future Research

The findings from our studies suggest a number of interesting questions for further research. In the current studies we were careful to tell participants that the delivered mug would be brighter and have more saturated colors than the pastel-like colors of the mug in the picture. However, we did not measure how well this message

was received and did not test the impact of further emphasizing or deleting this information. If a written warning appeared along with the moderate veridicality picture, it is possible that this effect could be attenuated. Additionally, providing a high veridicality picture should eliminate the effect because a high veridicality picture does not provide any misinformation to misdirect the consumer's expectations.

Because the central between-group difference in Studies 1 and 3 was the type of picture available during the waiting period, the significant change in satisfaction between groups makes clear that the picture was processed by the participant, either intentionally or automatically, during the waiting period. Further investigation should help to better understand this process. If it turns out that the effect persists even with stronger warnings, the implications become even stronger.

In addition, this research was limited to products for which the participant had significant design input. Would these results extend to products for which the person has not had significant design input and where respondents were not as motivated to want to like the product? This question could be tested within the current design context by giving the participant a picture of another person's product and having the participant evaluate that product at all of the time periods. If the finding generalizes to products over which the person has less design control, then the pattern of results should be similar to those seen in the current studies.

In addition, research shows that thinking about an imagined event increases its vividness and may result in impaired reality monitoring (Suengas and Johnson 1988). This contention could be tested within the present experimental conditions by manipulating the number and elaboration of people's thoughts by having them visualize

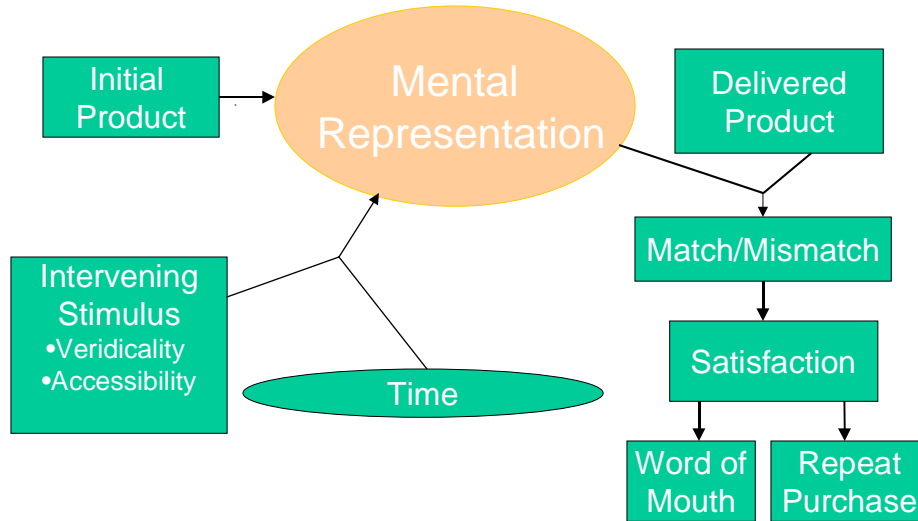
their product during the waiting period. If increased thinking about an imagined event does impair reality monitoring, then this exercise should moderate the effects of a moderate veridicality picture, resulting in a lower level of product satisfaction at delivery.

Learning more about the mechanisms driving the effects may require a more controlled environment. Although the random assignment utilized in the current study neutralizes many of the worries of a longitudinal study, including history and maturation, many process variables were inaccessible. These include whether the person was recalling stored evaluations about the product during the waiting period or whether the person was actually constructing new evaluations based upon the available attributes.

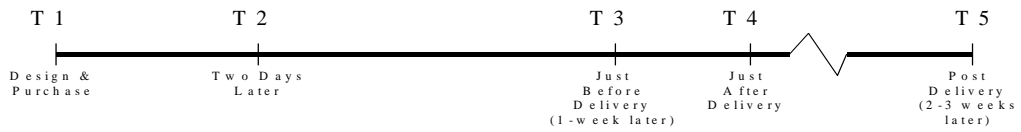
Conclusion

These studies examined specific factors that may systematically influence the evolution of evaluations for products that we purchase. The studies focused on the effects of variously veridical representations and how the accessibility of the representation moderated their effects. The results reveal that, contrary to intuition, a representation presenting more information about the product can sometimes lead to a lower level of satisfaction at delivery. When participants were presented with a receipt containing a moderate veridicality picture, they had less satisfaction with the final product at delivery than did people who relied only on their memory during the waiting period or had a low or high veridicality picture available to them. Furthermore, behavioral differences in line with the differences in satisfaction observed at delivery are evident for a period of at least two weeks following delivery. Overall, these findings imply that marketers must be mindful of slips ‘twixt cup and lip.

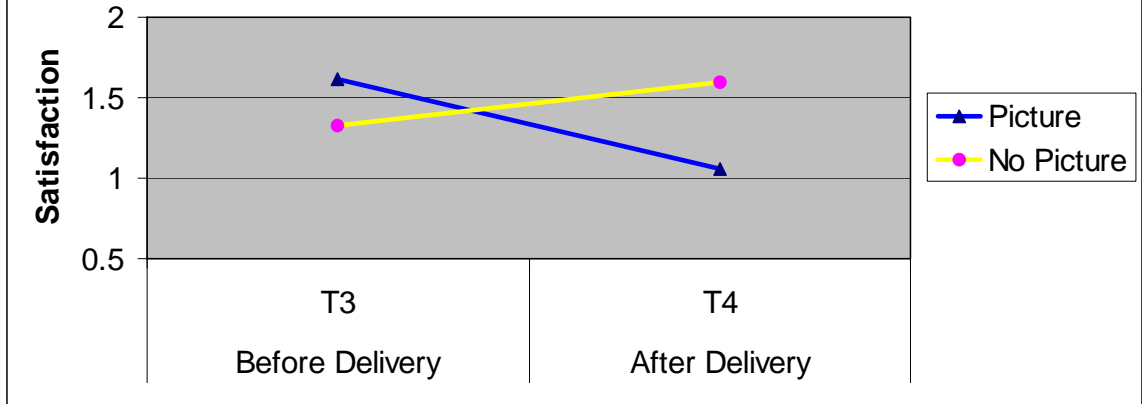
**Figure 1:
A Model of Evolving Evaluations**



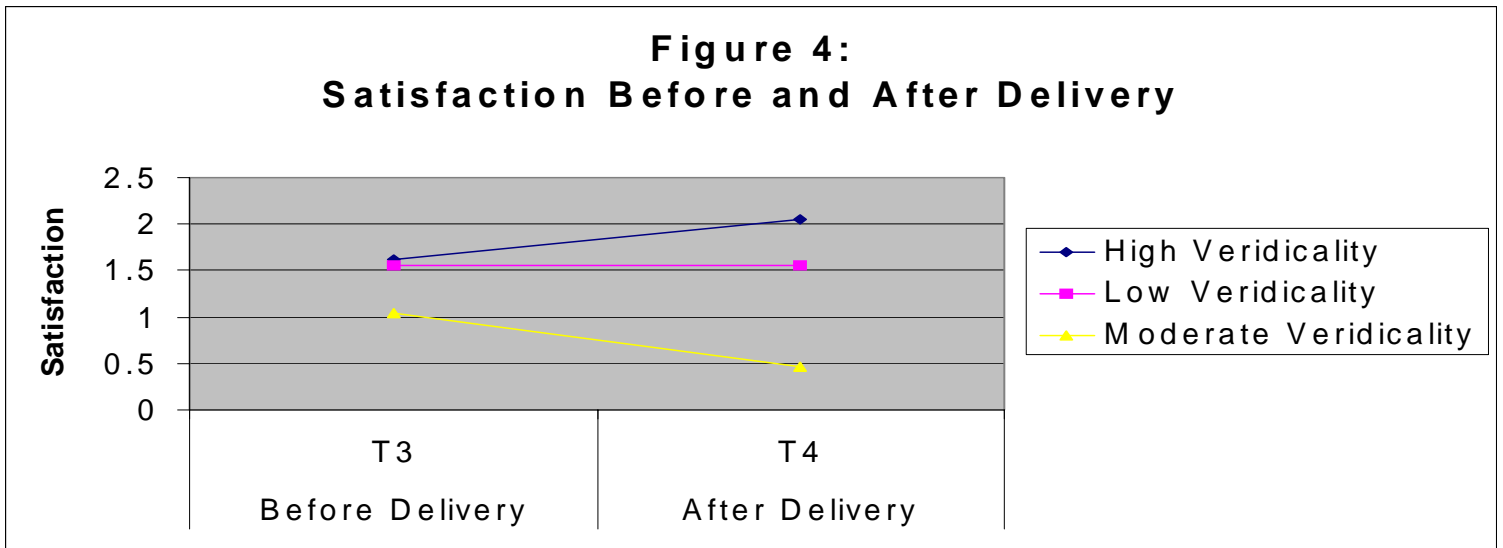
**Figure 2:
Experiment Time Line**



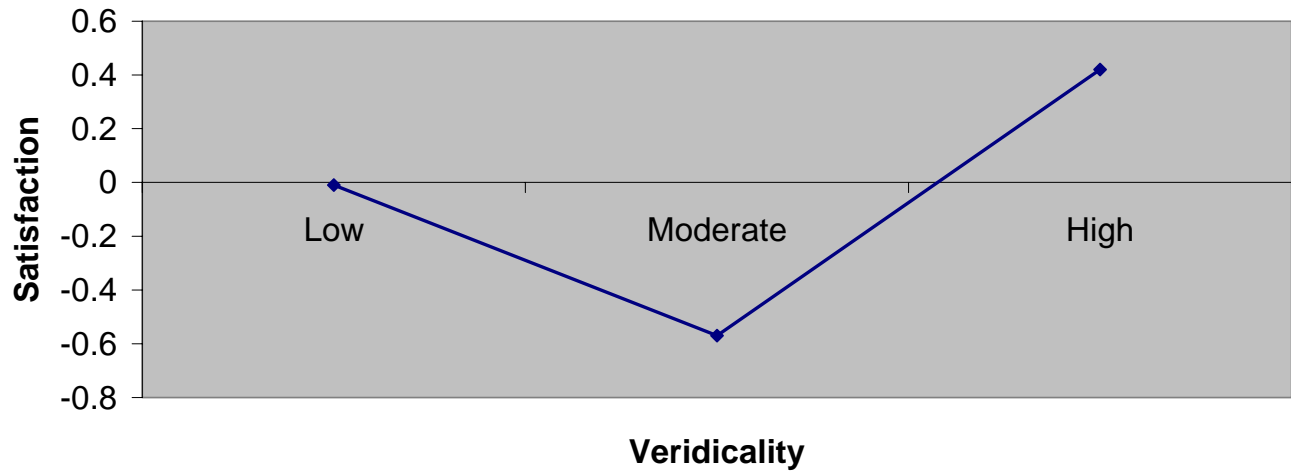
**Figure 3:
Satisfaction Change at Delivery**



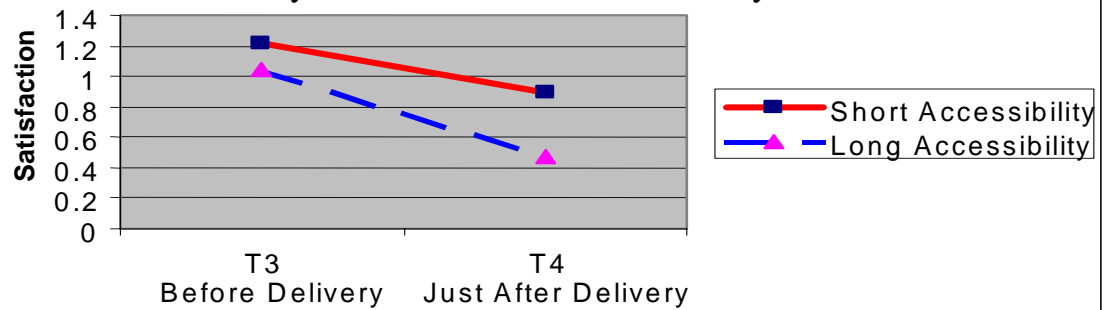
**Figure 4:
Satisfaction Before and After Delivery**



**Figure 5:
Cue Veridicality and Satisfaction**



**Figure 6:
Accessibility for Moderate Veridicality Stimuli**



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