

# Automatic Construction and Use of Contextual Information for Product and Price Evaluations

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The context in which a product is seen influences the internal standard that consumers use to judge both this and other products. Two experiments showed that a product was judged as less expensive in a high-priced context than in a low-priced context even though the product's actual price was recalled as higher in the first condition than in the second. This effect of the initial context carried over to a new product encountered 48 hours later and also influenced price estimates of products from other categories. Additional experiments demonstrated that the standard that people use to evaluate products can be influenced by exposure to high and low stimulus values that are below participants' perceptual thresholds. Thus, the effects of internal standards on product judgments can occur without an awareness of the conditions that led to the construction of this standard.

Companies that sell their merchandise through catalogs often present their higher priced products in strategic locations, expecting consumers to see these high-priced items first. Similarly, supermarkets often place higher-priced products at eye level so they will be noticed before other items on the shelf. These practices reflect a belief that the products consumers see initially influence their later judgments and decisions. In particular, these contextual products create a standard for subsequent product evaluations. Thus, for example, people may perceive a \$30 shirt to be less expensive if the shirts seen before it cost \$65 than if they cost \$15.

There is clear evidence that the context in which a product or attribute is seen influences evaluations of it. This influence, which has been identified in research on pricing (see Briesch et al. [1997] for a recent review) as well as in other areas (Kardes 1986; Lynch, Chakravarti, and Mitra 1991), presumably occurs because the context affects the internal standard from which a product or attribute is evaluated (Helson 1964). The context in which an object is seen can also influence the overall perspective (i.e., the range of values)

that people consider applicable to the judgment situation (Ostrom and Upshaw 1968). Although evidence suggests that both of these influences can occur (see Janiszewski and Lichtenstein 1999), several theoretical and empirical questions remain. For example, do consumers intentionally construct these types of standards when making a judgment? Or, do they form these standards automatically, without conscious awareness of the stimuli that influence them?

Previous research does not provide clear answers to these questions. Some studies suggest that the effects of context stimuli on standards that people form result from a deliberative process that occurs when objective stimulus values are compared with each other. For example, Lynch et al. (1991) showed that the effect of context stimuli on judgments along a response scale is often the result of their influence on how numbers along the scale are interpreted (for similar arguments, see Upshaw [1965]; Wyer [1974]). This process implicitly seems to involve a conscious translation of objective stimulus values into response scale values. Manis and Paskewitz (1984) found that the context in which people encounter a stimulus could also affect their underlying mental representation of the stimulus. However, the effects of context in these studies appeared to be domain specific. That is, the values of context stimuli in one domain did not influence judgments in other domains (Manis and Paskewitz 1984; see also Parducci, Knobel, and Thomas 1976). These findings suggest that participants consciously disregard context stimuli when they construct a standard to which the stimuli are not directly relevant. This interpretation corroborates Brown's (1953) earlier finding that people intentionally exclude context stimuli from consideration if they are led to believe that these stimuli are not part of

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another series being judged. Collectively, these studies lead to the conclusion that processes of which participants are aware probably mediate the construction of standards.

However, unconscious influences on the construction of a standard could occur as well. Previous studies have not been designed to examine this possibility. In most research that examines how such comparative standards are constructed and used, context stimuli were salient to the participants when they made their judgments. Moreover, the context stimuli were judged in the same situation as the target stimuli (Brown 1953; Manis and Paskewitz 1984; Ostrom and Upshaw 1968; Parducci et al. 1976). Therefore, it is unclear from this research whether people's previous experiences with contextual stimuli can have unconscious influences on the standards that they apply in future similar or dissimilar situations.

Whether the standards used for comparative judgments are constructed without awareness has important implications for several other issues. First, do consumers form and apply a standard of comparison spontaneously at the time that they receive information about a product, or does this application occur only when they are called on to make a conscious judgment or decision? If comparative standards are formed deliberately, consumers may only construct these standards when they are required to make a judgment. However, if standards are formed automatically, their construction may occur when consumers are exposed to stimuli, independently of any judgment that consumers expect to make.

Second, is the use of a standard specific to the situation in which it is constructed? Or, does its effect persist over time and influence purchasing decisions that people make later, in other situations? If consumers construct standards deliberately, they may form and apply different standards in different situations, depending on the stimuli that they consider to be relevant in these situations. However, if standards are constructed without awareness, their influence may persist over time and situations, regardless of the conditions that gave rise to them.

Finally, are the stimuli used to construct a standard confined to products that consumers consider to be relevant for comparisons or can these standards be influenced by experiences that are not related to the products that consumers are judging? If consumers form standards deliberately, these standards are likely to be influenced only by stimuli that consumers consider relevant. However, if the standards are constructed without awareness, objectively irrelevant stimuli may affect the standards used.

Although objectively irrelevant experiences can unconsciously influence information processing (for reviews, see Bargh [1997]; Higgins [1996]), the extent to which unconscious processes govern the construction and use of standards of comparison has not been investigated. To understand this issue, it is desirable to distinguish between the processes that occur at the time that information is received and those that occur later when people make a judgment. The influence of awareness may be different at each point.

In this article, we first provide a conceptualization of how internal standards are constructed and applied, and report an experiment that validates three hypotheses stemming from this conceptualization. We then address the central issue of concern (i.e., the extent to which internal standards are constructed automatically) through four additional experiments in which we systematically vary the salience of contextual information at the time that the judgment is made. In combination, these experiments provide compelling evidence that the standards people construct in judging products can be influenced by stimuli of which they are unaware and that are objectively irrelevant to the products they are evaluating. Furthermore, the effect of these standards can persist over time.

## CONCEPTUAL FRAMEWORK

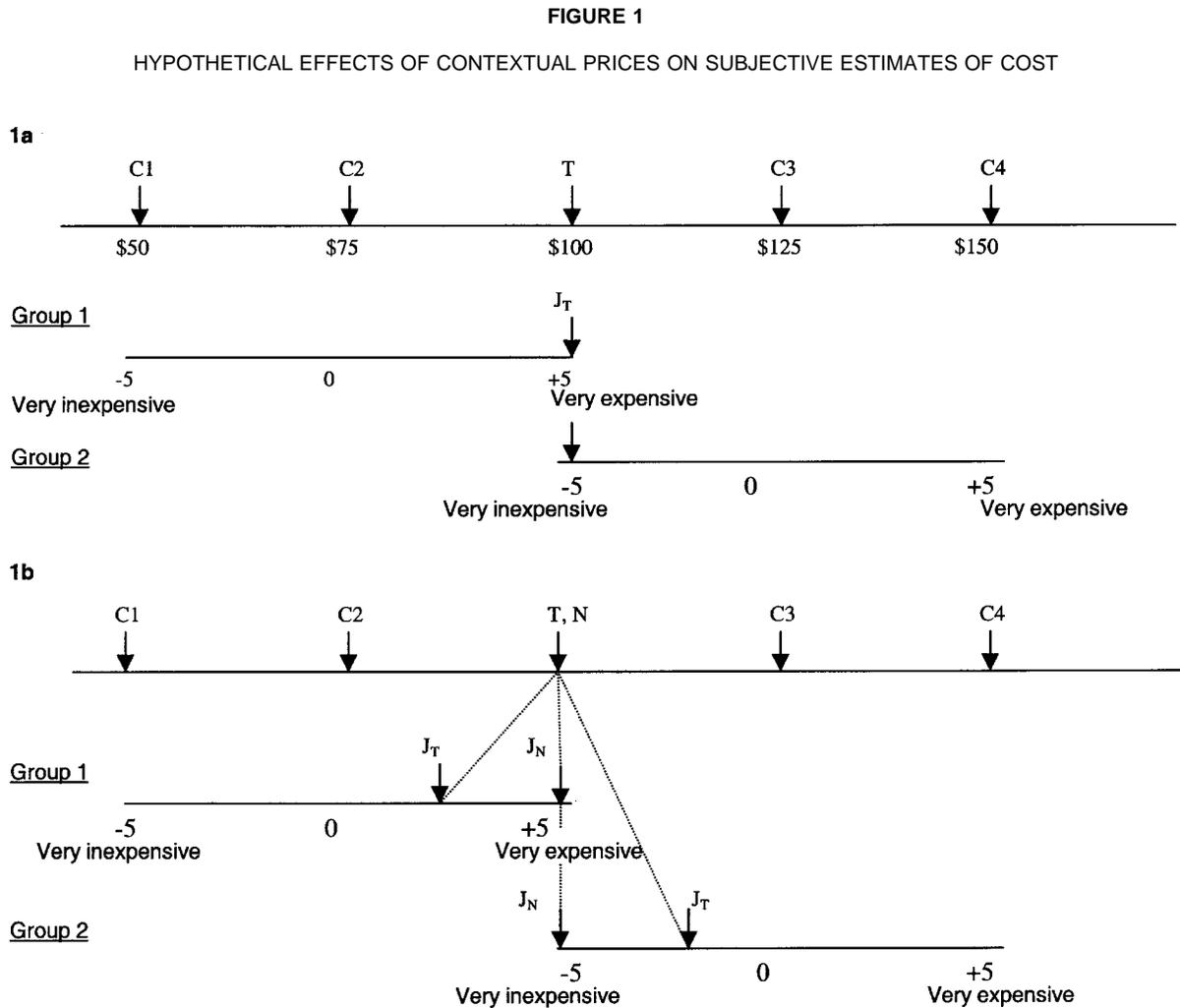
When consumers receive objective information about a product (e.g., \$50, 100% cashmere), they may translate it into subjective values (e.g., expensive, soft). This translation requires that they relate the information to a standard that could be based in part on the central tendency of the objective stimulus values that they have encountered either in the immediate situation or in the past (Helson 1964), and on the range of these values (Janiszewski and Lichtenstein 1999; Lynch et al. 1991; Ostrom and Upshaw 1968; Parducci 1965). The processes that underlie the use of either the mean or the range of the stimulus values are not incompatible, and both may influence product judgments at the different stages outlined below.

### Information Acquisition

Suppose some consumers visit a store that offers relatively low-priced products, and they encounter a \$100 target product (T) in the context of two others (C1 and C2) priced at \$50 and \$75, respectively. Suppose other consumers visit a different store that offers relatively high-priced products, and they encounter the same target product in the context of two others (C3 and C4) priced at \$125 and \$150, respectively. The positions of these products along a continuum of objective prices are shown in figure 1a. If the three products to which each group of customers is exposed represent the totality of their experience with this type of product, then only these products will influence the standards that are constructed. The prices of the three products may be subjectively integrated to form a weighted value representing a typical price of the products in question, or "adaptation level" (Helson 1964). In addition, each set of prices (\$50–\$100 or \$100–\$150) may provide consumers with a "subjective" perspective concerning the range of prices that products of this type are likely to have (Ostrom and Upshaw 1968; Parducci 1965).

### Judgment Processes

Now imagine that both groups of consumers judge the price of the products along a scale from  $-5$  (very inexpen-



NOTE.—Figure 1a shows the effects of context products (C1–C4) on judgments of the target product (T) at the time that it was first presented. The positions of these products are indicated along an objective continuum of price. Expression  $J_T$  denotes the judgment of the target along a rating scale of subjective cost by persons who are exposed to low-price context products (group 1) and persons who are exposed to high-price context products (group 2). Figure 1b shows the effects of context products on judgments of both the target product and a new product after a delay. Expression N denotes the position of the new product along the objective continuum of price, and  $J_N$  denotes its judgment along the rating scale in high- and low-price context conditions.

sive) to +5 (very expensive). If they make their judgments when they first see the information, they may position the scale to include the highest and lowest objective prices that they consider relevant, based on the perspective that they have formed. Consequently, consumers in the first group (group 1) should position the scale to include prices that range between T and C1, whereas those in the second group (group 2) should position it to include prices that range from T to C4 (see fig. 1a). In each case, their adaptation level will presumably be positioned near the center of the scale (Parducci 1965). As a result, the first group will judge T's price ( $J_T$ ) close to +5 (i.e., as expensive), but the second group will judge it close to -5 (i.e., as inexpensive).

Alternately, suppose the two groups of consumers merely examine the product prices at the time that they first receive

information about them but do not make judgments of their expensiveness. Upshaw (1969; see also Helson 1964) suggests that over time, the remembered values of the individual stimuli gradually become assimilated to the adaptation level. Thus, these values become less distinguishable both from one another and from the adaptation level itself. Nevertheless, the perspective formed on the basis of the original context stimuli (which determines the range of values considered relevant) may persist. As a result, it may continue to influence judgments of both the original stimuli and new ones.

This possibility has interesting implications. Suppose consumers in each group visit a third store at some later time and judge a new product (N) that is similar in price to the target. At this point, they may also judge the target product

(T) based on whatever they remember of it. If their perspective has not changed in the interim and no additional contextual information is present, both groups should assign the new product (N) a rating along the judgment scale ( $J_N$ ) that is similar to the value they might have assigned to the target at the time that they first encountered it (see fig. 1a). However, by this time, their memory for the target's price is presumably assimilated or partially displaced toward the adaptation level. Thus, their judgments of the target's expensiveness at this point in time should be closer to the center of the scale and, thus, less extreme ( $J_T$  in fig. 1b).

The aforementioned effects of context on judgments of a new product and the difference between these effects and the effects on judgments of the target after a period of time has elapsed are captured by the following hypotheses:

**H1:** Consumers will judge a target product to be less expensive if they have previously encountered it in the context of higher-priced products than if they have encountered it in the context of lower-priced products. Moreover, these effects will generalize to judgments of a new product that is ostensibly similar to the target but is encountered some time later.

**H2:** If consumers do not evaluate the target product until some time after it was first encountered, its original context will have less influence on their evaluation of it than on their evaluation of a new product that they have not previously considered.

An additional hypothesis is suggested by the preceding analysis. Suppose consumers are asked to recall the price of the target product immediately after information about it is presented. In this case, they should report it fairly accurately, and this should be true regardless of the context in which the product was encountered. As noted earlier, however, memory for the target price after a period of time has elapsed presumably becomes partially assimilated to the adaptation level (i.e., to a price corresponding to the position of  $J_T$  in fig. 1b). As can be seen from this figure, this price is lower when the context prices (and therefore, the adaptation level) are low than when they are high. This is true even though  $J_T$  has a higher value along the subjective scale of expensiveness in the first condition than in the second. In other words, although consumers should judge the target to be more expensive when it is encountered in a low-priced context than when it is encountered in a high-priced context, they should recall the actual price of the product to be lower in the former condition. To formalize:

**H3:** Consumers will remember the actual price of a product as being lower if they have previously seen it in the context of low-priced products than if they have seen it in the context of high-priced products.

## The Role of Consciousness in the Construction and Use of Comparative Standards

The preceding discussion leaves an important question unanswered. That is, are the effects of contextual stimuli on judgments implied by hypotheses 1–3 the result of deliberative cognitive activity? Or, can these stimuli influence a person's standard of comparison in the absence of awareness? As noted earlier, it is important to distinguish between (a) individuals' awareness of the fact that they are *applying* a standard of comparison at the time that they make a judgment and (b) their awareness of the stimulus experiences that influence the *construction* of this standard (for a similar distinction, see Higgins and Lieberman [1994]). The application of a standard in reporting a subjective judgment may be intentional. Thus, the response processes postulated by Lynch et al. (1991) and described earlier may be the result of deliberative attempts to assign each stimulus a scale value that reflects its position relative to others that are relevant.

However, the process of constructing this standard may not always be the result of deliberative cognitive activity. As Helson (1964) assumes, people's experiences before being exposed to the stimulus they are judging can also influence the standard that they apply (see also Parducci 1965). Furthermore, they may not always be conscious of the specific experiences that exert this influence (Herr 1989). Thus, for example, consumers might judge a \$50 shirt as "expensive"—based on a general impression that the price is relatively high—without remembering the basis for this impression (Monroe and Lee 1999).

As noted earlier, research on the influence of concept accessibility indicates that previously acquired knowledge may influence the interpretation of new information and judgments without an awareness of why this particular subset of knowledge is applied (for reviews, see Bargh [1997]; Higgins [1996]; Wyer and Srull [1989]). However, these results do not have direct implications for the issues of concern in this article. In much of the previous research on concept accessibility, individuals are asked to interpret a behavior in terms of a more abstract concept. In these conditions, subliminally primed experiences can influence which of several applicable concepts is used to interpret the behavior. The judgment processes of concern in the present research are quite different. Here, participants evaluate a product's attribute (e.g., price) in relation to a standard that is defined in terms of attributes at the same level of abstractness (i.e., other prices). It seems likely that in this situation experiences of which consumers are unaware could influence the construction of this standard and could have an influence on their judgments. However, this possibility has not been empirically established in the research reported to date.

## EXPERIMENT 1

Experiment 1 provides support for hypotheses 1–3. In addition, it shows that the standards people apply can be influenced by product information that is incidental to the

goal that they are pursuing when they encounter this information.

## Method

**Design.** Participants were 95 undergraduate business students (37 males and 58 females) who received extra course credit for participating. They were randomly assigned to one of eight conditions of processing objective (product-evaluation vs. ad-evaluation), focus (target product vs. collective), and price context (high vs. low).

**Procedure.** At the beginning of the experiment, participants were told that a company had made three models of a cordless phone with built-in caller ID. We further indicated that initial pretesting showed that consumers considered the three models to be equal in quality, and so the company had decided to market all three as a series in their product line. However, they wanted to perform one final pretest before launching them. With this preamble, participants under *product-evaluation* conditions were told that their objective was to evaluate the three models, and that they should attend to the product features (e.g., price, range, warranty, etc.) when they evaluated the models. In contrast, participants in the *ad-evaluation* conditions were told that their objective was to evaluate the three advertising layouts. Therefore, they were asked to attend to the aesthetic elements of the ad (e.g., the position of the headline, the amount of white space, and overall layout). Participants within each task objective were then asked to consider three ads.

To provide an additional indication of the extent to which standards are formed spontaneously, we told participants either to focus their attention on the third product (advertisement) or to evaluate the three products as a group (*target focus* vs. *collective focus*). We speculated that if participants form a standard deliberately, they might be more likely to do so in the target-focus condition than in the collective-focus condition. However, if they form standards spontaneously as a result of simply being exposed to product information, they might construct the standard in collective-focus conditions as well.

The three advertisements that participants saw had different layouts. However, each showed a picture of the model, a headline that introduced it by name (Ultralite-Pro, Ultralite-Tele, and Ultralite-Solo), a brief description of its features, and its price. The first two advertisements provided a context. These advertisements described products priced either at \$197.85 and \$184.75 (high-priced context) or at \$127.65 and \$134.75 (low-priced context). The third, target advertisement described a product that was in all cases priced at \$159.65. To ensure that the product features were equivalent with respect to all attributes but price, three sets of product features were created. While some of the features in the set remained constant between phones (e.g., warranty), others varied marginally (e.g., a range of 295–300 feet, 25–26 channels, 20–22-number memory dialing). Except for price, the three layouts and product descriptions were counterbalanced so that each ad or product description appeared

as the target a similar proportion of times in the third position.<sup>1</sup>

After viewing the ads in one of these conditions, participants were asked a series of general questions to legitimize the ostensible purpose of the study. For example, participants were asked which product (or ad) they liked best and why. Next, participants under product-evaluation conditions were asked about the attractiveness of the models that they saw and the extent to which they were influenced by specific features, by the name of the product, and by its price. In contrast, participants under ad-evaluation conditions were asked about the attractiveness of the layouts, the extent to which they were influenced by the location of the picture, the headline, and its readability. These questions were not relevant to the issues of concern in the study and are not discussed further.

After participants had responded to this initial questionnaire, they performed a 30-minute distracter task to decrease the salience of the specific product information they had seen. Then, they were asked to return to the original experiment and complete a final questionnaire. At this point, they were shown a new ad for a cordless phone that was ostensibly being promoted by a competitor. The competitor's product (called Slimline) was priced at \$157.89 (a price similar to that of the target product). Participants were asked to compare this new product with the target product that they had seen half an hour earlier. (In collective-focus and ad-evaluation conditions, participants had not previously been told to consider the target product per se. However, they were told to recall whatever they could of the third product that they had seen and to compare it to the new one.) Participants first indicated their preference for the two products. Then, they judged each product separately using 11-point (–5 to +5) scales. Three scales pertained to sacrifice (i.e., how expensive the product was, how much it would hurt to pay the price being asked, and how much it cost). Three other scales pertained to liking for the brand (i.e., whether the brand was attractive, desirable, or something that they liked).

Two procedures were used to assess participants' memory for the target product's price. First, participants were asked to recall the price of the target product as accurately as possible. Then they were given an incomplete price fragment (\$1\_\_\_.5) and asked to complete the fragment so that it matched the price of the target product that they had considered earlier.

<sup>1</sup>An initial pretest on 20 participants (using these product and price descriptions) revealed that the target was not seen as different from the context products in terms of quality as a result of these different price points. Participants who rated the quality of the target product while focusing specifically on the price of the three products indicated that its quality was similar both when the context products were high in price ( $M = 2.0$ ) and when they were low ( $M = 2.2$ ),  $F < 1$ . Given that these products were from the same manufacturer's product line, it is not surprising that the perceived quality of the target product did not vary significantly with the price context (see Grewal, Monroe, and Krishnan [1998] for a similar result).

## Results

Suppose participants only form a standard on the basis of product information when their goal at the time they receive the information is one to which the standard is relevant. Then, the effects of the context products on the perspective they form, and thus on the judgments that they report later, should be evident only under the first, product-evaluation condition. Furthermore, these effects might depend on whether participants focused on the target product or on the set of products (collective) at the time that the product information was presented.

Alternatively, suppose the standard that results from participants' initial exposure to the context and target products is formed automatically. Then, it could influence participants' later judgments regardless of whether their initial processing objective was to evaluate the product or the ads, and regardless of whether they were told to focus their attention on the target product alone or on the set of products as a whole.

Data were analyzed as a function of context (high vs. low price), processing objectives (product evaluation vs. ad evaluation), and focus (target focus vs. collective focus). When analyzing judgment data, product type (target vs. new) was treated as an additional, within-subjects variable.

*Effects on Judgments of Sacrifice.* According to hypothesis 1, participants should judge both the target product and the new product as less expensive when the context products that accompanied the target were higher in price than when they were lower. Because the target product's evaluation was delayed, however, hypothesis 2 asserts that the context should have less effect on judgments of the target than on judgments of the new product.

These hypotheses were confirmed. Consistent with hypothesis 1, participants judged both the target and new products to be less expensive when the price of the context products was high ( $M = 0.70$ ) than when it was low ( $M = 1.71$ ),  $F(1, 89) = 9.05$ ,  $p < .01$ ,  $\eta^2 = .092$ . However, this difference was significantly greater in the case of the new product (0.62 vs. 1.92) than in the case of the target product (0.78 vs. 1.50),  $F(1, 89) = 6.16$ ,  $p < .02$ ,  $\eta^2 = .065$  (hypothesis 2). The difference did not significantly depend on whether their processing objective was to evaluate the products (1.09 vs. 2.44) or the ads (0.31 vs. 0.99),  $F(1, 89) = 1.03$ ,  $p > .10$ . Nor did this difference depend on whether participants were told to focus attention on the target (0.27 vs. 1.41) or the collective (1.13 vs. 2.02),  $F < 1$ .

*Effects on Judgments of Liking.* It seemed reasonable to suppose that participants would like products less when they perceived them to be expensive than when they did not. Consistent with this expectation, participants liked the products more when the context products were high in price than when they were low (2.27 vs. 1.55),  $F(1, 87) = 4.98$ ,  $p < .05$ ,  $\eta^2 = .054$ . This result generalized to ratings of both the target (2.42 vs. 1.58) and the new product (2.12

vs. 1.53) and did not depend on either task objectives or focus conditions ( $p > .10$  in each case).

The directionally different effects of context on sacrifice and liking judgments were confirmed in an overall analysis of data that included type of judgment as an additional within-subject variable. This analysis yielded a highly significant interaction of context and type of judgment,  $F(1, 87) = 11.35$ ,  $p < .01$ ,  $\eta^2 = .115$ . The contingency of these effects on product type (target vs. new) was not reliable, however ( $p > .10$ ).

*Memory.* Hypothesis 3 predicts that although participants judge the target product to be less expensive when the context products' prices are high than when they are low, they will recollect the actual price of this product to be higher in the high-price context than in the low-price context. Participants' free recall of the target's price was marginally higher when the context products' prices were high ( $M = \$154.97$ ) than when they were low ( $M = \$147.02$ ),  $F(1, 89) = 2.88$ ,  $p < .10$ ,  $\eta^2 = .031$ . The recalled price of the product in the fragment-completion task was also higher in the high-price context conditions ( $M = \$161.50$ ) than in low-price context conditions ( $M = \$150.84$ ),  $F(1, 88) = 23.00$ ,  $p < .01$ ,  $\eta^2 = .207$ . This difference was not contingent on either processing objectives or focus ( $p > .10$ ).

## Discussion

The results of experiment 1 were consistent with hypotheses 1–3 and provided support for our conceptual framework. That is, prices of the contextual products were shown to have a contrast effect on judgments of sacrifice for both the target product and the new product. Moreover, these effects, which occurred 30 minutes after participants had been exposed to the target product, had a greater effect on sacrifice judgments of the new product than on sacrifice judgments of the target itself. On the other hand, although the target product was judged to be less expensive when it had been encountered in a high-priced context than when it had been presented in a low-priced context, its price was remembered as relatively higher in the high-price context than in the low-priced context.

Of particular importance is the fact that the context effects we observed were not appreciably different when participants were told to focus their attention on the ad layout than when they were told explicitly to evaluate the products themselves. This was true not only for judgments of the target's expensiveness but also for memory of the target's price. The latter finding is particularly noteworthy. That is, participants might be expected to pay more attention to the target's price and, therefore, to remember it more accurately, when its price is relevant to the goal that they are pursuing at the time that they encounter it (i.e., product evaluation conditions). Yet, the effect of context on the price that participants remembered was no different in these conditions than in ad-evaluation conditions. In one sense, this is not too surprising. Dickson and Sawyer (1990) found that consumers often

cannot accurately remember the prices of products even when they are asked almost immediately after they have purchased them. However, the similar effects of context in the two processing objective conditions is consistent with the assumption that the assimilation of participants' perceptions of the target's price to their adaptation level occurred automatically and, therefore, was independent of any specific objective that participants were pursuing at the time.

## EXPERIMENT 2

Although the findings from experiment 1 suggest that standards of comparisons may be constructed spontaneously, several questions remain. Most studies of the effects of context on judgment and choice have not examined whether these effects persist over time (cf. Brickman, Coates, and Janoff-Bulman 1978). Context effects are implicitly assumed to be relatively short-lived and restricted to situations in which consumers make on-line evaluations. However, this assumption may not be true, and the effects of context may generalize to new situations over time.

Experiment 2 investigated the extent to which the standards that consumers construct and use as a basis for product evaluations persist over time and are applied to product evaluations to which they may not be directly relevant. In this study, participants were not presented with the new product until 48 hours after the context and target product had been presented. Under these conditions, the prices of the target and context products should be even more completely assimilated into the pool of past experiences that make up participants' adaptation levels than they were in experiment 1. Even though these prices may not be explicitly remembered, their effects on the standards that participants construct, and then apply when rating the two products at a later point in time, may continue to be evident. Further, these standards may be applied in judging products to which they are not directly relevant.

In this context, it is worth noting that several studies suggest that once people have judged a stimulus in relation to a context-based standard, they may retrieve the judgment they made out of context and use it as a basis for their later responses to other stimuli. In doing so, they may fail to take into account the context in which the judgment was originally made (Higgins and Lurie 1983; Sherman et al. 1978). Furthermore, this judgment may be retained in memory longer than the actual information that gave rise to it. Although this tendency has been found in research on social judgment (Carlston 1980a; Higgins and Lurie 1983), the results of investigations in the consumer domain have been mixed (cf. Alba, Marmorstein, and Chattopadhyay 1992; Kardes 1986). However, one implication of research in both areas is that consumers may, under some conditions, generate verbal descriptions of the judgments that they make. These descriptions could then be retrieved and used as a basis for later evaluations, independently of the comparative standards they constructed on exposure to the context information.

To test this possibility in the present research, we asked

participants in some conditions to write down the reasons for their reactions to the target and context products at the time that they were exposed to the product information (explanation generation). These instructions should induce participants to generate implicit or explicit verbal descriptions of the products (e.g., "expensive" or "inexpensive") that, once formed, are likely to be retained in memory. If these participants are asked 48 hours later to recall the target and to rate the sacrifice required to purchase it, they may remember their descriptions of the products they had encountered earlier. However, the effects of these verbal descriptors may depend on whether participants also recall the particular products to which these descriptions were applied. If they cannot do so, their use of these verbal descriptions as a basis for judgment could offset or reverse the effects of context that would otherwise occur.

Suppose, for example, that participants in the high-price context conditions are asked to explain their reactions in session 1. In doing so, they may describe the context products as "relatively expensive" and the target as "relatively inexpensive." If they are asked 48 hours later to judge the target, they may remember that *most* of the products were "relatively expensive" but may not remember which product was which. (This possibility seemed particularly likely in the conditions that we investigated, as product features, other than price, were very similar.) To this extent, they might judge the target to be more expensive (and more like the majority of the products) than would participants in low-priced context conditions (who might remember that most of the products were "relatively inexpensive"). Thus, when participants generate these verbal labels under explanation-generation conditions, the contrast effect of the context stimuli on these judgments might not be evident.

- H4:** If participants provide explanations for why they like the context and target products at the time that they first encounter them, the effects of the context products on their judgments of the target at a later point in time will be reduced in magnitude, relative to conditions in which explanations are not generated.

## Method

Fifty male and 70 female introductory business students participated in the experiment for extra course credit. They were assigned randomly to each combination of price context (low vs. high), focus (target vs. collective), and explanation generation.

*Procedure.* Participants initially received stimulus materials and instructions identical to those employed under the product-evaluation conditions of experiment 1. Instructions to focus on either the target or the collective were also similar. After reading the ads containing the product information, participants under *target-focus* conditions reported their liking for the target, its attractiveness, and its desirability, whereas participants under *collective-focus* conditions made corresponding ratings of the set of products as a col-

lective. Then, participants under *explanation-generation* conditions were asked to write down their reasons for their product evaluations, whereas participants under *no-explanation* conditions were not given this task. Participants returned 48 hours later ostensibly for another experiment. At this point, they were given the ad for the new product and provided ratings of both this product and the target according to procedures used in the first experiment.

Before receiving materials in session 2, however, half the participants in each experimental condition were administered an additional questionnaire that provided an unobtrusive measure of the persistence of the standard that we assumed that they had formed in session 1. Specifically, the experimenter walked in and out of the lab a few times looking somewhat disturbed. After a brief delay, she announced that the professor in the adjacent lab (who the participants had actually seen conducting a study) had been called away on an emergency. Before leaving, however, he had asked if participants in our study could complete a short questionnaire that he had been unable to administer. The questionnaire was prepared in a different font and had the other professor's name on it. Pictures of eight different products were presented (cordless phone, shirt, compact disk player, toaster, shoes, carry-on suitcase, boom box, and a pair of shorts), and participants were asked to complete a price fragment that was provided beside each picture (e.g., \$ 1\_\_5\_, \$ 9.3\_, etc.) in a way that indicated the typical price of the product portrayed. The picture of the cordless phone presented was different from that shown in the earlier session and appeared after a couple of other products in order to minimize the likelihood that the context effects on the price estimates of the phone would guide price estimates of other products.

After completing this task, participants were reminded of the study that they had participated in 48 hours earlier. Then, they were given the ad for the new product and rated both this product and the target following procedures used in the first experiment. (The other half of the subjects, who did not receive this additional questionnaire, proceeded to evaluate the new product directly.)

## Results

*Persistence of Standards over Time.* If the target and context products that participants considered in session 1 influenced the standard that they used as a basis for their judgments, its persistence over time should be reflected in the price estimates that they made in session 2. That is, their estimates of the typical price of cordless phones should be displaced toward the value of their adaptation level and, therefore, should be higher when the context prices they had considered earlier were high than when they were low. Moreover, if the effects of context carry over to other product categories, this effect should be reflected in the price estimates of other products as well.

To examine this possibility, participants' price estimates for all products were converted to standard scores, and the es-

timates for products (other than the phone) were averaged to create a composite index of price estimates for "other" products. An overall analysis of these two price estimates as a function of context, focus, explanation-generation conditions, and type of product (phone vs. other) indicated that participants estimated products to be generally higher in price when the context products they had seen in session 1 were high-priced ( $M = .20$ ) than when they were low-priced ( $M = -.17$ ),  $F(1, 45) = 4.18$ ,  $p < .05$ ,  $\eta^2 = .085$ , and this difference did not significantly depend on either focus or explanation generation. Moreover, although the initial price context had more influence on the estimated price of phones (.31 vs.  $-.28$ ) than on other types of products (.08 vs.  $-.06$ ), this difference was small,  $F(1, 45) = 2.90$ ,  $p < .10$ ,  $\eta^2 = .061$ . The results suggest that the effects induced by exposure to high- and low-priced phones affected the standards that participants applied not only to phones but also to other types of products.

*Effects on Judgments of Sacrifice.* If the effects of context persist over a period of 48 hours, these effects on product judgments under no-explanation conditions should be similar to those observed in experiment 1 and implied by hypothesis 1. However, when participants explained their reactions to the products in the first session, we expected them to label the products subjectively as "expensive" or "inexpensive." Then, when evaluating the target products in session 2, the participants were expected to remember the subjective descriptions pertaining to the majority of the products since they were unclear about the specific products to which the descriptions pertained. If participants based their judgments on these labels, the effects of perspective that occur under no-explanation conditions might be mitigated or even reversed.

Participants' judgments in session 2 were analyzed separately as a function of context, focus, and explanation conditions, treating product type (target vs. new) as an additional within-subject variable.<sup>2</sup> Consistent with the results of experiment 1, participants in no-explanation conditions judged the two products to be *less* expensive when the context products presented in session 1 were high in price ( $M = 0.96$ ) than when they were low in price ( $M = 1.78$ ),  $F(1, 104) = 3.20$ ,  $p < .08$ ,  $\eta^2 = .053$ . This result occurred for both the new product (0.89 vs. 1.69) and the target (1.03 vs. 1.87).

However, when participants wrote down explanations for their reactions to products in the first session, they judged the products in session 2 to be *more* expensive when the context products had been high-priced ( $M = 1.50$ ) than when they had been low-priced ( $M = 0.88$ ),  $F(1, 104) =$

<sup>2</sup>Half of the participants in each of the experimental conditions completed the initial price-estimation questionnaire and half did not. Several effects involving this variable were reliable. However, few involved context, and virtually all were not clearly interpretable and were irrelevant to the issues of primary concern in the study. It seemed desirable to eliminate this source of systematic variance from the error terms used to evaluate the effects to be reported. However, the use of this strategy had little impact on the conclusions to be drawn.

4.16,  $p < .05$ ,  $\eta^2 = .084$ . This result occurred for both the new product (1.50 vs. 1.10) and the target (1.57 vs. 1.67). This pattern of results predicted by hypothesis 4 is confirmed by an interaction of context and explanation-generation conditions,  $F(1, 104) = 7.41$ ,  $p < .01$ ,  $\eta^2 = .067$ , that is not contingent on product type or focus conditions (in each case,  $p > .10$ ).

*Persistence of Liking Judgments across Sessions 1 and 2.* The extent to which prior judgments persisted and had an effect on later ones was particularly evident in participants' estimates of liking for the product that they considered. In session 1, participants made explicit judgments of their liking for either the target (in target-focus conditions) or the set of products as a whole (in collective-focus conditions). Then 48 hours later, in session 2, they indicated their liking for both the target and the new product. The three judgments (liking for the target/collective in session 1, liking for the target in session 2, and liking for the new product in session 2) were analyzed as a function of context, focus, and explanation generation. Data pertaining to these ratings are summarized in table 1. Participants under target-focus conditions rated the target as more likable (because it was less expensive) when it had been presented in a high-priced context than when it had been conveyed in a low-priced context, replicating the results of experiment 1. Moreover, these effects persisted over time and were evident in judgments of the new product as well as the target itself.

In contrast, participants who were asked to report their liking for the collective in session 1 evaluated it similarly in both context conditions. When these participants were asked in session 2 to report their liking for the target alone, they apparently could not remember the features of the target per se. Therefore, they recalled the value of the collective that they had made earlier and had used it as a basis for evaluating the target, thus judging it (and also the new product) as equally likable in both context conditions. This pattern of results is confirmed by an interaction of focus and context,  $F(1, 112) = 4.33$ ,  $p < .05$ ,  $\eta^2 = .037$ , that did not depend on either explanation generation or judgment type ( $F < 1$ ).

## Discussion

The products that participants considered during the first session of the experiment had an influence on their judgments of the price of products that they encountered 48 hours later during an ostensibly unrelated study. This finding is consistent with the assumption that the standards people form as a result of past, product-relevant experiences are not restricted to the particular set of products that they encountered in the course of these experiences. Moreover, the effects of past experiences on these standards can be detected as long as two days after the specific stimuli that led to their formation have been encountered.

The effect of perspective on judgments is most evident under conditions in which participants are unlikely to have elaborated their thoughts about the products that influenced its formation. When participants implicitly or explicitly describe the basis for their reactions to products at the time that they first encounter them, they may later recall these descriptions and use them as criteria for rating both these and other products. As the results suggest, this tendency may offset or even reverse the effects of perspective that occur in the absence of this initial cognitive activity.

The fact that judgments of the target under no-explanation conditions were as strongly affected by context stimuli as judgments of the new product might appear contradictory to hypothesis 2. That is, if the price of the target had been assimilated to participants' adaptation level, the effects of context on the perceived sacrifice associated with the product should be low (see fig. 1). However, this prediction assumes that participants had some memory for the prices attached to the products in session 1. In contrast, it is conceivable that although participants had little explicit memory for the specific features of any of the products that they had considered 48 hours earlier, they nevertheless recognized the target as generally similar to the new product that they were shown. Therefore, they judged the target to be similar to the new product in cost as well.

## EXPERIMENT 3

The previous experiments provide evidence that the effects of context can occur without any deliberate goal-di-

TABLE 1

LIKING JUDGMENTS AS A FUNCTION OF ATTENTIONAL FOCUS AND THE CONTEXT IN WHICH THE TARGET WAS PRESENTED—EXPERIMENT 2

| Judgments                               | Target focus conditions |                   | Collective focus conditions |                   |
|---|-------------------------|-------------------|-----------------------------|-------------------|
|   | High-price context      | Low-price context | High-price context          | Low-price context |
| Liking for target/collective, session 1 | 3.13                    | 1.75              | 2.94                        | 3.02              |
| Liking for target, session 2            | 2.45                    | 1.77              | 2.62                        | 2.69              |
| Liking for new product, session 2       | 2.52                    | 2.00              | 2.68                        | 2.62              |

rected activity (experiment 1) and can also influence participants' price estimates in an ostensibly unrelated experiment 48 hours later (experiment 2). These findings suggest indirectly that the standard of comparison may be constructed without awareness of the stimuli on which it may be based. That is, although people may be aware at the time of judgment that they are evaluating them on the basis of an internal standard, they may not always be aware of the experiences that influence this standard. The next three experiments provide more direct evidence that comparative standards can be constructed without awareness.

Participants in experiment 3 were subliminally exposed to either high prices or low prices while they performed a letter-identification task. Then, as part of an ostensibly unrelated experiment, they evaluated a product (a camera) on the basis of information about its price and other product attributes. We expected that subliminally priming participants with high prices might induce the construction of a perspective that includes a high range of values whereas priming low prices might lead to the construction of a perspective that includes a low range of values. If so, participants should judge the camera that they encounter later as less expensive when they have been primed with high prices than when they have been primed with low prices.

## Method

Forty undergraduate business majors participated in the experiment for extra course credit. Participants were told that they would be asked to take part in a number of short studies that were unrelated to one another but were being run together to allow them to get one full hour of experimental credit.

*Subliminal Priming Task.* Participants were then told that the first study was on visual perception and would require the use of the computer. The instructions went on to indicate that the objective of the task was to determine how quickly and accurately people could respond to visual stimuli. Participants were told that when they started the program, a string of letters would appear in a small box on the screen (e.g., "aaaaaaa") and that they should report as quickly as possible whether the string of letters contained consonants or vowels by pressing a designated key on the computer keyboard. They were told that as soon as they responded to one string of letters, they would see a series of dashes (e.g., "-----"), after which another string of letters would appear (e.g., "ppppppp"). They were informed that the presentation of different strings of letters would continue for a number of trials and that on each trial, they should indicate if the string of letters contained vowels or consonants. The computer ostensibly recorded their responses and provided researchers with the data necessary to assess visual perception and manual dexterity skills.

Participants performed 46 trials of the task just described. Unknown to the participants, a two-digit number was presented between successive trials. Specifically, after a letter string had been judged, a series of dashes appeared on the

screen for 1.5 seconds. Then, a number (the subliminal prime) appeared for 15 milliseconds followed immediately by a mask that remained on the screen for 120 milliseconds to prevent an afterimage. After the mask, the next letter string to be judged was presented. Each number was positioned in the same location as the letter string. In the *low-price* priming conditions, the prices ranged from \$15 to \$29, and under *high-price* priming conditions, they ranged from \$85 to \$99. The subliminal priming procedure used here and elsewhere is consistent with general guidelines established by Bargh and Chartrand (2000).

*Product Evaluation Task.* On completion of the subliminal priming task, participants were told that the second task was a paper and pencil study on product evaluations. They were presented with information about a product and asked to form an impression of the price of the product described (i.e., how expensive or inexpensive it was). The product information pertained to a 35-millimeter camera with the following features: auto focus with focus lock, auto flash with red eye reduction, auto film loading, advance and rewinding, 35–80 zoom, self-timer, quartz date, and time imprint. It was priced at \$69.99 (a value that was in between the magnitudes primed under high- and low-price priming conditions). After reading the description of the product, participants evaluated how expensive it was and how much it would hurt to pay the price. They also indicated how much they liked the product. These judgments were made along scales from  $-5$  to  $+5$ .

*Manipulation Checks.* Following these judgments, participants were told that sometimes people's responses to an evaluation task are influenced by what they did earlier in the experiment. On this pretence, they were asked if the visual perception task influenced their evaluation of the product and, if it did, in what way. They were also asked if they thought that the two tasks they had performed up to that point were related and, if so, in what way.

Finally, consistent with guidelines established (see Bargh and Chartrand 2000), we told participants that the program we had employed in the visual perception task had previously been used to present numbers and that we needed to determine whether we had successfully erased the numbers from the screen. With this general introduction, we asked them to go through the visual perception exercise again and, in this case, to determine if they could see any numbers between the time that the dashes went off the screen and the time that the next string of letters appeared. We asked them to indicate on each trial whether they saw a number and, if so, what it was.

## Results

No participants reported insight into the relationship between the visual-perception task and the product-evaluation task or indicated that the first task had any influence on their judgments. Moreover, no respondent reported seeing anything even after being told that something might have been flashed

on the screen during the subliminal priming task. Nevertheless, priming had a similar contrast effect on both sacrifice and liking. Specifically, participants judged the product to be less expensive if they were primed with higher prices than if they were primed with low prices ( $-1.0$  vs.  $.10$ , respectively), and they also liked the product relatively less in the former condition ( $1.50$  vs.  $2.40$ ). These effects were not significant when evaluated in isolation ( $F(1, 38) = 2.22$  and  $2.61$ , respectively;  $p > .10$  in each case). However, an overall analysis of judgments as a function of priming magnitude and judgment type yielded a significant effect of priming,  $F(1, 37) = 4.42$ ,  $p < .05$ ,  $\eta^2 = .104$ , that was not contingent on judgment type,  $F < 1$ .

## Discussion

Participants' judgments of the cost of the target product in experiment 3 were influenced by prices to which they were subliminally exposed. This result indicates that the standards they used when making these judgments were constructed automatically on the basis of stimuli of which they were not consciously aware. However, the fact that priming had similar effects on participants' liking for the target is intriguing. One might intuitively expect that subliminally priming high prices, which decreased judgments of the product's cost, would increase liking for the product, as it did in experiments 1 and 2. In fact, however, the opposite occurred.

A possible interpretation of these findings is that when the priming stimuli are presented subliminally, they may not activate concepts of high and low prices per se but, rather, more general concepts of high and low magnitude. Research on numerical cognition (Dehaene 1992) suggests that Arabic numerals are translated automatically into a quantity representation and that these quantities are processed similarly regardless of the units in which they are presented (dollars, grams, meters, etc.). If the subliminally primed prices are indeed represented as unitless magnitude representations, they may have independent effects on both the standard used to judge liking and the standard used to judge sacrifice, and these effects may occur over and above the tendency to infer one of these judgments (i.e., liking) from the other (i.e., sacrifice). In other words, although participants in this experiment may have in fact inferred their liking for the product from its cost, the negative relation between liking and sacrifice that resulted from this inference was overridden by a more general effect of priming that influenced judgments along each dimension independently. In this regard, Schwarz and Wyer (1985) found that unobtrusively stimulating participants to think about high or low values along one dimension (i.e., the importance of a marriage partner's attributes) influenced their ratings of stimuli along a totally different dimension (i.e., the importance of social issues). Similar processes might have occurred in experiment 3.

Note that comparable effects would not be expected in experiments 1 and 2, in which the context stimuli that affected participants' standards were not subliminal. In these

experiments, the concepts activated by the context stimuli may have pertained to price alone. These concepts may have affected the standard used to judge sacrifice but not the standard used to judge liking. As a result, the negative relation between perceptions of sacrifice and liking were more apparent.

## EXPERIMENT 4

Our interpretation of experiment 3 has further implications. That is, it assumes that subliminally primed stimuli may have similar effects on the standards that participants use in making judgments regardless of the dimension along which these stimuli vary. For example, priming high and low values along irrelevant dimensions (e.g., weights) might have the same effect as priming high versus low prices. To explore this possibility, participants in some conditions of experiment 4 were subliminally primed with stimuli in units of weight (grams) rather than price. If our interpretation of experiment 3's findings is correct, the effects of these primes should be similar to those seen in experiment 3 despite the irrelevance of the dimension along which they varied.

## Method

Sixty-one undergraduate business majors participated in the study for extra course credit. The procedure we employed was identical to that used in the preceding experiment with three exceptions. First, while some participants were primed with high or low prices (e.g., "\$99," "\$15"), others were primed with stimuli of identical magnitude but in units of weight (e.g., "99 gms," "15 gms").

Second, participants were asked to evaluate two different products: a camera (described as having auto focus with focus lock, an auto flash with red eye reduction, auto film loading, and a 35-80 zoom lens) and a cordless phone (described as having 10 channels, 20-number memory dialing, a one-year warranty, and adequate recording time). One product was priced at \$69.99 and the other at \$124.68. (The prices associated with each product and the order in which the products were evaluated were counterbalanced within each priming condition.)

Third, participants after reading each product description evaluated it in terms of not only perceived sacrifice and liking (on scales used in earlier experiments) but also quality and value. Product quality was assessed using three items pertaining to the product's durability, reliability, and overall quality. Product value was measured using items that asked participants to indicate whether the item was a good or bad buy, whether it was worth the money, and whether it was a good bargain. All items were assessed on 11-point scales ranging from  $-5$  to  $+5$ .

## Results

As in experiment 3, no respondents reported seeing anything even after being told that something might have

been flashed on the screen during the subliminal priming task. Preliminary analyses revealed no meaningful effects of product category (phone vs. camera) or the target price (\$69.99 vs. \$124.68). Therefore data were pooled over these variables and analyzed as a function of priming magnitude (low vs. high number primes), priming unit (dollars vs. weights), whether the product being judged was presented first or second, and type of judgment. This analysis yielded a significant effect of prime magnitude,  $F(1, 53) = 3.29$ ,  $p < .10$ ,  $\eta^2 = .059$ . However, this effect was contingent on whether the product being evaluated was presented first or second,  $F(1, 53) = 7.01$ ,  $p < .05$ ,  $\eta^2 = .117$ . Specifically, judgments of the first product were lower in magnitude when high numbers were primed (averaged over the four types of judgments,  $M = 0.65$ ) than when low numbers were primed ( $M = 1.62$ ), whereas judgments of the second product were not (1.34 vs. 1.25). However, these effects did not significantly depend on the dimension along which priming stimuli varied (dollars vs. weight),  $F < 1$ . Priming appeared to have greater effect on judgments of liking (0.65 vs. 1.50, when primes were high vs. low in magnitude, respectively),  $F(1, 53) = 5.51$ ,  $p < .05$ ,  $\eta^2 = .094$ , and on value (1.14 vs. 1.96),  $F(1, 53) = 4.51$ ,  $p < .05$ ,  $\eta^2 = .078$ , than on judgments of either sacrifice (0.21 vs. 0.22),  $F < 1$ , or quality (1.98 vs. 2.09),  $F < 1$ . However, the effects were similar in direction in all cases, and the contingency of these effects on type of judgment was not significant,  $F(3, 159) = 1.63$ ,  $p > .10$ .

## Discussion

It seems reasonable to conclude that subliminal priming effects on judgments do not reliably depend on either the dimension along which priming stimuli vary or the dimension of judgment. It is conceivable that 15 milliseconds of exposure to priming stimuli was too short for participants to identify clearly the units of priming stimuli, and so only their numerical values had an effect. However, evidence that priming stimuli can often influence judgments with as little as five milliseconds of exposure argues against this possibility (see Bargh and Chartrand 1999). Even if it were the case that participants did not notice the units of priming stimuli, it does not compromise our conclusions that the primed magnitudes had similar effects on different judgments. The contingency of the effects on the order in which products were evaluated is worth considering in this context. That is, the two products being judged were of different types, and so evaluations of one product should not necessarily have much to do with judgments of the second. Nevertheless, participants appeared to use their judgment of the first product when judging the second product. Thus, although the subliminal primes produced a contrast effect on the first product, a comparative standard that was constructed consciously or unconsciously was used to judge the second one, and this construction partially offset the effects of subliminal primes.

## EXPERIMENT 5

The evidence that people's internal standards can be influenced by stimuli of which they are unaware leaves another issue unresolved. Specifically, it is unclear at what point in the judgment process a standard is imposed. On one hand, people evaluating a product's attributes may spontaneously construct a standard for use in interpreting information at the time that they receive this information. If so, the effect of priming stimuli on this interpretation, and thus on the judgments they make, should depend on the accessibility of these primes at the time that the product information is presented.

Another possibility, however, is that people who receive information about a product simply comprehend its literal meaning and do not impose a standard on the evaluation of its specific attributes until they are asked to report these evaluations along a response scale (Lynch et al 1991; Wyer 1974). If so, the effect of priming stimuli should be a function of the accessibility of these stimuli at the time that judgments are reported, independently of when information about the product was presented and its implications are interpreted.

To examine this issue we adopted a procedure similar to that used by Srull and Wyer (1980). That is, all participants first completed the subliminal priming task. Then participants in one condition were given information about a product immediately after the priming task and made judgments soon after receiving this information. Participants in a second condition also received the product information immediately after the priming task but did not judge the product until 30 minutes later. Finally, participants in a third condition did not receive product information and make judgments until 30 minutes after they were primed.

If people apply a standard at the time that they first receive information about the product, priming effects should be evident when the primed stimuli are accessible at the time that the product information is presented, regardless of whether participants report their judgments immediately or not until 30 minutes later. However, suppose people do not impose a standard until they are asked to rate the product along the response scale that they are given. If this is the case, priming effects should only be evident when priming stimuli are easily accessible at the time that the judgment is reported. That is, these effects should be more pronounced when participants make judgments immediately after being exposed to these stimuli than in either of the other two conditions, which should not differ from one another.

## Method

One hundred twenty-five undergraduates participated in this study to earn extra course credit. The instructions to participants, priming stimuli, and product information that they received, as well as the judgments that they made, were identical to those in experiment 3. However, we varied the time intervals between the priming task, the presentation of information about the product to be judged, and the judg-

ments participants reported. Specifically, participants in *immediate-judgment* conditions were exposed to the priming stimuli and were given the product information and evaluation task immediately after (in a manner similar to that in experiments 3 and 4). However, participants in *delayed-information* conditions were not exposed to the product information until 30 minutes later, at which point they saw the information and made judgments. In the interim, they performed two tasks (an aesthetic preference task and a task assessing their reactions to political candidates), neither of which exposed them to numbers or required them to make numerical ratings. (This procedure avoided any contamination of the priming manipulation by numerical concepts that might be activated subsequently.)

Finally, participants in *delayed-judgment* conditions, like those in immediate-judgment conditions, received the product information immediately following the subliminal priming task. They were asked to form an impression of how much they liked the product described. After giving them some time to form these impressions, however, the experimenter informed them that because previous research had shown that people made more reliable judgments if they reported these judgments after some time had lapsed and the information had had time to "settle," they would be asked to perform two other tasks before making their ratings. On this pretense, they performed the same two tasks as participants in delayed-information conditions and were not asked to evaluate the product until 30 minutes later. Participants in all three conditions evaluated the target's cost as in experiment 3 and completed a similar manipulation check.

## Results

Participants who received product information immediately after the priming task judged the product to be less expensive if they had been primed with high numbers ( $M = -0.64$ ) than if they had been primed with low numbers ( $M = 0.12$ ). This difference also occurred when participants received the product information immediately after the priming task but did not make judgments until 30 minutes later ( $-0.36$  vs.  $1.15$ ). However, when participants did not receive product information until 30 minutes after the priming task, this effect was reversed ( $0.28$  vs.  $-0.62$ ). This interpretation was confirmed by a series of planned comparisons. These analyses indicated that the priming effect under immediate-judgment and delayed-judgment conditions did not significantly differ,  $F < 1$ , whereas the effect was significantly greater in these two conditions combined than in the third, delayed-information condition,  $F(1, 117) = 4.45, p < .05, \eta^2 = .04$ .

## Discussion

The results of this experiment clearly demonstrate that subliminally primed context stimuli have an influence on the standard that they construct at the time product information is first received rather than at the time an actual judgment is reported. This finding suggests that the effects

of subliminally primed stimuli on the standards that people use were not simply the result of output processes that occurred at the time that the judgments were reported along a response scale (Lynch et al. 1991). Rather, participants constructed standards at the time that they first received product information and subjectively evaluated its implications. (For other evidence that priming stimuli affect the interpretation of information at the time that the information is presented rather than at the time that judgments are reported, see Srull and Wyer [1980].)

A distinction should, however, be made between the time that judgments are reported and the time that they are actually constructed. Kahneman and Miller (1986) argue that people typically construct a comparative standard at the time that they evaluate a stimulus. However, this evaluation may not be reported until later. Thus in experiment 5, participants in delayed-judgment conditions (like immediate-judgment conditions) may have constructed a standard at the time that they received the target information, based on stimulus values that came to mind at the time, although they did not report these judgments until after a delay. To this extent, the results of this experiment would be consistent with norm theory (Kahneman and Miller 1986).

## GENERAL DISCUSSION

At the beginning of this article, we raised questions about the manner in which internal standards of comparison are constructed and used by consumers in making evaluative judgments. An important issue underlying these questions is the role of automatic or nonconscious information processing relative to deliberative or conscious information processing. Previous research suggests some degree of deliberative thought in the use of contextual stimuli to construct a standard of comparison or a perspective. However, we found that the formation of judgment standards and perspective can also occur automatically without consumers' awareness. Theoretical and substantive implications of these and other findings follow.

### Automatic versus Deliberative Processes

Consumers who evaluate a particular product along an attribute dimension may often be aware that they judge it relative to a standard that reflects both the range and central tendency of attribute values that this type of product might have. However, they may be unaware of the factors that have led to the construction of this standard. The present research strongly suggests that the standards that people use when evaluating products can be formed unintentionally and may be influenced by exposure to stimuli of which they are not consciously aware.

In experiment 1, for example, participants' judgments of sacrifice and liking for a product were influenced by the price of other products. This influence occurred regardless of whether their goal was to evaluate the products or to assess the aesthetic quality of the advertisements that conveyed the product information. Moreover, the prices of prod-

ucts to which participants were exposed in experiment 2 influenced their evaluations of the price of similar (and different) products 48 hours later as part of an ostensibly different study. Finally, the perspective that participants used to evaluate the products in experiments 3, 4, and 5 were influenced by stimuli to which they had been exposed subliminally. The subliminal procedures used in these studies were nonreactive, unobtrusive, and not susceptible to demand effects. Consequently they provide strong evidence that standards of comparison can be constructed and used without intention or awareness of the stimuli that entered into their formation (see Kahneman and Miller [1986] for additional discussion of this possibility).

The conceptualization that we proposed to account for these effects brings together implications of both adaptation-level theory (Helson 1964) and perspective theory (Ostrom and Upshaw 1968). Although some of our findings are predictable on the basis of adaptation-level theory alone, they extend on implications of the theory in at least two ways. First, adaptation-level theory assumes that the contrast effects of immediate context stimuli are rather short-lived. In contrast, experiment 2 suggests that the effects can persist over a period of days. Second, adaptation-level theory implies that the effects of context are dimension-specific. However, the results of experiment 4 suggest that cross-dimensional influences of a standard can occur as well.

The findings we obtain also circumscribe the conditions in which these standards are constructed and applied automatically, as well as their persistence over time. Subliminally primed stimuli influenced evaluations only when they were followed immediately by the product information (experiment 5). In such situations, the standard constructed on the basis of subliminal exposure to stimuli was used spontaneously to evaluate the product even though participants were not instructed to report this judgment until sometime later. Second, the effects of context that were detected after 48 hours (experiment 2) showed that the initial context led to the construction of a standard and affected price estimates of cordless phones and other products as well. Further, it had effects on judgments of a new product that was similar to the target judged initially.

*Generalizability over Priming Dimensions.* The effects of subliminal priming did not depend on either the dimension along which priming stimuli varied (dollars vs. weight) or the dimension of judgment. These results indicate that individuals are often unaware of the factors that influence the standards that they apply and that exposure to stimuli that are high or low in magnitude may be sufficient to influence these standards even when the stimuli refer to a different attribute from the one to which judgments pertain. Note that these results contrast with evidence reported by Manis and Paskewitz (1984), who found context effects that were domain specific. In their research, however, the context stimuli that influenced participants' standards were highly salient, and so participants could consciously discount stimuli if they were irrelevant to these standards. The use of subliminal priming procedures ensured that subjects did not

explicitly see the numbers that were used to create different contexts. Under these conditions, it is conceivable that the numerical information was implicitly perceived and translated into magnitude representations regardless of whether the numbers were presented as dollars or grams. Then, this dimensionless magnitude representation influenced subsequent product and price evaluations.

*Implications for Product and Price Perception.* The conceptualization we proposed is applicable to judgments along many dimensions. However, its implications for pricing phenomena are particularly noteworthy. Experiment 2 showed that the reference price for cordless phones in general (i.e., the price estimates participants provided 48 hours later) was shifted toward the prices of specific phones to which participants had been exposed earlier. Moreover, as experiment 1 indicated, participants' memory for the actual price of the target was similarly affected. This result suggests that the price information about a product is unlikely to be coded into memory in terms of exact numerical digits but, rather, is coded spontaneously in more general magnitude terms (e.g., "low," "high"). Thus the numerical price is susceptible to the influence of its original context when people attempt to reconstruct it later. This conclusion, which is consistent with current views of numerical cognition (Dehaene 1992), provides one explanation for the generally poor recall of price information that appears to exist (Dickson and Sawyer 1990; Monroe and Lee 1999).

The conditions investigated in this research should be distinguished from those investigated in other studies of context effects on product judgments. In a study by Herr (1989), for example, participants were first unobtrusively exposed to names of products (e.g., automobiles) that were known to be either expensive or inexpensive. They then evaluated the expensiveness of target products that were moderately priced. In these conditions, the priming stimuli apparently activated a more general concept of the type of products being judged that was specific to a given range of prices (e.g., expensive automobiles) and thus led the target product to be interpreted as an exemplar of this concept. Thus, they judged the targets as more expensive when the priming stimuli were expensive than when they were not. In this research, specific prices were not provided in descriptions of either the priming stimuli or the target. When objective values are conveyed along the dimension of judgment, people are more likely to engage in comparison processes of the sort investigated in the present research, and contrast effects of priming stimuli are more likely.

*Qualifications.* Certain qualifications regarding these findings are worth noting. First, the products being evaluated in our studies were unfamiliar, and participants had few, if any, other experiences with similar products in the intervening period. In many cases, however, the perspectives that participants apply reflect a large pool of past experiences with products of the type they are considering. In these instances, the effects of experiences from a specific situation are more likely to dissipate over time.

Second, although participants were led to believe that the tasks involved in each phase of the studies were unrelated (i.e., the fragment completion task in experiment 2 and the visual perception task in experiments 3–5), they performed the tasks in the same laboratory situation under the supervision of the same experimenter. Situational features that were fortuitously present during each phase of the research may have become associated with the standards at the time they were formed and, therefore, cued their retrieval and use as a basis for judgments that participants reported later.

In actual marketing situations, however, products in a given category are sometimes encountered in quite different physical surroundings. In such cases, this cuing is less likely to occur. For example, product evaluations may be influenced more by previous experiences with other products that one has encountered in the same store than by experiences with products encountered in different stores or seen on television. Clearly similarity between exposure and test environments should enhance the persistence of the effects of standards reported in this article. However, based on the current evidence, similarity between the exposure and retrieval environments would not be necessary for the effects to occur. “Mental representations designed to perform a certain function [e.g., product evaluations] will perform that function once activated, regardless of where the activation comes from” (Bargh and Chartrand 1999, p. 476).

### Other Contextual Effects

The literature on the effects of context is rich and varied, and several different types of context effects have been identified. Some of these effects are attributed to output processes that occur primarily at the point at which judgments are reported along a response scale (Lynch et al. 1991; Wyer 1974). Others are the result of retrieval of previously formed judgments made in a different context (Higgins and Lurie 1983; Kardes 1986; Sherman et al. 1978). Still others are attributed to the retrieval of exemplars at the point of judgment, using cues from the immediate environment (Herr 1989; Kahneman and Miller 1986). We discuss the extent to which these findings may have accounted for our results.

*Response Language Effects.* The context effects identified in experiments 1 and 2 may be partly attributable to the participants’ interpretation of the response scale that they used to report their judgments rather than to their subjective perceptions of the products (Upshaw 1965; Wyer 1974). However, such “response language” effects are insufficient to account for our results in entirety. In experiment 1, for example, context stimuli influenced participants’ recall of the target’s actual price as well as their estimates of its cost. If these stimuli had only influenced how participants reported their judgments along response scales, this difference in recall should not have occurred. Note that a difference in response-scale use should produce similar effects on judgments of all stimuli that participants rated along the scales provided (Upshaw 1978). Consequently, the different effects of context on judgments of the target and new stimuli would

be difficult to explain in terms of these effects alone. Further, experiment 5 shows that the primed stimuli had no effect in the delayed judgment condition, which suggests that these stimuli did not influence the use of the response scale. Thus, although an influence of context on response language cannot be completely discounted, it seems reasonable to conclude that the effects that we observed in our research occurred over and above this more general influence.

*Effects of Previously Formed Product Judgments on Later Ones.* A difference in perspective is not the only factor that can influence consumers’ response along the scale that they use in reporting their product judgments. If persons have made prior judgments of products under consideration, or have otherwise generated overt descriptions of these products, representations of these cognitions may be stored in memory. Later, these representations may be retrieved out of context and used as bases for judgments independent of the particular stimulus features to which they originally pertained. This general tendency, which has been demonstrated in several research paradigms (Carlston 1980a, 1980b; Higgins and Lurie 1983; Lingle and Ostrom 1979; Sherman et al. 1978), was evident in the present research as well. That is, when participants in experiment 2 generated verbal explanations for why they liked or disliked a product, their later judgments appeared to be influenced by these explanations, independently of the specific features (e.g., prices) to which they originally pertained. This influence offset the more general effects of perspective that occurred when these explanations were not generated.

The implications of norm theory (Kahneman and Miller 1986) are worth noting in this context. According to this theory, people often form standards at the time of judgment on the basis of specific exemplars that come to mind at that point. Features of the judgment situation as well as the product being evaluated could cue the retrieval of these exemplars. In contrast, the effects observed in the present research suggest that the standards that are constructed prior to the time of judgment can later be retrieved and used without awareness of specific stimuli that entered into their formation. However, these two types of effects are not incompatible and could occur in different situations. It therefore would be desirable in future research to distinguish more clearly between conditions in which people are likely to retrieve a previously formed standard and conditions in which they construct a new one from exemplars that are salient at the time.

The present research identifies processes that may underlie consumer judgments in an important subset of purchasing situations. Obviously there is a need for further research investigating these effects and the implications they might have for altering consumer perceptions without their awareness. Given that consumers may look at a specific product for only about 1/25 to 1/50 of a second when they scan shelves in stores, these subliminal effects may occur regularly (Chiem 1999), and an exploration of their various implications is warranted.

As summarized by Merikle, Smilek, and Eastwood (2001,

p. 132), "Considerable stimulus information is perceived under conditions that do not lead to subjective conscious experiences normally associated with perceiving. . . . Information perceived without awareness can . . . bias what stimuli are attended, and . . . can influence how attended stimuli are consciously experienced." Given that considerable amounts of environmental stimuli are perceived without awareness and that these stimuli do influence subsequent consumer behavior, perhaps in ways not previously conceptualized, we need to think much less myopically about the so-called deliberative, calculating consumer and widen our lens to the nonconscious experiences that may drive much of consumer behavior.

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