Assimilation and Contrast in Price Evaluations

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How are price judgments influenced by the distribution of observed prices for other items in the same category? Processing goals will moderate price-judgment processes. When the processing goal is discrimination, price perceptions will be influenced by variations in range and ranks of prices in a distribution and contrast effects will be observed. For example, lowering the price of the lowest-priced product in a set will increase perceived expensiveness of higher-priced products. When the processing goal is generalization, however, price perceptions will be influenced by variations in the mean of the price distribution, in which case assimilation is observed. For example, lowering the price of the lowest-priced product in a set will decrease perceived expensiveness of higher-priced products. This latter finding is in sharp contrast to findings in the current literature on the effect of price structure on price judgments.

Jen is shopping for a portable media player. As she contemplates buying the product priced at $148.98, she wonders whether the player is a good buy. To aid her judgment, Jen will compare $148.98 to a reference price. This comparison will influence the likelihood that Jen buys the media player. How the reference price is formed and used depends, among other factors, on how she processes and uses the price information from the set of acceptable options. It is important for marketers to understand the mechanisms driving consumers' price evaluations, so they can improve product-assortment strategies, product-line pricing, and promotional strategies.

Consumer behavior researchers have long been intrigued by how consumers form and use reference prices in price judgments (Adaval and Monroe 2002; Blattberg, Briesch, and Fox 1995; Kalyanaram and Winer 1995; Mazumdar, Raj, and Sinha 2005; Monroe 1973; Niedrich, Sharma, and Wedell 2001; Niedrich, Weathers, and Bell 2009). Reference prices have been studied from perspectives such as their formation, retrieval and usage, and influence on purchase decisions (for an extensive review, see Mazumdar et al. 2005). Recently, there has been growing interest in answering the question that Monroe and Petroshius (1981, 51) raised, "What happens to price perceptions when the structure of prices to be judged varies?" This line of research has investigated "the effects of the properties of the acceptable price range (e.g., end points and distributions) on price judgments" (Mazumdar et al. 2005, 89).

When a consumer considers a range of differently priced products, the perception of a given price within the observed distribution has been shown to depend on the highest and lowest prices in the distribution, as well as on the ranks of prices (e.g., Cooke et al. 2004; Janiszewski and Lichtenstein 1999; Niedrich et al. 2001). For instance, increasing (decreasing) the price of the most expensive (affordable) alternative or increasing the frequency of more (less) expensive alternatives will lead to contrast effects in which other prices in the set are perceived as less (more) expensive. This prediction is consistent with Parducci's (1965) range-frequency model. Alternatively, earlier research suggests that perceptions of a price within the distribution depend on its relation to the mean of that distribution (e.g., Kalyanaram and Winer 1995; Monroe 1990). This prediction is consistent

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with Helson's (1964) adaptation-level theory. While recent research in this area pitting these two reference price processes against each other has supported range-frequency theory (e.g., Cooke et al. 2004; Janiszewski and Lichtenstein 1999; Niedrich et al. 2001), such an approach implies that consumers may only follow a single process when making price judgments. This assumption may both be detrimental to marketers' understanding of additional ways to influence consumers' price judgments and prescribe that marketers change prices in a manner that produces unintended price perceptions.

In our research, we investigate how marketing activities before price evaluations (ads, displays, etc.) can influence price judgments. We propose and demonstrate that marketing actions can alter information-processing goals, which in turn influence how consumers judge prices. We replicate range- and frequency-based contrast effects predicted by literature investigating the effect of price structure on price perceptions when the active processing goal is *discrimination*. However, we find that price judgments are sensitive to the mean of the distribution and assimilate toward the direction of change in the mean of the price distribution when the active processing goal is *generalization*. This result is in sharp contrast with the current state of the literature on the effect of price structure on price perceptions, and it suggests that prescriptions by previous research may produce effects that are in direct opposition to that intended by a marketer.

We test our predictions in three experiments. In experiment 1, we show that contrast from endpoints and assimilation toward the mean can be observed by activating processing goals via the copy of an advertisement. In experiment 2, we activate processing goals via a categorization task and test the robustness of our findings across different price structures. Experiment 3 shows that comparative versus noncomparative advertising may activate different processing goals and in turn influence price judgments. It also provides additional evidence supporting the processing-goal hypothesis.

THEORETICAL BACKGROUND

There are two bodies of literature most related to our research: *price-structure* literature, which examines how changes in a distribution of prices affect judgments, and *processing-goals* literature, which examines how different processing goals may influence how one processes information. We first discuss the recent price-structure literature and then discuss the processing-goals literature and explain how the union of these two literatures suggests our hypotheses.

Price Structure

One of the key disagreements in the literature examining the effect of the structure of prices on price judgments is about how consumers form and use price referents to make price judgments. First, it has been proposed that consumers may compare a target price against a single reference price (Kalyanaram and Winer 1995; Monroe 1990). This single reference price has been proposed to be a central tendency measure of prices, such as "some average of the range of prices for similar products, and need not correspond to any actual price nor the price of the leading brand" (Monroe 1990, 44). Second, consumers may compare a target price against other individual prices in the price distribution, such as the endpoint prices (lowest and highest prices) and prices ranked below or above the target as posited by range-frequency theory (Parducci 1965). Research pitting these two classes of referent-formation and price-judgment processes has shown that price judgments are better accounted for by the latter process, with judgments contrasting away from changes in the endpoints and from changes in the ranks of prices rather than contrasting away from changes in the mean of the distribution (Cooke et al. 2004; Niedrich et al. 2001, 2009).

Although this body of research helps us to understand the price-evaluation processes that arise during price judgments, it does have its shortcomings. By focusing on finding that a perceptual process best explains how consumers judge prices, it implicitly assumes that consumers use a single process when judging prices. It also limits our understanding of price judgments only to situations in which judgment processes are triggered by the price context itself. However, recent literature has shown that consumers may process information with active processing goals that in turn may influence the outcome of judgments. Next, we discuss how the processing-goals literature can help to unveil the conditions under which different price-judgment processes may operate.

Processing Goals

Consumers face information-rich environments every day. There is growing evidence that such environments can activate a variety of processing goals, influencing how people process subsequent information (Russo et al. 2008). It is generally agreed that processing goals influence information processing so that such processing is consistent with the active processing goal. Such goals can be pursued and achieved by organizing and aggregating information in ways that allow one to better compare alternatives and reach a quick and accurate judgment or decision (Russo et al. 2008). Varying processing goals may lead one to reduce the effort in evaluating new information, increase separation between alternatives, and achieve consistency between old and new units of information (Russo et al. 2008).

There are several examples outside of the price perceptions literature showing how processing goals influence information processing. Laran (2010) activated an action (inaction) processing goal that subsequently affected decision effort and satisfaction with environments structured to allow for greater (lesser) information processing (e.g., number of attributes for a camera). Russo et al. (2008) showed that people distort information about attributes to maintain consistency between the processing goal of consistency and new units of information. Corneille et al. (2009) manipulated processing goals by asking respondents to describe either the similarities or the dissimilarities of two artwork images, and these goals moderated an evaluative conditioning task, with greater affect transfer occurring when a similarity processing goal was triggered. All of this evidence points to the possibility that individuals select rules of information processing that allow them to more effectively pursue their processing goal.

If processing goals drive how consumers process information, there could be important implications for price perception research. These goals could influence how people integrate price information to generate a judgment. If this is the case, judgments could vary in ways not predicted by the current literature investigating the effect of price structure on price judgments. Next, we discuss two processing goals that may affect how consumers generate a price judgment.

Processing Goals and Price Information Processing

As evidenced above, many different processing goals may influence how consumers process information. We will make the case that the processing goals of discrimination and generalization influence the type of information integration rules people use to process price information.

Discrimination Goal. Discrimination goals influence the way people process information, such that one focuses on identifying a subset of diagnostic features helping to properly organize information across classes of stimuli (Markman and Ross 2003; Nosofsky, Palmeri, and McKinley 1994; Tversky 1977). This processing goal leads one to focus on the distinctive features of stimuli that allow one to rapidly discriminate objects from different classes (Yamauchi and Markman 1998, 2000). For instance, to determine whether a shoe is good for running or for basketball, it is important to identify discriminating characteristics that uniquely define a shoe as either a running shoe or a basketball shoe. Such a goal often triggers the use of information-processing strategies that follow a class-inclusion principle in which one contrasts features of stimuli to properly classify objects (e.g., an object with features A and B is an X; Markman and Ross 2003).

One way a discrimination processing goal may operate during price evaluations is by influencing how price information is integrated to generate a judgment. Consistent with this idea, contrast effects predicted by range-frequency theory, a popular account of price judgments, are said to arise when one's goal is to discriminate among multiple stimuli (Wedell, Hicklin, and Smarandescu 2007). This is achieved by adopting a subtractive information integration rule (Wedell 2008; Wedell et al. 2007) that focuses on the relative difference between the perceived value of a target stimulus and those of the remaining stimuli available to judgment (Anderson 1996). This subtractive process can be illustrated by the range principle of range-frequency theory. This principle predicts that the judgment of a target stimulus is based on the difference between the value of this stimulus and that of the stimulus with the lowest value, all divided by the difference between highest and lowest stimuli in the set (Parducci 1965). In the case of price judgments, when the highest price in the set increases, the perceived expensiveness of the target price should decrease because the magnitude of the difference between the largest and the smallest prices increases in the denominator. This perceived decrease in magnitude of a price represents a contrast effect because it causes the target price to be judged as less expensive, a change in the opposite direction of change in the highest price.

Thus, it is predicted that when a discrimination processing goal is activated, consumers will process price information in a manner that prices will be contrasted against other individual prices in the set. Pricing and perceptual research has shown that, when this is the case, the ranges and ranks of prices are important standards of comparison against which prices are judged. The outcome of this process is a contrast effect, as predicted by range-frequency theory.

Generalization Goal. Consumers may alternatively approach information with a processing goal of making generalizations about the stimuli. In this case, the focus becomes to identify common characteristics that allow one to generalize about a given class of stimuli, rather than discriminate two classes of stimuli. Knowing which diagnostic features facilitate classification of a shoe as either a basketball shoe or a running shoe is not helpful in making a generalization about running shoes. Instead, one should focus on the characteristics of a typical running shoe. Such a process follows a partonomic principle in which a class of stimuli is defined by its prototypical features (e.g., an object X has features A and B; Markman and Ross 2003; Yamauchi and Markman 1998). As a consequence, when a generalization goal is aimed at making inferences about a class of stimuli, one tends to focus on within-class features that best capture the essence of the class.

A generalization goal leads consumers to focus on commonalities within a category, in order to develop a summary representation. When active during the integration of price information, the generalization goal's focus on commonalities can lead to additive, rather than subtractive, integration rules. The use of such a rule is consistent with pricing research that suggests the summary representation is often the mean of the distribution (Monroe 1990). Thus, if the context can be represented by some average of the values of stimuli, as perceptual research indicates (Pettibone and Wedell 2007; Wedell and Pettibone 1999), and the target is additively integrated with the context, literature in psychophysics predicts assimilation of the target toward the context (Geissler, Link, and Townsend 1992). In a price perception context, this suggests that an increase of the highest price in the set would make a target price be perceived as more expensive because the mean of the price distribution (i.e., context) increases. This perceived increased expensiveness of the target price represents an assimilation effect because the judgment changes in the same direction of change in the mean of the distribution. In sum, when the processing goal is generalization, it is hypothesized that consumers will integrate pricing information, such that price perceptual judgments will be sensitive to changes in a summary measure of the distribution such as the mean, resulting in assimilation effects.

EXPERIMENT 1

We designed experiment 1 to provide evidence that changes in price structures can lead to both contrast and assimilation of price judgments, depending on the active processing goal. To activate discrimination and generalization goals, we manipulated the information in the copy of an advertisement for a portable media player. After exposure to the advertisement, participants judged prices of media players. To test our predictions, prices were manipulated, so the range or the mean of the sets of prices varied relative to a control condition.

Design, Stimuli, and Procedure

Participants were 255 undergraduate students at the University of Washington who received course credit to participate in the experiment. The design was processing goal (discrimination vs. generalization) by price context (control, mean shift, endpoint shift), with nine prices rated in terms of expensiveness in three successive rounds of ratings. In other words, each of the nine prices was rated one at a time, and these nine ratings were conducted three times for a total of 27 ratings. The order of the nine prices was randomized at the beginning of each of the three rounds of ratings. The processing goal and context were between-subjects factors. The round of ratings and price were within-subject replicate factors. Participants were randomly assigned to the six between-subjects conditions.

After entering the lab and being seated in front of the computers, participants received the following instruction: "In this task we would like you to imagine that you are considering to purchase a new portable media player. Before you start evaluating the options available, you will see an advertisement for a given player. On the next screen we will show you the advertisement so you can learn about this portable media player." After reading these instructions, participants saw the advertisement on the computer screen. After 20 seconds, a Continue button became active, and participants could proceed to the next portion of the study at their own pace.

We designed two versions of the advertisement, each emphasizing the characteristics that define the discrimination or generalization processing goals. Recall that a discrimination processing goal follows a class-inclusion principle (e.g., an object with A and B is an X) and is aimed at identifying the unique subset of features that can help one to discriminate classes of objects. The headline for the discrimination-goal advertisement read, "Can you tell a high-performance portable media player *apart* [emphasis added] from the others?" and was followed by, "A Portable Media Player with . . . Extended battery life for days of playback, Storage capacity to hold weeks worth of entertainment, Vivid display, Capable of games, photos and more . . . *is* [emphasis added] high performance" and ended with, "All the features that make a portable media player high-performance . . . will be yours." This version of the advertisement was designed to activate a processing goal in which one focuses on the features (e.g., vivid display) that set the focal objects apart from others (non-high-performance media players).

Alternatively, generalization follows a partonomic principle (an X has A and B) and triggers a process focused on identifying commonalities among parts that define an object. In the advertisement designed to activate a generalization processing goal, the headline read, "What features do you expect from a high-performance portable media player?" and was followed by, "A high performance Portable Media Player *has* [emphasis added] . . . Extended battery life for days of playback, Storage capacity to hold weeks worth of entertainment, Vivid display, Capable of games, photos and more" and ended with, "All the features you expect from a high-performance portable media player . . . will be yours" (see fig. A1 for the two versions of the advertisement). This version of the advertisement was designed to activate a processing goal in which one focuses on the class of the object (high-performance media player) and identifies the features that define that class. Both versions of the advertisement also showed a fictitious brand (Monek) and a logo participants did not recognize (from a foreign bank that does not operate in the United States).

Price-Judgment Task. After participants reviewed the advertisement and clicked on continue, a new screen displayed the instructions for the price-judgment task. The instructions read, "On the next screens we will show you several portable media players and their respective prices. You will be asked to rate how low or high you judge the price of each product to be. Because we are only interested in your price judgments, we have concealed the brands and specifications as to not influence your price judgments. Each of the portable media players presented has been ranked by an independent agency as blue level within its category in terms of quality, ease of use, and features. Thus, the variance in price is not a function of the quality."

After participants clicked on continue, the price judgments started. In each condition of the context factor, the three target prices were \$114.35, \$128.66, and \$142.98. The lowest and highest prices in the control condition were \$71.39 and \$185.93, respectively. The mean of the distribution was \$128.66. In the mean-shift condition, the endpoint prices were the same as those in the control condition, while the mean of the distribution increased to \$138.07. In the endpoint-shift condition, the mean and the lowest prices remained the same as in the control condition, while the highest endpoint price increased to \$202.66 (see table A1 for full set of prices used across the three experiments).

The rating task consisted of three rounds of ratings of the nine prices used as stimuli. We collected pictures of nine players from an online retailer and used an image-editing software to blur the brands that were visible (see fig. A2). The pictures were randomly assigned to each of the nine prices for each participant. The order of presentation of the nine player-price pairs was randomized before each of the three rounds of ratings for each participant. On each screen, participants saw a player and its price on the center of a white background screen. On the bottom of the screen, participants were instructed to rate how low or high they perceived the price of each player. Ratings were performed on a 101-point sliding scale ranging from 0 (very low price) to 100 (very high price) presented on the bottom of the screen. Upon participants' rating and clicking on continue, the content on the screen was erased, and a new screen presented another player-price pair.

After the 27 price judgments, we collected two pieces of information. First, participants completed Zaichkowsky's (1985) involvement scale. This scale was used to check whether the different types of advertisements affected participants' involvement with the task. Second, we asked respondents to "describe what unique features (no other players have) a great portable media possesses." Participants with a discrimination goal should more easily access unique features in their memory than should participants with a generalization goal because a discrimination goal should increase processing of distinctive information that allows one to better discriminate classes of stimuli.

Results

Check Measures. The mean composite of the involvement scale (Cronbach's $\alpha = .96$) did not vary significantly across the discrimination ($M = 3.20$) and the generalization ($M = 3.30$) levels of the processing-goal factor ($F(1, 253) < 1$). Two judges unaware of the study hypothesis counted the number of unique features described by each participant. We instructed judges to count features that were unambiguous (e.g., "Bluetooth capability") but not those that were ambiguous (e.g., "can do many things," "being an ipod"). The judges agreed in 94.5% of the cases, and differences were resolved after discussion. Ambiguous answers were coded as nonresponses ($N = 20$). The results were consistent with the prediction that participants with a discrimination goal should list a greater number of unique features ($M = 1.70$) in comparison to participants with a generalization goal ($M = 1.27$; $F(1, 233) = 7.10$, $p < .01$).

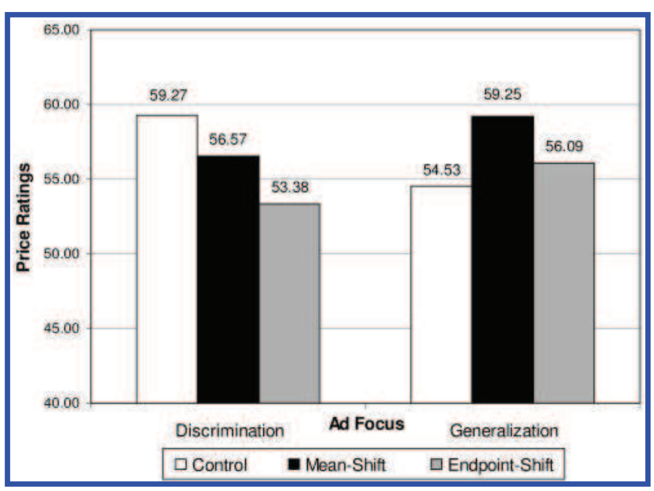
Price Perceptions. We followed the procedure of previous price-judgment studies (e.g., Cooke et al. 2004) and treated the first round of price ratings as a training round in which participants became acquainted with the prices being judged. We also only used the three target prices, which were constant across conditions. Thus, the model tested was a processing goal (discrimination vs. generalization) by context (control, mean shift, endpoint shift) with two rounds of ratings and three target prices mixed design. A repeated-measures ANOVA showed a statistically significant interaction between the processing goal and context factors ($F(2, 249) = 3.88$, $p = .02$; fig. 1). The rating round and target price factors did not interact with the key interaction between the processing goal and the context factors ($p > .10$). Thus, we collapsed price ratings across rounds and target prices (this was true for all experiments, and it is not reported hereafter).

When the advertisement was designed to activate a discrimination processing goal, there was no statistically significant difference between ratings in the mean-shift condition ($M = 56.57$) and those in the control condition ($M = 59.27$; $F(1, 249) = 1.57$, $p > .10$). The target price ratings in the endpoint-shift condition ($M = 53.38$), however, were statistically significantly lower than those in the control condition ($M = 59.27$; $F(1, 249) = 8.06$, $p < .01$). This latter result is a contrast effect because increasing the highest endpoint (largest price) of the distribution shifted the perceptions of the target prices toward less expensive judgments. These results are consistent with the prediction that the endpoint price operated as a referent for price judgments but the mean of the distribution did not.

When the advertisement was designed to activate generalization, ratings for the target prices were statistically significantly higher in the mean-shift condition ($M = 59.25$) than in the control condition ($M = 54.53$; $F(1, 249) = 8.59$, $p < .05$). This result is consistent with judgments assimilating toward the mean since participants perceived the target players to be more expensive in the mean-shift condition, which had a mean that was higher than the mean in the control condition. The ratings in the range-shift condition ($M = 56.09$), however, did not statistically significantly differ from those in the control condition ($M = 54.53$; $F(1, 249) < 1$). These results are consistent with the prediction that the mean of the distribution operated as a referent for price judgment but the endpoint of the distribution did not.

FIGURE 1

EXPERIMENT 1: MEAN AND ENDPOINT MANIPULATION



Discussion

Experiment 1 provides evidence supporting the processing-goal hypothesis. It shows that an advertisement designed to activate a discrimination processing goal makes participants sensitive to changes to the endpoint of the distribution (but not to the mean) and that price perceptions contrast away from the direction of such changes. This result is in line with the principles underlying range-frequency theory and with a large body of pricing research investigating effects of changes in price structure on price perceptions. The results in the generalization condition, however, were in sharp contrast with this pricing literature. An advertisement designed to activate a generalization processing goal made participants sensitive to changes to the mean of the price distribution (but not to the endpoint), and price perceptions assimilated toward the direction of change in the mean. Combined, these results point to the possibility that marketers have the ability to influence how consumers perceive prices by varying information under their control, such as the copy of an advertisement.

EXPERIMENT 2

We designed experiment 2 to accomplish two objectives. First, we aimed to test the robustness of the findings of experiment 1 by using a different manipulation of price structure. If our hypothesizing is correct, a discrimination processing goal should increase sensitivity to both price ranks and endpoints. However, in experiment 1, we only manipulated endpoints. In experiment 2, we manipulate the ranks of prices in a way that, according to range-frequency theory, the direction of the contrast effect found in experiment 1 would be reversed. Specifically, a contrast effect in this manipulation would mean that the target prices are perceived as more expensive in the manipulation relative to in the control because there are more prices that are less expensive than those of the targets. We also manipulated the mean of the distribution downward in experiment 2 (as opposed to upward in experiment 1). This change allowed us to observe whether assimilation would also happen when the mean of the distribution is lowered, reversing the direction of the assimilation effect found in experiment 1. Second, we wished to provide further support for the processing-goal hypothesis. Accordingly, we changed the processing-goal manipulation used in experiment 1. In experiment 2, we used a task that is known to activate processing goals of discrimination and generalization in categorization tasks. This type of task allowed us to provide further evidence for the processing-goal hypothesis because one can test whether participants were focused on discriminating or generalizing as they categorized stimuli.

Design, Stimuli, and Procedure

Participants were 217 undergraduate students at the University of Washington who received course credit to participate in the experiment. The design was a processing goal (discrimination vs. generalization) by context (control, mean shift, rank shift) with three rounds of 13 price-ratings mixed design. We used 13 prices in experiment 2 as a way to have a greater shift in the rank of prices in the rank-shift condition. Learning and context were between-subjects factors, and the round and the price factors were within-subjects replicates. Participants were randomly assigned to the six between-subjects conditions.

Learning Stimuli and Task. Participants were told that the task involved learning about cheese attributes and brands and that learning would require several trials. The cheeses had five dimensions: a brand and four attributes. Five binary sets of labels described the five dimensions. The labels were brand (Thab vs. Lork; as in Johansen and Kruschke 2005), type of rind (wax vs. natural), color (yellow vs. white), curd process (milling vs. pressing), and type of rennet (animal vs. vegetable). Labels for the brand and attributes were randomly assigned to each category. We used these stimuli to build two cheese brand categories used in the learning task. The learning task used a standard family-resemblance category structure (Rosch and Mervis 1975).

We manipulated the processing goals via type-of-category learning. Classification and inference learning are predicted to elicit discrimination and generalization processing goals, when people learn about categories featuring a category label (e.g., a brand) and stimuli features (e.g., attributes; Markman and Ross 2003). The key distinction between classification and inference learning is in what one learns to predict. In classification learning, participants predict the label of the category: in this case, the brand of cheese (Thab vs. Lork), given the four cheese attributes (a class-inclusion principle). By sorting objects into different categories, a discrimination goal is activated, so that one can focus on the subset of features that predicts category membership (Yamauchi and Markman 1998). In inference learning, participants predict the expected feature of a stimulus, given the category label and the remaining features of the stimulus (a partonomic principle). In this case, the task involves providing the category label (the brand) and three features and asking participants to predict the fourth missing feature. This type of task leads to a generalization goal because one needs to focus on the within-category structure to identify the features of the prototypical member of that category (Markman and Ross 2003; Yamauchi, Love, and Markman 2002).

Learning Procedure. To illustrate the learning task, assume that A and B are the brands of cheese (i.e., the category labels). Assume also that binary values (1 vs. 2; see table 1 for detailed category structure) describe each of the four attributes. Each cheese presented had three attributes that matched a prototypical cheese in its category and one exception attribute that matched the prototypical cheese in the opposite category. Suppose that the random assignment of labels led the prototypical cheese of category A to be "Thab, wax, yellow, milling, animal" (i.e., A,1,1,1,1) and the prototypical cheese of category B to be "Lork, natural, white, pressing, vegetable" (i.e., B,2,2,2,2). A cheese mem-

TABLE 1

CATEGORIES STRUCTURE

	Attribute					Attribute			
Brand	1	2	3	4	Brand	1	2	3	4
A	1	1	1	2	B	2	2	2	1
A	1	1	2	1	B	2	2	1	2
A	1	2	1	1	B	2	1	2	2
A	2	1	1	1	B	1	2	2	2
Prototype:									
A	1	1	1	1	B	2	2	2	2

ber of category A with the structure A,1,1,1,2 would be described as "Thab, wax, yellow, milling, *vegetable*" (vegetable being the exception attribute). A cheese member of category B with the structure B,2,1,2,2 would be described as "Lork, natural, *yellow*, pressing, vegetable" (yellow being the exception attribute).

In classification learning, participants always predict the brand of the cheese but never an attribute. An example of classification prediction for a cheese in categories A and B would be "?, wax, yellow, milling, *vegetable*" (i.e., ?,1,1,1,2) and "?, natural, *yellow*, pressing, vegetable" (i.e., ?,2,1,2,2), with the question mark representing the piece of information to be predicted (i.e., the brand of the cheese). In inference learning, participants always predict an attribute that resembles the attribute of the prototype of the category but never the exception attribute or the brand. An example of such a prediction would be "Thab, ?, yellow, milling, *vegetable*" (i.e., A,?,1,1,2) for category A and "Lork, *natural*, yellow, ?, animal" for category B (i.e., B,2,1,?,2). Participants always predict a different type of attribute for each category on every trial. Given the structure of the categories and that predictions are always made for a single piece of information, classification and inference learning are formally equivalent (Anderson 1991).

On each learning trial, participants saw the labels of each of the five dimensions of a given cheese (i.e., brand, ripening agent, type of whey protein, curd process, and type of coagulation enzyme). Participants also saw information about four of these dimensions and one question mark representing the brand (classification learning) or attribute (inference learning) that they had to predict. Each label appeared directly below its corresponding dimension, shown side by side in white type. Two radio buttons labeled with the options for the missing piece of information (brand or attribute) appeared at the bottom left- and right-hand sides of the screen (side randomized per participant). Once a participant had made a choice and clicked on the Continue button, all content on the screen was erased. Then, a feedback screen appeared for 2 seconds, showing the word "correct" or "incorrect" in white type. After this feedback, a new trial began. Before each training block, the order of presentation of the eight cheeses (four from each category) was randomized.

Participants received feedback on their performance after each training block (i.e., percent correct). They had to achieve a perfect predictive performance on a given block or complete eight blocks of training (whichever occurred first), to advance to the test phase. Participants who did not achieve a perfect performance performed eight blocks of eight trials each.

Price-Judgment Task. Upon completing the learning task, participants were informed that in the next task they would rate the expensiveness of gourmet cheeses. They were told that all the gourmet cheeses in the task weighed 1.7 kilograms and were rated in the top 1% of their category on the basis of their quality. They were also told that prices varied as a function of factors other than size/quality (e.g., type of milk, storage, transportation, processing, etc.). After these instructions, participants proceeded to rate each cheese's price, one at a time. The only pieces of information participants saw on the screen were the price, a sentence asking them to rate the price using a sliding scale, and the scale itself. No information about the cheese brand or attributes was presented during this task.

In each condition of the context factor, the target prices were $20.45 and $23.75, and the lowest and the highest prices in the distribution were $3.95 and $43.55. In the control condition, the ranks of the target prices were 6 and 7 (i.e., they were the sixth- and seventh-highest prices), and the mean of the price distribution was $23.75. In the mean-shift condition, the ranks of the target prices were kept the same as in the control condition, but the mean of the distribution was lowered to $18.98. In the rank-shift condition, the mean price of the distribution was kept the same as in the control condition, but the ranks of the target prices increased to 9 and 10 (see table A1 for the full set of prices). The stimuli randomizations and rating scale were the same as those of experiment 1.

Processing-Goal Check. Recall that each cheese from the two brand categories had three features that resembled the prototype of the brand category and one exception feature, a feature that resembled those of the prototype of the other brand category. In the processing-goal-check task, participants were asked to predict the missing feature for two cheeses (one from each category), each presented with three features that matched the prototype of its category and missing information about the fourth feature (which was presented as an exception feature during the learning task). When the learning task activated a discrimination goal, participants should identify features that allow them to more accurately discriminate between the two brands. Recognizing the presence of the exception feature among those that resemble the features of the prototype of a category was key to discriminating the brand categories. As a consequence, participants should recognize that the missing information about the cheese was the exception feature.

Alternatively, when the learning task activated generalization, participants were expected to focus on the within-category feature relationships that allow them to make inferences about a member of a category. The best summary of the relationship between the features within a given category is the prototypical cheese. Thus, a generalization goal should lead participants to select the feature that matches those of the prototype of the category (i.e., not the exception feature), when predicting the missing feature of a cheese.

Results

Check Measures. The pattern of results shows that when the task was designed to activate a discrimination processing goal, a statistically significantly larger proportion of participants (57.50%) predicted the missing piece of information to be the exception feature rather than the prototypical feature (42.50%; $z = 2.26$, $p < .05$). This pattern is consistent with the activation of a discrimination processing goal because it shows that during learning participants focused on identifying the features that allowed them to better discriminate between the two brands. When the task was designed to activate a generalization processing goal, a statistically significantly smaller proportion of participants (39.40%) predicted the missing piece of information to be the exception feature rather than the prototypical feature (60.60%; $z = 3.06$, $p < .01$). This pattern is consistent with the activation of a generalization processing goal because it shows that participants focused on processing the features that allowed them to generalize about cheeses of a given brand during learning.

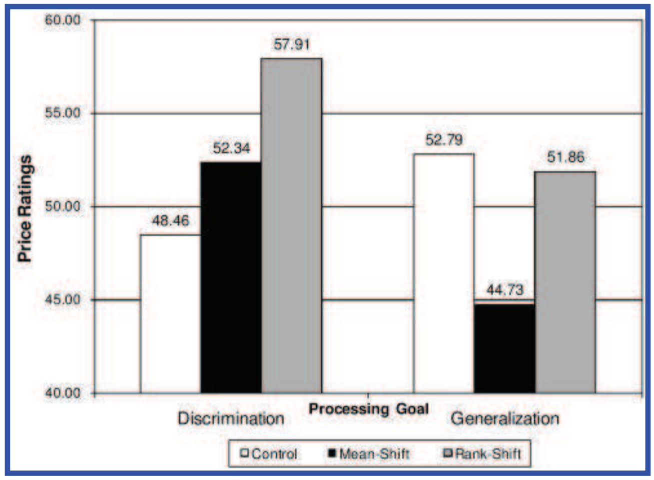
Price Perceptions. The model tested was processing goal (discrimination vs. generalization) by context (control, mean shift, rank shift), with two rounds of ratings and two target prices as within-subject replicate factors. To control for differential performance across the type of categorization tasks, we used the number of learning blocks that a subject took to achieve the learning criterion as a covariate. A repeated-measures ANCOVA showed a statistically significant interaction between the processing goal and context factors ($F(2, 210) = 3.66$, $p < .05$; see fig. 2).

The findings again show that the manner in which price-structure manipulations affect perceptions of target prices depends on the processing-goal manipulation. In the discrimination-goal condition, there was no statistically significant difference between ratings for target prices in the mean-shift condition ($M = 52.34$) and those in the control condition ($M = 48.46$; $F(1, 210) = 1.14$, $p > .10$). The target price ratings in the rank-shift condition ($M = 57.91$), however, were statistically significantly higher than in the control condition ($M = 48.46$; $F(1, 210) = 8.43$, $p < .01$). More expensive ratings for the target cheeses in the rank-shift condition relative to the control condition is a contrast effect because the rank-shift manipulation increased the number of prices ranked below the target prices. These results are consistent with the prediction that the price ranks influenced price judgments but the mean of the distribution did not.

In the generalization-goal condition, ratings for the target prices were statistically significantly lower in the mean-shift condition ($M = 44.73$) than in the control condition ($M = 52.79$; $F(1, 210) = 4.50$, $p < .05$). Less expensive ratings for the target cheeses in the mean-shift condition relative to the control condition is an assimilation effect because the mean-shift manipulation lowered the mean of the price distribution. The ratings in the rank-shift condition ($M = 51.86$), however, did not statistically significantly differ from those in the control condition ($M = 52.79$; $F(1, 210) < 1$). These results are consistent with the prediction that the mean of the distribution operated as a referent for price judgment but the ranks of prices did not.

FIGURE 2

EXPERIMENT 2: MEAN AND RANK MANIPULATION



Discussion

Experiment 2 extends the robustness of the results of experiment 1 in two important ways. First, in accordance with range-frequency principles, the results confirm that the findings of experiment 1 can be replicated for situations in which ranks are manipulated when a discrimination goal is activated. Second, we manipulated the context factor so that the contrast and assimilation effects could be observed in directions that were the opposite of those found in experiment 1. When combined, the evidence from experiments 1 and 2 shows that contrast and assimilation of price perceptions can occur both downward and upward, depending on the directional shift of the context and on the processing goal activated. Consistent with the processing-goal hypothesis, we observed sensitivity to the mean of the distribution and an assimilation effect when the processing goal was generalization but sensitivity to the ranks of prices in the distribution and a contrast effect when the processing goal was discrimination.

Experiment 2 also provides additional evidence for the influence of processing goals on the processing of price information. The results of the transfer task in which participants predicted the missing exception feature of a novel stimulus were more consistent with a discrimination goal when the categorization task was designed to activate such a goal. Alternatively, predictions of the missing exception feature were more consistent with a generalization goal when the categorization task was designed to activate such a goal.

Thus far, process evidence supporting the activation of processing goals was collected at the end of the experiment (recall task in experiment 1 and transfer task in experiment 2). Although indicative of the processing goal remaining active throughout the entire task, it is not unequivocal evidence that the processing goal was active just before the price-judgment task. The evidence for processing goals was also based on information related to the processing-goal task (i.e., predictions of a novel cheese in experiment 2). Experiment 3 addresses these issues and provides further evidence for the processing-goal hypothesis in a marketing-relevant context.

EXPERIMENT 3

We designed experiment 3 to provide evidence that actionable marketing tools can indeed influence price judgments via activation of processing goals. In experiment 3, we use comparative versus noncomparative advertisements for a camera as a way to activate discrimination and generalization processing goals. We anticipate that a comparative advertisement activates discrimination processing because it more closely follows the class-inclusion principle underlying discrimination (i.e., what are the features that allow one to distinguish between cameras A and B). Alternatively, we expect that a noncomparative advertisement activates a generalization processing goal because it follows the partonomic principle underlying generalization (i.e., what are the features that define a camera like camera A). We also used a measure of processing goals that was not directly related to the processing-goal activation and the price-judgment tasks. We took this measure between the two tasks to show evidence that the processing goal was active immediately before participants processed and judged prices.

Design, Stimuli, and Procedure

Participants were 110 undergraduate students at the University of Washington who received course credit to participate in the experiment. The design was a processing goal (discrimination vs. generalization) by price context (control, mean shift, endpoint shift) with three rounds of ratings of nine prices in each round mixed design. Processing goal and context were between-subjects factors. The round of ratings and price were within-subject replicate factors. Participants were randomly assigned to the six between-subjects conditions.

Overall, the procedure was very similar to that of experiment 1. The advertisements, however, were for a camera of the brand Insignia, and in the discrimination-goal condition, the copy read, "The new Insignia XS211 digital camera *sets itself apart* [emphasis added] from the competition. But don't take our word for it, you be the judge." A chart describing nine features for the Insignia camera and for a competing model (Canon) followed this text. The nine features were megapixels, optical zoom, LCD screen size, image stabilization, digital magnification, internal memory, product weight, file formats, and body color. The two brands performed equally on six of the nine features. To reinforce the cross-category discrimination, each brand dominated the other on one performance-relevant feature (optical zoom and file formats accepted) and was horizontally differentiated on a performance-irrelevant feature (color of the body). At the bottom of the screen, the copy read, "The new Insignia XS211, *a class of its own!* [emphasis added]," a tagline that we expected to emphasize discriminative focus.

In the generalization-goal condition, the copy read, "The new Insignia XS211 digital camera *has all the desirable features you would expect in a camera of its class* [emphasis added]. But don't take our word for it, you be the judge." A description of the nine features for the Insignia camera followed this text (no references to a competing brand were used in this condition). At the bottom of the screen, the copy read, "The new Insignia XS211, give it a shot!" Participants were unaware of the tasks that would follow these advertisements.

After the advertisements, we took two measures. First, we asked participants to rate how informative they thought the advertisement was (on a scale ranging from 0 [not at all informative] to 100 [very informative]). This measure was collected to be used as a control for the variations in the content of the two versions of the advertisement. After taking this measure, we told participants that we were interested in learning about the best way to describe objects. Participants saw two versions of a description of a running shoe on the screen. Each description was designed to capture the essence of the two processing goals. One description read, "A running shoe has a highly flexible toe area and no lateral ankle support." This description was designed to be in line with a discrimination processing goal, by presenting a feature representative of running shoes (flexible toe area) and a feature that is not representative of running shoes (lateral ankle support). The other description read, "A running shoe has a highly flexible toe area and a heel counter." This description was designed to be in line with a generalization processing goal, by identifying features that are prototypical of running shoes while not eliciting other shoe categories.

On the bottom of the screen, participants rated—on a 101-point sliding scale—which of the two descriptions they would rather use if they were describing a running shoe to a friend (the order of the descriptions on the screen was randomized per participant). The ratings were coded so that smaller (larger) ratings indicated a greater degree of agreement with the description that was designed to capture a discrimination (generalization) processing goal. If our expectations about the relationship between type of advertisement and processing goal were correct, we should observe a preference for the discrimination-consistent description when the advertisement was comparative and a preference for the generalization-consistent description when the advertisement was noncomparative.

The instructions and procedure of the price-judgment task replicated those of the portable media players in experiment 1. The key differences were that participants saw the pictures of cameras and that prices were $100 more expensive than those used in experiment 1. After the price judgments, participants completed Zaichkowsky's (1985) involvement scale.

Results

Check Measures. Participants were more likely to agree with the description targeted at capturing a generalization goal when the advertisement was noncomparative ($M = 60.59$) than when it was comparative ($M = 41.80$; $t(108) = 2.93$, $p < .01$). The rating in the noncomparative advertisement condition was statistically significantly larger than the indifference point (50; $t(53) = 2.21$, $p = .03$), and the rating in the comparative advertisement was smaller (marginally significant) than the indifference point (i.e., a rating of 50; $t(55) = 1.92$, $p = .06$). These results are consistent with the predictions that the advertisement manipulation activated the predicted processing goals before the price-judgment task. Involvement did not vary across types of advertisements ($F(1, 108) < 1$).

Price Perceptions. The model tested was a processing goal (discrimination vs. generalization) by context (control, mean shift, endpoint shift) with two rounds of ratings and three target prices mixed design. To control for variations in the content of the advertisement, we used the ratings of the judged informativeness of the ads as a covariate. A repeated-measures ANCOVA showed a statistically significant interaction between the processing goal and context factors ($F(2, 103) = 4.31$, $p = .02$).

The pattern of results replicated that of experiment 1. When the advertisement was designed to activate a discrimination processing goal (comparative), there was no statistically significant difference between ratings in the mean-shift condition ($M = 61.65$) and those in the control condition ($M = 66.99$; $F(1, 103) = 2.12$, $p > .10$). The target price ratings in the endpoint-shift condition ($M = 55.02$), however, were statistically significantly lower than those in the control condition ($M = 66.99$; $F(1, 103) = 7.42$, $p < .01$), a contrast effect.

When the advertisement was designed to activate generalization (noncomparative), ratings for the target prices were statistically significantly higher in the mean-shift condition ($M = 64.93$) than in the control condition ($M = 57.29$; $F(1, 103) = 5.37$, $p = .03$), an assimilation effect. The ratings in the endpoint-shift condition ($M = 57.50$), however, did not statistically significantly differ from those in the control condition ($M = 57.29$; $F(1, 103) < 1$).

Discussion

As in experiment 1, experiment 3 provides further evidence that marketing-relevant variables can be used to influence how consumers judge prices via activation of processing goals. The results were consistent with the processing-goal hypothesis put forward and, importantly, provided rich process evidence. Our measure of the active processing goal mapped onto the theory of processing goals but was not directly related to the manipulation. Yet the results showed that the manipulations produced the predicted processing goals, and these goals were active before the price-judgment task.

GENERAL DISCUSSION

The purpose of this research was to improve the understanding of how changes to price structures affect price judgments. Our findings enhance our understanding of price judgments by providing evidence of the role of processing goals in moderating the processes via which people judge prices. We find that when a discrimination processing goal is active, price perceptions are sensitive to changes to endpoints and ranks of a distribution, and we observe the standard contrast effect predicted by range-frequency theory. More important, we also find that when a generalization processing goal is active, price perceptions are sensitive to the mean of the distribution, and we observe assimilation effects. This latter result is in sharp contrast to the current state of the literature in price perceptions, and the assimilation effects are consistent with a processing strategy in which prices are additively integrated into the context. We replicate these findings across a wide array of price points and price structures, using both controlled and more externally valid experiments. We also use multiple ways to provide evidence for the claim that distinct processing goals were activated before price judgments. When taken together, the theory proposed and the evidence from the three studies provide compelling support for the moderating role of processing goals on price judgments.

Theoretical Implications

Extant literature indicates that perceptual judgments of prices is bottom-up oriented, with automatic processes influencing how people form standards of comparisons (Adaval and Monroe 2002; Cooke et al. 2004). In other words, a consumer observes price information, stores it, and makes judgments on the evidence observed. Our research shows that more elaborate top-down processes may play an important role in guiding the selection of information-processing strategies. We show that processing goals, which are a form of strategic selection of processes, may influence the set of rules that the bottom-up system uses to organize information in memory. Our results provide insights into the interaction of mechanisms that may produce perceptual assimilation and contrast effects, a topic of considerable interest in perception psychophysics (e.g., Pettibone and Wedell 2007; Wedell 2008; Wedell and Pettibone 1999).

Our findings also point to a possible explanation for the dominance of models based on range-frequency theory in pricing research. Such dominance suggests that humans may have discrimination as their default processing goal. This makes sense because learning organisms need first to establish different categories in order to generalize knowledge about these categories. Our research shows that if this default goal indeed operates, it can be overridden when marketing actions focus consumers on identifying within-category relationships that allow them to generate a prototypical representation of the category. This ultimately influences how people judge prices in ways not predicted by the pricing literature.

Our research also contributes to the literature studying assimilation and contrast effects from a social judgment perspective. Recent research in social judgments has provided a great understanding of how assimilation and contrast may arise, owing to important factors such as the extremity of the standard of comparison and ambiguity of the target or to more trivial factors such as whether one believes she was born in the same day as the standard (see Mussweiler 2003, for an extensive review). One common characteristic across such types of assimilation and contrast effects is that they rely on judgment-relevant target knowledge (Mussweiler 2003), which primes the processing of target- or standard-relevant information. In our research, however, apart from the manipulation of the price structure, there is no direct manipulation of knowledge about the target or the standard. Thus, research on social judgment could benefit from looking into the issue of assimilation and contrast effects that are independent of the accessibility of information about the target/standard, as we did in our research.

Practical Implications

The findings presented here have several interesting implications for marketers. When introducing changes to the product assortment, marketers should recognize the effects of other situational factors on judgments of prices. For instance, in-store displays, advertisements, or a sales person may trigger distinct processing goals and influence how consumers reach a price judgment. One interesting and counterintuitive result from our research, and one that is at odds with the large bulk of research on the effect of the structure of prices on perceptions, is that marketers can make a price be perceived as cheaper (more expensive) by adding lower- (higher-) priced options in the assortment. Prior research predicts that other prices in the set will be perceived as more (less) expensive when lower- (higher-) priced products are added to the assortment. The assimilation effects we predicted and observed are especially relevant from a practical standpoint because previous research prescribed adding more expensive products to an assortment to make a price seem less expensive. This prescription may affect both cost of inventory maintenance and perceived expensiveness of the store. We show that the perceptions of lower target prices can be obtained by adding less expensive products accompanied by adequate marketing materials targeted at triggering a generalization processing goal.

Limitations and Future Research

Our research provides evidence that marketers can manipulate processing goals that can affect how price structure influences perceptual judgments. We have shown that active processing goals determine the effects of price structure in price evaluations. However, we have not identified the impacts of all possible processing goals. Thus, future research can examine how processing goals other than discrimination and generalization can lead to varying effects of price structure on price judgments.

We have found that processing goals activated for a product category carry over to price information about the category. It is possible that the processing-goal activation is category specific. Future research can investigate whether a product-category match between information used to activate the processing goal and information available for processing plays a role in the pattern of results reported in this article. In addition, we have offered evidence that processing goals were active before and after the price-judgment task but have not shown more direct process evidence linking processing goals and the way people process price information. This limitation stems from the fact that the class of price judgments studied in this article relies on automatic algebraic processes, which are less prone to obtaining process evidence via mediation analysis. Such types of evidence, however, would be beneficial to better understand the processes involved in price judgments.

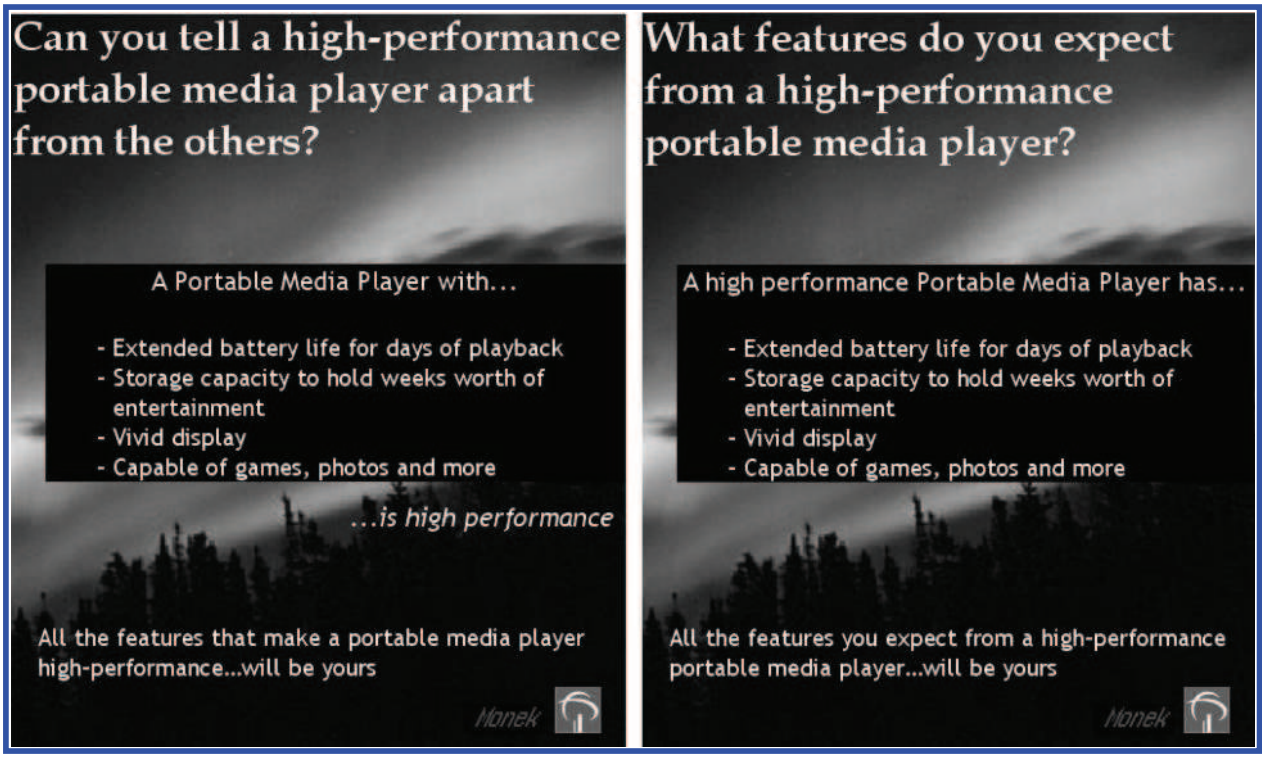
From a substantive standpoint, the mechanistic price-rating procedure may require that the effects are tested in a more externally valid price perception task. Our procedure of multiple rounds of price ratings is adequate to generate price distributions in consumers' memory and is consistent with situations in which consumers make repeated purchases for a given product category. However, further research should examine situations under which greater motivation to process prices exists and lower knowledge about the full range of prices is available.

When consumers such as Jen are determining the expensiveness of a product, marketers can influence the outcome through their choices of prices and through their advertising. Since assortment, pricing, and advertising decisions all carry their own costs and benefits, it is important to deeply understand the interaction between internal and external factors in consumers' formation of price perceptions.

APPENDIX

FIGURE A1

ADVERTISEMENTS: EXPERIMENT 1



NOTE.—Color version available as an online enhancement.

TABLE A1

PRICE STIMULI

	Experiment 1			Experiment 2			Experiment 3		
	Control	Mean shift	Endpoint shift	Control	Mean shift	Rank shift	Control	Mean shift	Endpoint shift
Price:									
1	**71.39**	**71.39**	**71.39**	**3.95**	**3.95**	**3.95**	**171.39**	**171.39**	**171.39**
2	85.71	113.93	82.81	7.25	4.40	17.51	185.71	213.93	182.81
3	100.03	114.14	94.43	10.55	4.85	17.93	200.03	214.14	194.43
4	**114.35**	**114.35**	**114.35**	13.85	5.30	18.35	**214.35**	**214.35**	**214.35**
5	**128.66**	**128.66**	**128.66**	17.15	5.75	18.77	**228.66**	**228.66**	**228.66**
6	**142.98**	**142.98**	**142.98**	**20.45**	**20.45**	19.19	**242.98**	**242.98**	**242.98**
7	157.30	185.52	154.64	**23.75**	**23.75**	19.61	257.30	285.52	254.64
8	171.62	185.73	166.05	27.05	24.50	20.03	271.62	285.73	266.05
9	**185.93**	**185.93**	**202.66**	30.35	25.25	**20.45**	**285.93**	**285.93**	**302.66**
10				33.65	26.00	**23.75**			
11				36.95	26.75	42.59			
12				40.25	32.25	43.07			
13				**43.55**	**43.55**	**43.55**			
Mean	128.66	138.07	128.66	23.75	18.98	23.75	228.66	238.07	228.66
Rank (target)	4, 5, 6	4, 5, 6	4, 5, 6	6, 7	6, 7	9, 10	4, 5, 6	4, 5, 6	4, 5, 6

NOTE.—Prices are in U.S. dollars. Target and endpoint prices are in bold.

FIGURE A2

PORTABLE MEDIA PLAYERS

NOTE.—Color version available as an online enhancement.

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