

Inference not Reference: The Price Image Heuristic as an Alternative to Reference Price  
Theories

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Reference price theories have dominated research into how consumers evaluate prices and make price-based choices. In this research, the authors propose an alternative to reference price theories, in which consumers use *retailer price image*, the retailer's general reputation for charging high or low prices, as a heuristic to evaluate prices and make choices within a store. This alternative account predicts a pattern of price perceptions, price estimates, choices, and inference making that cannot be accounted for using prevailing reference price theories. These predictions are tested in a series of eight empirical studies that offer converging evidence in support of the proposed theory.

Imagine a consumer standing in a store, considering the price of a particular bottle of wine. How does the consumer go about evaluating this price? The overwhelming consensus of previous research is that consumers evaluate prices by comparing them to a reference price, frequently an internalized summary of experience with past prices (Monroe 1973; Winer 1986; for a comprehensive review see Mazumdar, Raj and Sinha 2005). Reference price theories have dominated research on consumer price evaluations for several decades—and for good reason. Statistical models that include a reference price have generally been found to predict brand choice (Winer 1986; but see Bell and Lattin 1998), purchase quantity (Krishnamurthi, Mazumdar and Raj 1992), and purchase timing (Bell and Bucklin 1999) better than models that don't include a reference price factor. Furthermore, reference price theories have the advantage of being well-grounded in more general psychological theories explaining how people evaluate stimuli of all kinds (Helson 1964; Kahneman and Tversky 1979; Volkmann 1951).

Reference price theories differ in their particulars, but they all make the foundational assumption that consumers have access to (or can easily construct) a reference price upon which to base their evaluations. But what if the wine-buying consumer in our illustration has little experience in the category, and so has no well-defined reference point upon which to draw? There may be many settings in which consumers do not have pre-constructed reference prices when they go shopping. We know, for example, that consumers frequently evince poor price knowledge (Dickson and Sawyer 1990) and often engage in very shallow processing when shopping (Hoyer 1984). Further, the sheer volume of choice options available to consumers, with new, innovative product categories introduced all the time, suggests that consumers are likely to not have well-defined reference prices at all times and for all offerings.

How do consumers evaluate prices when they don't have access to an internal reference price? We suggest that when consumers do not have clear reference prices, they may use the retailer's price image, or general reputation for high or low prices, as a heuristic. This heuristic substitutes for the evaluation process consumers use when they have well-defined reference prices, and therefore can result in outcomes that diverge from prevailing reference price theories.

In the following sections, we articulate a price image based theory of price evaluations. We then contrast the predictions of this price image model with the predictions of reference price models in four domains: price evaluation, price estimation, choice, and inference making. In each domain, we present experimental evidence supporting consumer use of price image,

evidence that would be difficult to account for using standard reference price models.

In the domain of price evaluations, we argue that, contrary to the predictions of many reference price theories, the same price will be evaluated as more expensive in the context of a high price image store and cheaper in the context of a low price image store. We present the findings of two experiments that test this prediction (Experiments 1 and 2). Next, we investigate the role of price image in consumers' estimates of the price of a specific item at particular stores (Experiment 3). We propose that estimating prices at multiple stores is likely to lead to robust order effects, a prediction that cannot be accounted for by most reference price theories. In the domain of choice, we predict that price image will affect consumers' preferences for more or less expensive options within a choice set. In particular, we propose that, holding options and prices constant, consumers are more likely to choose more expensive options from a low price image store than from a high price image store. We examine the effects of price image on choice in two experiments (Experiments 4 and 5).

Reference price models imply that consumers update their beliefs about prices at a store when they receive disconfirming price information (e.g., when they find a high price at a store with typically low prices). The heuristic account we propose suggests that price image may often make consumers less likely to update price image impressions, because they will evaluate disconfirming prices (a high price at a low price-image store) as consistent with price-image. Experiments 6 and 7 investigate how price image can shape consumers' inferences about the likelihood of finding low prices at other stores. Consumers may both pass up low prices at high price image stores as overpriced, and neglect to search elsewhere even after seeing high prices at low price image stores.

Finally, we explore an important boundary condition on price image effects (Experiment 8). We propose that consumers are less likely to use price image heuristics when they have sufficiently specific, accessible reference prices. In other words, we expect that price image serves as an inferior substitute for reference prices, and that the price image effects we identify are likely to be reduced when consumers have easily accessible reference prices.

## **RETAILER PRICE IMAGE**

Price image is a consumer's qualitative impression of the overall price level of a retailer (Brown 1969; Van Heerde, Gijsbrechts and Pauwels 2008), and is reflected in consumers' common beliefs that some stores have generally high prices while others have generally low prices for

comparable offerings. The price image may be thought of as the price dimension of a more inclusive, multidimensional store image (Berry 1969; Martineau 1958) or brand image (Keller 2003). Retailer price image has been shown to influence a variety of consumer behaviors, including store choice (Singh, Hansen and Blattberg 2006; Van Heerde, et al. 2008) and purchase likelihood (Hamilton and Chernev 2010).

Price image, as defined in this paper, has several specific properties that collectively distinguish it from related constructs: 1) Price image is an aggregate evaluation and not a numerical estimate; 2) Price image is sensitive to the context in which judgments are made; 3) Price image is not strictly determined by the quality of goods sold; and 4) Price image is not strictly determined by actual prices.

First, price image differs from reference prices in the specificity of its conceptual representation. Reference prices have been defined in different ways by different authors, including as an adaptation-level (Kalyanaram and Winer 1995), as an expectation (Monroe 1973), and as an amount judged to be fair or equitable (Xia, Monroe and Cox 2004). These diverse reference price theories are similar in defining a reference price as a numerical price estimate of some kind, either a point (Briesch, Krishnamurthi, Mazumdar and Raj 1997) or a range (Janiszewski and Lichtenstein 1999). In contrast, a price image is a categorical evaluation of a retailer as a whole, and is not generally expressible as a numerical price estimate. For example, a consumer may have the opinion that prices at Walmart are low relative to other stores that sell comparable merchandise, without necessarily having specific price expectations for any of the products at Walmart or at competing stores. Thus, although a price image may influence specific reference prices, as we will discuss in the following sections, price image itself is a generalized, qualitative belief rather than a reference price or a numerical price estimate.

Second, we propose that price images are not absolute assessments of price levels. Rather, price image represents a subjective evaluation relative to some standard, such as the perceived price levels of a salient set of competing retailers. Thus, a traditional grocery store may be evaluated as having a high price image when compared to discount grocers like Walmart, but the same store may be evaluated as having a low price image when compared to convenience stores. Likewise, people with similar information may differ in their price image based on the salient comparisons that come to mind.

Third, price image is multiply determined and is not necessarily a function of the quality of the

merchandise sold. Although some high price image retailers carry high quality goods (e.g., clothing at Nordstrom vs. at Old Navy; jewelry at Tiffany's vs. at Target), other high price image stores carry merchandise that is identical to that found in lower price-image stores (e.g., DVDs at Suncoast vs. at Walmart; milk at 7-11 vs. at Food-4-Less), but may offer better service, more convenience or a more pleasant shopping environment to justify their higher perceived prices. When there is limited competition, retailers may even charge high prices for low quality and poor service. As a result, consumers' beliefs about the quality differences across retailers may contribute to, but will not by themselves determine, differences in price image.

Finally, price image is also not strictly determined by actual prices. The link between prices and perceived price image is complicated by the fact that stores often carry large and diverse inventories that only partially overlap with competitors (Stassen, Mittelstaedt and Mittelstaedt 1999), making a large-scale price comparison across retailers effectively impossible for ordinary consumers. Instead of direct price comparisons, consumers may use the non-representative prices of advertised "loss-leader" items (Simester 1995), environmental cues like store décor and layout (Brown and Oxenfeldt 1972), and store policies such as price match guarantees (Srivastava and Lurie 2001) to inform a price image. The impact of non-price cues on price image formation may make actual prices a relatively minor factor influencing price image, at least in some settings. Empirically, consumers' price image impressions have been shown to sometimes bear little resemblance to price reality (Brown 1969, 1971). As a result, consumers' inferences based on the price image of a store may not accurately reflect the actual prices a retailer charges.

In the following sections, we document four domains in which reference price theories make different predictions about consumer behavior than the price image account we propose. In each domain, we explain the differences between these predictions and then present experimental evidence in support of the use of price image as an alternative to reference price comparisons. We begin with a discussion of how consumers evaluate individual prices.

### **PRICE IMAGE AND PRICE EVALUATIONS**

In this research, we propose that consumers sometimes evaluate prices in a way that by-passes the need for reference price comparisons. We propose that when consumers do not have a sufficiently specific, accessible reference price, they may use the price image of the retailer as a heuristic when evaluating prices. Specifically, they may apply a rule that could be paraphrased as,

the prices at this store tend to be high (or low), therefore this particular price is also likely to be high (or low). According to the account we propose, the global evaluation of the price level of a retailer—the price image—results in directionally consistent evaluations of individual prices: higher evaluations at a high price image store and lower evaluations at a low price image store. Returning to the example of the wine-buying customer mentioned in the introduction, we propose that she would judge the same price to be less expensive if she encountered it in a discount wine store (low price image) than if she were to find it in a specialty wine store (high price image). This prediction is conceptually consistent with some early work on price image, which suggested that consumers can use a price image heuristically to evaluate prices (Nystrom, Tamsons and Thams 1975). Price image theories are by no means consistent on this point, however. Others have argued that price image influences only a consumer's choice of stores, but not the evaluation of individual shelf prices (Feichtinger, Luhmer and Sorger 1988).

This prediction also represents a break from reference-price theories. Most reference price models cannot account for the influence of price image, since they typically make no accommodation for the influence of store level effects. This is true for both internal reference price theories, which define reference prices as a function of previous exposure to individual prices (Bell and Bucklin 1999; Kalyanaram and Winer 1995; Mazumdar, et al. 2005; Monroe 1973; Winer 1986), and external reference price theories, which are based on contemporaneous exposure to individual prices (Biswas and Blair 1991; Mayhew and Winer 1992; Simonson, Nowlis and Lemon 1993). As a result, most theories would predict that for a given internal reference price or set of external reference prices, a particular price would be evaluated as equally high or low whether it was seen at Walmart or Nieman Marcus.

A subset of reference price theories does allow for store-level effects on price evaluations. However, these theories still start with the premise that consumers have a well-defined reference price, which they adjust based on the particulars of each store. These store-specific reference prices accommodate price image by raising the reference prices for stores with a high price image and lowering the reference prices for stores with a low price image (Biswas and Blair 1991; Mazumdar, et al. 2005; Thaler 1985). As a consequence of these store-specific reference prices, a given price would be evaluated as lower at a high price image store than at a low price image store. These theories predict that “the same price of a bottle of wine could be judged more favorably if it is sold in a specialty wine store [high price image] than if it is sold in a discount

wine store [low price image]” (Mazmudar, Raj and Sinha 2005, p. 87). In short, these theories, using store-specific adjustments to stable product reference prices, predict exactly the opposite of what we predict, using price image as a substitute for stable reference price comparisons.

Although our prediction that a high (or low) price image will lead to a higher (or lower) evaluation of a given price is inconsistent with reference price theories, it is consonant with the halo effect documented in psychology, in which a global impression of a person or object can have a directionally consistent influence on the evaluation of individual attributes (Nisbett and Wilson 1977). In the marketing literature, it has been shown that consumers use an overall positive/negative impression of a brand to infer that unobservable or missing information is also positive/negative (Dick, Chakravarti and Biehal 1990). Likewise, consumers’ overall impressions of a store have been found to have a directionally consistent influence on quality perceptions (Wheatley and Chiu 1977) and the believability of advertised prices (Berkowitz and Walton 1980; Fry and Gordon 1974). We predict that in the absence of a compelling internal reference price, consumers’ price evaluations may be influenced by the halo of the retailer’s price image, such that a price will be evaluated as higher when seen at a store with a high price image than it would be at a store with a low price image.

We tested this initial prediction in two experiments. In the first experiment, we asked participants to evaluate the price of a relatively common, small-ticket item: a disposable pen, sold either at a store with a high price image or at a store with a low price image. In the second experiment, we held the store constant and manipulated relative price image by asking participants to think of similar stores with either higher or lower price levels. Participants in the second experiment evaluated an uncommonly purchased, big-ticket item: a treadmill. Both experiments also measured participants’ price image ratings to allow us to test whether these store-level, subjective evaluations of aggregate price level mediated the influence of our manipulations on price evaluations. These experiments present a direct test of our proposal that consumers will evaluate prices as consistent with the price image. In contrast, reference price models predict that the same price will be evaluated equally or more favorably at a high price image store than at a low price image store (Mazmudar, Raj and Sinha 2005).



## **EXPERIMENT 1: THE SAME PRICE IS EVALUATED AS LOWER AT A LOW PRICE IMAGE STORE THAN AT A HIGH PRICE IMAGE STORE**

### *Method*

Ninety-eight adults from an online subject pool were randomly assigned to two conditions. Participants in the high price image condition were asked to imagine they were buying a two-pack of pens from Hudson News, described as a national newsstand chain found in many airport terminals. Participants in the low price image condition were asked to imagine they were buying the same pens from Walmart. (Pretesting had revealed that Hudson News was generally viewed as having a higher price image than Walmart.) In both conditions, participants were shown a picture of a Pilot Precise Needle Gel Retractable Pen priced at \$2.89 for a two-pack. They were given the brand name and several bullet-points of information about the product, of the type that would be found on the packaging. Participants rated the price of these pens on a scale anchored by 1 = very low and 7 = very high. On a separate page, they also rated the price image of either Hudson News or Walmart by indicating whether, in general, they considered the prices at that store to be low or high, using the same seven-point scale. They could also check a box indicating that they were completely unfamiliar with the prices at the store, even by reputation. The order of evaluating the price of the pens and rating the price image of the retailer was counterbalanced across participants.

### *Results*

Because we were interested in the influence of price image on price evaluations, we eliminated from the analysis those participants who indicated they were completely unfamiliar with the prices at the store, even by reputation. (The price evaluation findings were consistent using the complete sample.) Anticipating that more participants would be unfamiliar with the prices at Hudson News (22) than Walmart (1), we randomly assigned more participants to the high price image, Hudson News condition. After eliminating the participants who indicated they were unfamiliar with the store price image, we were left with 40 participants in the high price image condition and 35 in the low price image condition.

*Price evaluations.* We predicted that the same price would be evaluated as higher at a store with a high price image than at a store with a low price image. Consistent with this prediction, participants shopping at the high price image Hudson News rated \$2.89 to be a higher price for the pens than did participants shopping at the low price image Walmart (4.3 vs. 3.7;  $F(1,71) = 5.24, p < .05$ ). This result is inconsistent with the predictions of reference price models, which predict

either no effect of price image or that prices should be evaluated more favorably at high price image stores (Mazmudar, Raj and Sinha 2005). It is also inconsistent with a scale re-norming interpretation, since participants in the Hudson News condition would presumably have thought of higher prices and therefore would have rated the same price lower. The order of evaluations was not significant and this factor did not interact with the price image condition ( $ps > .3$ ).

*Mediation through perceived price image.* We argued that differences in price evaluations are driven by differences in the perceived price images of the retailers. To test this prediction, we examined the indirect effect of the price image manipulation (Hudson News vs. Walmart) through participants' ratings of the price images of these retailers. A mediation analysis revealed that price image condition was a significant predictor of both price evaluation ( $\beta = .58, t = 2.22, p < .05$ ) and our proposed mediator, perceived price image ( $\beta = 2.62, t = 8.92, p < .001$ ). Price image ratings predicted participants' evaluations of the price of the pens ( $\beta = .21, t = 2.03, p < .05$ ). As we anticipated, when the price image ratings were included in the model, the influence of the retailer (Hudson News vs. Walmart) was no longer significant ( $\beta = .04, t = .10, p > .90$ ), showing that perceived price image fully mediated the effect. Mediation was confirmed with a Soebel test ( $Z = 1.97, p < .05$ ) and a bootstrap analysis (CI: [.02, 1.14],  $p < .05$ ).

### *Discussion*

This study provides initial support for the idea that consumers may use price image as a heuristic in lieu of reference price evaluations. This study manipulated price image by using stores with well-established price images. Although this approach benefits from high external validity, it is also true that Walmart and Hudson News differ on many dimensions other than price image. The following study presents a more conservative test of our hypothesis by holding the store constant across conditions. Instead, price image is manipulated by changing the salience of the set of competitors that could influence a consumer's price image evaluation.

## **EXPERIMENT 2: A PRICE IS EVALUATED AS LOWER WHEN HIGH PRICE IMAGE STORES ARE SALIENT**

### *Method*

Thirty-six adults from an online subject pool evaluated the price of a treadmill at Sears. Participants were first randomly assigned to one of two price image conditions: participants in the high price image condition were asked to list six stores that sell items comparable to those

sold at Sears but that have lower prices than Sears. We anticipated that making lower priced stores more salient would make the prices at Sears seem higher by comparison—thereby leading to a higher price image of Sears. In contrast, participants in the low price image condition were asked to list six comparable stores that have higher prices than Sears.

After the price image manipulation, all participants evaluated a Gold's Gym 450 Treadmill sold at Sears priced at \$377. In addition to the brand name and price, participants were provided with a picture and product information about the treadmill. Participants then rated the price of \$377 on a scale ranging from 1 = very low to 7 = very high. After evaluating the price of the treadmill, participants were asked to rate the price image of Sears, by indicating whether, in general, they considered the prices at Sears to be low or high, using the same seven-point scale.

### *Results*

*Price evaluations.* We had predicted that listing several reference stores more expensive than Sears would lower Sears' relative price image, thereby making the price of the treadmill seem lower, compared to thinking about stores less expensive than Sears. Consistent with our predictions, and in contrast to the predictions of reference price models, participants in the low price image condition rated \$377 as a significantly lower price than did participants in the high price image condition (3.2 vs. 4.3;  $F(1,34) = 5.80, p < .05$ ).

*Mediation through perceived price image.* We conducted additional analyses to examine the mediating effect of perceived price image on price evaluations. Analysis revealed that the experimental condition (listing more vs. less expensive stores) predicted both price evaluations ( $\beta = -1.11, t = -2.41, p < .05$ ) and perceived price image ( $\beta = -.89, t = -2.83, p < .01$ ). Perceived price image successfully predicted price evaluations ( $\beta = .83, t = 3.90, p < .001$ ). When perceived price image was included in the model, it fully mediated the influence of the experimental manipulation on price evaluations ( $\beta = -.38, t = -.87, p > .35$ ). Mediation was confirmed with a Sobel test ( $Z = -2.25, p < .05$ ) and a bootstrap analysis (CI: [-1.93, -.03],  $p < .01$ ).

### *Discussion*

These studies provide evidence that consumers may use a price image heuristic when evaluating prices, with the resulting price evaluations running contrary to the predictions of reference price theories (Mazmudar, Raj and Sinha 2005). We find this effect for both treadmills, a relatively exotic category, and also for pens, a relatively commonly encountered category. Next, we investigate how price image affects price estimates for a common product at familiar stores.

## **PRICE IMAGE AND PRICE ESTIMATES**

How do consumers estimate the price of a particular item at a particular store? In some cases, an informed consumer may have a store-specific reference price for the item. For example, a consumer who purchases a carton of Tropicana orange juice every week from the same grocery store may have a well-defined expectation for the price of Tropicana at that store. Estimating the expected price in this case would simply involve articulating the store-specific reference price.

Alternatively, a consumer may not know exactly how much a particular store charges for an item, but instead may have a market-wide reference price. The consumer could then adjust this reference price up for high price image stores or down for low price image stores when generating a price estimate. So, a consumer may have a general reference price of \$3.50 for a carton of Tropicana orange juice, but expect the price to be \$3.00 at a low price image store and \$4.00 at a high price image store. Both of these accounts assume that when consumers want to estimate the price of a particular item at a particular store, they start with a well-defined internal reference price.

We propose that when consumers do not have an articulated reference price, price image affects the relative interpretation of a price estimate as high or low, but has little impact on what that price estimate is, in absolute terms, because price image does not lend itself to producing specific numerical estimates. Consumers may believe that the prices at one store are relatively higher than the prices at another store, even without having accessible store-specific price estimates. Once a consumer knows (or has estimated) the price at one store, however, she may anchor on that initial estimate to generate an estimate for a different store with a different price image. However, before that initial estimate is articulated, there is nothing to adjust. Put another way, price image beliefs allow a consumer to be internally consistent in terms of relative price differences (e.g., this will cost \$2 more at Store X than at Store Y), but do not help consumers to produce accurate initial estimates in the absence of a well-defined reference price.

The resulting prediction is that consumer estimates of the prices of the same item at different stores are likely to be affected by whether the consumer has some initial price to adjust. Specifically, we expect a higher estimate of the price at a low price image store if it is made before estimating the price of the same item at a high price image store, rather than after. Likewise, we expect the estimate of a price at a high price image store will be lower if the estimate is made before estimating the price for the same item at a high price image store rather than after. Such order effects cannot be accounted for by reference price models, which would

predict that both the initial and subsequent price estimates would be based on store-specific or market-wide internal reference prices, and so would be insensitive to the order in which the estimates are made. We test these predictions in the following experiment.

### **EXPERIMENT 3: SALIENT PRICE IMAGE COMPARISONS FACILITATE DIFFERING PRICE ESTIMATES**

#### *Method*

We recruited participants in the decision lab of a large Midwestern university as well as on campus, for a total of 215 completed surveys. We chose two grocery chains well-known locally for having a high (Whole Foods) vs. low (Jewel-Osco) price-image. We asked participants to estimate the price of one half-gallon carton of Tropicana orange juice, first at one store and then, on a subsequent page or screen, at the other store.

Participants' estimates for the prices of Tropicana orange juice at each store were elicited in one of two conditions. In the WF-first condition, participants first estimated the price only for Whole Foods, without knowing that they would be asked to make estimates for any other store, and then estimated the price at Jewel-Osco. In the JO-first condition, the order was reversed, and participants first estimated the price at Jewel-Osco without knowing that they would then be asked to estimate the price at Whole Foods. For each store, participants were shown a picture of the product, the store name and logo and were asked for their best estimate of the current price.

#### *Results*

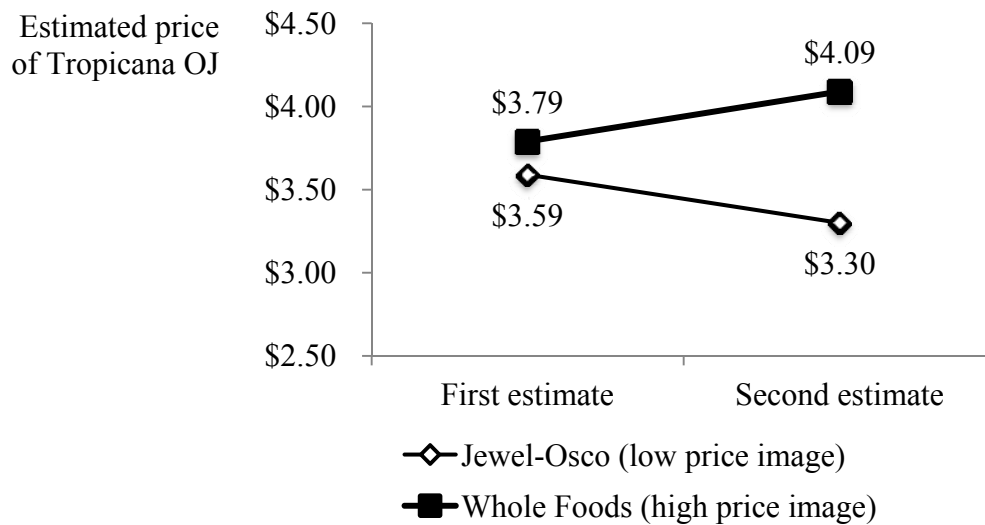
*Manipulation check.* We confirmed that the two stores' price image differed in our sample in two ways. First, we conducted a seven-week price audit for a Whole Foods and Jewel-Osco store across the street from each other to see whether actual prices on equivalent merchandise differed in the metro-area in which the experiment was conducted. We confirmed that prices were significantly higher at Whole Foods for a basket of items carried by both stores (by about 12%), and specifically for Tropicana orange juice (\$3.99 Whole Foods vs. \$3.36 Jewel-Osco). Second, participants were asked to rate the prices at each store, on a scale from 1 ("lower prices than most stores") to 5 ("higher prices than most stores"). The price-image ratings for Whole Foods were substantially higher than the ratings for Jewel-Osco (4.1 vs. 2.7;  $t(183) = 16.2, p < .001$ ).

*Price estimation.* Averaging across conditions, participants estimated the price of the product as higher at Whole Foods, compared to Jewel-Osco (\$3.95 vs. \$3.45;  $t(214) = 11.0, p <$

.001). This overall difference in price estimates across stores could have occurred for one of two reasons. People might have stable store-specific reference prices for this product, and simply reported these reference prices. Alternatively, they might have a stable price image for each store and only a general sense of the typical price of the product. If people are reporting stable store-specific reference prices, then the method of elicitation should not matter. However, if they are constructing an estimate based on differences in store price image, the salience of specific stores in mind may affect their estimates.

To test this, we compare the two order conditions, and found that the order of elicitation had a significant effect on price estimates (see Figure 1). The estimated price at Whole Foods was lower in the WF-first condition than in the JO-first condition (\$3.79 vs. \$4.09;  $t(213) = 2.18$ ,  $p < .05$ ). Conversely, the estimated price at Jewel-Osco was higher in the JO-first condition than in the WF-first condition (\$3.59 vs. \$3.30;  $t(213) = 2.30$ ,  $p < .05$ ). If participants had stable store-specific reference prices or general reference prices that they adjusted based on price image, then the order should not have affected the estimates.

**FIGURE 1: ORDER EFFECTS IN PRICE ESTIMATES ACROSS STORES**



When participants made their first estimate, they presumably had only a general sense of plausible prices as well as the price image of the store, but differences in price image across stores were not salient. As a consequence, first prices were only weakly associated with the store (WF = \$3.79 vs. JO = \$3.59;  $t(213) = 1.55$ ,  $p > .1$ ), consistent with our account, as well as with

the literature on scope insensitivity in single-evaluation mode (Hsee 1996). In contrast, when participants saw the second store, they attended to the difference in price image and adjusted accordingly, making very different second estimates for the price of the product at the two stores (WF = \$4.09 vs. JO = \$3.30;  $t(213) = 5.90, p < .001$ ). Consistent with this interpretation, the store asked first had no effect on the average differences between the price estimates ( $\Delta = \$0.50$  JO-first vs. \$0.49 WF-first;  $t(213) = .09$ ). Additional analyses confirmed that none of the findings could be explained by differences in quality perceptions of Tropicana orange juice across the two stores.

### *Discussion*

Our results suggest that when people make an estimate of the price of a product at a single store, they reconcile the price image of the store and their approximate sense of the price of the product, by assuming that the store charges the estimated price and evaluating the price based on the store's price image. Thus, they may even estimate the same price for a high-price image store as they would for a low-price image store, but they will see that price as more expensive at the high price-image store. Then, when making another estimate of the product at another store, the differences in price image will be salient, and to accommodate this difference, they will adjust accordingly, estimating a lower price at the low price-image store or a higher price at the high price-image store. This instability in price estimates, based on the order of estimation, is attributable to the salience of relative price image, but is inconsistent with stable reference prices and cannot be explained by normative models of price learning, such as Bayesian updating.

If the same prices for the same products are evaluated differently, based on the price image of the store, then price image can be expected to affect how a set of products in a store context are evaluated. In the next section, we argue that consumers may use price images not only to evaluate prices, but also as an aid in making choices between products within a store.

## **PRICE IMAGE AND CONSUMER CHOICE**

In order to derive predictions about how price image might affect choice—and in particular, consumers' preferences for more or less expensive offerings—we begin by noting one implication of our contention that consumers sometimes do not have the aid of well-defined reference prices. Without ready access to a reference price, a consumer would not be able to say, *a priori*, that she wants to spend \$30 on a bottle of wine before entering the store. Instead she may only know where

on the price-quality spectrum her preferences fall, relative to what is available on the market. In other words, she may know only that she is interested in a low priced, a moderately priced, or a high priced wine, without knowing exactly what constitutes a low, moderate or high price. In such cases, the consumer's choice may be strongly influenced by the set of prices available at the retailer. Thus, if the consumer is interested in a moderately-priced wine, she will select a wine from the mid-range of prices available at the store.

The idea that consumers map their subjective preferences onto the range of the local consideration set was elegantly demonstrated by Prelec, Wernerfelt, and Zettelmeyer (1997). They showed that when given the choice of three poncho lengths, short people selected the shortest available, those of medium height selected the middle option, and tall people selected the longest—this despite the fact that *all* available options were much shorter than standard poncho lengths. Presumably, if participants were aware of either the full range of poncho lengths available on the market or of the specific poncho length they needed, they all would have selected the longest (though still short) poncho.

We propose that consumers may use retailer price image to refine their assumptions about the distribution of prices on the market. First, consider the predictions of reference price models in such a setting. A consumer interested in purchasing a moderately priced wine enters a high price image specialty wine store. According to prevailing reference price theories, this consumer will adjust her reference price up to accommodate for the high price image of the retailer, meaning she will evaluate the prices she encounters more favorably (Mazmudar, Raj and Sinha 2005; Thaler 1985). As a result, higher priced options should seem more moderate (or more justifiable, via transaction utility; Thaler 1985) than they would otherwise. Therefore, higher priced options would be more likely to be chosen at a store with a high price image than if the same options were encountered at a store with a lower price image. Thus, prevailing reference price theories imply that a consumer with the intention to purchase a moderately priced wine would be more likely to select one of the higher priced bottles at a specialty (high price image) wine store than at a discount (low price image) wine store, from among the same set of wines at the same prices.

In contrast, we propose that when a consumer does not already have a well-defined reference price, the influence of price image on choices will result in the opposite effect. In our proposed account, and consistent with the data already presented, when consumers encounter prices at a store with a high price image, they will tend to evaluate those prices as higher than if they had



encountered the same prices at a store with a low price image. We therefore argue that higher priced options are *less* likely to be chosen at a store with a high price image than if the same options were encountered at a store with a lower price image. To illustrate, we propose that consumers without available reference prices are likely to evaluate a set of prices at a specialty wine store as higher than if they had encountered the same prices at a discount wine store. As a result, a consumer looking to purchase a moderately priced wine would be more likely to select one of the lower priced bottles at the specialty (high price image) wine store than at the discount (low price image) wine store, holding intentions, prices and options constant.

This process is illustrated in Figure 2 (Appendix B). In the first panel, a consumer with a preference for moderately priced wines is considering three wines. In order to select a moderately priced wine, the consumer first maps her evaluations of the wines onto a subjective scale and then selects the option that best matches her preferences (Prelec, Wernerfelt, and Zettelmeyer 1997). In the second panel, the consumer encounters the same options at a high price image retailer. The consumer takes into account the price image when evaluating the prices, shifting these evaluations toward the high-price end of the continuum. As a result, the lowest priced option is now considered the best match for a moderate-price preference. In the third panel, the consumer encounters the same options at a low price image retailer. The low price image of the retailer leads the consumer to conclude these prices are likely to be low priced. In this case, the highest priced option is now considered a moderately priced wine and so is chosen by this consumer.

Experiment 4 examines whether and how consumers' choices change as a result of a change in price image, holding options and prices constant. We test these predictions in the context of choices among more and less expensive options in several grocery categories. Experiment 5 asks participants to choose between a more and less expensive replacement automobile tire at stores with different price images. This experiment also examines consumers' intuitions about the cause of price image differences in order to rule out the alternative explanation that the choice effects are caused by differences in perceived quality of the offerings at different stores.

## **EXPERIMENT 4: LOWER PRICED ITEMS ARE MORE PREFERRED AT A STORE WITH A HIGH PRICE IMAGE**

### *Method*

One-hundred and three adults from a web-based subject pool were randomly assigned to either a high price image or a low price image condition. First, all participants were shown the logos of nine national and regional grocery chains (e.g., Food 4 Less, Trader Joe's, Whole Foods, Walmart) and asked to indicate which store they thought had the lowest and the highest prices, overall, on groceries. Whole Foods was the most commonly selected (50.0%) and Trader Joe's the second most commonly selected (14.3%) as high price image stores. Walmart was the most commonly selected (61.7%) and Kroger the second most commonly selected (12.8%) as low price image stores. Next, depending on the price image condition to which they had been assigned, participants were told they would be shopping for several different products at either the store they had indicated had the highest or the lowest price image. Thus, a participant who indicated they thought Food 4 Less had the lowest prices overall and was randomly assigned to the low price image condition, was told that he or she would be shopping at Food 4 Less.

Participants were asked to choose from among four options in each of four product categories: frozen pizza, pasta sauce, maple syrup and tuna. All options in each category were national brands and prices were identical across price image conditions. For example, in the pasta sauce category, participants were asked to choose among Prego (\$3.09), Ragu (\$3.29), Barilla (\$3.49) and Newman's Own (\$3.69). Prices were based on the prices of a national Internet grocery store.

### *Results*

We report the choice share of the lowest priced option in each set relative to the share of the other three, higher-priced options. We present the data this way because of the large choice share of the lowest priced brand (more than a 35% choice share across conditions and product categories, and more than 50% choice share in some conditions) relative to the other three.

We had predicted that a low-priced option would be more likely to be chosen at a high price image store than at a low price image store. The choice data are consistent with this prediction. Across the four product categories, 29.4% of choices were for the lowest priced brands when participants were shopping in the low price image store. In the high price image store, the choice share of the lowest-priced brands increased to 41.7%—this despite the fact that the same prices were shown in both conditions. This pattern held across all four product categories: frozen pizza

(27.7% vs. 35.7%), pasta sauce (44.7% vs. 54.5%), maple syrup (30.4% vs. 50.0%), and tuna (14.9% vs. 26.8%).

A mixed-model binary logistic regression predicting choice of the least expensive option (vs. one of the other three, more expensive options) as a function of store price image (between-subjects) and product category (within-subject) revealed that price image condition was a significant predictor of the option participants chose ( $\chi^2(1) = 3.82, p = .05$ ). While the results also revealed a significant main effect of product category ( $\chi^2(5) = 25.67, p < .001$ ), the interaction between product category and price image was not significant ( $p > .80$ ), suggesting that the predicted effect was consistent across product categories.

### *Discussion*

This study demonstrates the influence of price image on preference between more or less expensive offerings in some frequently purchased grocery categories. Consistent with a price image-based view of price evaluations, we found that participants were more likely to prefer less expensive options when they were shopping at high price image stores, despite the fact that the actual prices and products were held constant.

An alternative account for the choice findings may be derived from a difference in perceived quality of options at stores with different price images. As discussed previously, price image can result from differences in quality, where higher prices are the result of higher merchandise costs (e.g., Neiman Marcus charges a higher price for its suits than K-mart, in part, because the suits are arguably of better quality and cost more to design and produce). If consumers believe that a high price image store carries high quality merchandise, then they may think that a comparable product provides higher quality at a high price image store. For example, consumers might feel that the most expensive item carried by the low PI store is comparable in quality to the cheapest item at the high PI store.

The well-known national brands used in Experiment 4 provide clear quality signals and make this alternative explanation unlikely. Participants would have needed to believe that Prego pasta sauce purchased at one store was higher quality than Prego pasta sauce purchased at the same price at another store. To rule this out more directly, Experiment 5 provides additional data on perceived quality. Participants were asked about their beliefs regarding the reason for the price image of the store in which they were shopping. If the alternative account holds, then choice should have been driven by differences in perceived quality of the store's offerings. On

the other hand, if choice is a function of a change in price perceptions, as we propose, then choices would be driven by beliefs about the degree to which the store marks up its merchandise, and not by perceived quality differences. Experiment 5 tests these predictions.

### **EXPERIMENT 5: THE PREFERENCE FOR LOWER PRICED ITEMS AT A HIGH PRICE IMAGE STORE IS DRIVEN BY BELIEFS ABOUT MARKUP, NOT QUALITY**

#### *Method*

Eighty-seven adults from a web-based subject pool were randomly assigned to one of two price image conditions (high vs. low). All participants were asked to imagine that they were on a road trip when their car had a blowout. Participants in the high price image condition were told that the only nearby tire store had a reputation for having high prices. In the low price image condition, participants were told that the only nearby tire store had a reputation for having low prices. In both conditions, the store carried two tires that would work as a replacement, a \$59 Riken brand tire and a \$47 Barum brand tire. After choosing one of the two tires, participants were asked to evaluate both prices on a seven-point scale. Finally, participants indicated their beliefs about the extent to which the store's price image was driven by differences in the quality of the tires or by the markup charged by the store. Participants used two nine-point scales to indicate their beliefs about quality differences (1 = tires are likely very low quality, 5 = tires are likely average quality, 9 = tires are likely very high quality) and markup (1 = store likely has very low markup, 5 = store likely has average markup, 9 = store likely has very high markup).

#### *Results*

*Price evaluations.* Unsurprisingly, participants rated the higher priced tire as more expensive than the lower priced tire (Table 1;  $F(1,85) = 114.66, p < .001$ ). More important, and consistent with the findings of Experiments 1 and 2, participants evaluated the prices of both the \$59 tire and the \$47 tire as significantly more expensive in the high price image condition than in the low price image condition ( $F(1,85) = 10.64, p < .005$ ). The interaction between tire price (\$59 vs. \$47) and price image condition was not significant ( $p > .35$ ), suggesting the effect of price image was consistent across tire prices.

**TABLE 1: A LESS EXPENSIVE OPTION IS MORE PREFERRED AND PRICE EVALUATIONS ARE HIGHER AT A HIGH PRICE IMAGE STORE**

Store price image	Relative choice share of less expensive tire	Price evaluations		Perceived quality relative to other stores	Perceived markup relative to other stores
		\$47 tire	\$59 tire		
High	54.4%	3.4	4.4	5.8	6.7
Low	23.3%	2.5	3.3	4.8	4.4

NOTE.—Price evaluations were measured on a seven-point scale with 1 = very low and 7 = very high. Perceived quality and perceived markup were measured on a nine-point with 1 = very low, 5 = about the same as other stores, and 9 = very high.

*Choice.* We predicted that consumer preferences for higher and lower priced options would be a function of price image, such that the low priced option would be more preferred at a high price image store than at a low price image store. The consumer choice data are consistent with this prediction. Specifically, when participants were told that the store had a reputation for low prices, 23.3% chose the cheaper \$47 replacement tire. In contrast, when participants were told that the store had a reputation for high prices, the choice share of the cheaper tire rose to 54.4% ( $\chi^2(1) = 8.53, p < .005$ ).

*Beliefs about price image.* Participants in the high price image condition (those who were told the store had a reputation for high prices) believed the quality of the merchandise was likely to be higher than did participants in the low price image condition (5.8 vs. 4.8;  $F(1,85) = 15.93, p < .001$ ). Likewise, participants in the high price image condition also believed the store was likely to charge a larger markup (6.7 vs. 4.4;  $F(1,85) = 45.64, p < .001$ ).

Although beliefs about both quality and markup differed across conditions, only beliefs about markups mediated the influence of price image on choice. Specifically, quality beliefs did not predict choice ( $p > .35$ ), rendering the overall mediation not significant. A mediation analysis examining the indirect effect of price image through beliefs about markup revealed that price image predicts choice ( $\beta = -1.38, t = -2.92, p < .005$ ), price image predicts beliefs about markups ( $\beta = 2.29, t = 6.76, p < .001$ ), and beliefs about markups predict choice ( $\beta = -.33, t = -2.04, p < .05$ ). With beliefs about markups included in the model, price image is no longer a significant

predictor of choice ( $\beta = -.70$ ,  $t = -1.24$ ,  $p > .20$ ). Full mediation is indicated by a significant Sobel test ( $Z = -1.93$ ,  $p = .05$ ) and a bootstrap analysis significant at  $p < .05$  (CI: [-1.97, -.01]).

### *Discussion*

This experiment provides further evidence that retailer price image influences both consumers' evaluations of prices and their preferences for higher or lower priced offerings within a choice set. While Experiment 4 provided indirect evidence against a quality-based account, Experiment 5 provides more direct evidence to rule out this alternative account, by measuring participants' beliefs about the reasons for a store's price image. Although participants in the high price image condition were more likely to believe the merchandise was high quality than participants in the low price image condition, this difference in quality beliefs did not drive choice. Instead, choices was mediated by beliefs about price differences, specifically, the extent to which the retailer marked up its merchandise. This suggests that, at least in this setting, participants were more motivated by a desire to avoid paying too much than by a desire to buy a tire of sufficiently good quality.

## **PRICE IMAGE AND MAKING INFERENCES FROM KNOWN PRICES**

Prevailing reference price theories would suggest that consumers form and update their beliefs about stores through the natural process of evaluating the prices they encounter. When consumers see prices at a particular store that fall below their reference prices, they evaluate these prices as low. If enough of these low price evaluations accumulate, consumers will update (lower) their overall impression of the prices at the store. The relative inferences about competing stores will follow suit.

In contrast to this bottom-up view of price evaluations, we have documented that consumers may use the top-down heuristic of assuming the prices at a high price image store are high and the prices at a low price image store are low. We propose that the tendency to evaluate prices as consistent with a price image can actually inhibit the formation and maintenance of more accurate store-level impressions. Consumers will then act on these inaccurate impressions. For example, a consumer who assumes an objectively low price is high when encountered at a high price image store may be susceptible to several errors, including failing to update the price image of the current store and passing up the low price to shop elsewhere. We test these predictions concerning the updating of price images in the following two experiments.

In Experiment 6, participants were shown a picture of a focal store (signaling either a high or low price-image) and the price of orange juice at the store. We tested how using a price image heuristic to evaluate prices impacted beliefs about prices at another nearby store and intentions to check prices at the competing store. In Experiment 7, participants were shown prices at one of two stores (one high and one low in price-image) and estimated prices at the other store. We found that the differences in price estimates between stores was consistent, even as the estimates themselves varied with the price participants were shown at the other store.

## **EXPERIMENT 6: A STORE'S VISUAL CUES OF LOW PRICE IMAGE INHIBIT SEARCH FOR LOWER PRICES AT COMPETING STORES**

### *Method*

We collected 185 complete surveys from an adult internet panel paid for their participation. Participants were shown one of two pictures of a store, taken from a similar angle above the store floor (see Appendix A). One picture depicted a high-end grocery store, the other a warehouse store. Participants were told to imagine that they were in the store shown in the picture and planned to buy 10 half-gallon cartons of Tropicana orange juice for a picnic. They were told that the juice cost \$3.50 per carton at this store but that there was another store, a BigSave supermarket, across the street. They were asked to estimate the price of Tropicana at the BigSave, whether they would check the price at the competing supermarket, and how likely they would be to buy at the pictured store versus at the BigSave store. Half of the participants were asked to estimate the price of a carton of Tropicana orange juice at a “typical store” before seeing the picture and reading the scenario, while the other half of the participants made the estimate at the end of the task.

### *Results*

Participants' reactions to the \$3.50 price were markedly different, depending on the picture of the store they saw. First, the warehouse-picture store was rated as likely to have lower prices (e.g. lower in price-image) than the upscale-picture store (1.9 vs. 3.5;  $t(183) = 12.1, p < .001$ ). Next, while the other store (BigSave) was described in exactly the same way in all conditions, after seeing the low price-image picture for the focal store, participants rated BigSave as less likely to have lower prices than the store shown in the picture (39% vs. 97%;  $\chi^2 = 71.1, p < .001$ ). After seeing the \$3.50 price with the low price-image picture for the focal store, participants' estimates for the price of a carton of Tropicana orange juice at BigSave was higher than the estimates of

participants who saw the same \$3.50 price at a high price image picture store (\$3.12 vs. \$2.86;  $t(183)=2.84, p < .01$ ). These differences in price beliefs, in turn, impacted the likelihood of both checking the price at the competing store across the street (2.7 vs. 3.3;  $t(183) = 2.7, p < .01$ ) and for buying the Tropicana juice there (2.5 vs. 3.1;  $t(183) = 3.7, p < .001$ ). Essentially, showing a less expensive interior picture of the focal store decreased the price image of the focal store, which increased the estimated price at Big Save when people saw the \$3.50 price at the focal store, which reduced intent to check prices at BigSave and purchase there. Consistent with this interpretation, bootstrap mediation analyses confirmed a significant indirect effect of the focal store picture manipulation on both intent to check prices at BigSave ( $\beta = .15, CI = [.04, .29], p < .01$ ) and on intent to buy at BigSave ( $\beta = .11, CI = [.03, .21], p < .01$ ), via the effects of the manipulation on focal store price image and of focal store price image on BigSave estimated price.

We found that the store picture presented has no effect on either rated quality of Tropicana juice at that store or on how important the participant considered prices as a factor in deciding where to shop for groceries ( $ps > .1$ ). In additional analyses, we tested for potential moderators of the effect of the price image manipulation (the picture shown) on intentions to check the price at the other store and to buy at the other store. We found that our results were robust to the time participants spent on the survey, gender, mood, price sensitivity, the tendency to plan purchases, frequency of shopping and self-rated knowledge of prices.

### *Discussion*

One interpretation of these findings is that participants do have stable reference prices, but are forgetting or are too lazy to use their information about the distribution of prices. If that's the case, then helping participants realize that they should compare their known distribution of prices with the price they see at the specific store should reduce the effect. However, we find that asking participants to first think about what they know about the price of orange juice does not debias the effect overall. Half of the participants were asked to estimate the price of a carton of Tropicana orange juice at a typical store before encountering the manipulation. We find that making these initial estimates did not significantly moderate any of the results.

## **EXPERIMENT 7: PRICE IMAGE INHIBITS LEARNING FROM EXPOSURE TO A SINGLE PRICE**

In the prior study, we provided evidence that, when observing a given price, different beliefs



about the price-image of the store lead to a different likelihood of searching for lower prices. This suggests a source of difficulty that consumers may have in updating their beliefs when a store changes its prices. Consider a high price-image store that attempts to combat the perception by lowering the price on a salient item that consumers will notice. If consumers construct price estimates based on price image, the change in price may not affect their beliefs about the store they are in, but instead only change their estimates about prices at other stores. Returning to the example from Experiment 3, seeing an objectively low price for Tropicana at Whole Foods may lead consumers to infer that the price will be correspondingly lower at Jewel-Osco. Conversely, seeing a higher price at Jewel-Osco may lead the consumer to infer that price for the item at Whole Foods is even higher. If consumers do not directly compare prices for the same items across the two stores, the price image belief may therefore persist even when actual relative pricing changes.

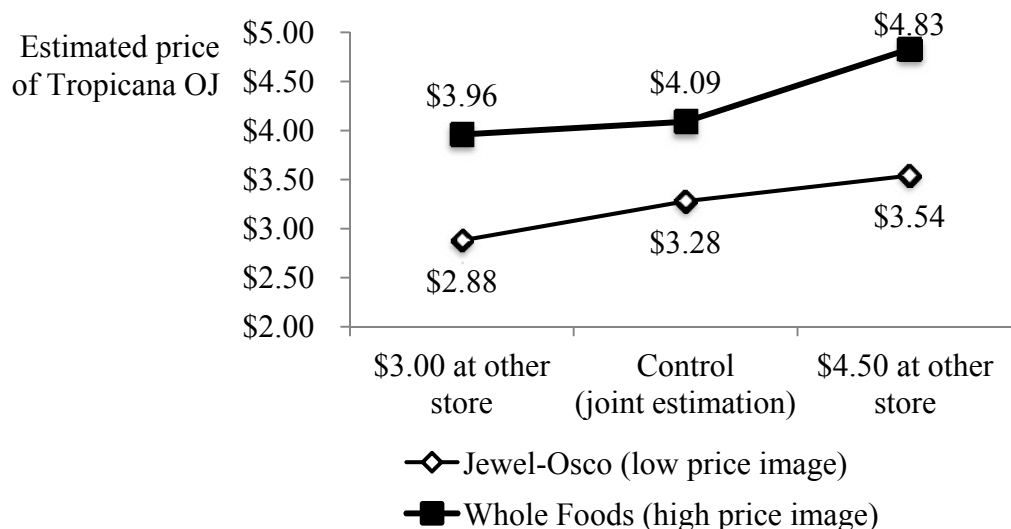
### *Method*

We test this in a study conducted with participants in the decision lab of a large Midwestern university as well as on campus, for a total of 204 completed surveys. The study consisted of a control condition, in which participants estimated the price of Tropicana at both stores simultaneously (on the same page, order counterbalanced), and four experimental conditions. In the experimental conditions, participants were shown a hypothetical price at one store and asked to estimate the price at the other store. We varied the amount of the price shown (\$3.00 vs. \$4.50) and which store was estimated (Whole Foods vs. Jewel-Osco) in a 2 x 2 between-subjects design. We collapsed the data in the control condition as the order had no effect on estimates.

### *Results*

In the control condition (joint estimation) participants estimated higher prices for Tropicana orange juice at Whole Foods than at Jewel-Osco (\$4.09 vs. \$3.28;  $t(36) = 6.09, p < .001$ ). Thus, when estimating the price at both stores simultaneously, participants expressed the belief that Tropicana would cost, on average, \$.81 more at Whole Foods than at Jewel-Osco.

In the experimental conditions, the price provided from the other store had a significant effect on estimated prices at the focal store (see Figure 3). Telling participants that Tropicana cost \$4.50 at Whole Foods yielded significantly lower estimates at Jewel-Osco than the comparison price (\$3.54 vs. \$4.50;  $t(34) = 7.1, p < .001$ ). The difference between stated price and estimated price across stores was not significantly different from the difference in the control condition ( $\Delta = $.96$  vs. \$.82;  $p > .40$ ).

**FIGURE 3: PRICE ESTIMATES ACROSS STORES**

Telling participants that Tropicana cost \$3.00 at Jewel-Osco yielded an average estimate at Whole Foods that was significantly higher than the comparison price (\$3.96 vs. \$3.00;  $t(45) = 8.58, p < .001$ ). This price difference did not differ from either the price difference in the control condition ( $\Delta = \$ .96$  vs.  $\$.82$ ;  $p > .40$ ) nor from the price difference when the reference price was \$4.50 at Whole Foods ( $\Delta = \$ .96$  vs.  $\$.96$ ;  $p > .95$ ).

Although the estimated price difference between stores was stable in these conditions, this was not the case when participants saw a \$3.00 price at Whole Foods or a \$4.50 price at Jewel-Osco. It appears that participants were reluctant to provide estimates outside of a fairly broad range of plausible prices. In other words, there appears to be a limit on how low a low price image store would be willing to go, and how high a high price image store would be able to charge.

When participants read that Tropicana cost \$3.00 at Whole Foods, their average estimate at Jewel-Osco was significantly lower than in the control condition (\$2.88 vs. \$3.28;  $t(84) = 2.1, p < .05$ ). This difference between the comparison and estimated price was significantly smaller than the difference between prices in the control condition ( $\Delta = \$ .12$  vs.  $\$.82$ ;  $t(84) = 4.4, p < .001$ ).

Correspondingly, participants who read that Tropicana cost \$4.50 at Jewel-Osco estimated a higher price than both the control condition estimate (\$4.83 vs. \$4.09;  $t(72) = 3.12, p < .01$ ) and the comparison price (\$4.83 vs. \$4.50;  $t(36) = 2.41, p < .05$ ). However, the difference between the

comparison and estimated price was significantly smaller than the difference between prices in the control condition ( $\Delta = \$0.33$  vs.  $\$.82$ ;  $t(72) = 2.5$ ,  $p < .05$ ).

### *Discussion*

These results imply that when participants do not have stable reference prices, they may update their price expectations for other stores in line with the relative price image, rather than update their price image for the focal store. This suggests that price changes alone, in the absence of stable reference prices, may be an ineffective means of changing the price image of a store. Instead, for a high price-image store to induce consumers to update their perceived price image may require that the retailer provides a reference price, such as direct price comparisons with lower price-image stores. Similarly, low price-image stores may be shielded from changes in price image when raising prices, to the degree that customers either do not invest time in directly comparing the prices to other stores or find it difficult to do so. However, when consumers do overcome these factors and form stable reference prices, the impact of price image on judgments should diminish.

## **PRICE IMAGE AS INFERIOR SUBSTITUTE FOR REFERENCE PRICE**

We argued that price image represents an alternative to reference price theories in situations where consumers do not have ready access to a well-articulated reference price. Thus, we propose that price image serves as an inferior substitute for reference prices when consumers are evaluating prices and making choices. We expect that consumers will favor specific category-, brand- or option-level reference prices over the more aggregate, retailer-level price image when both are available and equally salient. In the following experiment, we tested this proposed boundary condition for when price image will or will not impact price evaluations. Specifically, we show that providing an explicit reference price reduces the effect of price image on evaluations of prices.

## **EXPERIMENT 8: THE EFFECT OF PRICE IMAGE ON PRICE EVALUATIONS IS REDUCED WHEN REFERENCE PRICES ARE AVAILABLE**

### *Method*

Two-hundred and sixty one adults from a web-based subject pool were randomly assigned to the conditions of a 2 (price image: high vs. low) x 3 (reference price: none vs. low vs. high) factorial design. Participants were asked to imagine that they wanted to buy some indoor/outdoor weatherproof speakers. Price image was manipulated by using a retailer pre-tested as either

having a low price image (Walmart) or a high price image (Radio Shack).

In the no reference price condition, participants were immediately given information about a pair of speakers, including a picture of the speakers, the brand and model name, and a brief product description, sold for \$47.99 at either Walmart or Radio Shack. The price was evaluated on a seven point scale anchored by 1 = very low and 7 = very high. In the low reference price condition, participants were told they had done some research before shopping and found six speakers comparable in quality and features, labeled Brand A through Brand F, priced from \$27.99 to \$52.99. In the high reference price condition, the six speakers were priced from \$42.99 to \$67.99. Thus, in each reference price condition, participants were given information that would encourage them to form a low or high reference point (Monroe 1973) or reference range (Janiszewski and Lichtenstein 1999), relative to the price they would be evaluating. Participants then evaluated the same pair of \$47.99 speakers at either Walmart or Radio Shack. All participants rated the price image of the retailer they had seen on the same seven-point scale.

### *Results*

*Price evaluations.* We had predicted that when consumers do not have a readily available reference price, they will evaluate prices as consistent with the retailer price image. In contrast, when consumers do have an available reference price, their price evaluations will be based on a comparison with the reference price (Monroe 1973). The price evaluation data are consistent with these predictions. Analysis of variance revealed a significant main effect of reference price condition ( $F(2,255) = 31.93, p < .001$ ) and no main effect of price image condition ( $F(1,255) = 2.45, p > .10$ ). Consistent with our hypothesis, there was a significant interaction between price image and availability of a reference price ( $F(2,255) = 3.21, p < .05$ ).

Planned contrasts reveal that, as predicted, when participants were not given additional price information with which to form a reference price, they evaluated the prices as consistent with the price image of the retailer, such that the price was evaluated as higher when it came from Radio Shack than when it came from Walmart (4.3 vs. 3.6;  $F(1,255) = 7.79, p < .01$ ). When consumers had a reference price, however, the effect of price image was no longer significant. Instead, participants evaluated prices as consistent with their reference point. When the reference price was low, the \$47.99 price was evaluated as high at both the high and the low price image stores (4.7 vs. 4.8;  $p > .50$ ); when the reference price was high, the price was evaluated as low at both the high and low price image stores (3.5 vs. 3.3;  $p > .45$ ).

*Mediation through perceived price image.* Consistent with the results of the previous experiments, in the no reference price condition, the difference in price evaluations was mediated by participants' ratings of the retailer's price image ( $Z = 3.11, p < .005$ ; 99% CI: [.18,1.34]). In contrast, in the high and low reference price conditions, the price image condition did not predict price evaluations, so there was no mediation by price image rating.

*Discussion.* This experiment identifies a predicted boundary condition on price image effects. We had proposed that price image serves as an inferior substitute for reference prices when making price evaluations: When consumers have access to a reference prices, they will be more likely to use it and less likely to rely on price image as a heuristic. The data from Experiment 8 is consistent with this prediction. When participants were not given a reference price, their price evaluations were consistent with the price image effects documented in the rest of the paper. However, when participants were given the opportunity to form a reference price, retailer price image no longer influenced their evaluations.

## **GENERAL DISCUSSION**

The overwhelming consensus among behavioral researchers studying price is that consumers evaluate prices by comparing the number they see on the shelf with a reference price. If the price on the shelf is lower than the reference price, then the price is evaluated as low, favorable, fair or attractive. If the price is higher than the reference price, the price is high, unfavorable, unfair or unattractive. As useful as reference price theories have proven in explaining consumer behavior, they all rely on a central assumption that does not always hold in the real world: that consumers have an accessible, stable reference price (or reference price distribution) against which to make comparisons.

The research presented in this article advances an alternative approach to price evaluations, one not based on reference prices, but based on retailer price image (Brown and Oxenfeldt 1972; Nystrom, et al. 1975). We identified four domains in which a price image account results in different predictions from those derived using prevailing reference price theories. Across domains, we found results that are consistent with the use of a price image heuristic, but that could not be accounted for using reference price models. In fact, some reference price theories predict effects in the opposite direction to our results (Biswas and Blair 1991; Mazumdar, et al. 2005; Thaler 1985). These effects were robust across a variety of different price image

manipulations: different stores with existing price image differences (Experiments 1, 3, 4, 6, and 8), the same store with a different salient set of competitors (Experiment 2), hypothetical stores with a stated explicit price image (Experiment 5), and hypothetical stores identified with nothing but a picture of the interior (Experiment 7).

The purpose of this article is not to invalidate reference price models, but rather to provide an alternative explanation for situations in which consumers are unlikely to have an available reference price. As we documented in Experiment 8, when consumers are given comparative price information in a product category, reference prices trump price image as a means for evaluating prices. In this context, a price image heuristic may serve as an inferior substitute for reference price comparisons: When consumers have accessible reference prices, they are likely to use them. When consumers do not have accessible reference prices, however, it appears that a price image heuristic is better able to account for consumers' price evaluations and choices.

This article makes several contributions to the theory and practice of price image management. Our identification of the link between price image and brand choice may provide an important tool for researchers and managers looking to investigate changes in price image using purchase data. To date there has been remarkably little research on price image using statistical models of purchase data (though see Van Heerde, et al. 2008 for an exception), especially when compared to the robust stream of research on individual price evaluations. Part of the reason for this may be that the preferred dependent measure for investigating changes in price image is store choice (e.g., Bell and Lattin 1998; Singh, et al. 2006), and given all the factors involved in deciding to switch stores, customer defections may not be a very sensitive measure of price image changes. The research presented in this paper suggests that changes in brand choice may serve as an alternative means of measuring changes in price image. To illustrate, if a retailer's price image increases over time, this research suggests that the same consumers may begin to purchase less expensive items from the store's assortment. Thus, by using changes in a household's purchase patterns of consumers across time as a starting point, researchers may be able to use statistical models to increase our knowledge of what factors influence price image.

The research in this article also contributes to the reference price literature by suggesting a new relationship between price images and reference prices. We propose that once a consumer has evaluated a price based on price image, she may use this evaluation to infer a reference price. Returning to the illustration we used in the introduction, a consumer who sees a bottle of wine

selling for \$32 at a high price image store (e.g., a specialty wine store) could deduce that because this store has high prices in general, \$32 is likely to be a high price for this bottle of wine, consistent with the findings presented in this article. Based on this conclusion, the consumer could then back-out an inferred reference price using the following logic: If \$32 is a high price, then I should expect the market price to be somewhat lower, perhaps closer to \$28. We demonstrate this pattern of inference in Experiment 7.

Thus, our proposed process takes the typical assumptions about the relation between reference prices, price evaluations, and price images and reverses the directionality. Reference price theories typically begin with the assumption of a preformed reference price, which consumers use to evaluate the prices they encounter. These price evaluations are subsequently aggregated and combined with other information to form a price image of the retailer. In contrast, we propose that when a reference price is often not readily available, consumers may start with a preformed price image and use that price image to infer whether encountered prices are high or low. These price evaluations can then be used to infer more general reference prices. Thus, whereas previous research has assumed a process that starts with a reference price and ends with a price image (i.e., reference price → price evaluation → price image), we propose that consumers may start with a price image and end with a reference price (i.e., price image → price evaluation → reference price).

Finally, the findings in this article have several implications for retailers seeking to understand and manage their price images. First, the research presented in this article helps explain why price image can remain stubbornly divergent from actual price levels (Brown 1969; Brown and Oxenfeldt 1972). Our findings illustrate the perverse effect of a store's price image. When a store perceived as high priced and a store perceived as low priced offer the same product for sale at the same price, the reaction is very different. At the high price-image store, shoppers behave as if the price is high and therefore assume they could get a better deal at a competing store. At the low price-image store, shoppers believe the same price is a low price. This suggests that stores with a high price-image are in some sense stuck – it may be more difficult for them to convince shoppers that a low price really is as cheap as it is. Conversely, stores with a low price-image enjoy the benefit of doubt, such that even a relatively high price will still be assumed to be a good deal by many of their customers, reducing the motivation to search further. This suggests that low price image may be especially resistant to change. When consumers perceive a price to

be high, there is a greater chance they will engage in additional price search, which could disconfirm their initial impressions. However, as shown in Experiment 6, when consumers mistakenly think a price is low, they are less likely to engage in additional price search, decreasing the likelihood that they will disconfirm their initial impression.

A corollary of this point is that retailers who are seeking to change their price image face an uphill battle. The most intuitive way for a retailer to lower its price image is simply to lower its prices. However, our findings suggest that this intuitive strategy is unlikely to work in many cases. As we showed, a consumer shopping at a high price image store is likely to assume the price is high, even if it is not. Thus, a high price image retailer that wishes to lower its price image by lowering prices, may simply be giving away margin without convincing consumers that their prices are, in fact, low. Our findings suggest that such price reductions may need to be accompanied by other cues that help consumers interpret these prices, such as direct price comparisons with other stores, and non-price signals of price image, such as store décor. However, in the absence of such additional cues, stores with high price images might as well charge high prices: consumers are likely to assume their prices are high regardless.



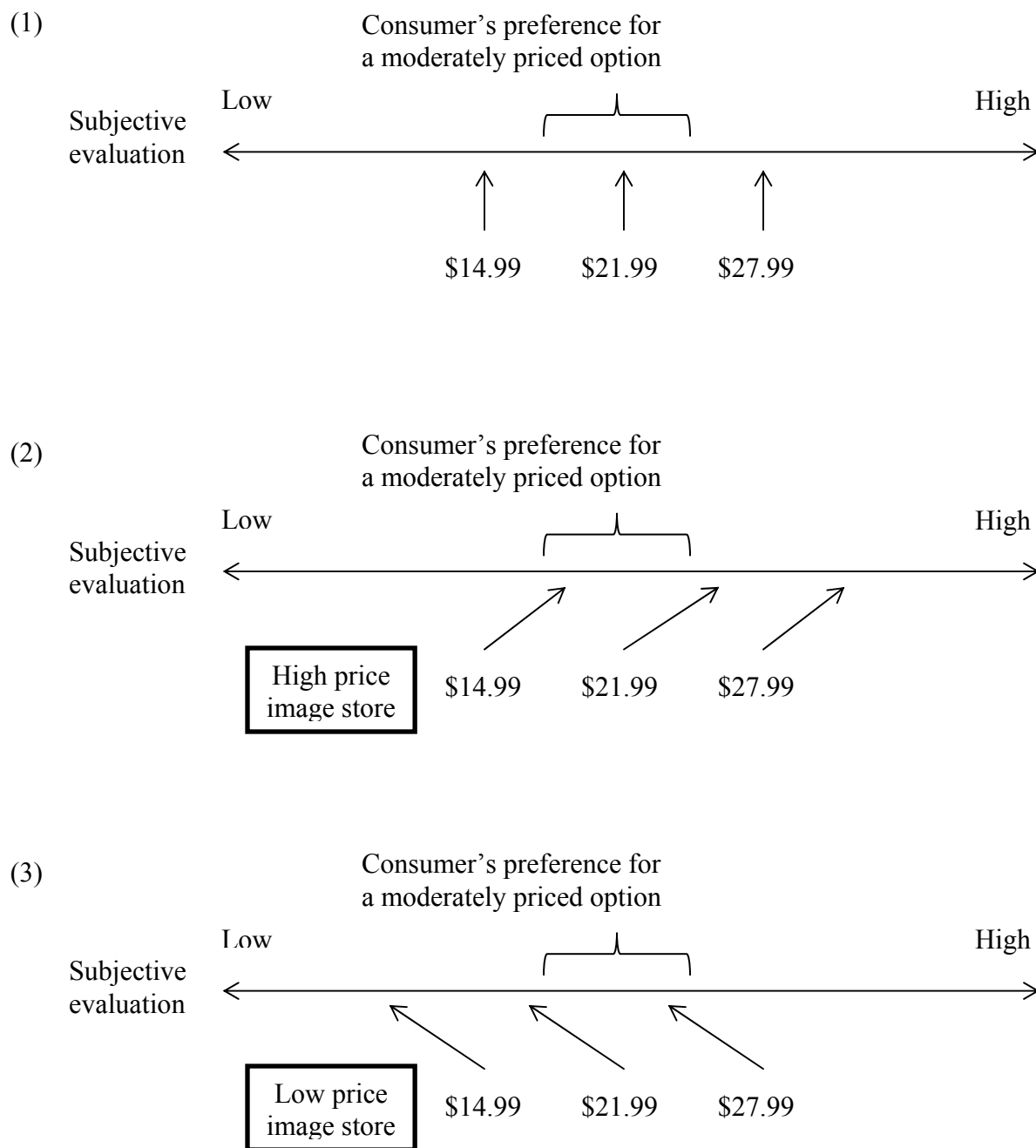
**APPENDIX A**  
**EXPERIMENT 6: PRICE IMAGE STIMULI**

(A) Picture of a High Price Image Store



(B) Picture of a Low Price Image Store



**APPENDIX B: FIGURE 2****THE INFLUENCE OF PRICE IMAGE ON PREFERENCE FOR MORE OR LESS  
EXPENSIVE OFFERINGS**

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