Relationship between Product Groups' Price Perceptions, Shopper's Basket Size, and Grocery Store's Overall Store Price Image

Kalpesh Kaushik Desai and Debabrata Talukdar
State University of New York at Buffalo

ABSTRACT

This research investigates how consumers form an overall store price image (OSPI) of grocery stores. Whereas prior research on this topic has explored the influence of the *number* of products offered at lower prices and of the *magnitude* of such price reduction, this study addresses the following two questions: How do the (lower) prices offered on different *types* of products influence OSPI? Does such influence vary across consumers, and, if so, how? A general framework of product-price saliency on consumers' OSPI is developed and tested. Specifically, based on two product-related factors—*consumption span* (length of time required to finish the consumption of a standard unit of the product) and *unit price,* grocery-store products are classified into four exhaustive and mutually exclusive product groups, and the relationship between OSPI and group-level price perceptions across the four product groups is examined. The framework also examines to what extent this relationship is moderated by consumers' shopping-basket size. Consistent with the proposed framework, this research finds strong empirical evidence of a systematic but differential relationship between OSPI and product group-level price perceptions and also a

Psychology & Marketing, Vol. 20(10): 903–933 (October 2003)
Published online in Wiley InterScience (www.interscience.wiley.com)
 DOI: 10.1002/mar.10102

systematic interaction effect with consumers' basket size. The findings help to identify focal product categories across distinct consumer segments and thus hold important strategic implications for category management and target marketing that are likely to increase the overall effectiveness of retail promotional strategies.

Pricing strategy is viewed consistently by store managers as one of the top five priorities in retail management (Bell & Lattin, 1998). Price, after all, is a common and salient product attribute for most consumers in any purchase decision. Not surprisingly, a significant stream of behavioral research has investigated how consumers form their price perceptions, especially of grocery products, in reaction to various types of retail pricing and price promotion strategies (Alba, Mela, Shimp, & Urbany, 1999; Biswas, Wilson, & Licata, 1993; Dickson & Sawyer, 1990; Monroe, 1990; Urbany, Bearden, & Weilbaker, 1988; Winer, 1988). However, in spite of this large body of literature on pricing, most prior research has focused on consumers' price perceptions of individual products. Relatively little research has been conducted to investigate consumers' price perceptions of entire retail outlets (Buyukkurt, 1986). As Alba, Broniarczyk, Shimp, and Urbany (1994) point out, this inattention to *overall store price image* (OSPI) is unfortunate, given that "the price image of a store is related to patronage, and a common goal of retail strategy is to influence (store) price perceptions."

OSPI is a belief that consumers hold about the overall (or general) price image of a store, based on their perceptions of individual product prices at that store. For example, consumers believe that JC Penney stores charges lower prices for their products, in general, compared to those charged by Macy's. OSPI is thus analogous to the belief that consumers hold about the overall value image of a brand, based on their perceptions of individual attribute levels for that brand (Moorthy, Ratchford, & Talukdar, 1997). The OSPI of a store has direct implications not only for store patronage, but also for its strategy in terms of the kind of customers it wants to attract and the consistent in-store atmospherics that such strategy entails. For example, a store desiring to attract upper-income consumers would adopt a higher OSPI among consumers and a classy décor in the store. Finally, a store's OSPI strategy is linked to its tactical trade-off options between market share and profit margin to boost its total profit—stores with lower (higher) OSPIs need to attract more (fewer) customers to be profitable. Therefore, understanding how consumers form their beliefs about OSPI is of considerable managerial import to retailers (Arnold, Oum, & Tigert, 1983; Cox & Cox, 1990).

Realizing the strategic import of OSPI, recent research in pricing has

started shifting its focus from consumers' price perceptions of individual products to that of entire stores (Alba et al., 1994). For consumers, forming OSPI is challenging, as it entails processing price information across a large number of products with prices changing frequently over time within and across stores (Blattberg, Briesch, & Fox, 1995). Consequently, comparing prices of products across stores may be very difficult (if not impossible) because of the sheer number of comparisons involved in the process. In an effort to reduce the complexity of such a daunting information-processing task, consumers are likely to use heuristics based on only a subset of the total possible information.

In the context of grocery-store pricing, the research of Alba et al. (1994) makes an important contribution to our understanding of how consumers' OSPI undergoes a modification, but it leaves unanswered the question of what factors influence OSPI in the first place. It also limits our understanding to only the effects of two factors—the number of products being sold at lower prices (*frequency cue*) and the extent of such price reduction (*magnitude cue*)—on changes in OSPI. However, prior research suggests that it is not only these two factors, but also the *type* of products being sold at lower prices that are likely to shape consumers' OSPI. For example, Bell and Lattin (1998) found that some product categories such as bacon and ice cream were more salient than others in influencing consumers' OSPI. Further, Alba et al. (1994) did not investigate the role of individual differences on the OSPI beliefs of consumers. However, consumer characteristics have been found to moderate consumers' individual product price perceptions (Wakefield & Inman, 1993) as well as consumers' OSPI (Bell & Lattin, 1998).

The above limitations of the Alba et al. (1994) study raise the following important questions: How do the prices charged on different types of products influence OSPI? Does such influence vary across consumers, and, if so, how? The findings of this research will help retailers identify focal product categories across distinct consumer segments, manipulating prices of which can favorably influence a store's OSPI. This is important because actual prices of individual products in a store and consumers' OSPI beliefs about that store may be in conflict, and once a belief about OSPI is formed, it may be very difficult to change (Hoch & Deighton, 1989). For example, some retailers may reduce their prices of some individual products aggressively, but may still find that consumers perceive the OSPIs of their stores to be high. A possible explanation is that retailers are promoting nonfocal products that consumers usually do not consider or consider less when forming a store's OSPI. Thus, the questions investigated by this research hold important strategic implications for category management and target marketing that are likely to increase the overall effectiveness of retail promotional strategies (Bell & Lattin, 1998; Walters & MacKenzie, 1988). With wider availability of scanner data making target marketing increasingly fea-

sible and popular among retailers (Hoch, Kim, Montgomery, & Rossi, 1995), answers to these questions assume more significance. The motivation of this research lies in addressing these questions.

This article extends prior research by examining how price perceptions of different types of (vs. individual) products influence a grocery store's OSPI. Specifically, based on a product's consumption frequency and unit price, it classifies grocery-store products into four exhaustive and mutually exclusive product groupings, measures consumers' product-price perceptions across these four product groupings for a grocery store, and examines if there is any systematic difference in the relationship between OSPI for the store and price perceptions across these four product groups. The article also investigates to what extent this relationship is moderated by consumer differences with respect to their shopping-basket size, a characteristic found to have important strategic implications for market segmentation and target marketing (Julander, 1992). Finally, these issues are investigated in the context of only grocery stores (vs. convenience or discount stores). Regression analysis of survey data supports the postulated influence of product group prices and basket size on OSPI.

CONCEPTUAL FRAMEWORK

Processing of Product Price Information in Grocery Stores

Price is a search attribute, and regardless of how it is framed, consumers have the opportunity to estimate the price differentials among brands within a store or across stores for a brand. However, it is legitimate to have reservations about whether consumers actually process price information of grocery products they purchase. Although consumers do not always remember and recall *actual* prices of products they purchased (Sawyer & Dickson, 1986), recent research (Monroe & Lee, 1999) suggests that consumers develop over time some form of *general* price perceptions of individual products at a particular store. Such perceptions are reflected in their judgments about the price of a product at a store either as "too high," "a good deal," or "expensive." This encoding of prices in more meaningful magnitude versus nominal representation (i.e., actual prices), according to numerical information processing research (Tzelgov, Meyer, & Henik, 1992; Viswanathan & Childers, 1996), may not only be automatic and unintentional, but in many cases it may dominate the nominal presentation (Hinrichs & Novick, 1982). The usual evidence of a systematic relationship between price and quantity sold at the market level bears testimony to the above argument.

Even though consumers may encode prices of individual products in meaningful terms, combining those prices to form an OSPI and comparing it with OSPIs of other stores will still involve considerable effort,

especially in the context of grocery products, because many and different products are purchased during a shopping trip, and prices vary within and across stores due to the promotional activities of retailers and manufacturers. Finally, rarely, if ever, does one store dominate another on all items, and it is difficult to identify any particular category of goods that may serve as an accurate predictor of overall prices on a consistent basis.

The practicality of the decision context thus makes it more likely that consumers will attempt to simplify the task of price comparison across grocery stores. In addition to the frequency heuristic that they examined, Alba et al. (1994) speculated another way in which consumers can reduce the complexity involved in forming OSPI—through price comparison of a selective group of products. This alternative approach suggests that prices of some products are likely to be more salient in influencing OSPI than others, and thus stands in contrast to the frequency heuristic, which makes an underlying assumption that prices of all products in consumer's shopping basket are equally salient in influencing OSPI. Bell and Lattin (1998) presented preliminary evidence in support of this approach by reporting that certain individual products such as bacon, ice cream, and paper towels appear to be more salient in terms of their influence on consumers' OSPI. However, the authors underscored the need for future research to come up with more generalizable and managerially relevant findings on the relationship between product group-level price perceptions and consumers' OSPI. One approach to achieve this would be to shift the focus from individual products *per se* and to instead classify grocery products into product groups based on some intrinsic factors in a product that are likely to make its price more or less salient in influencing consumers' OSPIs. Two such intrinsic product factors that are likely to determine the relative influence of a product's perceived price on consumers' OSPI are discussed below.

Grocery Products Categorization

Grocery-store products can be classified in many different ways. Consistent with its objective to develop a general theoretical framework of product saliency on consumers' OSPI, this research excludes seasonal and special occasion products (like Christmas cards) from its grocery products categorization and instead focus only on regularly consumed/used products. For these products, the waiting time between two consecutive consumption/usage occasions will be relatively small. Based on two product factors—*unit prices* and *consumption span* (length of time required to finish the consumption/usage of a standard unit of the product)—all regularly consumed/used grocery store products are classified into four mutually exclusive and exhaustive product categories: (a) products with shorter consumption span and higher unit prices (SH), (b) products with shorter consumption span and lower unit prices (SL), (c)

products with longer consumption span and higher unit prices (LH), and (d) products with longer consumption span and lower unit prices (LL). This categorization encompasses all regularly consumed/used grocery products in only four product groups and is thus more parsimonious than the traditional approach of classifying grocery store products into dozens of product groups such as produce, bakery, beverage, and meat. More importantly, the theoretical justification for focusing on these two factors is rooted in research in consumer memory (e.g., Alba & Hutchinson, 1987; Alba, Hutchinson, & Lynch, 1991). It suggests that these two product factors influence the saliency of a product's price in multiple ways: by affecting a consumer's frequency of exposure to a product's price, by forcing him or her to pay attention to a product's price, and by providing opportunities to rehearse and elaborate upon that price. Thus, when making a judgment about a store's OSPI, consumers will retrieve those products from memory whose prices are salient, and the perceived level of those prices will influence a high or low OSPI judgment.

Unit Prices of Products. Using unit prices of products as one of the factors to classify grocery-store products makes obvious sense for the problem under investigation. Even though the unit prices of grocery-store products are nowhere close to the prices of durable products such as appliances, the relatively high unit prices of certain items (e.g., flowers, wine, cake) compared to others (e.g., toothpaste, milk) in the shopping basket can make them more salient when forming OSPI. Zeithaml (1988) suggests that attention to prices is likely to be greater for higher-priced packaged goods. Literature in psychophysics (Berelson & Steiner, 1964) suggests that any stimulus with higher intensity on any dimension is likely to be more noticeable than those with lower intensity. For example, loud noises, heavy weights, and extreme temperatures are likely to be more attention catching than faint noises, light weights, and mild temperatures. In a similar vein, advertising literature (Hanssens & Weitz, 1980; Wagner, 1988) has conclusively shown that larger ads are more noticeable than smaller ads. Greater attention to a product's price results in greater elaboration (or processing at deeper level) of this price and this enhances the salience and retrieval of the product's price (Heckler & Childers, 1992) in OSPI judgment.

This ability to classify grocery-store products into high- and low-priced groups should come as easily to consumers as their ability to recognize different price tiers within distinct product categories (e.g., luxury vs. low priced cars) including grocery products, because similar processes are likely to be operating in both cases. Finally, there is likely to be little variation in the unit price benchmark that different consumers use to classify grocery-store products into high- and low-priced products, because prices of grocery-store products vary over a narrow range (most products cost less than $10) and consumers may be encoding prices in magnitude versus nominal form (Monroe & Lee, 1999) (e.g., as

too expensive, priced reasonably, a bargain versus say, $5.25, $4.75, and $3.50) over this narrow versus broad range. Thus, grocery-store managers should be able to implement this approach to classify grocery-store products on the basis of their unit prices.

Consumption Span of Products. Before defining this construct, it is important to reiterate that this study investigates the influence of prices of only regularly used products that have relatively small waiting time between two usage occasions. That is, consumers cannot wait for long before buying their next toothbrush or shampoo once the current toothbrush or the bottle of shampoo is fully used up. Consumption span refers to the average time between two consecutive consumption (for consumables) or usage (for durables) incidences of a standard unit of that product by a consumer. In other words, it refers to the typical length of time required to finish the consumption of a standard unit of the product (for consumables) or the typical length of time for a standard unit of the product (for durables) to remain usable before the consumer buys the next standard unit and commences its consumption/usage. Standard unit of a product refers to that unit (of the many available) that is purchased by most consumers, and thus is also stocked in greater numbers by the supermarket (e.g., one roll of paper towel or toilet paper; one roller mop). In other words, it is it is market-driven and independent of the characteristics of the sample selected. Consumers are likely to finish eating a (11–12 oz.) bag of potato chips or a (14–16 oz.) box of breakfast cereal in few days or weeks compared to, say, light bulbs (4-pack), or cloth hangers (a set of 10), which may last for months before consumers see the need to repurchase them. The former (latter) products are referred to as shorter (longer) consumption span products.

Because this study is focusing only on regularly consumed products in this study, the longer a product's consumption span, the less frequent the product's purchase. For example, because a (100 oz.) container of laundry detergent (6-pack beer) is likely to last for a relatively long (short) time, consumers are likely to buy that product less (more) frequently. Prices of shorter versus longer consumption span products will have greater influence on OSPI because, in a given time period, these products are purchased more often, thus providing consumers frequent opportunities to be exposed to their prices and to rehearse them. Research in consumer memory suggests that frequent exposure and rehearsal of a product's price will not only result in it being transferred to the long-term memory but also in its easy retrieval when required (e.g., when judging a store's OSPI) (Alba & Hutchinson, 1987; Alba, Hutchinson, & Lynch, 1991). That is, prices of such products will be more salient in influencing a store's OSPI.

The above grocery product categorization is essential for investigating systematic differences in the saliency of prices of different types of products on consumers' OSPI. However, such information is only helpful

in formulating efficient category-level pricing strategy for consumers in general. For marketing strategy targeted to specific segments, grocery-store managers would also like to know whether and how such saliency of product group prices will vary across heterogeneous consumers.

Grocery Shoppers' Segmentation

This study uses *shopping basket size* as the individual difference variable. It refers to the average number of different products (e.g., potato chips, milk, and produce) a consumer would purchase on a grocery-shopping trip. The greater the number of products purchased per trip to a grocery store, the larger the basket size. Basket size is selected to capture consumer differences for both theoretical and managerial reasons. Bell and Lattin (1998) have found a significant relationship between shopper's basket size[1] and "basket attractiveness" (a variable similar to OSPI) across stores. Also, with more and more grocery stores offering their customers membership in shopper's club card programs, it is easier for grocery retailers to collect relevant data to classify households based on their shopping-basket sizes.

As the large- (small-) basket shoppers purchase many (few) products on any given trip, they fulfill a relatively large (small) percentage of their total grocery needs on a single visit. The motivational force behind small-basket shoppers' shopping behavior may be a lack of ability to plan ahead of time what is needed in a given time period. Or, it may be a deliberate intent to take advantages of price variations over time in a store, that is, buying more product categories when the prices are relatively low, and deferring purchase when prices are high (Bell & Lattin, 1998). Irrespective of the nature of motivational force, the behavioral upshot will be that a typical large-basket shopper is likely to incur higher expenditure per trip and is likely to make fewer trips over a given time period than a typical small-basket shopper. In other words, the basket size will be highly correlated with two other consumer difference variables: the amount of money spent on a grocery trip and the frequency of grocery trips. So, although this study uses basket size to capture consumer differences, any one of these three variables could be used with similar conclusions.

In reality, some shoppers may demonstrate atypical behavior when shopping for grocery products. For example, there could be some shoppers with heavy shopping level who purchase many different products on the same trip and yet make many trips to the grocery stores. Similarly, there could be some shoppers with light shopping level who pur-

[1]Bell and Lattin (1998) classified consumers into large- and small-basket shoppers based on how much money on an average they spent on a grocery trip. However, this study defines basket size in terms of the average number of different products purchased on a trip because it drives how much money is spent on a grocery trip and the frequency of trips to grocery stores.

chase very few categories on a trip and still make very few trips to grocery stores. As it is highly unusual for a consumer with typical grocery product needs to engage in these atypical shopping behaviors, their incidence at the level of individual shoppers is likely to be minimal. Arguably, their incidence is more likely at the household level, where a large household (i.e., with more members) can be a large-basket household and yet make frequent trips to grocery stores. However, if one controls for household size, then the incidence of these atypical shopping behaviors is again likely to be very low in households of a given size. Thus, the expected high correlation among basket size, expenditure per shopping trip, and the frequency of grocery-store tripsis expected to hold across both conceptions of shoppers: individual and household (shoppers) of a given household size.[2] This study uses the *individual* conception of grocery shoppers because it is interested in understanding how individual shoppers' perceptions of specific product group prices influence their OSPIs.

HYPOTHESES

Building on the earlier conceptual framework, a set of hypotheses on the relationships between consumers' individual product-price perceptions, shopping-basket sizes and OSPIs are now developed. It is argued that the relative influence of the price of a product category on consumers' OSPI will depend primarily on two issues: How noticeable is its price on a shopping trip? How often is it likely to be noticed in the context of shopping activities? As noted earlier, one would expect in general that the higher the unit price of a product, the greater is the likelihood that consumers will notice it. This in turn will imply that prices of grocery products with higher unit prices will weigh more heavily in the formation of a grocery store's OSPI than of those with lower unit prices, *ceteris paribus.* Similarly, the shorter the consumption span of a regularly consumed/used product, the more frequently it is likely to be purchased, resulting in its greater saliency in consumers' minds.

Research in the retrieval of category members from memory (Barsalou, 1983; Desai & Hoyer, 2000) shows that the greater the frequency with which a member of a category is encountered (e.g., breakfast cereal for the category of breakfast products), the greater is its exposure, rehearsal opportunity, and the strength with which it is linked to the category in the memory. This will result in its quicker and easier recall compared to the recall of other members linked to that category when the consumer is thinking about the category. Because products with shorter (vs. longer) consumption span are purchased more frequently,

[2]Empirical results (discussed later) from the current study confirm this expected high correlation among basket size, shopping-trip frequency and shopping-trip expenditure.

the above will apply more to prices of these products resulting in their stronger association with the OSPI (category). Thus, these prices will be more salient and quick to be recalled when forming (or retrieving) a store's OSPI.

To capture the above ideas on the differential influence of prices of different products on consumers' OSPI, the following two indices are proposed: (1) the price-saliency (PS) index, which measures the unit price of a product relative to the average expenditure incurred on a grocery shopping trip, and (2) the shopping-frequency saliency (SFS) index, which measures the number of times a product is purchased relative to the average number of grocery-shopping trips made over a given time period. For example, if the average price for a standard unit of toothpaste is $2.00 and it is typically purchased once a month (because its average consumption span is 1 month), then its PS and SFS indices are 0.05 and 0.25, respectively, for a consumer whose average expenditure on a grocery trip is $40.00 and average number of grocery shopping trips is four per month.

The PS (SFS) index measures the relative likelihood of a product's price becoming salient in influencing OSPI due to its unit price (consumption span). The theoretical underpinning for the proposed indices is akin to the Weber's concept of "just noticeable difference," that is, the larger the denominator of an index, the larger its numerator ought to be to be noticed (in this case, influence OSPI). The indices not only capture the two product-related factors (unit price and consumption span) that determine the relative saliency of the price of a product, but also two consumer-related factors (shopping-basket value and shopping-trip frequency) that are likely to accentuate or attenuate the saliency of a product's price across heterogeneous consumers.

The PS index will be high either when its numerator term is high or when its denominator term is low or both. Thus, for a given amount of money spent on a shopping trip, the greater the unit price of a product, the more noticeable and thus more salient it will be in influencing OSPI. Similarly, the price of any product is likely to be more noticeable and thus more salient to a consumer who usually spends less on a shopping trip than to someone who spends more. A similar line of arguments could be made for the SFS index. Thus, for a given number of shopping trips made in a time period, the shorter the consumption span of a product, the more frequently it will be purchased. This will result in increased noticeability of its price and thus enhanced saliency in influencing OSPI. Also, the price of any product is likely to be more salient to a consumer who, in general, shops less frequently and thus ends up buying the product and noticing its price more often in the context of his or her shopping trips than someone who shops more often but buys the product on proportionately fewer trips.

Finally, it is argued that SFS index should dominate the PS index.

Consumers are known to have reference prices (Monroe, 1990) for each discernible (price) quality level of grocery-store products that vary in their unit prices from very low to very high. However, it is very unlikely that consumers would have formed these reference prices in a short period of time because, as noted by Alba et al. (1994) and as discussed above, the product-price information in grocery stores is not only complex (frequent changes, prices provided in both absolute and relative terms) but the amount of information available is also overwhelming (large number of products, brands, and line extensions). Only over many purchase occasions would consumers have an approximate idea about product prices (in a given store and how they compare to prices in competing stores). This underscores the importance of purchase frequency in the formation of reference prices (of both low and high unit price products). Consequently, consumers will take much longer to form reference prices of products that have longer versus shorter consumption span and once formed, the (reference) prices of these products would be more difficult to retrieve from memory because of their weaker strength of associations with OSPI.

Based on the two product saliency indices, hypotheses about the main effects of product grouping price perceptions and their interaction effects with shopping-basket size on OSPI are now developed.

Main Effects

Although it is natural to expect that the main effects of price perceptions of each individual product group on any consumer's OSPI will be positive, the interesting managerial question is their relative magnitude. A comparison of the two product saliency indices across the product groupings indicate that prices of short (consumption) span–high (unit) price products will have the most impact on OSPI (see Table 1) because they will dominate the other three product groupings on both PS and SFS indices. That is, the prices of these products will have the most influence on OSPI because not only will their prices be most noticeable compared to those of others (because they are higher) but also because their prices will be noticed most often in the context of shopping trips (due to their shorter consumption span resulting in more frequent purchase). In con-

Table 1. Comparison of Product-Saliency Indices across Product Categories.

	Product Category			
Product-Saliency Indices	SH	SL	LH	LL
Price-saliency (PS) index	Highest	Lowest	Highest	Lowest
Shopping-frequency saliency (SFS) index	Highest	Highest	Lowest	Lowest

trast, prices of low span–low price products will have the weakest (though a positive) influence on OSPI because the PS and SFS indices would be lowest for them compared to those of other three groupings.

As for the short span–low price and long span–high price product groupings, neither is dominant nor dominated on both saliency indices. The former grouping will have the highest SFS index but the lowest PS index. The opposite is true for latter grouping. However, based on the earlier discussion of the dominance of SFS index over the PS index, it is argued that prices of short span–low price grouping will have greater influence on OSPI. Consumers will take much longer to form reference prices of the latter grouping compared to that of the former because of the lower SFS index of the former. Also, once formed, the (reference) prices of latter grouping would be more difficult to retrieve from memory than those of former because of their weaker strength of associations with OSPI. Thus, even though the long span–high price grouping is likely to have greater influence on OSPI based on its higher PS index alone, its lower SFS index will make retrieval that much more difficult relative to prices of the short span–low price grouping. Consequently, the prices of the latter grouping are likely to exert greater influence on consumers' OSPI than the prices of the former grouping. So, this study hypothesizes the following.

H1: (a) Prices of each of the four product groupings will have positive influence on OSPI.
(b) Prices of short span–high price grouping will have the strongest influence on OSPI followed by prices of short span–low price, long span–high price, and long span–low price groupings, in that sequence.

Interaction Effects with Shopping-Basket Size

From the perspective of target marketing strategies, a more relevant question is how the main effects of product grouping prices are moderated by consumers' shopping-basket size. On comparing the two product saliency indices for each product grouping between the large- and small-basket shoppers (refer to Table 2), because the average expenditure per shopping trip is found to be higher for large-basket shoppers, the PS index for all the four product groups will be lower for them than for the small-basket shoppers. However, the relative value of the SFS index between the large- and small-basket shoppers will vary across the four product groupings.

For short span–high price and short span–low price groupings whose short consumption spans require frequent purchases, both large- and small-basket shoppers are likely to purchase them on almost all their shopping trips in a given time period. For example, a small-basket shopper who shops weekly and a large-basket shopper who shops biweekly

Table 2. Comparison of Product-Saliency Indices across Consumers.

	Product Category							
	SH		SL		LH		LL	
Product-Saliency Indices	Large-Basket Shopper	Small-Basket Shopper	Large-Basket Shopper	Small-Basket Shopper	Large-Basket Shopper	Small-Basket Shopper	Large-Basket Shopper	Small-Basket Shopper
Price-saliency (PS) index	Lower	Higher	Lower	Higher	Lower	Higher	Lower	Higher
Shopping-frequency saliency (SFS) index	Similar (≈ 1.0)	Similar (≈ 1.0)	Similar (≈ 1.0)	Similar (≈ 1.0)	Higher	Lower	Higher	Lower

are both likely to buy a product with a weekly consumption span on all their shopping trips. The only difference is that the latter is likely to buy the product in larger quantity per trip. Thus, the SFS index for large- and small-basket shoppers will be similar—about 1.0 for both these product groupings. However, the PS index is lower for large-basket shoppers. Thus, the combined influence of these two indices suggests that large-basket shoppers are likely to be *less* influenced by the prices of either of these two groupings, that is, the positive effect of prices of these two product groupings on OSPI will be attenuated by basket size.

On the other hand, the purchase incidence of either long span–high price or long span–low price product grouping will be few and far between for both large- and small-basket shoppers. However, as the number of shopping trips in a given time period is lower for large- versus small-basket shoppers, their SFS index will be higher for both of these product groupings. Based on the earlier arguments for the dominance of the SFS index over the PS index, it thus follows that large-basket shoppers are likely to be *more* influenced by the prices of both of these product groupings. That is, the positive effects of prices of both these product groupings on OSPI will be accentuated by shopping-basket size. So, the following interaction effects of product groupings prices with basket size are hypothesized.

H2: (a) As basket size increases, the influence of short span–high price grouping's prices on OSPI will be attenuated.
(b) As basket size increases, the influence of short span–low price grouping's prices on OSPI will be attenuated.
(c) As basket size increases, the influence of long span–high price grouping's prices on OSPI will be accentuated.
(d) As basket size increases, the influence of long span–low price grouping's prices on OSPI will be accentuated.

METHOD

Overview

In exchange for extra credit, 117 undergraduate subjects from a Northeastern university participated in a survey. For the one or two grocery stores where they shop regularly, subjects provided their OSPIs and rated prices of 20 distinct grocery products, five each from the four product groupings that varied on unit prices and consumption span (short span–high price; short span–low price; long span–high price; long span–low price). Asking subjects to rate OSPIs for only grocery stores (and not convenience stores) enabled this research to control for store type. Subjects also provided information pertaining to their shopping-basket sizes and the items they usually purchase from grocery stores. The 20 grocery products referred to above were selected through a pretest.

Pretest

A pretest was conducted with two objectives in mind: (a) to select the 20 individual products, (b) to examine if there was enough heterogeneity on shoppers' basket size and relationship of basket size with other grocery-shopping-related variables. Of the 194 undergraduate students who participated in the pretest, responses of 27 subjects were excluded from the analyses because they were on some kind of meal plan with the university and were thus not regular grocery shoppers.

Selection of Products. Because this research pertains specifically to regularly used/consumed products that are available in grocery stores, it was important to first identify a reasonably large number (50–60) of these products from which a limited set of 20 appropriate products could be selected for the final study. Based on a field survey of the two most popular supermarket chains in the area, 64 products covering a wide range of items usually carried by different sections of a typical supermarket were selected. As rating 64 products on multiple scales would be very exhausting to respondents, the pretest was administered in four different forms—each having a different set of 16 products. Each form was rated by 48–50 subjects. Subjects rated the regularity of usage/consumption of products with the use of a single 11-point item with end points "never in a year" to "more than 100 times a year" with midpoint "9–12 times a year." Before the rating instruction, the survey provided subjects with the meaning of regularity of usage/consumption (i.e., how often you consume or use the product in a year) and some examples (e.g., "never" for pet food if you don't own a pet).

Next, subjects rated the 16 products on the following 7-point consumption span item with endpoints "less than a week" and "more than 6 months:" Please rate how long each of the below listed grocery products will last if you were to buy one unit of that product today.[3] Because the number of units purchased may vary from one product to another and because this can differentially impact the consumption span of distinct products (i.e., products purchased in many units may last longer than a similar product purchased in fewer units), subjects were asked to rate consumption spans for one standard unit of the product concerned (e.g., one 6-pack of socks).

[3]*Consumption span* was preferred over the construct of *purchase frequency* because the latter is partially related (or not orthogonal) to basket size, one of the other independent variables. In general, large-basket shoppers will buy any product less often than small basket shoppers because they shop less frequently. In contrast, consumption span is independent of basket size in the sense that irrespective of a consumer's basket size (or shopping frequency), usage of certain products is likely to last for a shorter (or longer) time span. Finally, consumption span and purchase frequency are related but not identical constructs—the former is one of the factors that influences purchase frequency of a product. Examples of other factors that influence purchase frequency of a product are the shopper's tendency to stock up the product during promotion, availability of substitute products, and shopper's tendency to switch between these products.

To classify the products based on their unit prices, subjects were first asked to list a cutoff price above which they would classify a product as a high-priced grocery product and below which, a low-priced grocery product. Listing the cutoff price ensures that each subject consistently uses it as a reference when classifying the 16 products. Next, each subject rated the unit prices of the 16 products using a single item with endpoints "high" –and "low." Underlying the ratings of the above item is the assumption that subjects usually purchase these products from grocery stores. This assumption was checked by asking subjects if they purchased these products from grocery stores with the use of a single 2-point item with endpoints "yes" and –"no." Data analysis indicated that almost all products (57 out of 64) were typically purchased (by 95% or more subjects) from supermarkets. Moreover, informal examination of the issue with faculty and staff members in the department revealed similar results.

Products with mean ratings of less than 3 (or less than twice a year) on regularity of usage question were considered irregularly used/consumed products and dropped from further analysis. This resulted in the dropping of 8 products; the final 20 were selected from the remaining 56 products. These were classified into four groups with the benchmarks of sample mean scores on the consumption span and unit prices: 15 products with short consumption span and low unit prices (these products received lower-than-average consumption span and lower-than-average unit price scores); 11 products with short consumption span and higher unit prices; 18 products with long consumption span and high unit prices; and 12 products with long consumption span and low unit prices. From each of these four groups, five products that best represented their group in terms of their mean unit price and mean consumption span values were selected. For example, of the 15 products in the short span–low unit price group, the selected five products had the lowest mean scores on unit price and consumption span. Figure 1 lists the selected 20 products.

Two additional analyses were conducted: (a) to confirm the point made earlier that there is likely to be little variation (and thus less subjectivity) in the cutoff price subjects use to classify grocery products into high- and low-priced products, and (b) to have some external validity about the price classification of grocery products based on the ratings of pretest subjects. Regarding the former, a low standard deviation (0.23; mean was $3.84) of the cutoff price listed by pretest subjects revealed relatively little sample variation. Pertaining to the latter, actual prices were collected from two different stores of each of the two leading grocery-store chains in the area over a period of 2 months. Analysis revealed a strong match (90%) between the price classifications of grocery products by pretest subjects and of that based on actual product prices in the market.

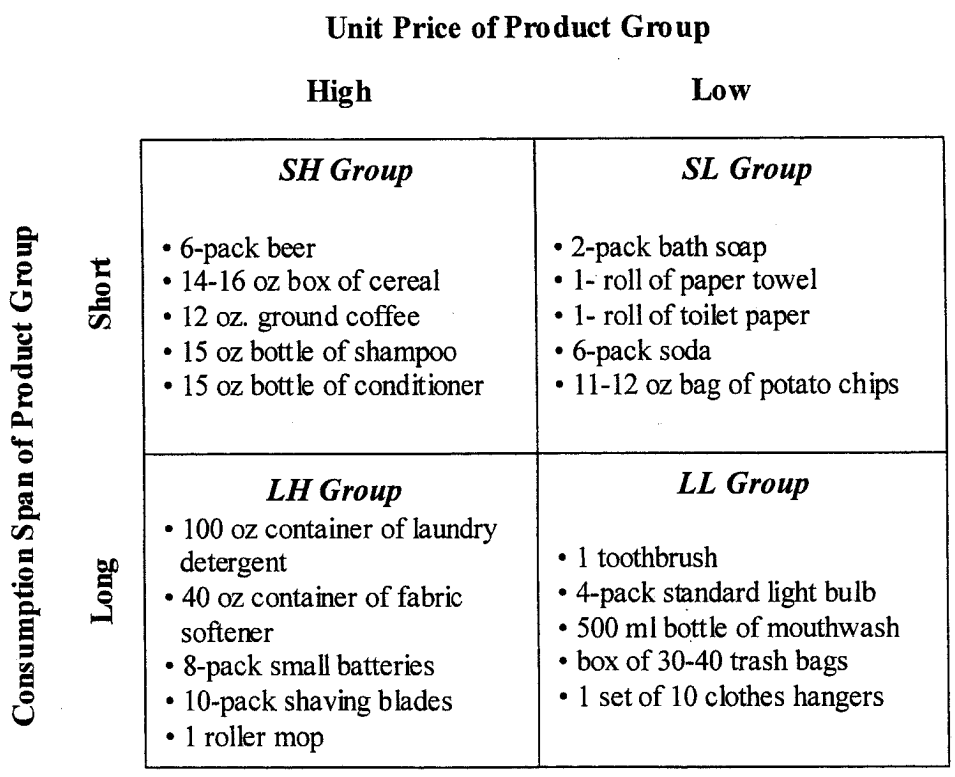

Figure 1. Individual products for the four product groups used in the study.

Shoppers' Basket Size. Another purpose of the pretest study was to check if there is enough consumer difference in terms of basket size and how basket size varies with other grocery-shopping-related variables. After asking subjects which grocery store(s) they buy products from regularly (i.e., frequently or every time), they responded to the following single 7-point item: "In general, how many different grocery products (e.g., soda, cookies, vegetables) do you buy on one trip to that grocery store?" with endpoints "1–2 items" and –"more than 30 items." Mean value of response to this item was 3.1 with a standard deviation of 1.8, indicating considerable heterogeneity in basket size across shoppers. Responses from this item were correlated to other grocery-shopping items that subjects responded to in the pretest. Specifically, basket size was found to have a highly negative relationship with shopping-trip frequency ($r = -0.73$, $p < .01$) and a highly positive relationship with expenditure per shopping trip ($r = 0.72$, $p < .01$).[4] A median split of the

[4]Shopping-trip frequency was operationalized by a single item—"How often in a month do you visit that grocery store?"—with endpoints "once in 4 weeks"–"4 or more times a week." Expenditure per shopping trip was measured by a single item—"How much do you approximately spend on one trip to that grocery store?"—with endpoints "less than $5"–"more than $70."

subjects' responses on the basket-size item revealed the mean basket size for large- versus small-basket shoppers as 4.4 versus 1.7 (i.e., between 11–15 & 16–20 products for large-basket shoppers and between 1–2 and 3–5 products for small-basket shoppers) and this difference was significant ($p < .01$). Further, the proportion of large-basket shoppers with above-median shopping-trip frequency was relatively small (4.2%) as was the proportion of small-basket shoppers with below-median shopping-trip frequency (2.7%). These results are consistent with the earlier findings on correlation between basket size and shopping-trip frequency (Bell & Lattin, 1998), and support the *a priori* expectations of a relatively small proportion of atypical shoppers, namely, large-basket shoppers with high shopping-trip frequency and small-basket shoppers with low shopping-trip frequency (refer to Footnote 2).

Another aspect about basket size that needed to be checked was that even though the basket size of these two segments of shoppers differed, was there any systematic difference in the household size between the two segments? The mean household size[5] was found to be 1.3 and 1.5 (i.e., between "myself only" and "2–3 people") for small- and large-basket shoppers, respectively, and the difference was not statistically significant ($p > .1$). It is important to check this because this study does not want factors other than the shopping behavior of subjects (e.g., family size of the shopper) to explain their different basket sizes.

Please note that single items were used to measure basket size, consumption span, and unit prices of products because using multiple scale items to rate 16 products on multiple constructs would result in respondent fatigue. However, strong results of supporting analyses (e.g., correlation of basket size with shopping frequency) provide great confidence in the operationalization of the above variables.[6]

PROCEDURE AND MEASURES

The actual study was conducted in two phases that were separated by a week. In the first week, subjects rated how high or low they perceived prices of the 20 products at their regular grocery store(s) and responded to various shopping-behavior and deal-proneness questions. A week later, they rated the dependent variable—OSPI rating for their regular grocery store(s)—and provided demographic information. The purpose

[5]Household size was measured with a single 4-point item—"In general, the groceries that you purchase are for how many people in the household?"—with endpoints "myself only"–"more than 6 people."

[6]The pretest also asked subjects some miscellaneous questions such as their reasons for not shopping at other grocery stores, why they are large- (or small-) basket shoppers, how often they visit their "regular" grocery stores under different situations such as "planned trips," "emergency trips," and "to take advantage of special promotions run at the store," the percentage distribution of grocery purchase from the two stores (for two-stores shoppers).

behind this separation was to mitigate halo-effect biases in that subjects' ratings of a grocery store's OSPI in the same survey may bias their ratings of the prices of 20 products at that store. By asking subjects to rate prices of 20 products a week earlier, the study attempted to erase the memory of those ratings on subjects' ratings on the dependent variable—OSPI. Moreover, asking subjects to rate product prices and OSPI for only their regularly visited (or familiar) grocery store(s), attempted to address the problem of halo-effect biases in subjects' responses.

Unless otherwise stated, the scales used in the actual study were identical to the ones used in the pretest. In the first survey, after reading the cover story—"to understand students' grocery-shopping behavior"—subjects rated their familiarity with the first grocery store using four 9-point scale items with different endpoints but the same midpoint of "unsure." (a) My familiarity with X grocery stores with endpoints "very low"–"very high." (b) The most common consumer promotion offered by X grocery store is buy one–get one free with endpoints "strongly disagree"–"strongly agree." (c) and (iv) Most X grocery stores have a laundry facility and video-rental facility—"strongly disagree"–"strongly agree." The 9-point scale was transformed into a 5-point scale such that responses toward either of the two endpoints (midpoint) would represent more (less) familiarity. A high Cronbach alpha of 0.94 indicates very high reliability for the scale. This was followed by subjects rating the prices of 20 products for that store (with endpoints "very low price"–"very high price") and then answering questions about grocery shopping at that store—shopping trip frequency, basket size, and expenditure per shopping trip.

The above sets of questions were then repeated for the second grocery store. Rather than first asking subjects from which grocery store(s) they shop regularly and then getting their ratings on prices of 20 products only for that grocery store(s), subjects were asked to provide price ratings for both grocery stores and then to list the grocery store(s) that they regularly visited (price ratings for the nonregular stores were discarded). This was done chiefly to prevent the subjects from answering questions for only one store even though they may be two-store shoppers.

Next, similar to the pretest, subjects were asked to check back their responses to the basket-size items and asked to list reasons for being a small- (or a large-basket shopper). This was followed by subjects indicating by either a "Yes" or "No" response if in past 3 months they have regularly shopped from the two grocery stores. Next, they were asked to provide the distribution of their grocery purchase for the two grocery stores using the item "If you were to add up all the money that you spent on buying products at the two grocery stores in past 3 months, how would your total expenditure be distributed (in % terms) between X and Y grocery stores? Subjects then rated the consumption spans and unit prices of 20 products. Finally, subjects responded to the eight 7-point

items on the deal-proneness scale (Lichtenstein, Netemeyer, & Burton, 1995) (Cronbach alpha of 0.91) that was used as a covariate in the study—the more deal prone a consumer is, the higher his or her OSPI rating will be).

The following week, the second survey was administered. It was positioned as a two-part survey, the first dealing with students' opinion about grocery shopping and the second, with their gift-buying behavior. This two-part positioning would help prevent the subjects from focusing exclusively on shopping survey and relating it to the survey that most of them participated in the previous week. The first question asked them for how many people is the grocery shopping done (see footnote for the "household size" variable above). This was followed by subjects rating the OSPIs at two grocery stores using a single 9-point item: In general, the prices of products available at X grocery stores is "very low"–"very high." Finally, along with demographic information, subjects provided information that would help determine if they were regular grocery shoppers—participation in a meal plan offered by the university, if they use a prepaid campus card to pay for meals on campus.

ANALYSES AND RESULTS

Regression Model

To test the proposed hypotheses about the main effects of individual product category price perception and its interaction with basket size, the regression analysis approach is used (Sharma, Durand, and Gur-Arie, 1981). The specific regression model used is

$$\mathrm{OSPI}_{ij} = \alpha + \sum_{k=1}^{4} \beta_k (P_{ijk}) + \sum_{k=1}^{4} \gamma_k (P_{ijk} \times \mathrm{BS}_j) + \delta(\mathrm{DP}_j) + \epsilon_{ij}, \qquad (1)$$

where

OSPI_{ij} = Overall store price image of store i by consumer j
P_{ijk} = Perceived price level by consumer j for product category k in store i
BS_j = Shopping basket size of consumer j
DP_j = Deal proneness of consumer j
ϵ_{ij} = Random error term

As with analogous brand perception regression studies (e.g., Hauser & Urban, 1977), cross-sectional data across survey respondents is used for the empirical analysis. The analysis includes only those respondents who do not participate in any meal plan program that would obviate the

need for regular grocery shopping and who do their own grocery shopping in the two dominant grocery supermarket chains of the survey city.[7] This resulted in an effective sample size of 99 out of the 117 who participated in the final survey. As one would expect with student subjects, the sample is quite homogeneous on major demographic factors. For example, 87% of the final sample was in the 18–25 years age group and about 80% have an average personal monthly income of $500 or less. Forty-six percent of the final sample was composed of male students.

As outlined in the previous section, each respondent rated OSPI for the two grocery stores and the final sample consisted of only those respondents that shop regularly in one or both of the two dominant grocery supermarket chains of the survey city. For those respondents who shop regularly from both the stores, the regression analysis uses the data for the store with which each respondent is more familiar. Of the final group of respondents providing data, 56% are regular shoppers at Store A and 44% regularly shop at Store B. This split is very similar to the current relative market shares between the two stores.

Regarding the independent variables, the operationalization of basket size was described in the previous section. As in Bell and Lattin (1998), basket size of consumers is taken as exogenous in this study; that is, it is considered to be an intrinsic consumer difference characteristic that moderates consumers' OSPI rather than being contingent on store characteristics. However, unlike the Bell and Lattin study, this exogeneity premise was in fact verified on both pretest and final survey data.[8] Price-perception measure of each respondent for each of the four product groups is based on the average of his or her price-perception measures (on 9-point scales) for the corresponding five individual products representing each product group. Table 3 presents the sample descriptive statistics of the various independent variables used in this study.

[7]These two supermarket chains, accounting for over 85% of the grocery market in this city, operate in an essentially duopoly competition market structure with similar general store pricing format (Hi-Lo). It should be noted that although the two chains practice similar store pricing format, both casual empiricism and the survey data indicate significant variation between the two chains in terms of individual-product and product group level pricing practices.

[8]After respondents indicated their shopping-basket size, they were asked up to five reasons for being a small or large basket shopper (buying less than 11–15 products on a trip, which was the mid-point on 7-point scale, was classified as small basket). Subjects' protocols were sorted into three categories—consumer lifestyle related reasons (e.g., "I don't have much time for grocery shopping and so I buy a large number of items at a time"), store-related price-based reasons (e.g., "I buy few products on a trip to Store X to take advantage of its special deals"), and store-related non-price-based reasons (e.g., "Since Store X is very close to my home, I usually buy few items on each trip"). Analyses of both pretest and final survey protocols revealed that for an overwhelming majority (about 90%) of the respondents, consumer lifestyle related reasons are the sole or primary determinants of their choice of shopping-basket size, supporting the exogeneity premise of shopping-basket size. Consistent with the protocol results, there was no significant difference ($p > .1$) between the two basket sizes of shoppers who bought groceries from two stores.

Table 3. Sample Descriptive Statistics of the Independent Variables.

Independent Variable[a]	Sample Mean	Sample *SD*
Price perception of short span–high price product group	4.8	1.6
Price perception of short span–low price product group	4.1	1.4
Price perception of long span–high price product group	4.4	1.9
Price perception of long span–low price product group	4.2	2.1
Shopping-basket size[b]	3.2	1.9
Deal proneness	4.4	1.7

[a]Whereas price perceptions of individual grocery products were measured on a 9-point item, the deal proneness was measured on eight 7-point items, and basket size on a 7-point item. For all three variables, the higher the value on the scale or scale item, the larger the value of the concept measured.

[b]Mean of 3.2 on the 7-point item translates into basket size of between 6–10 and 11–15 products.

As the sample used in this study is quite homogeneous in age and income, those variables were not included as explanatory variables in the regression model. Although the regression model arguably does not include all the potential determinants of consumers' OSPI, its purpose is not so much in developing a predictive model of consumers' OSPI, but to test for any systematic empirical relationship among OSPI, product group price perceptions, and shopping basket size. Table 4 summarizes the implications of the proposed set of hypotheses on the expected signs of the coefficients for the regression model.

Results

Before presenting the results of the regression analysis, the results of manipulation checks and several preliminary analyses conducted to increase confidence in the reliability and interpretation of the regression results are discussed.

Table 4. Implications of the Proposed Hypothesis on the Expected Signs of the Regression Model Coefficients.

Hypothesis	Implications for the Regression-Model Coefficients
1. Main effects of product category prices All main effects are positive with the highest for SH category, second highest for SL category, third highest for LH category and the least for LL category.	$\beta_{SH} > \beta_{SL} > \beta_{LH} > \beta_{LL} > 0$
2. Interaction effects of product category prices and shopping basket size	
(a) Negative effect for SH category	$\gamma_{SH} < 0$
(a) Negative effect for SL category	$\gamma_{SL} < 0$
(c) Positive effect for LH category	$\gamma_{LH} > 0$
(d) Positive effect for LL category	$\gamma_{LL} > 0$

Manipulation Checks. Ratings of the final study subjects on product consumption span and unit price scales were analyzed, and the results strongly confirmed the success of the manipulations used in the study. Specifically, 19 out of 20 products were consistently classified into the same four product groups by the pretest and final study subjects. Moreover, no significant difference ($p > .1$) was found between pretest and final samples in terms of the mean cut-off price ($3.84 vs. $3.98, respectively) for classifying grocery-store products into high-and low-priced items.

Next, the two key measures of the study—OSPI and basket size—were checked for some internal validity. For the former, a correlation between the percentage of grocery purchased from a store and that store's OSPI was run. The relatively high, negative correlation ($r = -.66, p < .01$) is consistent with prior research (Cox & Cox, 1990) that higher OSPI results in lower store patronage.

For the basket-size measure, the same analyses as in the pretest were performed, and it was found that mean household size was similar ($p > .1$) for small- and large-basket shoppers—1.3 and 1.4, respectively on a 4-point scale. Further, as in the pretest results, the basket size was found to have a strong negative correlation with shopping trip frequency ($r = -0.72, p < .01$) and a strong positive relationship with expenditure per shopping trip ($r = 0.77, p < .01$). These results increase confidence that the operationalization of basket size used in this study indeed measured the shopper's basket size.

Finally, preliminary analysis was done to check for a possible halo effect on respondents' responses in terms of their price perceptions of the 20 individual products for each grocery store. The presence of a halo effect would be manifested by very little variation in a participant's price perception responses for the 20 products for a given store. Each participant's price-perception responses (on a 9-point scale) to the 20 products for her or his more familiar store yielded values ranging the entire scale (with standard deviations ranging from 1.3 to 2.7 with a mean of 2.1). Such standard-deviation values on a 9-point scale suggest significant variation in price perceptions across products for individual consumers, and thus point to minimal evidence of halo effect.

Table 5 presents the estimation results of the regression model [Eq. (1)]. Robust variance matrix estimators[9] were used to allow for heteroskedasticity and the assumption of independence within groups (here, observations within each of the two selected grocery supermarket chains) was relaxed. The coefficient estimates provide strong support for all the proposed hypotheses. First, positive and statistically significant ($p < .05$) coefficient estimates for prices of all four product groups support the main effects of prices of the four product groups on consum-

[9]These estimators also go by alternative names: Huber/White/Sandwich estimators (MacKinnon & White, 1985).

Table 5. Estimation Results of the Regression Model [Eq. (1)].

Independent Variable	Coefficient	Coefficient Estimate	t statistic
Deal proneness	δ	−0.704	−2.221*
Price of SH product category	β_{SH}	0.589	2.018*
Price of SL product category	β_{SL}	0.541	2.770**
Price of LH product category	β_{LH}	0.182	2.004*
Price of LL product category	β_{LL}	0.043	2.244*
Price of SH product category × Basket size	γ_{SH}	−0.158	−2.176*
Price of SL product category × Basket size	γ_{SL}	−0.118	−3.143**
Price of LH product category × Basket size	γ_{LH}	0.164	2.028*
Price of LL product category × Basket size	γ_{LL}	0.058	2.129*
Constant	α	3.011	2.468**
Adjusted R^2		0.63	
Number of observations		99	

*Significant at the .05 level
**Significant at the .01 level

ers' OSPI [H1(a)]. The coefficient values indicate that short span–high price group has the strongest and long span–low price group has the least influence, with the short span–low price and long span–high price groups in between in the order proposed in H1(b). To test the statistical significance of these differences, pairwise F tests for the four coefficients (Judge, Griffiths, Hill, Lutkepohl, & Lee, 1985) were carried out. The Wald F-test statistics are: $F(1, 89) = 4.11, p < .045$ for short span–high price versus short span–low price coefficients; $F(1, 89) = 8.17, p = .005$ for short span–low price versus long span–high price coefficients; and $F(1, 89) = 19.10, p = .001$ for long span–high price versus long span–low price coefficients. The results show that the estimated differences in magnitude in pairwise comparisons of the four coefficients are statistically significant ($p < .05$ or lower), thus providing support for the hypothesized order of magnitude of main effects across the four product groups. The greater influence on OSPI of prices of short span–low price product group over that with long span–high price indicates the dominance of SFS over the PS index and is consistent with the hypothesis. Moreover, a closer look at these differences reveals the weakest significance level (.045) for the short span–high price versus short span–low price pair and the strongest (.0001) for long span–high price versus long span–low price pair. These suggest that for short (long) consumption span products, unit prices have a weaker (stronger) influence on OSPI.

Finally, the results are also consistent with H2 in terms of the moderating influence of basket size on OSPI. Statistically significant coefficients with the expected signs lend support to the study's predictions that although larger basket size accentuates ($p < .05$) the price influence of the long span–high price and long span–low price product

groups on OSPI, it attenuates ($p < .01$) those of the short span–high price and short span–low price product groups.

GENERAL DISCUSSION

Implications

Despite the strong managerial relevance of OSPI for retailers, research on the topic has been sparse. Although prior research on OSPI (Alba et al., 1994) has focused on the influence of *number* of products being sold at lower prices and of the *magnitude* of such price reduction, it sheds little light on the influence of the *type* of products being sold at lower prices. The current research adds to this budding literature by examining how prices charged on different types of products influence OSPI and how such influence is likely to vary across consumers. The findings of this research help grocery retailers to identify focal product groups across distinct market segments. Lack of such insights can lead to indiscriminate offering of lower prices on a wide range of products that may not be economically efficient or offering lower prices on a very restricted set of products that may not have the desired effect on OSPI. Thus, identifying the appropriate set of focal products for price promotion is critical to a more efficient realization of a retailer's goal of lower OSPI (Bell & Lattin, 1998). Selection of nonfocal products for price promotion may create situations where actual product prices in the store and consumers' OSPI beliefs about that store may be in conflict, and once a belief about OSPI is formed, regardless of its basis, it may be very difficult to change (Hoch & Deighton, 1989). For example, some retailers may reduce their product prices aggressively, but find that consumer perceptions about store's OSPI lag far behind. Probably, the retailers reduced their prices on products that consumers usually do not consider (or consider less) when forming a store's OSPI. However, being aware of appropriate focal products that need to be price promoted can have its beneficial effects. Specifically, grocery stores can increase prices on nonfocal products without worrying about their adverse consequences on OSPI and consumer patronage, because consumers continue to perceive the stores' OSPIs to be lower because of their prior favorable OSPIs.

This study found the relative influences of the four product groups varying on consumption span and unit prices to be consistent with the proposed hypotheses. As one would expect, price perceptions of all four groups were found to have positive influence on OSPI. That is, the higher the price perception of any of these product groups at a store, the higher the OSPI of that store. However, the interesting question for grocery-store managers is which of these four groups of products should

they focus on for their price-promotion efforts to achieve the desired OSPI most efficiently. In absence of any prior research on this issue, grocery-store managers may assume that each of the four product groups can have equal influence on OSPI beliefs. Alternatively, they can assume that the degree of influence that prices of a product group can have on OSPI is proportional to the percentage share of that product group in the total set of products sold by grocery stores. In other words, the more the number of items in a product group, the greater the influence of that group on OSPI. As hypothesized, and as the results of this study bear out, answer to the question of relative influence of the prices of the four product groups on OSPI do not conform to either of those two intuitive assumptions. The results not only show that the influence of the prices of these four product groups on OSPI is not equal, but also that their influences are not proportional to their market shares of the total products sold in grocery stores. For example, even though products with short consumption span and high unit prices are the fewest (11) among the 56 products that were randomly selected from supermarkets for pretesting (there were 18, 12, and 15 long span–high price, long span–low price, and short span–low price products, respectively), their relative influence on OSPI is the highest.

Another important insight from the findings is how the influences of the four product groups on OSPI vary across consumers. Unlike prior research on OSPI, which treated all shoppers alike, the current study recognizes the possible influence of shopper characteristics on OSPI and segments individual shoppers based on their shopping-basket size. Its findings help to identify focal product groups at distinct consumer segment levels, and thus hold important strategic implications for category management and target marketing. The strategic importance of the four groups of products varies depending upon which segment of shoppers a grocery store is trying to target. If the grocery store finds that the large- versus small-basket shoppers segment contributes more to the overall profitability of the store, managers can focus their promotional efforts on long span–high price and long span–low price products. This is because as the basket size increases, the influence of prices of these products on OSPI becomes more critical. In contrast, if the store decides to focus on small-basket shoppers, then the store is better off focusing on promoting short span–high price and short span–low price products. With an increasing number of grocery chains tracking the purchase habits of their customers using their own shopping club card programs, such target marketing strategy gets easier to implement as information on customers' basket size becomes readily available.

On the other hand, smaller supermarkets and supermarkets located in smaller towns may not be interested in targeting to any specific segment but instead may want to go after the mass market. Then they should promote (by offering discounts and advertising them) short span–high price products followed by short span–low price, long span–

high price, and long span–low price products because this order corresponds to the relative influences of the prices of these four product groups.

For grocery-store managers, implementing the product group classification used in this study would require measuring consumption span and unit prices of individual products from their customers through surveys, similar to those used in this study. The former is relatively a more objective construct with less likelihood of much variation. Regarding the latter, consumers are known to have within-category price tiers (generics vs. private label vs. national-brand products) even for generally low-priced grocery products. Thus, as found in this study, it is reasonable to expect that consumers are likely to similarly classify grocery products into high and low unit price products because similar thought processes are likely to underlie both computations. This is notwithstanding the narrow range within which grocery product prices vary relative to prices of products in other stores such as department stores. As the findings here show, the narrow range, in fact, results in less variation in the cutoff unit price that subjects use to classify grocery products into high and low unit price products.

This study adopted a longitudinal perspective to OSPI because of the three independent variables that were employed, two of them—consumption span (length of time required to finish the consumption of a standard unit of the product and thus how often you buy that product) and shopper's basket size (small- vs. large-basket shoppers shop more often)—have implications beyond the current grocery trip. That is, these two factors suggest that consumers' OSPIs are formed over a period of time. Thus, the influence on OSPI of prices of products that shoppers are exposed to on any one trip is quite limited and irregular discounting of distinct products at different times may not have any discernible impact on OSPI. Instead, marketers need to adopt a long-term strategy toward discounting specific products to influence OSPI.

Finally, significant *and* differential influences of the prices of all four product groups on OSPI suggest the practical utility of classifying grocery-store products by using the two product factors of consumption span and unit prices. In contrast, the traditional classification of grocery-store products into groups such as produce, meat, beverages, and so on is of limited help in investigating their influence on OSPI. This is because, apart from the lack of parsimony inherent in such numerous product groups, the underlying criteria (product's inherent functionality) to classify grocery products into these different groups have little relation with their price perceptions. For example, this approach would result in grouping of beverage products of all unit prices (e.g., wine and soda, high and low unit price products, respectively) and consumption span ranges (e.g., wine and soda, a high and low consumption span products, respectively) together in a single group (e.g., beverage). Thus, to the extent that prior research on OSPI has overlooked them, identi-

fying consumption span and unit price factors to classify grocery-store products is an important theoretical contribution of this research.

LIMITATIONS AND FUTURE RESEARCH

Although this study makes important contributions to the price-perception literature by providing some interesting findings on the determinants of overall store price image, it is of course not without some shortcomings that future research needs to work upon. A key limitation of the study was that it used a single item to measure the dependent variable of OSPI. Future research can develop a multiple-item scale for the construct. This study used basket size (thus, indirectly, shopping expenditure per trip and shopping frequency) as the household difference variable within households of a similar size. It will be worthwhile for later research to use additional variables likely to influence OSPI either directly or indirectly through influence on basket size. For instance, it would be interesting to examine if consumer's lifestyle would be the primary influence on their shopping-basket size, as it was among these student subjects, or would it be also influenced by other factors such as household composition (a family with two boys versus one boy and one girl).

Another area for future research to look into is to what extent the findings from this study generalize across different consumer samples and variety of retail competitive settings. For instance, although the student sample provided one appropriate consumer group for this study because it satisfied the theoretical requirement of the proposed hypotheses that it should be homogeneous with respect to household size, future research can investigate if the results would also hold for other homogeneous nonstudent samples.[10] Similarly, additional research can test whether the findings generalize across nongrocery products (e.g., department-store products). Specifically, it should investigate whether a key implication of the empirical findings—the dominance of the SFS index over the PS index—holds across different types of consumer and product settings. For example, SFS index may dominate the PS index when a less frequently purchased product that is high in price and high in involvement is more salient than a more frequently purchased product that is lower in price and low in involvement.[11]

Future research can also investigate the interactive influence on OSPI of frequency cue or the number of products offered on discount,

[10]In contrast to student samples, nonstudent samples are likely to be more heterogeneous in terms of household size. As such, use of nonstudent samples will first require segmentation of the sample into homogeneous groups with respect to household size, and then carrying out analyses with such homogeneous groups.

[11]The authors thank an anonymous reviewer for suggesting this point.

the magnitude cue or the extent of discount offered, and shopper's basket size. One can speculate that large-basket shoppers are more likely to be influenced by the frequency cue. This is because they buy many different products on an average shopping trip and find it difficult to keep track of the prices of all the products they buy on that trip. In contrast, because of buying fewer products on a shopping trip and because they are more price sensitive (Bell & Lattin, 1998), small-basket shoppers are more likely to be influenced by the magnitude cue.

REFERENCES

Alba, J. W., Broniarczyk, S. M., Shimp, T. A., & Urbany, J. E. (1994). The influence of prior beliefs, frequency cues, and magnitude cues on consumers' perceptions of comparative price data. Journal of Consumer Research, 21, 219–235.

Alba, J. W., & Hutchinson, J. W. (1987). Dimensions of consumer expertise. Journal of Consumer Research, 13, 411–454.

Alba, J. W., Hutchinson, W., & Lynch, J. G. (1991). Memory and decision making. In H. H. Kassarjian & T. S. Robertson (Eds.), Handbook of consumer theory and research (pp. 1–49). Englewood Cliffs, NJ: Prentice Hall.

Alba, J. W., Mela, C. F., Shimp, T. A., & Urbany, J. E. (1999). The effect of discount frequency and depth on consumer price judgments. Journal of Consumer Research, 26, 99–114.

Arnold, S. J., Oum, T. H., & Tigert, D. J. (1983). Determinant attributes in retail patronage: Seasonal, temporal, regional, and international comparisons. Journal of Marketing Research, 20, 149–157.

Barsalou, L. W. (1983). Ad hoc categories. Memory and Cognition, 11, 211–227.

Bell, D. R., & Lattin, J. M. (1998). Shopping behavior and consumer preference for store price format: Why "large basket" shoppers prefer EDLP. Marketing Science, 17, 66–88.

Berelson, B., & Steiner, G. A. (1964). Human behavior: An inventory of scientific findings. New York: Harcourt, Brace, & World.

Biswas, A., Wilson, E. J., & Licata, J. W. (1993). Reference pricing studies in marketing: A synthesis of research results. Journal of Business Research, 27, 239–256.

Blattberg, R. C., Briesch, R., & Fox, E. J. (1995). How promotions work. Marketing Science, 14, G122–G132.

Buyukkurt, B. K. (1986). Integration of serially sampled price information: Modeling and some findings. Journal of Consumer Research, 13, 357–373.

Cox, A. D., & Cox, D. (1990). Competing on price: The role of retail price in shaping store-price image. Journal of Retailing, 66, 428–445.

Desai, K. K., & Hoyer, W. D. (2000). Descriptive characteristics of memory-based consideration sets: Influence of usage occasion frequency and usage location familiarity. Journal of Consumer Research, 309–323.

Dickson, P., & Sawyer A. (1990). The price knowledge and search of supermarket shoppers. Journal of Marketing, 54, 42–53.

Hanssens, D., & Weitz, B. A. (1980). The effectiveness of industrial print advertisements across product categories. Journal of Marketing Research, 53–62.
Hauser, J. R., & Urban, G. L. (1977). A normative methodology for modeling consumer response to innovation. Operations Research, 25, 579–619.
Heckler, S. E., & Childers, T. L. (1992). The role of expectancy and relevancy in memory for verbal and visual information: What is incongruency? Journal of Consumer Research, 475–492.
Hinrichs, J. V., & Novick, L. R. (1982). Memory for numbers: Nominal vs. magnitude information. Memory and Cognition, 10, 479–486.
Hoch, S. J., & Deighton, J. (1989). Managing what consumers learn from experience. Journal of Marketing, 53, 1–20.
Hoch, S. J., Kim, B., Montgomery, A. L., & Rossi, P.R. (1995). Determinants of store-level price elasticity. Journal of Marketing Research, 32, 17–29.
Judge, G. G., Griffiths, W. E., Hill, R. C., Lutkepohl, H., & Lee, T. C. (1985). The theory and practice of econometrics. New York: John Wiley & Sons.
Julander, C.R. (1992). Basket analysis: A new way of analysing scanner data. International Journal of Retail & Distribution Management, 20, 10–18.
Lichtenstein, D. R., Netemeyer, R. G., & Burton, S. (1995). Assessing the domain specificity of deal proneness: A field study. Journal of Consumer Research, 22, 314–326.
MacKinnon, J. G., & White, H. (1985). Some heteroskedasticity consistent covariance matrix estimators with improved finite sample properties. Journal of Econometrics, 29, 305–325.
Monroe, K. B. (1990). Pricing: Making profitable decisions. New York: McGraw-Hill.
Monroe, K. B., & Lee, A. Y. (1999). Remembering versus knowing: Issues in buyers' processing of price information. Journal of the Academy of Marketing Science, 27, 207–225.
Moorthy, S., Ratchford, B. T., & Talukdar, D. (1997). Consumer information search revisited: Theory and empirical analysis. Journal of Consumer Research, 23, 263–267.
Sawyer, A., & Dickson, P. (1986). The price knowledge and search of supermarket shoppers. Journal of Marketing, 54, 42–53.
Sharma, S., Durand, R. M., & Gur-Arie, O. (1981). Identification and analysis of moderator variables. Journal of Marketing Research, 28, 291–300.
Tzelgov, J., Meyer, J., & Henik, A. (1992). Automatic and intentional processing of numerical information. Journal of Experimental Psychology: Learning, Memory, and Cognition, 18, 166–179.
Urbany, J. E., Bearden, W. O., & Weilbaker, D. C. (1988). The effect of plausible and exaggerated reference prices on consumer perceptions and price search. Journal of Consumer Research, 15, 95–110.
Viswanathan, M., & Childers, T. L. (1996). Processing of numerical and product information, Journal of Consumer Psychology, 5, 359–386.
Wagner, W. F. (1988). Yellow Pages report. Scotts Valley, CA: Mark Publishing.
Wakefield, K. L., & Inman, J. J. (1993). Who are the price vigilantes? An investigation of differentiating characteristics influencing price information processing. Journal of Retailing, 69, 216–233.
Walters, R. G., & MacKenzie, S. B. (1988). A structural equations analysis of the impact of price promotions on store performance. Journal of Marketing Research, 25, 51–63.

Winer, R. S. (1988). Behavioral perspectives on pricing: Buyers' subjective perception of price revisited. In T. M. Devinney (Ed.), Issues in pricing: Theory and research (pp. 35–57). Lexington, MA: Lexington Books.

Zeithaml, V. A. (1988). Consumer perceptions of price, quality, and value: A means–end model and synthesis of evidence. Journal of Marketing, 52, 2–22.

The order of authorship is alphabetical and both authors contributed equally toward the project. The authors would like to thank Brian Ratchford and participants of marketing research seminar at SUNY—Buffalo for their helpful comments on an earlier version of the article.

Correspondence regarding this article should be sent to: Kalpesh Kaushik Desai, School of Management (Jacobs Management Center), State University of New York at Buffalo, Buffalo, NY 14260 (kdesai@acsu.buffalo.edu).