

**Packaging: Are Consumers Paying for Price Discrimination,
Service Provision or Both?**

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Packaging: Are Consumers Paying for Price Discrimination, Service Provision or Both?

In retail stores, consumers are frequently offered choices between large and small packages of products. Previous literature characterizes choices between large and small packages primarily as a means for manufacturers to practice price discrimination. Quite often, however, packaging also provides services to consumers, such as keeping foods fresh or facilitating storage. In this paper, we examine consumers' willingness to pay more for the services provided by packaging, and the degree to which this changes their susceptibility to price discrimination. We conduct a series of studies in which consumers make choices among alternatives with different package characteristics, brands, and prices, holding constant the purchase quantity. We find evidence that consumers are willing to pay for packaging services, and that their willingness to pay for these services varies across product categories. Our results suggest that in product categories for which freshness is a concern, packaging services may be underutilized as positioning attributes. We also find evidence that consumers are willing to pay more for packaging services provided by name brands than for store brands, suggesting that name brands can increase their profits by offering packaging services.

Keywords: Packaging, price discrimination, bundling.

INTRODUCTION

In retail stores, consumers are frequently offered choices between large and small packages of products such as soft drinks, ready-to-eat cereals, and cold cuts. Typically, the price per unit differs between large and small packages, so that consumers are commonly offered a quantity discount or less commonly charged a quantity surcharge for a large package relative to a small package (Agrawal, Grimm and Srinivasan 1993; Gerstner and Hess 1987; Sprott, Manning and Miyazaki 2003). In previous literature, these choices between large and small packages have been characterized as a means to practice price discrimination (Adams and Yellen 1976; Khan and Jain 2005; Tirole 1988) by charging different prices to different consumers or by allowing consumers to self-select into different price ranges of a price schedule. This characterization requires that the packaging of the product does not itself provide services to the consumer, yet packaging can reduce consumers' time and effort in purchasing, storing and using the product (Berry, Seiders and Grewal 2002). Thus, consumers might be happy to pay more for small packages if these are perceived to keep food fresher, facilitate storage or increase convenience.

As evidence, consider the wide selection of packaging options available in a single grocery store for a carbonated beverage such as Coca-Cola. One can buy a 2-liter (67.6 oz.) bottle of Coca-Cola Classic, a 12-pack of 12 oz. cans, a 24-pack of 12 oz. cans, a 6-pack of 16.9 oz. (1/2 liter) bottles, a 6-pack of 10 oz. bottles, a 6-pack of 8 oz. bottles, a 6-pack of 24 oz. bottles, or an 8-pack of 12 oz. bottles. When buying roughly the same volume of the beverage, consumers have the choice to spend slightly more for an 8-pack of 12 oz. bottles (\$3.99) than for a 6-pack of 16.9 oz. bottles (\$3.00), or to spend slightly more for a 12-pack of 12 oz. cans (\$5.29) than for a 6-pack of 24 oz. bottles (\$4.99). Smaller packages must provide value to consumers if they are willing to pay such premia for them. Current discussions of price discrimination in the literature, however, have focused on differences in consumers' desired volumes of purchase rather than on the value provided by services associated with features of product packaging (e.g., Khan and Jain 2005).

Using standard empirical methods, it is extremely difficult to discriminate between price discrimination and the value of services provided by product packaging as explanations for the correlation between price and package size. Indeed, Betancourt (2004, Chapter 6) surveys previous literature implicating price discrimination and shows that all empirical stylized facts that are consistent with price discrimination through packaging are also consistent with the assumption that small packages facilitate storage of the product. In this paper, we rely on experimental studies to disentangle these two explanations for the relationship between price and package size.

In the next section, we discuss previous literature related to packaging and price discrimination, and we propose five hypotheses to be tested. A description of our experimental methodology follows and complements this initial section. Next, we present the findings from three studies: a pilot study on soft drinks and two studies on cold cuts and ready-to-eat cereals. We conclude by describing the implications of our findings for future research and for positioning strategies that can be leveraged by managers.

CONCEPTUAL FRAMEWORK

In this section, we discuss the relationship between packaging and price discrimination and draw its implications for our experiments. We address the critical role of marginal costs in differentiating between service provision and price discrimination as well as between price bundling and product bundling. We conclude the section with a discussion of the hypotheses to be tested in our experiments.

A recent paper by Khan and Jain (2005) examines price discrimination based on package size as a mechanism to improve retailer profitability in the context of analgesic drugs. The objective of this paper is to decompose the contributions of two different price discrimination mechanisms, quantity discounts and micromarketing, to retailer profitability. The authors arrive at the conclusion that quantity discounts rather than micromarketing are the primary contributor to retailer profitability. In order to do so, however, the authors make a number of important assumptions that may be violated in their data or that may apply to analgesics but not to other products. For instance, 1) they assume that size is the only relevant dimension of packages, 2) they assume that consumers must differ in their valuation of additional volume of product, 3) they assume that the retailing costs of all package sizes are the same, and 4) they assume that the nonlinearity in retail prices is invariant to retailer-manufacturer interactions. By using an experimental approach, we are able to eliminate or relax these assumptions.

Quantity discounts based on package sizes are an example of second degree price discrimination because prices differ according to the number of units bought (nonlinear pricing) but not across consumers (Varian 2006). All consumers face the same price schedule and self-select a package size based on their preferences. In retailing, self-selection is often critical because it is difficult to distinguish among consumers a priori based on their purchase volumes, consumers typically have choices about which stores to visit, and consumers have choices as to which sizes and brands to purchase. Thus, for consumer packaged goods, second degree price discrimination is typically feasible whereas third degree price discrimination (charging different consumers different prices per unit) is not (Khan and Jain 2005).

Quantity Discounts as Bundling

One way to conceptualize quantity discounts is as a form of bundling. Stremersch and Tellis (2002) define price bundling as the sale of two or more products together without any integration of the products. In contrast, they define product bundling as the integration and sale of two or more different products or services. While selling packages of different sizes has traditionally been conceptualized as a form of price bundling, this is true only if the packaging of the product provides no additional services to consumers (Betancourt 2004). If the packaging of the product provides services such as keeping food fresher for consumers, then selling different package sizes would be more accurately characterized as product bundling. For example, because small bottles keep cola fresher than large bottles, some consumers might be happy to pay a premium for smaller bottles of cola, even if their purchase quantity is as large as that provided by a larger size bottle. Thus, whether quantity discounts represent price bundling or product bundling depends on consumers' beliefs about whether greater freshness is provided by smaller packages. This distinction is important because price bundling implies price discrimination, but product bundling may not.

It has been extensively acknowledged in the literature that to establish price discrimination in a particular situation, one must account for all possible relevant cost differences (e.g., Carroll and Coates 1999). More specifically, in the case of second degree price discrimination, it is usually acknowledged that the marginal costs of quality differences must be accounted for in the analysis (e.g., Pepall, Richards and Norman 1999). If there are any benefits or services associated with packaging, these benefits or services play the same role as quality. Providing benefits or services via packaging usually does entail additional costs for manufacturers and/or retailers. For instance, when selling the same number of items, using two small packages rather than one large one usually adds costs. These consist, for example, of additional costs of shelving, labor or refrigeration for retailers (Khan and Jain 2005) or additional costs of materials or labor for manufacturers. Because it is very difficult to measure marginal costs precisely, the empirical literature at times proceeds by arbitrarily assuming them to be zero or the same for different packaging alternatives, or to find special cases in which the assumption that marginal costs are zero can be justified.¹ One benefit of using experiments is that we can explicitly control for marginal costs and for consumers' assumptions about marginal costs.

¹ An interesting recent illustration is provided by Borzekowski, Thomadsen and Taragin (2005). They argue that in the case of information goods, marginal costs are indeed zero and proceed to make that assumption in their empirical analysis of mailing lists.

Similarly, we require information about marginal costs to differentiate between price discrimination via price bundling and service provision via product bundling. That is, when smaller packages are more costly to produce or stock, we must control for these additional costs to conclude that a situation represents product bundling rather than price bundling and not a combination of both. Product bundling is equivalent to service provision when the package with the higher level of services is priced just enough higher to cover the additional costs of providing these services. In contrast, we have both price discrimination and service provision when the package with the higher level of services is priced higher than would be sufficient to cover the additional costs of providing the services.

Hypotheses

We now introduce the hypotheses that will be tested in our experiments.

Hypothesis 1: Consumers need not have heterogeneity in preferences for volume (e.g., due to high vs. low consumption rate) for packaging variations to be used to implement second degree price discrimination.

Hypothesis 2: The feasibility of second degree price discrimination differs across product categories due to differences in consumers' willingness to pay more for smaller sizes and other packaging variations.

Hypothesis 3: The feasibility of second degree price discrimination is greater for high priced name brands than for low priced store brands.

Hypothesis 4: The feasibility of second degree price discrimination based on variations in packaging differs from the feasibility of second degree price discrimination based on brand.

Hypothesis 5: The feasibility of second degree price discrimination based on variations in packaging is greater when consumers have indefinite time horizons than when they have short time horizons.

METHOD

Our goal is to examine consumers' willingness to pay more for the services provided by packaging and the degree to which this willingness to pay makes them more or less susceptible to price discrimination. Just as in previous research, we assume that consumer willingness to pay for packaging services is based on three parameters: the consumer's rate of consumption (Khan and Jain 2005), transaction costs (e.g., the cost of making a trip to the store to replenish stock; Gerstner and Hess 1987) and storage costs (e.g., the space required to store a product or the risk of product spoilage; Gerstner and

Hess 1987). We focus on the relationship between willingness to pay and storage costs (specifically, the risk of spoilage), and we control for the other parameters. This focus allows us to clearly separate second degree price discrimination from service provision.

In a series of three studies, we measure consumers' willingness to pay for one service that is provided by smaller packages, reducing storage costs by decreasing the risk of spoilage. We refer to this packaging service as maintaining "freshness." Our goal is to examine whether consumers are willing to pay more for packages that maintain greater freshness. If consumers are willing to pay more for packages that maintain freshness, price discrimination is still feasible, but price differences also may be due to consumers' willingness to pay for service provision. In this case, the relevant question is the degree to which price differences are due to susceptibility to price discrimination or willingness to pay for packaging services.

We use scenario-based conjoint analysis to measure the degree to which individual consumers make tradeoffs between price and freshness. A scenario-based approach allows us to abstract from reality and limit the focus to a few key attributes of interest. Conjoint analysis is a multivariate statistical technique which estimates relative preferences for product attributes based on ratings or rankings of combinations of these attributes (Green and Rao 1971). In our studies, participants rank a full profile of product alternatives in the soft drinks, ready-to-eat cereals and cold cuts categories.

Both advantages and disadvantages of conjoint analysis have been discussed in previous research (e.g., Green and Srinivasan 1978, 1990; Ding, Grewal and Liechty 2005). For our purposes, the most important advantage of conjoint analysis is that while consumers are not very good at estimating the relative importance of attributes like price and variations in packaging, they can easily rank product alternatives, and conjoint analysis uses product rankings to uncover the relative importance of the underlying attributes to consumers. This is particularly relevant because our focus is on the relative importance of price and freshness-enhancing attributes such as package size. For our estimation, we use a simple model in which each consumer's preferences are assumed to be additive in the product attributes. Although more complex models could be estimated (e.g., ideal point models with interaction terms), our goal is to measure the degree to which consumers make tradeoffs between price and freshness-enhancing attributes rather than to predict overall preferences for combinations of attributes.

Once participants complete the conjoint analysis task by ranking the combinations of product attributes, we use these rankings as the dependent variable in a regression analysis where the attributes are the independent variables. This regression estimates coefficients for each attribute. We then use the coefficients to divide participants into categories. We are most interested in those who prefer a low price and fewer packaging services (e.g., a larger package) and those who prefer a high price and more

packaging services, because these consumers are either being subjected to price discrimination or they are voluntarily making tradeoffs between price and packaging services (Betancourt 2004). In our studies, we attempt to distinguish between these two explanations for the tradeoffs we observe.

We chose soft drinks as the product category for our pilot study because freshness is an important attribute or service provided by the packaging of this product. For this product category, small package sizes are the primary means for maintaining freshness, so package size and package quality are one and the same. In selecting other products for studies 1 and 2, however, we chose product categories in which we could vary package size and package quality independently. Another important consideration is that we wanted to compare two products for which the importance of freshness differed. With these considerations in mind, we chose cold cuts and ready-to-eat cereals as the product categories for studies 1 and 2.

PILOT STUDY

In this pilot study, our goal was to measure the degree to which consumers are willing to make tradeoffs between price and package size. We used the package size of cola bottles as a proxy for the packaging service of providing freshness and we included a control for brand.

Participants and Procedure

Ninety-two students (53% female, average age 20) in an undergraduate Marketing course participated in the study in exchange for extra credit. Participants were asked to imagine that they had moved to a new city for a summer job, and they were buying soft drinks for themselves. To control for transaction costs, participants were told to imagine that they lived a short distance from a shopping center. To control for storage costs other than spoilage, they were told that their storage space was not constrained.

Participants were given a set of nine index cards, which they were asked to rank order based on their preferences for the alternatives described on the cards. Each alternative was described on the following dimensions: brand (Coke, Pepsi or RC), package size (small, medium or large bottle), price, price per ounce and total number of servings (see Appendix A). Although the package size, price, and price per ounce varied across alternatives, the total number of servings (total volume) was constant across alternatives (i.e., participants compared two 1-liter bottles to a 2-liter bottle). To reflect real market conditions, smaller bottles had a higher price per ounce than larger bottles, the per ounce prices of Coke and Pepsi were the same, and the per ounce price of RC was lower than the price of Coke and Pepsi.

After completing the conjoint task, participants estimated their consumption rate for soft drinks (“How many servings of soft drinks do you usually have per week? (1 serving = 1 cup = 8 ounces)”). They also answered two agree/disagree items measuring the degree to which they were concerned about freshness (“I often have a problem with soft drinks going flat after the bottles are opened” and “Using small bottles helps to keep soft drinks from going flat”) using a seven-point scale. Finally, they answered demographic items.

Results

Using the nine rankings of the alternatives provided by each participant as the dependent variables, we ran a regression for each participant in which price (i.e., brand reputation; high price brands Coke and Pepsi vs. low price brand RC), brand (Coke vs. other two brands Pepsi and RC) and package size (small or large) were the three independent variables. The coefficients of these regressions allowed us to classify participants based on their willingness to make tradeoffs between price (i.e., brand reputation) and package size. These coefficients reflected the choices participants made between lower prices per ounce and smaller package sizes and between lower prices per ounce and brand. Averaging the standardized beta coefficients across participants shows that in general, participants considered high price brands more important (average $\beta = -.71$) than package size (average $\beta = -.31$).

Insert table 1 here

Table 1 shows that a majority of participants preferred the less expensive larger package size (67 of the 92 participants), and that a majority preferred the higher-priced brands (76 of 92 participants). The diagonal cells in the table show that 23 participants are willing to pay a premium for both a small package size and a high price brand (Coke or Pepsi instead of RC), while 14 participants were not willing to pay a premium for either a high price brand or small package size. The bottom left-hand cell shows that 53 participants prefer to pay a premium for a high price brand, but favor the larger package size. These participants do not seem to have a high concern about freshness. In contrast, we can infer that the 2 participants in the upper right-hand cell do not mind a low price brand but prefer to have smaller packages, perhaps due to concerns about freshness.

Insert table 2 here

Do these coefficients reflect a concern for freshness (i.e., storage costs) or do they simply reflect a difference in consumption rate? To answer this question, we analyzed the correlations between the conjoint analysis coefficients and our self-report measures (table 2). Notably, coefficients for package size are positively correlated with both of the measures “I have a problem with soft drinks going flat” and “Using small bottles prevents soft drinks from going flat,” but not with consumption rate. This suggests that greater concern with freshness and a belief that smaller packages keep products fresher motivated participants to prefer smaller bottles. These correlations also allow us to rule out the alternative explanation that consumers who consume the largest volumes prefer the largest packages.² Thus, coefficients for package size seem to reflect participants’ concerns with freshness rather than their consumption rate.

Discussion

The results of this pilot study allow us to reject Khan and Jain’s (2005) assertion that package size matters only because consumers care about the volume of product purchased. In the case of soft drinks, the freshness provided by packaging is likely to be a more important consideration than in the case of Khan and Jain’s (2005) analgesics. In this study, we held volume constant but varied package size, and participants clearly made tradeoffs between package size and price, supporting Hypothesis 1.

Our analysis suggests that a significant majority of the participants (76 of 92) may be targets for price discrimination because they prefer a high price brand to a low price brand. In particular, the 23 participants who prefer both a high price brand and a smaller package may be forced to pay relatively more for packaging services when these services are provided by the high price brand. In this study, the price differences across package sizes were nearly identical for high price and low price brands. In markets for consumer packaged goods, however, this may not be the case. Stronger brands with greater perceived credibility may be able to extract higher prices for the same packaging services due to decreased price sensitivity among consumers (Erdem and Swait 2004). We examine this possibility in study 1.

Another limitation of the pilot study that we address in study 1 is our use of package size as a proxy for package quality. In reality, there are several means for improving the freshness of products via their packaging. For example, packages that are resealable may preserve freshness better than those that are non-resealable, even if both packages are the same size. Thus, in study 1, we vary package attributes

² In fact, participants who consumed higher volumes indicated marginally more problems with soft drinks going flat ($r = .19, p = .07$).

such as resealable closures in addition to package size to test whether participants make tradeoffs between these attributes and price in a manner similar to the tradeoffs they make between package size and price.

STUDY 1

One goal of study 1 is to address the limitations of the pilot study and provide a more stringent test of whether consumers make tradeoffs between price and freshness. We use two different manipulations of packaging services for each product category to test whether consumers make similar tradeoffs between price and packaging services across manipulations. We also compare two different product categories: one that requires refrigeration and has a short shelf life (cold cuts) and a second that does not require refrigeration and has a longer shelf life (ready-to-eat cereals). A second goal of this study is to test whether high price brands can charge more for packaging services than low price brands (e.g., store brands).

Design and Stimuli

Participants were randomly assigned to cells of a 2 product category (cold cuts, cereals) x 2 order (cold cuts first, cereals first) mixed design in which product category was manipulated within-subjects and order was counterbalanced between subjects.

Cold cuts and ready-to-eat cereals were chosen as the product categories because cold cuts require refrigeration but cereals do not, and the shelf life of cold cuts is shorter than that of cereals. Thus, we expected participants to be more concerned about freshness for cold cuts than for cereals. A pretest ($N = 33$) confirmed that participants believed that both unopened ($M_{\text{cold cuts}} = 30.12$ days vs. $M_{\text{cereal}} = 327.21$ days, $t(32) = 7.63$, $p < .001$) and opened ($M_{\text{cold cuts}} = 7.76$ days vs. $M_{\text{cereal}} = 62.33$ days, $t(32) = 3.52$, $p = .001$) ready-to-eat cereals have a longer shelf-life than cold cuts.

In addition to varying package size across alternatives, we varied package quality. For cold cuts, packages were either resealable or non-resealable. For ready-to-eat cereals, packages either had two small freshness bags or they had one large freshness bag. To test whether high reputation brands have greater ability to price discriminate than low reputation brands, we included two high price brands and one store brand for each product category. We also created a price structure such that the high price brands charged more for smaller packages and for higher quality packages than the low price (store) brands. The stimuli are presented in Appendix B.

Participants and Procedure

Participants were 66 students (58% female, average age 20) in an undergraduate Marketing course who participated in the study in exchange for extra credit. As in the pilot study, participants were asked to imagine that they had moved to a new city for a summer job, they were renting an apartment where they lived by themselves, and they had made a trip to the grocery store to buy some supplies. To control for transaction costs and storage costs other than freshness, participants were told that they lived a short distance from the shopping center and that their storage space was not constrained. To control for usage occasion, they were told that they would be consuming the products by themselves.

After participants completed the conjoint task for the first product category, they completed the second conjoint analysis task. Once they had completed both conjoint tasks, they responded to questions about their consumption rate and three agree/disagree questions about their concern for freshness for each product category. In the case of ready-to-eat cereals, for example, the items were “I often face a problem with cereals getting stale after the boxes are opened,” “Using small boxes helps to keep cold cereals from getting stale” and “The freshness bags inside boxes of cold cereal help to keep them from getting stale.” Finally, they answered demographic items.

Results

As predicted, participants were more concerned about freshness for cold cuts ($M = 4.69$) than for cereals ($M = 3.74$; $F(1, 64) = 10.70$, $p < .01$). Consistent with the pilot study, concern about freshness was not correlated with consumption rate for either product category ($p > .13$).

Using the nine and twelve rankings of the alternatives provided by each participant as the dependent variables, we ran a regression for each product category for each participant in which price, package size, package type and a control for brand were the four independent variables. Of the 66 responses for each product category, there were only three responses for which none of the coefficients were significant for cold cuts, and only three responses (provided by different participants) for which none of the coefficients were significant for cereals, suggesting that participants ranked the alternatives consistently.³ The coefficients of these regressions allowed us to classify participants based on their willingness to make tradeoffs between high/low price brands, package size and package quality. Averaging the standardized beta coefficients across participants shows that for cereals, participants placed more weight on high price or name brands (average $\beta = -.54$) than on package size (average $\beta = -.25$) or package quality (average $\beta = .15$). However, for cold cuts, participants placed more weight on package

³ Analyses using only participants for whom at least three of the coefficients (price, package size and package quality) were significant yielded very similar results to those reported in the paper.

quality (average $\beta = -.34$) than on high price brands (average $\beta = -.27$) or package size (average $\beta = -.18$).

Insert table 3 here

For ready-to-eat cereals, as shown in table 3, participants preferred the high price brands Kellogg's and General Mills to the store brand (80% vs. 20%), large packages to small packages (83% vs. 17%), and low quality packages to high quality packages (71% vs. 29%). Notably, a log-linear analysis⁴ of table 3 shows that for high price brands, a preference for high quality packaging (i.e., freshness bags) was associated with an increase in participants' preferences for large packages relative to small packages ($G^2(4) = 10.18, p = .04$). This suggests that for high price brands, participants viewed freshness bags as a substitute for smaller packages. None of the two-way interactions were significant ($ps > .21$).

Insert table 4 here

For cold cuts, as shown in table 4, the majority of participants preferred the high price brands Oscar Mayer and Tyson's over the store brand (64% vs. 36%), large packages to small packages (62% vs. 38%), and high quality packages to low quality packages (73% vs. 27%). A log-linear analysis of table 4 shows that those who preferred small packages were also more likely to prefer high quality packages (i.e., resealable packages; $G^2(1) = 13.32, p < .001$) and that those who preferred high price brands were marginally more likely to prefer small packages ($G^2(1) = 2.74, p < .10$). These two-way interactions were qualified by a three-way interaction showing that those who preferred to pay more for high price brands were more likely to prefer small packages and high-quality packaging ($G^2(4) = 17.50, p = .001$). No other effects were significant ($ps > .75$). In contrast to the results for ready-to-eat cereals, participants did not seem to be using package quality as a substitute for package size. Instead, those participants who were most concerned about quality were willing to pay for multiple attributes related to quality: high price brands, smaller packages, and resealable packages.

In sum, the results in tables 3 and 4 reported above provide evidence supporting Hypothesis 2. The feasibility of second degree price discrimination is greater for a category in which freshness is more of a concern, cold cuts, than for a category in which freshness is less of a concern, ready-to-eat cereals.

⁴ Log-linear analysis is a version of chi-square analysis for three-way contingency tables in which the relevant values are calculated using weighted natural logarithms. For a $2 \times 2 \times 2$ table, the G^2 statistic has one degree of freedom for the two-way interactions and four degrees of freedom for the three-way interaction.

More participants were willing to pay a premium for small packages or for freshness-enhancing packages in the case of cold cuts than in the case of cereals.

For both product categories, more participants were willing to pay for the packaging services of the high price name brands than for the packaging services of the store brands despite the higher price premium. For cereals, this is supported by only 3 out of 66 (5%) participants being willing to pay more for freshness and/or small size for the store brand while 27 out of 66 (41%) were willing to pay more for these packaging services for the high price brands. For cold cuts, only 24 out of 66 (36%) were willing to pay more for freshness and/or small size for the store brand while 49 out of 66 (74%) were willing to pay more for these packaging services for the high price brands. If we assume that packaging services are equally costly for store brands and high price name brands to provide, this difference suggests that name brands have more opportunity to practice price discrimination than store brands when offering packaging services to their customers, supporting Hypothesis 3.

Comparisons Between Product Categories

First, we tested for differences in participants' willingness to pay for high price brands across product categories. Because each participant ranked alternatives for both the cold cuts and cereals categories, we used McNemar's test of correlated proportions to test for differences in the proportions of consumers with particular preferences across product categories. Referring to table 5, a majority of the participants were willing to pay a premium for high price brands in both product categories. Although the proportion was higher for ready-to-eat cereals (79%) than for cold cuts (65%), the proportions did not differ significantly across categories (McNemar's $p = .11$). This was not the case for either package size or package quality and we will discuss those results further below.

Insert table 5 here

Next, we tested for differences across product categories in participants' willingness to pay for packaging services. More consumers were willing to pay a premium for high quality packaging in the cold cuts category (48 out of 66 or 73%) than in the ready-to-eat cereals category (19 out of 66 or 29%; McNemar's $p < .001$; see table 5). Thus, after accounting for individual differences in participants' concern with package quality, we find differences across product categories that are consistent with participants' greater concern with freshness for cold cuts than for cereals.

We also compared participants' preferences with respect to package size across product categories. More consumers were willing to pay a premium for small packages in the cold cuts category

(25 of 66 or 38%) than in the ready-to-eat cereals category (12 of 66 or 18%; McNemar's $p < .05$). Thus, after accounting for individual differences in participants' concern with package size, we find differences across product categories. This is consistent with participants' greater concern with freshness for cold cuts than for cereals, and with their greater willingness to pay for high quality packaging for cold cuts than for cereals. In sum, these results provide evidence supporting Hypothesis 4. Willingness to trade off price for size or price for quality is higher for cold cuts than for cereals, whereas the willingness to trade off price for a name brand does not seem to differ between cold cuts and cereals.

Supporting our proposed explanation, significant correlations between the conjoint analysis coefficients and self-reported concerns about freshness were more numerous for cold cuts than for cereals (see Appendix C), probably due to greater concern about the freshness of cold cuts than cereals. For cereals, the correlation between the coefficient for package quality and consumption rate is marginally significant, indicating that those who consume more prefer higher quality packages. This correlation and the nonsignificant correlation between the coefficient for package size and consumption rate seem to rule out the alternative explanation that variations in consumption rate drive preferences for packages that better preserve freshness.

Notably, for cold cuts, coefficients for package size are positively correlated with both "I often have a freshness problem with cold cuts after the packages are opened" and "Using small packages helps to keep cold cuts fresh," but not with consumption rate. Similarly, coefficients for package quality are correlated with having a freshness problem and the item "A resealable package helps to keep cold cuts fresh," but not with consumption rate. This suggests that greater concern with freshness and a belief that smaller packages/resealable packages keep products fresh motivated participants to prefer smaller packages/resealable packages. These correlations also allow us to rule out the alternative explanation that consumers who consume the largest volumes prefer the largest packages. In sum, coefficients for package size and package quality seem to reflect participants' concerns with freshness rather than their consumption rate, i.e., this evidence favors Hypothesis 1 just as we found in the pilot study for soft drinks.

Discussion

This study suggests where and how manufacturers and/or retailers can use price discrimination. Our results show that controlling for volume purchased, consumers are willing to pay more for packaging services such as smaller packages and freshness-enhancing features like freshness bags and resealable packages. Moreover, by selecting product categories that vary in the degree to which consumers are concerned about freshness, we provide additional evidence that participants choosing smaller packages

are motivated by freshness concerns. The similar pattern of results for package size and package quality for cold cuts relative to cereals also suggests that package size is viewed by consumers as a freshness-enhancing attribute.

Because we designed the stimuli so that high price brands charged more for the same packaging services provided by store brands, this study shows that high price brands have an opportunity to practice price discrimination when they offer packaging services. Despite the higher price premium, participants who were willing to pay more for high price brands were also willing to pay more for packaging services. Especially for the cold cuts category, there was a synergy between high price brand, package size and quality. Those who preferred high price brands were more likely to prefer both small packages and high quality packages, suggesting that consumers who are more sensitive to quality may be more sensitive to quality across multiple dimensions.

One limitation of study 1 is that we did not make marginal costs for packaging variations explicit, instead allowing participants to infer marginal costs based on the store brand's increase in price for packaging services. Another limitation is that all participants were given an indefinite time horizon in which to consume the products. We address these limitations in study 2.

STUDY 2

Study 2 builds on study 1 by manipulating the participants' time horizon. In one condition, the time horizon for consumption is indefinite, as in study 1, and in the other condition, participants are told that in one week, they will be leaving town for several days. In addition, we made it explicit that while the store brand charges their marginal costs for packaging services, this may not be true for the name brands. By explicitly associating the variation in the marginal costs of packaging with the pricing policy of the store brand, we can separate the effect of service provision from the effect of price discrimination with unusual precision.

Design and Stimuli

Participants were randomly assigned to cells of a 2 product category (cold cuts, cereals) x 2 order (cold cuts first, cereals first) x 2 time horizon (short, indefinite) mixed design in which product category was manipulated within-subjects and order and time horizon were manipulated between subjects. As in study 1, cold cuts and ready-to-eat cereals were chosen as the product categories. Package size, package quality, price and brand were manipulated as in study 1.

Participants and Procedure

Participants were 170 students (57.6% male, 42.4% female, average age 21 years) in an undergraduate Marketing course who participated in the study in exchange for course credit. As in study 1, participants were asked to imagine that they had moved to a new city for a summer job, they were renting an apartment where they lived by themselves, and they had made a trip to the grocery store to buy some supplies. To control for transaction costs and storage costs other than freshness, participants were told that they lived a short distance from the shopping center and that their storage space was not constrained. To control for usage occasion, they were told that they would be consuming the products by themselves.

To manipulate time horizon, participants in the short time horizon condition were told that “As you walk through the store, you remember that a week from now, you will be leaving town for several days.” This statement was absent for participants in the indefinite time horizon condition, making the assumed time horizon comparable to study 1. We chose a time horizon of one week because the pretest we conducted for study 1 showed that once opened, cold cuts are believed to have a shelf life of about one week ($M = 7.76$ days), while ready-to-eat cereals are believed to have a significantly longer shelf life after they have been opened ($M = 62.33$, $t(32) = 3.52$, $p = .001$).

To control for participants’ assumptions about the marginal cost of packaging services, participants in all conditions were given the following information: “Please assume that when the store brand charges more for a particular kind of packaging, they are covering their additional costs for the packaging, but they are not making any additional profit. However, this may not be the case when Oscar Mayer or Tyson charges more for a particular kind of packaging.” A similar statement was made for cereals with respect to the General Mills and Kellogg’s brands.

After participants completed the conjoint task for the first product category, they completed the second conjoint analysis task. Once they had completed both conjoint tasks, they responded to questions about their consumption rate, their concern for freshness in each product category, and demographic items.

Results

As predicted, participants were more concerned about freshness for cold cuts ($M = 3.87$) than for cereals ($M = 3.51$; $F(1, 169) = 4.46$, $p < .05$). Notably, however, concern about freshness differed across time horizon conditions. In the short time horizon condition (one week), there was no difference in concern about freshness for cereals ($M = 3.33$) and cold cuts ($M = 3.64$; $F(1, 80) = 1.58$, $p = .21$), but in the long time horizon condition, concern about freshness for cold cuts ($M = 4.08$) was marginally greater

than concern about freshness for cereals ($M = 3.67$, $F(1, 88) = 2.93$, $p < .10$). Consistent with studies 1 and 2, concern about freshness was not correlated with consumption rate for either product category (all $ps > .3$; see Appendix D).

Using the nine and twelve rankings of the alternatives provided by each participant as the dependent variables, we ran a regression for each product category for each participant in which price, package size, package type and brand were the four independent variables. The coefficients of these regressions allowed us to classify participants based on their willingness to make tradeoffs between high price brands, package size and package quality.

Insert table 6 here

Overall, for ready-to-eat cereals, as shown in table 6, participants preferred the more expensive brands Kellogg's and General Mills to the store brand (64.71% vs. 35.29%), large packages to small packages (82.35% vs. 17.65%), and low quality packages to high quality packages (65.89% vs. 34.11%). Thus, for cereals, second degree price discrimination seems to be more feasible for high price brands than for packaging services such as small packages or high quality packages.

Insert table 7 here

For cold cuts, as shown in table 7, the majority of participants preferred the high price brands Oscar Mayer and Tyson's over the store brand (62.35% vs. 37.65%), and high quality packages to low quality packages (71.77% vs. 28.23%), but they were indifferent between large and small packages (50.59% vs. 49.41%). Thus, for cold cuts, second degree price discrimination is more feasible for high price brands and package quality than for package size. Again, as predicted by Hypothesis 2, the feasibility of second degree price discrimination differs across products due to differences across product categories in consumers' willingness to pay a premium for freshness in the form of package size or package quality.

For both product categories, more participants were willing to pay for the packaging services of high price brands than for the packaging services of the store brands, despite the higher price premium. For cereals, this is supported by only 27 out of 170 (16%) participants being willing to pay more for quality and/or small size for the store brand while 47 out of 170 (28%) were willing to pay more for these packaging services for the high price brands. For cold cuts, only 38 out of 170 (22%) were willing to pay more for quality and/or small size for the store brand while 93 out of 170 (55%) were willing to pay more

for these packaging services for the high price brands. If we assume that packaging services are equally costly for store brands and high price name brands to provide, this difference suggests that name brands have an opportunity to practice price discrimination when offering packaging services to their customers, supporting Hypothesis 3.

Comparisons Between Product Categories

First, we tested for differences in participants' willingness to pay for high price brands across product categories. Because each participant ranked alternatives for both the cold cuts and cereals categories, we used McNemar's test of correlated proportions to test for differences in the proportions of consumers with particular preferences across product categories. Referring to table 8, a majority of the participants were willing to pay a premium for high price brands in both product categories. Although the proportion was slightly higher for ready-to-eat cereals (64.31%) than for cold cuts (62.35%), the proportions did not differ significantly across categories (McNemar's $p = .66$).

Insert table 8 here

Next, we tested for differences across product categories in participants' willingness to pay for packaging services. As in study 1, more consumers were willing to pay a premium for high quality packaging in the cold cuts category (122 out of 170 or 72%) than in the ready-to-eat cereals category (58 out of 170 or 34%; McNemar's $p < 0.001$; see table 8). After accounting for individual differences in participants' concern with package quality, we find differences across product categories that are consistent with participants' greater concern with freshness for cold cuts than for cereals, and with their self-reported greater willingness to pay for high quality packaging for cold cuts ($M = 5.97$) than for cereals ($M = 5.25$, $F(1,169) = 32.55$, $p < .01$).

Subsequently, we compared participants' preferences with respect to package size across product categories. More consumers were willing to pay a premium for small packages in the cold cuts category (84 of 170 or 49%) than in the ready-to-eat cereals category (30 of 170 or 18%; McNemar's $p < 0.001$). Thus, after accounting for individual differences in participants' concern with package size, we find differences across product categories. This difference is also consistent with participants' self-reported value for small packages, which was higher for cold cuts ($M = 5.11$) than for cereals ($M = 4.14$, $F(1,169) = 35.85$, $p < .01$).

Also supporting our proposed explanation, correlations between the conjoint analysis coefficients and self-reported concerns about freshness were significant. For cold cuts, concern for freshness was

correlated with participants' preference for smaller packages ($r = .206, p < .001$) and higher quality packages ($r = -.203, p < .001$). For cereals, concern for freshness was correlated with participants' preference for higher quality packages ($r = -.275, p < .001$; see Appendix D).

Consistent with the results of study 1, and supporting Hypothesis 4, we see the same pattern of differences in the feasibility of second degree price discrimination in packaging services with respect to size and quality and the same lack of difference in the feasibility of second degree price discrimination with respect to brands of cold cuts and cereals.

Comparisons Across Time Horizons

Did the time horizon shift participants' willingness to pay for packaging services? In the cold cuts product category, average beta values show that participants put more weight on package size in the indefinite time horizon ($\beta = -.14$) than in the short time horizon condition ($\beta = .02$; $F(1, 168) = 5.18, p < .05$). Said another way, in the short time horizon condition, participants had a greater preference for small packages (45 of 81 or 56%) than in the indefinite time horizon (39 of 89 or 44%). There was also a marginally significant difference between the two time horizon conditions in participants' preference for name brands ($\beta_{\text{long}} = -.07$ and $\beta_{\text{short}} = -.20, F = 3.49, p = .06$), indicating that those in the indefinite time horizon were more willing to choose the store brand than those in the short time horizon condition. There was no difference in concern with package quality ($\beta_{\text{long}} = -.37$ and $\beta_{\text{short}} = -.35, p > .76$) between indefinite and short time horizon conditions. Thus, for cold cuts, the feasibility of second degree price discrimination for package size seems to be greater for short time horizons than for indefinite time horizons and there seems to be no difference with respect to package quality.

In the ready-to-eat cereals product category, participants placed more weight on package quality in the indefinite time horizon ($\beta = .15$) than in the short time horizon condition ($\beta = -.01$; $F(1, 168) = 4.36, p < .05$), but there was no difference in concern with package size ($\beta_{\text{long}} = -.34$ and $\beta_{\text{short}} = -.26, p > .16$) or high price brands ($\beta_{\text{long}} = -.21$ and $\beta_{\text{short}} = -.23, p > .78$) across time horizon conditions. Specifically, in the indefinite time horizon condition participants had a greater preference for high quality packaging (37 of 89 or 42%) than in the short time horizon condition (21 of 81 or 26%). That is, for cereals, the feasibility of second degree price discrimination seems to be greater for indefinite time horizons than for short time horizons. Thus, Hypothesis 5 is supported for cereals but not for cold cuts.

We also examined synergies among the dimensions. In the short time horizon condition, for cold cuts (Table 7), those who preferred high quality packages were more likely to prefer high price brands ($G^2 = 11.75, p < .001$) and were more likely to prefer small packages ($G^2 = 8.30, p < .01$). These two-way interactions were qualified by a three-way interaction showing that those who prefer high price brands

were more willing to choose both high quality packaging and small packages ($G^2 = 20.44$, $p < .01$).

Similarly, in the indefinite time horizon condition, those who preferred high quality packages of cold cuts were more likely to prefer high price brands, such as Tyson or Oscar Mayer ($G^2 = 6.44$, $p < .05$), and were more likely to choose small packages ($G^2 = 20.92$, $p < .001$). In contrast to the short time horizon condition, those who preferred high price brands were more likely to choose small packages ($G^2 = 11.31$, $p < .001$). These two-way interactions were qualified by a three-way interaction showing that those who prefer high price brands were more willing to choose both high quality packages and small packages ($G^2 = 35.68$, $p < .001$). Thus, the only difference in the synergies among dimensions between short and long time horizon conditions was for the synergy between high price brands and preference for small packages, which was significant only in the indefinite time horizon condition.

For ready-to-eat cereals (Table 6), there were no significant interactions among variables. However, if we look only at low-price brands in the indefinite time horizon condition, there was an interaction between package quality and package size ($G^2(1) = 5.30$, $p < .05$) such that those who preferred high quality packages were more likely to choose large packages. Although the pattern is the same for high-price brands, the effect is not significant. Thus, for cereals, we see evidence for substitution between package size and package quality as we did in study 1. Although the substitution effect was more prominent in study 1 for the high price brands, fewer participants in study 2 chose name brands in the cereal category, probably because of our explicit statement about marginal costs.

It is notable that the differences across time horizon conditions seem to be in opposite directions for the cold cuts and cereals categories. For cold cuts, a short time horizon leads to preferences for smaller packages, while for cereals, it is a long time horizon that leads to preferences for higher package quality. Perhaps this is because the perceived shelf life of cereals is longer once opened than the perceived shelf life of cold cuts, regardless of package quality.

DISCUSSION AND IMPLICATIONS

Our results provide evidence that consumers are willing to pay a premium for packaging that promotes freshness based on either smaller package size or package type. Our results also suggest that these tradeoffs differ across consumers and across product categories. Consumers vary in their willingness to pay more for high reputation brands, smaller package sizes, and high quality packages that promote freshness. Moreover, even the same consumers differed in their willingness to pay for these attributes across product categories. Thus, our results support our first four hypotheses without exception. They also support our fifth hypothesis with respect to cereals but not with respect to cold cuts. For cold

cuts, we found that a short time horizon increased rather than reduced the feasibility of second degree price discrimination.

While it has been suggested that packaging can reduce the time and effort consumers expend in purchasing, storing and using products (Berry et al. 2002), previous empirical literature has assumed that packages are merely a vehicle for delivering the desired quantity of goods to a consumer (e.g., Khan and Jain 2005). Our paper is the first to explicitly examine consumers' willingness to pay for packaging services. We show both directly and indirectly that consumers attribute services such as enhancing freshness to different sizes and types of packages. For example in study 1, using direct measures, 74% of the participants responded 5 or higher on a seven-point scale when asked if smaller packages helped to keep cold cuts fresh, and 86% responded 5 or higher when asked if resealable packages helped to keep cold cuts fresh. The indirect measures produced by the conjoint analysis showed that 36% of the participants in study 1 were willing to pay a higher price per ounce for smaller packages of cold cuts, and 73% were willing to pay a higher price per ounce for resealable packages of cold cuts. Thus, our results provide empirical support for the argument that small packages and resealable packages provide value to consumers rather than acting solely as an instrument for second degree price discrimination.

Implications for Future Research

While the results of studies 1 and 2 were largely consistent, there were two interesting differences between the studies. First, in study 2, we explicitly told participants that the store brand charged their marginal cost for packaging services, but that this might not be the case for the high price brands. In study 2, choices of high price brands for cereals and cold cuts were lower than in study 1. That is, 53 out of 89 (60%) indefinite horizon participants in study 2 chose high price brands for cereals compared to 53 out of 66 (80%) in study 1; similarly, 51 out of 89 (57%) indefinite horizon participants chose high price brands for cold cuts compared to 42 out of 66 (64%). This raises an interesting issue for future research: to what extent are these differences due to perceptions of unfairness when consumers know that the high price brands may be charging more than their marginal cost for packaging services?

In study 2, we also varied participants' time horizon and found that for both cold cuts and cereals, a short time horizon weakens preferences for freshness in the form of high quality packages [58 of 81 (72%) in the short time horizon and 66 of 89 (74%) in the indefinite time horizon condition for cold cuts and 21 of 81 (26%) in the short time horizon versus 37 of 89 (42%) in the indefinite time horizon condition for cereals]. Participants may believe that while they are out of town, even a high quality package will not maintain freshness. Nonetheless, a short time horizon strengthens preferences for freshness in the form of small packages for cold cuts and cereals [45 of 81 (56%) in the short time horizon

and 39 of 89 (44%) in the indefinite time horizon condition for cold cuts and 16 of 81 (20%) in the short time horizon and 14 of 89 (16%) in the indefinite time horizon condition for cereals]. Thus, it seems that a desire for freshness differentially impacts willingness to pay more for smaller package sizes and higher package quality across product categories. In the case of cereals, a short time horizon seems to enhance the perceived substitutability between small packages and package quality in the form of freshness bags. In the case of cold cuts, a short time horizon seems to diminish the perceived complementarity between small packages and package quality in the form of resealable packages. It would be interesting to further explore variations in preferences for package size and package quality across time horizons in future research with other product categories.

It is interesting to compare our results with two recent analyses of consumer purchase data for small and large package sizes. Cohen (2000) showed that consumers tend to choose small packages of paper towels with a higher unit price more frequently than large packages with a lower unit price. Similarly, Khan and Jain (2005) show that consumers tend to choose small packages of analgesics with a higher unit price more frequently than large packages with a lower unit price. In contrast, the majority of our participants preferred large packages, whether the category was soft drinks, ready-to-eat cereals or cold cuts. Because we control for the volume purchased, our study design removes one of the key advantages offered by smaller packages, the lower total price (despite a higher unit price; Khan and Jain 2005). Similarly, we control for the influence of household size by using a scenario-based conjoint analysis task in which all participants are asked to imagine the same usage situation and living arrangements. These are advantages of our experimental method that can be leveraged in future research.

Our results do have several limitations. First, our data is from a lab study conducted with undergraduate students, and we conducted our research using only three product categories. Although the participants' choices were hypothetical, the product categories we chose were familiar to our participants, and we chose these product categories to represent different levels of concern about freshness: while cold cuts have a short shelf life and must be refrigerated, ready-to-eat cereals have a much longer shelf life and require no refrigeration. The fact that our participants made consistent tradeoffs in the conjoint analysis and differentiated between product categories in the predicted manner suggests that they took the experimental task seriously. They also responded in a predictable way to the time horizon manipulation in study 2. That said, it would be helpful to replicate these findings for consumers making real rather than hypothetical choices (Ding et al. 2005). A second limitation is that our estimate of price discrimination is only a lower bound, because we cannot be sure that real consumers interpret packaging costs for the store brand as marginal costs (as we explicitly told consumers in study 2). In future research, it would be interesting to examine consumers' inferences about packaging costs.

Managerial Implications

Our results suggest that packaging services may be underutilized as positioning attributes for consumer packaged goods. For at least some product categories, consumers seem to care a lot about packaging services, and they are willing to pay higher per unit prices to obtain packaging services such as smaller package sizes or resealable packages. For name brands, in particular, it appears that higher profits can be made by offering a wider array of packaging services to consumers. If consumer concerns about additives and preservatives that extend the shelf life of foods increase, this positioning opportunity may become even larger.

Although we focused on freshness in this research, there are a variety of packaging attributes that could be used to position products and differentiate them from the competition. For example, ease of storage, ease of package disposal, and ease of removing the product from the package all might increase consumers' convenience, making consumers willing to pay for these attributes. Our conjoint analysis methodology can be used by firms to measure consumers' willingness to pay for packaging attributes specific to their product categories. Conjoint analysis is widely used in industry, and there are several software packages available that make it relatively easy to analyze the results (Green and Srinivasan 1990).

Our results also have implications for the introduction of store brands by retailers. Because consumers who are unwilling to pay more for name brands are often willing to pay more for packaging services, expanding the packaging services offered by store brands may be a key strategy for retailers. Research suggests that high store brand share may increase profits not only through sales of the store brand, but also by enabling retailers to earn higher percentage margins on national brands (Ailawadi and Harlam 2004). The opportunities are greater in some product categories than in others: for example, in study 1, for cold cuts, 18 of the 66 (27%) participants wanted high package quality (a resealable package) but favored the lower priced store brand over a high reputation brand, and 6 of the 66 (9%) participants wanted small package sizes and the store brand. In contrast, in the cereals category, only one of the 66 participants who preferred the store brand was willing to pay more for packaging services. Notably, from a normative perspective, store brands or other low-priced brands that offer packaging services desired by consumers may increase consumer welfare by reducing opportunities for price discrimination.

Until now, the literature on store brands seems to have ignored the possible effects of packaging variations on consumer preferences. For instance, in their paper on the positioning of store brands, Sayman, Hoch and Raju (2002) show that retailers have profit incentives for positioning the store brand to compete with the leading national brand. While they refer to package design as one of four criteria used to

establish targeting of the national brand, their empirical evidence does not explicitly address variations in packaging alternatives. Similarly, Scott Morton and Zettelmeyer (2004) show that retailers' desire to improve their bargaining position with respect to manufacturers is sufficient to lead to the targeting of the national brand. Nonetheless, these authors simply note that the store brand is designed to imitate the leading national brand with respect to size, shape and color in 52% and 59% of the 82 categories that they considered for two supermarket chains, and they don't explicitly address issues such as freshness and ease of storage.

When the goal is to target the leading national brand, our results suggests that store brands should pay attention to all of the packaging variations of the leading national brand or they will risk missing substantial segments of the target market. Furthermore, our results suggest that packaging niches not currently satisfied by the leading national brand should be considered. Of course, the importance of these considerations varies across product categories. While it is harder to make conclusive statements about packaging niches not currently being satisfied by the name brands, our results suggest that consumers are sensitive to packaging variations. In sum, packaging services should be viewed as a relevant aspect of positioning strategy for both store brands and name brands.

APPENDIX A
STIMULI FOR PILOT STUDY

Conjoint analysis cards for soft drinks:

<p><u>Soft Drink L</u> Coca Cola One 2 liter bottle Price-\$1.69 Price per oz.-\$.025 Number of servings-8</p>	<p><u>Soft Drink P</u> Pepsi One 2 liter bottle Price-\$1.69 Price per oz.-\$.025 Number of servings-8</p>	<p><u>Soft Drink O</u> RC Cola One 2 liter bottle Price-\$.99 Price per oz.-\$.015 Number of servings-8</p>
<p><u>Soft Drink Q</u> Coca Cola Two 1 liter bottles (total 2 liters) Price-\$1.98 Price per oz.-\$.029 Number of servings-8</p>	<p><u>Soft Drink K</u> Pepsi Two 1 liter bottles (total 2 liters) Price-\$1.98 Price per oz.-\$.029 Number of servings-8</p>	<p><u>Soft Drink S</u> RC Cola Two 1 liter bottles (total 2 liters) Price-\$1.3 Price per oz.-\$.019 Number of servings-8</p>
<p><u>Soft Drink N</u> Coca Cola Four .5 liter bottles (total 2 liters) Price-\$2.48 Price per oz.-\$.037 Number of servings-8</p>	<p><u>Soft Drink R</u> Pepsi Four .5 liter bottles (total 2 liters) Price-\$2.48 Price per oz.-\$.037 Number of servings-8</p>	<p><u>Soft Drink M</u> RC Cola Four .5 liter bottles (total 2 liters) Price-\$1.84 Price per oz.-\$.027 Number of servings-8</p>

APPENDIX B

STIMULI FOR STUDIES 1 AND 2

Conjoint analysis cards for cold cuts:

<p><u>Cold Cuts L</u> Oscar Mayer One 16oz. non-resealable package Price: \$5.79 Price per oz.: \$.36 Number of servings: 16</p>	<p><u>Cold Cuts V</u> Tyson One 16oz. non-resealable package Price: \$5.79 Price per oz.: \$.36 Number of servings: 16</p>	<p><u>Cold Cuts O</u> Store brand One 16oz. non-resealable package Price: \$5.49 Price per oz.: \$.34 Number of servings: 16</p>
<p><u>Cold Cuts Q</u> Oscar Mayer Two 8oz. non-resealable packages (total 16oz.) Price: \$6.59 Price per oz.: \$.41 Number of servings: 16</p>	<p><u>Cold Cuts K</u> Tyson Two 8oz. non-resealable packages (total 16oz.) Price: \$6.59 Price per oz.: \$.41 Number of servings: 16</p>	<p><u>Cold Cuts U</u> Store brand Two 8oz. non-resealable packages (total 16oz.) Price: \$6.09 Price per oz.: \$.38 Number of servings: 16</p>
<p><u>Cold Cuts N</u> Oscar Mayer One 16oz. resealable package for freshness Price: \$6.29 Price per oz.: \$.39 Number of servings: 16</p>	<p><u>Cold Cuts R</u> Tyson One 16oz. resealable package for freshness Price: \$6.29 Price per oz.: \$.39 Number of servings: 16</p>	<p><u>Cold Cuts M</u> Store brand One 16oz. resealable package for freshness Price: \$5.79 Price per oz.: \$.36 Number of servings: 16</p>
<p><u>Cold Cuts P</u> Oscar Mayer Two 8oz. resealable packages for freshness (total 16oz.) Price: \$6.99 Price per oz.: \$.44 Number of servings: 16</p>	<p><u>Cold Cuts T</u> Tyson Two 8oz. resealable packages for freshness (total 16oz.) Price: \$6.99 Price per oz.: \$.44 Number of servings: 16</p>	<p><u>Cold Cuts S</u> Store brand Two 8oz. resealable packages for freshness (total 16oz.) Price: \$6.39 Price per oz.: \$.40 Number of servings: 16</p>

Conjoint analysis cards for ready-to-eat cereals:

<p><u>Cold Cereal L</u> General Mills One 30oz. box with one 30 oz. freshness bag inside Price: \$5.39 Price per oz.: \$.18 Number of servings: 27</p>	<p><u>Cold Cereal P</u> Kellogg's One 30oz. box with one 30 oz. freshness bag inside Price: \$5.39 Price per oz.: \$.18 Number of servings: 27</p>	<p><u>Cold Cereal O</u> Store brand One 30oz. box with one 30 oz. freshness bag inside Price: \$4.79 Price per oz.: \$.16 Number of servings: 27</p>
<p><u>Cold Cereal Q</u> General Mills Two 15oz. boxes, each with 15 oz. freshness bag inside (total 30oz.) Price: \$7.79 Price per oz.: \$.26 Number of servings: 27</p>	<p><u>Cold Cereal K</u> Kellogg's Two 15oz. boxes, each with 15 oz. freshness bag inside (total 30oz.) Price: \$7.79 Price per oz.: \$.26 Number of servings: 27</p>	<p><u>Cold Cereal S</u> Store brand Two 15oz. boxes, each with 15 oz. freshness bag inside (total 30oz.) Price: \$6.59 Price per oz.: \$.22 Number of servings: 27</p>
<p><u>Cold Cereal N</u> General Mills One 30oz. box with two 15 oz. freshness bags inside (total 30oz.) Price: \$6.59 Price per oz.: \$.22 Number of servings: 27</p>	<p><u>Cold Cereal R</u> Kellogg's One 30oz. box with two 15 oz. freshness bags inside (total 30oz.) Price: \$6.59 Price per oz.: \$.22 Number of servings: 27</p>	<p><u>Cold Cereal M</u> Store brand One 30oz. box with two 15 oz. freshness bags inside (total 30oz.) Price: \$5.69 Price per oz.: \$.19 Number of servings: 27</p>

APPENDIX C
CORRELATIONS AMONG COEFFICIENTS AND SELF-REPORT MEASURES (STUDY 1)

Ready-to-Eat Cereals	Coefficient for Brand Reputation	Coefficient for Size	Coefficient for Brand	Coefficient for Quality	Servings Per Week	“Problem with stale”	“Using small boxes”	“Using freshness bags”
Coefficient for Brand Reputation ^a	1.0							
Coefficient for Size ^b	.42 (<i>p</i> < .01)	1.0						
Coefficient for Brand ^c	.10 (<i>p</i> = .45)	.41 (<i>p</i> < .01)	1.0					
Coefficient for Quality of Package ^d	.56 (<i>p</i> < .01)	.47 (<i>p</i> < .01)	.25 (<i>p</i> = .05)	1.0				
Number of Servings Per Week	.05 (<i>p</i> = .70)	-.13 (<i>p</i> = .29)	-.28 (<i>p</i> = .02)	-.22 (<i>p</i> = .07)	1.0			
“Have problem with cereals getting stale” ^e	-.07 (<i>p</i> = .59)	-.06 (<i>p</i> = .66)	.20 (<i>p</i> = .11)	-.06 (<i>p</i> = .66)	-.19 (<i>p</i> = .14)	1.0		
“Using small boxes...” ^e	-.16 (<i>p</i> = .19)	.05 (<i>p</i> = .69)	.24 (<i>p</i> = .06)	-.24 (<i>p</i> = .06)	-.18 (<i>p</i> = .15)	.36 (<i>p</i> < .01)	1.0	
Using freshness bags...” ^e	-.04 (<i>p</i> = .75)	-.08 (<i>p</i> = .53)	-.05 (<i>p</i> = .72)	-.17 (<i>p</i> = .19)	.02 (<i>p</i> = .86)	.46 (<i>p</i> < .01)	.39 (<i>p</i> < .01)	1.0

^a Higher coefficients indicate preference for store brand; coding of variables: General Mills or Kellogg’s = 1, store brand = 0

^b Higher coefficients indicate preference for small packages; coding of variables: 30 oz. box with one bag or 30 oz. box with two bags = 1, two 15 oz. boxes = 0

^c Higher coefficients indicate preference for Kellogg’s or store brand; coding of variables: General Mills = 1, Kellogg’s and store brand = 0

^d Higher coefficients indicate preference for lower quality packages; coding of variables: 30 oz. box with 2 bags or two 15 oz. boxes = 1, one 30 oz. box = 0

^e Responses were reported using a 1-7 scale where 1 = disagree, 7 = agree

Cold Cuts	Coefficient for Brand Reputation	Coefficient for Size	Coefficient for Brand	Coefficient for Quality	Servings per Week	“Problem with freshness”	“Using small packages”	“Using resealable packages”
Coefficient for Brand Reputation ^a	1.0							
Coefficient for Size ^b	-.38 (<i>p</i> < .01)	1.0						
Coefficient for Brand ^c	-.29 (<i>p</i> = .02)	-.08 (<i>p</i> = .55)	1.0					
Coefficient for Quality ^d	-.20 (<i>p</i> = .10)	-.46 (<i>p</i> < .01)	.18 (<i>p</i> = .16)	1.0				
Servings Per Week	.22 (<i>p</i> = .08)	-.09 (<i>p</i> = .50)	.07 (<i>p</i> = .58)	-.13 (<i>p</i> = .31)	1.0			
“Have a freshness problem with cold cuts” ^e	.03 (<i>p</i> = .81)	.21 (<i>p</i> = .09)	-.06 (<i>p</i> = .65)	-.24 (<i>p</i> = .06)	-.04 (<i>p</i> = .76)	1.0		
“Using small packages...” ^e	-.25 (<i>p</i> = .04)	.38 (<i>p</i> < .01)	.06 (<i>p</i> = .65)	-.03 (<i>p</i> = .84)	-.16 (<i>p</i> = .19)	.55 (<i>p</i> < .01)	1.0	
“Using resealable packages...” ^e	-.07 (<i>p</i> = .58)	.16 (<i>p</i> = .19)	.00 (<i>p</i> = .98)	-.31 (<i>p</i> = .01)	.09 (<i>p</i> = .46)	.24 (<i>p</i> = .06)	.43 (<i>p</i> < .01)	1.0

^a Higher coefficients indicate preference for store brand; coding of variables in regression: Oscar Mayer or Tyson = 1, store brand = 0

^b Higher coefficients indicate preference for small packages; coding of variables: one 16 oz. package = 1, two 8 oz. packages = 0

^c Higher coefficients indicate preference for Tyson or store brand; coding of variables: Oscar Mayer = 1, Tyson and store brand = 0

^d Higher coefficients indicate preference for nonresealable packages; coding of variables: resealable packages = 1, nonresealable packages = 0

^e Responses were reported using a 1-7 scale where 1 = disagree, 7 = agree

APPENDIX D
CORRELATIONS AMONG COEFFICIENTS AND SELF-REPORT MEASURES (STUDY 2)

Ready-to-Eat Cereals	Coefficient for Brand Reputation	Coefficient for Size	Coefficient for Brand	Coefficient for Quality	Servings Per Week	“Problem with stale”	“Using small boxes”	“Using freshness bags”
Coefficient for Brand Reputation ^a	1.0							
Coefficient for Size ^b	-.15 (<i>p</i> = .05)	1.0						
Coefficient for Brand ^c	-.48 (<i>p</i> < .01)	-.02 (<i>p</i> = .85)	1.0					
Coefficient for Quality of Package ^d	.06 (<i>p</i> = .44)	.24 (<i>p</i> < .01)	-.02 (<i>p</i> = .77)	1.0				
Number of Servings Per Week	-.05 (<i>p</i> = .51)	.12 (<i>p</i> = .14)	-.01 (<i>p</i> = .97)	.13 (<i>p</i> = .08)	1.0			
“Have problem with cereals getting stale” ^e	-.18 (<i>p</i> < .05)	-.04 (<i>p</i> = .57)	.12 (<i>p</i> = .12)	-.28 (<i>p</i> < .01)	-.08 (<i>p</i> = .31)	1.0		
“Using small boxes...” ^e	-.11 (<i>p</i> = .15)	.07 (<i>p</i> = .39)	.02 (<i>p</i> = .79)	-.16 (<i>p</i> < .05)	-.16 (<i>p</i> < .05)	.36 (<i>p</i> < .01)	1.0	
Using freshness bags...” ^e	-.16 (<i>p</i> < .05)	-.06 (<i>p</i> = .43)	.11 (<i>p</i> = .14)	-.15 (<i>p</i> = .06)	-.15 (<i>p</i> = .06)	.24 (<i>p</i> < .01)	.42 (<i>p</i> < .01)	1.0

^a Higher coefficients indicate preference for store brand; coding of variables: General Mills or Kellogg’s = 1, store brand = 0

^b Higher coefficients indicate preference for small packages; coding of variables: 30 oz. box with one bag or 30 oz. box with two bags = 1, two 15 oz. boxes = 0

^c Higher coefficients indicate preference for Kellogg’s or store brand; coding of variables: General Mills = 1, Kellogg’s and store brand = 0

^d Higher coefficients indicate preference for lower quality packages; coding of variables: 30 oz. box with 2 bags or two 15 oz. boxes = 1, one 30 oz. box = 0
^e Responses were reported using a 1-7 scale where 1 = disagree, 7 = agree

Cold Cuts	Coefficient for Brand Reputation	Coefficient for Size	Coefficient for Brand	Coefficient for Quality	Servings per Week	“Problem with freshness”	“Using small packages”	“Using resealable packages”
Coefficient for Brand Reputation ^a	1.0							
Coefficient for Size ^b	-.35 (<i>p</i> < .01)	1.0						
Coefficient for Brand ^c	-.29 (<i>p</i> < .01)	.11 (<i>p</i> = .15)	1.0					
Coefficient for Quality ^d	.21 (<i>p</i> < .01)	-.44 (<i>p</i> < .01)	.06 (<i>p</i> = .44)	1.0				
Servings Per Week	.13 (<i>p</i> = .10)	-.09 (<i>p</i> = .27)	-.05 (<i>p</i> = .49)	.12 (<i>p</i> = .12)	1.0			
“Have a freshness problem with cold cuts” ^e	-.06 (<i>p</i> = .43)	.21 (<i>p</i> < .01)	-.07 (<i>p</i> = .35)	-.20 (<i>p</i> < .01)	.08 (<i>p</i> = .33)	1.0		
“Using small packages...” ^e	-.06 (<i>p</i> = .43)	.20 (<i>p</i> = .01)	-.03 (<i>p</i> = .70)	-.06 (<i>p</i> = .41)	.07 (<i>p</i> = .34)	.30 (<i>p</i> < .01)	1.0	
“Using resealable packages...” ^e	-.11 (<i>p</i> = .15)	.06 (<i>p</i> = .44)	.04 (<i>p</i> = .61)	-.18 (<i>p</i> = .02)	.01 (<i>p</i> = .91)	.20 (<i>p</i> = .01)	.38 (<i>p</i> < .01)	1.0

^a Higher coefficients indicate preference for store brand; coding of variables in regression: Oscar Mayer or Tyson = 1, store brand = 0

^b Higher coefficients indicate preference for small packages; coding of variables: one 16 oz. package = 1, two 8 oz. packages = 0

^c Higher coefficients indicate preference for Tyson or store brand; coding of variables: Oscar Mayer = 1, Tyson and store brand = 0

^d Higher coefficients indicate preference for nonresealable packages; coding of variables: resealable packages = 1, nonresealable packages = 0

^e Responses were reported using a 1-7 scale where 1 = disagree, 7 = agree

REFERENCES

- Adams, William J. and Janet L. Yellen (1976), "Commodity Bundling and the Burden of Monopoly," *Quarterly Journal of Economics*, 90 (3), 475-98.
- Agrawal, Jagdish, Pamela E. Grimm and Narasimhan Srinivasan (1993), "Quantity Surcharges on Groceries," *Journal of Consumer Affairs*, 27 (2), 335-56.
- Ailawadi, Kusum L. and Bari Harlam (2004), "An Empirical Analysis of the Determinants of Retail Margins: The Role of Store-Brand Share," *Journal of Marketing*, 68 (January), 147-165.
- Berry, Leonard L., Kathleen Seiders and Dhruv Grewal (2002), "Understanding Service Convenience," *Journal of Marketing*, 66 (July), 1-17.
- Betancourt, Roger R. (2004), *The Economics of Retailing and Distribution*. London: Edward Elgar Publishing, Ltd.
- Borzekowski, Ron, Raphael Thomadsen and Charles Taragin (2005), "Competition and Price Discrimination in the Market for Mailing Lists," Finance and Economics Discussion Series 2005-56. Washington: Board of Governors of the Federal Reserve System.
- Carroll, Kathleen and Dennis Coates (1999), "Teaching Price Discrimination: Some Clarification," *Southern Economic Journal*, 66 (October), 466-480.
- Cohen, Andrew (2000), "Package Size and Price Discrimination in Paper Towels," unpublished working paper, University of Virginia, Charlottesville, VA.
- Ding, Min, Rajdeep Grewal and John Liechty (2005), "Incentive-Aligned Conjoint Analysis," *Journal of Marketing Research*, 42 (February), 68-82.
- Erdem, Tulin and Joffre Swait (2004), "Brand Credibility, Brand Consideration and Choice," *Journal of Consumer Research*, 31 (June), 191-198.
- Gerstner, Eitan and James D. Hess (1987), "Why Do Hot Dogs Come in Packs of 10 and Buns in 8s or 12s? A Demand-Side Investigation," *Journal of Business*, 60 (October), 491-517.
- Green, Paul E. and Vithala Rao (1971), "Conjoint Measurement for Qualifying Judgemental Data," *Journal of Marketing Research*, 3 (August), 355-363.

- Green, Paul E. and V. Srinivasan (1978), "Conjoint Analysis in Consumer Research: Issues and Outlook," *Journal of Consumer Research*, 5 (September), 103-123.
- Green, Paul E. and V. Srinivasan (1990), "Conjoint Analysis in Marketing: New Developments with Implications for Research and Practice," *Journal of Marketing*, 54 (October), 3-19.
- Khan, Romana J. and Dipak C. Jain (2005), "An Empirical Analysis of Price Discrimination Mechanisms and Retailer Profitability," *Journal of Marketing Research*, 42 (November), 516-524.
- Pepall, Lynne, Daniel J. Richards, George Norman (1999). *Industrial Organization: Contemporary Theory and Practice*. Cincinnati, OH: Southwestern College Publishing.
- Sayman, Serdar, Stephen J. Hoch and Jagmohan S. Raju (2002), "Positioning of Store Brands," *Marketing Science*, 21 (4), 378-397.
- Scott Morton, Fiona and Florian Zettelmeyer (2004), "The Strategic Positioning of Store Brands in Retailer-Manufacturing Negotiations," *Review of Industrial Organization*, 24 (2), 161-194.
- Sprott, David E., Kenneth C. Manning and Anthony D. Miyazaki (2003), "Grocery Price Setting and Quantity Surcharges," *Journal of Marketing*, 67 (July), 34-46.
- Stremers Stefan and Gerard J. Tellis (2002), "Strategic Bundling of Products and Prices: A New Synthesis for Marketing," *Journal of Marketing*, 66 (January), 55-72.
- Tirole, Jean (1988). *The Theory of Industrial Organization*. Cambridge, MA: The MIT Press.
- Varian, Hal R. (2006). *Intermediate Microeconomics*. New York: W.W. Norton & Company.

TABLE 1
CLASSIFICATION OF PARTICIPANTS BASED ON COEFFICIENTS FOR BRAND REPUTATION
AND PACKAGE SIZE (PILOT STUDY)

Package size	Brand Reputation	
	High	Low
Small	23	2
Large	53	14

N = 92 participants.

TABLE 2
CORRELATIONS AMONG COEFFICIENTS AND SELF-REPORT MEASURES
(PILOT STUDY)

	Coefficient for Brand Reputation	Coefficient for Size	Coefficient for Brand	Servings Per Week	“Problem with flatness”	“Using small bottles”
Coefficient for Brand Reputation ^a	1.0					
Coefficient for Package Size ^b	-.33 (<i>p</i> < .01)	1.0				
Coefficient for Brand ^c	-.83 (<i>p</i> < .01)	.15 (<i>p</i> = .15)	1.0			
Servings Per Week	-.27 (<i>p</i> = .01)	.05 (<i>p</i> = .63)	.19 (<i>p</i> = .07)	1.0		
“Have a problem with flatness” ^d	-.11 (<i>p</i> = .30)	.22 (<i>p</i> = .04)	.05 (<i>p</i> = .63)	.19 (<i>p</i> = .07)	1.0	
“Using small bottles prevents flatness” ^d	-.28 (<i>p</i> = .01)	.30 (<i>p</i> < .01)	.16 (<i>p</i> = .13)	-.06 (<i>p</i> = .58)	.04 (<i>p</i> = .68)	1.0

^a Higher coefficients indicate preference for low reputation brand; coding of variables: Coke or Pepsi = 1, RC = 0 (dependent variables are ranks, 1 = most preferred, 9 = least preferred)

^b Higher coefficients indicate preference for small packages; coding of variables: 2 liter bottle = 2, two 1 liter bottles = 1, four .5 liter bottles = 0

^c Higher coefficients indicate preference for Pepsi or RC; coding of variables: Coke = 1, Pepsi and RC = 0

^d Responses were reported using a 1-7 scale where 1 = disagree, 7 = agree

TABLE 3
 CLASSIFICATION OF PARTICIPANTS BASED ON COEFFICIENTS
 FOR BRAND REPUTATION, PACKAGE SIZE AND PACKAGE QUALITY
 FOR READY-TO-EAT CEREALS (STUDY 1)

Brand Reputation	Low Quality Package		High Quality Package		Low Quality Package ^a	High Quality Package ^a	Large Package ^b	Small Package ^b
	Large Package	Small Package	Large Package	Small Package				
High	27	9	16	1	36	17	43	10
Low	11	0	1	1	11	2	12	1

N = 66 participants.

^a Totals in the Low (High) Quality Package column are summed across Small Package and Large Package columns.

^b Totals in the Large (Small) Package column are summed across Low Quality Package and High Quality Package columns.

TABLE 4
 CLASSIFICATION OF PARTICIPANTS BASED ON COEFFICIENTS
 FOR BRAND REPUTATION, PACKAGE SIZE AND PACKAGE QUALITY
 FOR COLD CUTS (STUDY 1)

Brand Reputation	Low Quality Package		High Quality Package		Low Quality Package ^a	High Quality Package ^a	Large Package ^b	Small Package ^b
	Large Package	Small Package	Large Package	Small Package				
High	11	1	12	18	12	30	23	19
Low	6	0	12	6	6	18	18	6

N = 66 participants.

^a Totals in the Low (High) Quality Package column are summed across Small Package and Large Package columns.

^b Totals in the Large (Small) Package column are summed across Low Quality Package and High Quality Package columns.

TABLE 5
 SENSITIVITY TO BRAND REPUTATION, PACKAGE SIZE AND PACKAGE QUALITY ACROSS
 PRODUCT CATEGORIES (STUDY 1)

	Brand Reputation		Package Size		Package Quality	
	Yes	No	Yes	No	Yes	No
Cold Cuts	35	8	3	22	13	35
Yes	35	8	3	22	13	35
No	17	6	9	32	6	12
McNemar's test result	$p = .11$		$p < .05$		$p < .001$	

$N = 66$ participants.

TABLE 6
 CLASSIFICATION OF PARTICIPANTS BASED ON COEFFICIENTS
 FOR BRAND REPUTATION, PACKAGE SIZE AND PACKAGE QUALITY
 FOR READY-TO-EAT CEREALS (STUDY 2)

CEREALS	Brand Reputation (Price)	Low Quality Package		High Quality Package		Low Quality ^a	High Quality ^a	Large Package ^b	Small Package ^b
		Large Package	Small Package	Large Package	Small Package				
Short Horizon	High	36	6	10	5	42	15	46	11
	Low	13	5	6	0	18	6	19	5
Long Horizon	High	27	4	18	4	31	22	45	8
	Low	20	1	10	5	21	15	30	6

N = 170 participants.

^a Totals in the Low (High) Quality Package column are summed across Small Package and Large Package columns.

^b Totals in the Large (Small) Package column are summed across Low Quality Package and High Quality Package columns.

TABLE 7
 CLASSIFICATION OF PARTICIPANTS BASED ON COEFFICIENTS
 FOR BRAND REPUTATION, PACKAGE SIZE AND PACKAGE QUALITY
 FOR COLD CUTS (STUDY 2)

CUTS	Low Quality Package		High Quality Package		Low Quality ^a	High Quality ^a	Large Package ^b	Small Package ^b	
	Brand Reputation (Price)	Large Package	Small Package	Large Package	Small Package				
Short Horizon	High	6	3	15	31	9	46	21	34
	Low	10	4	5	7	14	12	15	11
Long Horizon	High	7	2	14	28	9	42	21	30
	Low	16	0	13	9	16	22	29	9

N = 170 participants.

^a Totals in the Low (High) Quality Package column are summed across Small Package and Large Package columns.

^b Totals in the Large (Small) Package column are summed across Low Quality Package and High Quality Package columns.

TABLE 8
 SENSITIVITY TO BRAND REPUTATION, PACKAGE SIZE AND PACKAGE QUALITY ACROSS
 PRODUCT CATEGORIES (STUDY 2)

	Brand Reputation		Package Size		Package Quality	
	Cereals		Cereals		Cereals	
Cold Cuts	Yes	No	Yes	No	Yes	No
Yes	84	22	16	68	49	73
No	26	38	14	72	9	39
McNemar's test result	$p = .66$		$p < 0.001$		$p < 0.001$	

$N = 170$ participants.