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Can Package Size Accelerate Usage Volume?

Packaging influences usage behavior long after it has influenced purchase. Managers of consumer packaged goods and public policy officials have, therefore, questioned whether a package's size influences usage volume. Although often assumed, it has never been supported. Four laboratory studies and a final study in a Laundromat identify circumstances in which larger package sizes encourage greater use than do smaller package sizes. Unit cost is a key factor mediating this relationship. After noting useful implications for decisions regarding package size portfolios, sales promotions, and public policy, the author concludes by identifying other important but overlooked factors that increase usage volume and provide research opportunities.

Increased competition is forcing brand managers of consumer goods to alter the portfolio of the package sizes they offer (Elliott 1993). In making these decisions, managers are beginning to speculate whether larger package sizes accelerate a consumer's usage volume of particular products. Indeed, a recent memo distributed within a large packaged goods company encouraged brand managers to "rethink how package sizes and shapes influence (pouring) volume" before making package-related decisions in their product line. In effect, the interest of these managers is shifting from how consumers *choose* brands to how they *use* them (Wansink 1994a).

Although some managers assume that larger package sizes encourage consumers to use more (per usage occasion) than smaller package sizes, the support is only anecdotal and these assumptions are becoming a source of controversy. Managers are interested in selling more of a product, whereas public policy officials are interested in decreasing the amount that a consumer wastes (Shapiro 1993). At the center of this issue is the relationship between package size and usage volume. My aim here is to help clarify this issue by (1) empirically determining whether package size has an impact on the usage volume of branded products and (2) investigating the reasons for any such impact.

Folkes, Martin, and Gupta (1993) suggest that compared to small packages, one reason large packages might be expected to encourage greater use is because consumers would be less concerned about running out of the product. The greater the supply of a product (e.g., large package), the lower the transaction (replacement) costs for using the product and the greater the volume people are willing to use (Lynn 1992; Worchel, Lee, and Adewole 1975). Another possible reason that has not yet been investigated is that unit costs often vary inversely with package size. Because products from large packages are generally less expensive (per unit) than those from small packages, they may be used in greater volume. Understanding why package size might accelerate usage has important marketing mix implications. If any usage-related differences are caused by unit cost perceptions, there are pricing and promotion implications. If they instead are caused by supply perceptions, there are package size and multipack implications.

With usage variant products it is hypothesized that package size has a positive impact on product usage that can at least be partially explained by differences in unit costs.[1] I systematically test this notion in four laboratory studies and one field study by isolating the hypothesized effect of unit costs on usage volume from effects that could instead be misattributed to other explanations, such as supply. I then discuss implications for decisions regarding package size portfolios, sales promotions, and public policy. I conclude by identifying product-related, situation-related, and packaged-related factors that increase usage volume and provide further research opportunities.

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[1] *Usage variant* products have elastic demand functions because they have a high degree of substitutability or are able to create their own demand when salient. These products' usage volumes are most affected by package size, and they are likely to include most foods and household cleaning products (70% of consumers use a quantity different from the amount recommended—Friedman 1988). *Usage invariant* products, in contrast, have price insensitive demand functions and are unlikely to be affected by package size differences. These include most personal care products, such as toothpaste and contact lens cleaner, and products with negative consequences to overuse, such as medicines, some solvents, and certain cooking ingredients.

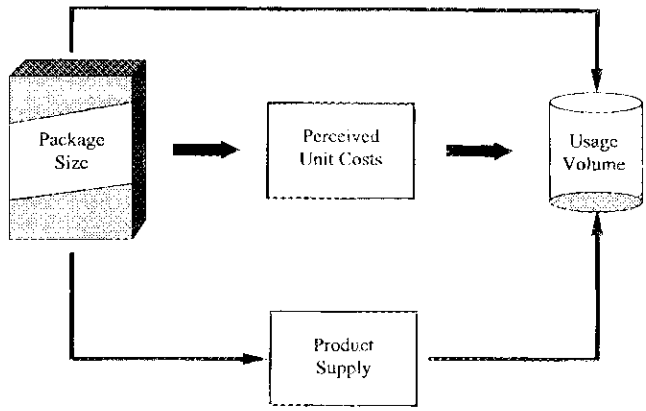
Background

Although no research has shown that package size directly influences usage volume, there is much folk wisdom and many anecdotes as to why researchers expect such a relationship. Such notions range from suggesting that large-size packages are more difficult to control and are subject to overpouring (Stewart 1994) to suggesting that people are more willing to "finish-up" large-size packages because they take up too much space in household inventory (Hendon 1986).

A common explanation that has been offered emphasizes the transaction (replacement) costs associated with replacing a depleted product. If depleting a product necessitates an inconvenient trip to the store (or to the pantry), consumers might use smaller packages more sparingly than larger ones. This is consistent with findings that suggest that scarce resources are conserved because they are overvalued (Lynn 1989, 1992; Worchel, Lee, and Adewole 1975) and less immediately accessible (Brock and Brannon 1992). In a package context, the greater the supply of a product (i.e., large packages), the lower the transaction costs for using the product and the greater volume people are willing to use.

Another explanation that has been largely overlooked is that any such package size effects may be attributable to unit cost differences. The *unit cost explanation* is as follows: If larger packages have lower unit costs than smaller packages, they should be used more freely. When considering usage variant products, any factor that decreases the perceived unit cost of that product should correspondingly increase usage (cf. Becker 1987). Package size is one such factor. Large packages are perceived as having lower unit costs than medium-size packages, and medium-size packages are perceived as having lower unit costs than small packages.[2] As a result, if lower unit costs are associated with large packages, large packages should stimulate greater usage volume than small packages. There should be, however, an eventual point of satiation, at which usage volume levels off (Boice 1984).

FIGURE 1
The Impact of Package Size on Usage Volume



I hypothesize that larger packages encourage greater usage volume (per usage occasion) than smaller packages and that a portion of this usage is influenced by the perceived unit cost of the product. It is likely, however, that usage volume is influenced by several different factors (see Figure 1). To investigate two of these factors—unit costs and product supply—four laboratory studies and one field study were conducted. Study 1 directly tests whether package size increases usage volume. By controlling the fill-level (supply) of differently sized packages, I investigate whether package size has an impact on usage that is independent of supply. This is a key departure from supply studies, because it disentangles the confound between package size and supply. Study 2 indirectly tests the unit cost hypothesis by determining if there is a package size effect for bottled water but not for tap water (a product perceived as "free"). Study 3 directly manipulates unit costs (i.e., sales-priced versus regular-priced) to determine whether they have an independent impact on usage. Study 4 examines the extent to which this relationship is curvilinear as packages become larger. In Study 5, I demonstrate the differential effect of package size on usage variant and usage invariant products in a field study at a Laundromat.

Study 1: The Effect of Package Size and Fill Level on Usage Volume

If large package sizes are associated with lower unit costs, which in turn influence usage volume, then this relationship must exist even when I control for supply. For instance, suppose one person pours a liquid cleaner from a half-full two-liter bottle and a second person pours from a full one-liter bottle. Although both bottles have the same amount of liquid in them (one liter), the person pouring from the half-full two-liter bottle should be less concerned about the cost of pouring a given volume of liquid and should, therefore, pour

[2]Although it is assumed that larger packages are perceived as having lower unit costs than smaller packages of the same product, both consumer perceptions and the empirical reality of this were investigated. Empirical support was found by examining the regular prices of 21 national brands in 21 different product categories across three grocery stores located in Menlo Park, California; Sioux City, Iowa; and West Lebanon, New Hampshire. The 21 brands represented a convenience sample of products that could be purchased in three package sizes and were available at all three stores. For 19 of the 21 brands, the large package was less expensive per unit than the medium package. For 21 of the 21 brands, the medium package was less expensive per unit than the small package.

The assumption that larger packages are perceived to have lower unit costs than smaller ones was also supported by a study with 83 consumers. Consumers recruited through Parent-Teacher Associations in New Hampshire were shown these 21 brands and asked to estimate the price of each across three different sizes. Unit prices were calculated from their estimates. For 20 of the 21 products, consumers estimated (at the $p < .01$ level) that the large package was less expensive per unit than the medium package. For all 21 products, consumers estimated (at the $p < .01$ level) that the price of the medium package was less expensive per unit than the small package. Although a perfect inverse relationship between package size and unit cost may not be consistent across all sizes of all packaged goods products in all countries, segments of consumers have this perception in the United States. These perceptions are important because they indicate that a unit cost heuristic may be available for consumers to evoke when they are using a branded product with which they are familiar.

a greater volume. In contrast, if the same amount of liquid is poured from both bottles, I would conclude that package size has no independent impact on usage and operates only by altering the product's supply level.

Study 1 tests the hypothesis that the larger a package's size, the greater the volume a person uses on a given occasion. This is accomplished by altering package size while holding the total supply of the product constant. In all of the reported studies, I investigate familiar brands in regularly used product categories.[3]

Method and Procedure

Adult subjects were recruited through Parent-Teacher Associations (PTAs) in New Hampshire and Vermont, and $6 were donated to the respective organization for each of the 98 women who participated. Two different products (Crisco oil and Creamette brand spaghetti) in two different sizes were selected for the study. In both cases, the larger package held twice as much of the product as the smaller package. The supply for each brand was held constant by leaving the smaller package full and by using only half of the larger package. The volume of each product was determined by the size of the package in which each was sold.

The design of the study is a 2 × 1 between-subjects design in which package size is manipulated (small or large) and volume is held constant. Each subject was randomly assigned to use either a small or large package. Two products were used for generalizability, and the pattern of results was expected to be similar for both products.

In individual meetings, each subject was told that some basic home economics–related information about two different types of products were being collected. The subject was then led to one of four isolated cubicles in which there was one of the two products in one of the two package size conditions. The research assistant assigned to each cubicle was blind to the purpose of the study. When the subject arrived, the research assistant read a scenario involving the use of the product (Crisco brand oil: "You are frying a chicken dinner for yourself and another adult"; Creamette brand spaghetti: "You are making spaghetti for yourself and another adult"). The subject was asked to show how much of the product she would use in this situation and then how much money that use of the product would entail. (This estimate was divided by the number of units she had used, and the resulting number was used to represent the inferred unit cost for that particular product. Although it is uncertain that consumers can accurately estimate such costs, the relative magnitude of their difference is of greater interest than their accuracy, per se.) After the subject left the cubicle, the volume of intended use was measured for the product. The procedure was repeated for all subjects.[4] In the studies reported here, subjects were neither encouraged nor discouraged from reading the instructions on the package. Few, however, appeared to read them.

TABLE 1
The Effect of Package Size and Fill Level on Usage Volume[a]

Products	Volume Used (standard deviations in parentheses)	
	Small Package (full)	Large Package (half-full)
Crisco brand oil (milliliters)	99 (68)	122* (83)
Creamette brand spaghetti (strands)	234 (131)	302* (136)

[a]Total supply is held constant. Both small packages and large packages contained the same volume of oil or spaghetti.
*Difference poured between the small and large package is significant at the $p < .05$ level.

Study 1 focuses on what people do during their first pour of a product. The dependent measure is the volume of the product each subject indicated she would use. Subjects indicated their use of oil by pouring it into a frying pan; they indicated their use of spaghetti by placing it in a large (dry) pot. The volume of oil they used was measured by pouring the liquid into a narrow beaker. The volume of spaghetti was measured by holding the strands together and measuring the circumference with a tape measure; a table was developed that enabled this circumference to be directly translated to a close approximation of an individual count.

Results and Discussion

As is indicated in Table 1, the hypothesis that the larger a package's size, the more of a product a person uses was confirmed across both products. A t-test for the oil indicates that there was a difference between the usage of the small and large packages (99 versus 122 milliliters; $t_{96} = 2.3$; $p < .05$), even though each contained the same supply of oil. Similar results were found for the differences in spaghetti usage across the small and large packages (234 versus 302 strands; $t_{96} = 2.6$; $p < .05$). Package size accounted for a statistically significant percentage of the usage variance of both oil ($R^2 = .072$; $F_{(1,96)} = 4.9$) and spaghetti ($R^2 = .068$; $F_{(1,96)} = 4.5$).

An inferred measure of unit cost was calculated by dividing each subject's cost estimate for the volume she used by the number of units (e.g., milliliters of oil or strands of spaghetti) she used. As is consistent with the unit cost hypothesis, subjects believed that the per unit cost of the large package was less expensive than that of the small. This was true for both the oil ($t_{96} = 2.2$; $p < .05$) and the spaghetti ($t_{96} = 2.9$; $p < .05$).

[3]The use of branded, regularly-used products can be distinguished from the unbranded bottles of toilet cleaner that Folkes, Martin, and Gupta (1993) asked college students to pour. In effect, if unit cost mediates the relationship between package size and usage volume, researchers are most likely to see a package size effect with regular users of a category who are using a branded product for which they can infer unit costs.

[4]A detailed description of the procedures for all the studies and copies of the measurement instruments are available from the author.

Study 2: The Effect of Package Size and Unit Cost on Usage Volume

The results from Study 1 show a positive relationship between package size and usage volume and an inverse relationship between package size and inferences about unit costs. Study 2 directly tests the hypothesis that the lower the unit cost of a product, the higher is the usage volume. To examine this hypothesis, both unit cost and package size were manipulated to determine whether unit costs have an independent impact on usage beyond what can be attributed to package sizes. Package size is manipulated directly, whereas unit costs are manipulated indirectly by examining one product with variable unit costs (Acme brand bottled water) and one perceived as having fixed unit costs of zero (tap water).

The ideal product to use in this study would be one that is perceived as having a constant price per milliliter but is not perceived as being free. Nonetheless, for the purposes of this study, using a free product (tap water) still enables me to test the basic hypothesis that package size does not itself directly influence usage. I expect that subjects use the same amount of tap water regardless of the size of container[5] from which it is poured but that they use more bottled water when pouring from a two-liter bottle than when pouring from a one-liter bottle.

I also examine a competing hypothesis that people pour more from large packages than from small packages because they use a package's size as an "anchor" (cf. Brown 1953), thereby finding it perceptually congruent to pour more from larger packages. According to this competing perceptual congruity notion, the volume a person pours is proportional to the size of the accompanying package. If differences in usage are only found with bottled water, then this is consistent with a unit cost explanation. Conversely, if differences are found both with bottled water and tap water, then this result is instead consistent with a package size explanation. I predict that a package's size will not influence the use of a product that has no differences in unit cost across package size (e.g., tap water).

Method and Procedure

Adult subjects were recruited from PTAs in Philadelphia, with $4.50 donated to the respective PTA for each of the 126 women who participated. These subjects had not been involved in any other study of this nature. The 2 × 2 between-subjects design directly manipulated package size (one-liter versus two-liter) and indirectly manipulated unit cost (bottled water versus tap water). These products were chosen because (1) they are similar, (2) bottled water has (as do all bottled drinks) a significant cost-per-milliliter difference between one- and two-liter sizes (ratios of the regularly priced products are .067¢ and .045¢ per milliliter), and (3) tap water has no perceived cost per milliliter difference at the residential level.

As in Study 1, subjects were told that some basic home economics–related information about different topics were being collected. Each subject was randomly assigned to one of the four conditions noted previously and was told, "Imagine that when you get home this afternoon, you go to the refrigerator and take out a container of bottled water (tap water) to pour yourself a drink. To make it easier to pour we've put the water in a pitcher. This afternoon when you get home, how much will you pour?" Efforts were taken to emphasize the source of the water that was in the pitcher. The two pouring stations for the tap water condition were each situated next to a sink and faucet. The two stations for the bottled water condition were accompanied with either an empty one- or two-liter bottle of Acme brand bottled water.

As the directions were being explained, the subject was given a pitcher of water and a large (840 milliliter) clear drinking glass. (The drinking glass was large enough to not constrain how much the subjects could pour.) After she finished pouring the water, each subject was asked how much she thought the amount of water that she poured would cost and how many ounces she believed she had poured. Although the results of all the studies are measured and reported in milliliters, a pilot test indicated that ounces were easier for subjects to estimate accurately than were milliliters.

Results and Discussion

As a manipulation check, the unit cost difference between the one- and two-liter bottles of water was perceived as significantly different (.020¢ per milliliter versus .016¢ per milliliter; $t_{60} = 4.6$; $p < .01$), whereas tap water was perceived as essentially free. Therefore, altering the product was an effective way of manipulating perceptions of unit costs.

An ANOVA was conducted across package size and product. The overall model is significant ($F_{1,123} = 7.8$; $p < .05$), and the results (see Table 2) support the expectation that package or container size influences the usage volume for bottled water but not for tap water. This package size-by-product interaction was significant ($F_{1,123} = 4.6$; $p < .05$).

TABLE 2
The Effect of Package Size and Unit Cost on Usage Volume

Products	Volume Poured (milliliters) (standard deviations in parentheses)	
	1000 Pitcher	2000 Pitcher
Volume Poured		
Tap water	376 (50)	387 (75)
Acme brand bottled water	355 (84)	410* (86)
Perceived Volume Poured		
Tap water	452 (70)	463 (111)
Acme brand bottled water	427 (93)	494* (105)

*Difference poured between the 1000 milliliter and the 2000 milliliter pitcher is significant at the $p < .05$ level.

[5]This study involves different size containers (pitchers) of water. To be consistent with the other studies, I refer to these containers as *packages*.

The usage volume of bottled water increased as the package size increased (from 355 milliliters to 410 milliliters), whereas the usage volume of tap water remained similar across both sizes of pitchers (from 376 milliliters to 387 milliliters). Planned contrasts showed these usage differences were statistically significant for bottled water ($F_{1,123} = 4.1$; $p < .05$) but not for tap water ($F_{1,123} = 0.2$; ns).[6] Package size accounted for 8.3% ($F_{1,123} = 4.7$) of the variance in usage of the bottled water.

Do consumers intentionally pour more from larger packages? Not only did subjects pour more from the two-liter pitcher of bottled water than from the one-liter pitcher, but they also believed they had poured more (494 milliliters versus 427 milliliters; $F_{1,123} = 4.3$; $p < .05$). Furthermore, the cost of what they had perceived as having poured was relatively similar across both the large and small pitchers (20.8¢ versus 23.1¢). Such findings are consistent with the notion that subjects are aware that they are using more from larger packages, and these findings are inconsistent with the notion that consumers simply pour more because of the perceptual congruity associated with large packages.

A test of mediation (Baron and Kenny 1986) indicated that the amount of bottled water a subject poured was mediated by the unit cost she inferred for the product. Although package size is significantly related to the usage volume of bottled water ($F_{1,123} = 7.8$; $p < .05$), so is the unit cost of the products ($F_{1,123} = 9.1$; $p < .01$). When unit cost is added to the ANOVA along with package size, the effect for package size is no longer significant ($F_{1,123} = .8$; ns), and the unit cost variable remains significant ($F_{1,123} = 8.4$; $p < .01$). This is consistent with the notion that package size influences usage volume because consumers believe that large packages are less expensive to use.

There are two primary conclusions from these results. First, in combination with Study 1, the results provide further support that larger packages encourage greater usage. Second, these results are consistent with the notion that this association between package size and usage volume may be influenced by the inferences a person makes about unit costs. That is, when a relatively costless item (tap water) is examined, package size had no impact on usage. This suggests that a packages' unit cost can affect usage volume independently of the package size itself.

Study 3: The Effect of Package Size and Price Promotions on Usage Volume

Studies 1 and 2 show that increasing a package's size can increase usage volume and that these larger packages are associated with lower unit costs. If unit costs are indeed driving usage, any direct alteration of them should alter usage volume also. One way they can be manipulated is through price promotions. For example, if people believe they have purchased a liquid cleaner at a sizable price discount, they should use more of it than if they did not believe it to be discounted. The primary objective of Study 3, therefore, is to test directly a variation of the hypothesis that was examined in Study 2. I hypothesize that the usage volume of a product increases if it is perceived as being a low-priced product. Along with Study 2, a secondary objective of this study is to eliminate the counter hypothesis that people pour more from large containers simply because these containers are more unwieldy and difficult from which to pour.

Method and Procedure

Adult subjects were recruited through PTA groups in New Hampshire, with $6.50 donated to the respective organization for each of the 203 group members who participated. A 2 × 2 between-subjects design was specified that varied sales promotion (regular price, sale price) and package size (small package, large package). To increase the generalizability of the findings, each subject was exposed to stimuli for Mr. Clean brand cleaner, Clorox brand bleach, and Crisco brand oil. The order of exposure to the three products was varied to eliminate any order bias.

Recall that one potential explanation of the package size–usage volume relationship is that large packages may simply be more unwieldy and difficult from which to pour. To address the possibility that package size effects may simply represent "overpouring," a different method was employed for this study. Instead of actually pouring the product, subjects were shown a full-size photograph of the product. Price promotion information was made salient by an on-package coupon involving a 50% discount (along with the dollar savings). In the photograph, there was a glass container next to the product.

As in Studies 1 and 2, subjects were told that some basic home economics–related information about different types of products were being collected. Subjects were then asked to read the instructions and indicate how much of the product they might use by drawing a line at the appropriate level on the photograph of the glass container. The instructions presented scenarios that involved washing a full load of unstained white clothes (for Clorox brand bleach), cleaning a kitchen floor (for Mr. Clean brand cleaner), and frying chicken (for Crisco brand oil). After completing this task for all three products, subjects were asked to estimate how much each of these amounts would cost and how many times they had used each of these three product categories over the last month.

To determine if this method presented any serious methodological biases, it was pretested with 22 subjects who had been exposed to photographs of Crisco brand oil. The estimates of how much they would use were similar to the amounts of Crisco brand oil that subjects had actually poured in Study 1. From these results, I concluded that the Study 3 method would enable me to determine whether price promotions had the potential to stimulate greater usage volume.

[6]These results are consistent with a similar study involving Diet Pepsi and tap water (Wansink 1995, pp. 9–12). The usage volume of Diet Pepsi increased as package size increased (from 231 milliliters to 334 milliliters), but the usage volume of tap water remained similar across both size containers (from 352 milliliters to 317 milliliters). These usage differences were statistically significant for Diet Pepsi ($F_{1,71} = 4.8$; $p < .05$) but not for tap water ($F_{1,65} = .8$; $p > .20$). The statistical significance of this interaction ($F_{1,131} = 4.5$; $p < .05$) also was consistent with what was found in Study 2.

TABLE 3
The Effect of Package Size and Price Promotions on Usage Volume

Products	Package Size		F-Values (d.f. 1, 199)			
	x	2x	Overall F-Value	Package Size Effect	Promotion Effect	Package Size × Promotion
	Volume Poured (milliliters)					
Mr. Clean brand cleaner[a]						
Sale price	204 (195)	216 (166)	7.4*	4.8*	3.8*	4.2*
Regular price	150 (121)	215 (142)				
Crisco brand oil						
Sale price	139 (102)	141 (95)	6.9*	3.9*	4.6*	4.7*
Regular price	105 (72)	137 (142)				
Clorox brand bleach						
Sale price	192 (133)	186 (121)	1.3	1.2	1.7	2.2
Regular price	176 (186)	190 (127)				

*$p < .05$.
[a]Package sizes: Mr. Clean brand cleaner—414 milliliters and 828 milliliters.
Crisco brand oil—472 milliliters and 944 milliliters.
Clorox brand bleach—289 milliliters and 578 milliliters.

Results and Discussion

It is believed that the unit cost of a product can affect usage volume. The last two studies manipulated this indirectly by altering package size. In Study 3, I directly manipulated unit cost by comparing sale-priced bottles to regular-priced ones. If unit costs influence usage, I expect that subjects will pour more from a sale-priced bottle than from a regularly-priced bottle. The results of this study confirm this hypothesis for two of the three products.

As the means in Table 3 indicate, subjects poured more from sale-priced bottles than from regular-priced bottles for both Mr. Clean brand cleaner ($F_{1,199} = 3.8$; $p < .05$) and Crisco brand oil ($F_{1,199} = 4.6$; $p < .05$). This is consistent with the notion that unit costs can have a direct impact on usage intentions. The effect of price on usage volume was stronger when the bottles were small than when they were large.[7] Planned contrasts showed this was true for both Mr. Clean brand cleaner (150 versus 204 milliliters; $t_{199} = 4.7$; $p < .05$) and Crisco brand oil (105 versus 139 milliliters; $t_{199} = 3.8$; $p < .05$). One reason why there is no package size effect across the large bottles may simply be because there is a usage ceiling or saturation point past which there is no additional benefit to using a greater quantity of the product. When a product has a low enough unit cost (either because of being on sale or coming from a large package), further decreases in its cost are unlikely to affect usage volume.

Unexpectedly, neither price nor package size influenced the usage volume of Clorox brand bleach. To determine why this result was different than expected, a focus group was conducted with members of the subject population. The group suggested that the potential downside of using too much Clorox would explain why neither price nor package size affected usage. In effect, Clorox appears to be a usage invariant product.

In summary, results for Mr. Clean brand cleaner and Crisco brand oil are consistent with the unit price explanation. If changes in usage volume are influenced only by perceptions of product scarcity, sale-priced promotions would not have had this impact on usage volume. This price promotion effect provides further evidence that unit costs can have a powerful impact on usage.

Study 4: The Diminishing Impact of Package Size on Usage Volume

Study 3 raises the issue that the relationship between package size and usage volume can be curvilinear. There is a point at which the marginal benefit of using any more of the product becomes negligible. Past this point of saturation, the product is wasted (or even becomes harmful). Results from animal foraging studies suggest that this precise point of sat-

[7]With regularly-priced bottles, 8.1% ($F_{1,102} = 5.5$; $p < .05$) of the usage volume of Mr. Clean brand cleaner and 6.9% ($F_{1,102} = 4.6$; $p < .05$) of the usage volume of Crisco brand oil could be attributed to package size. With the small bottles, 7.0% ($F_{1,98} = 4.8$; $p < .05$) of the usage volume of Mr. Clean brand cleaner and 6.7% ($F_{1,98} = 4.4$; $p < .05$) of the usage volume of Crisco brand oil could be attributed to the sales promotion.

uration depends on the product (Hursh et al. 1988), the individual (Boice 1984), and the situation (Becker 1987). The purpose of Study 4 is to test the hypothesis that beyond a point, progressively larger packages of a product have no impact on usage volume. This should be true regardless of the impact these package sizes have on inferences about unit cost.

Method and Procedure

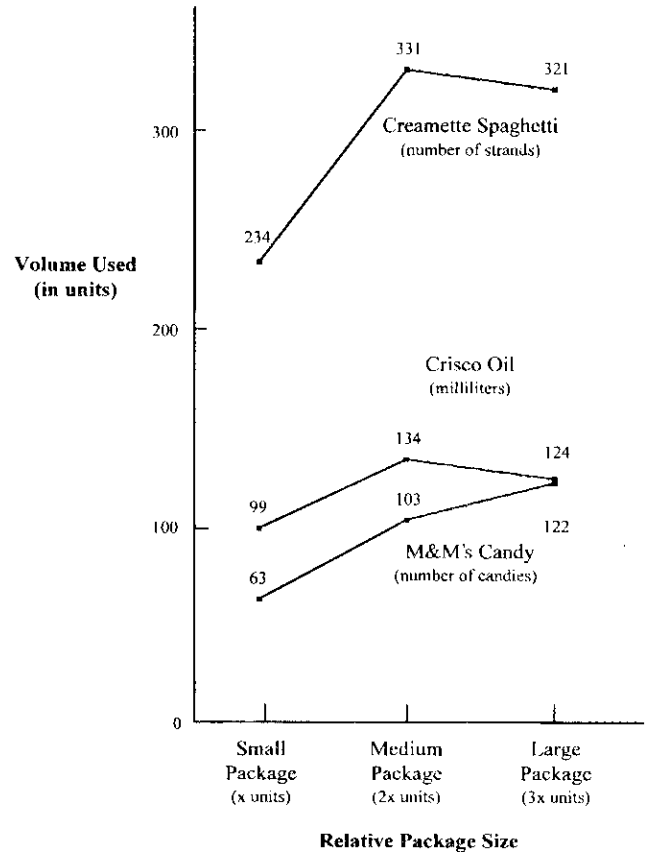
Adult subjects were recruited through PTAs in New Hampshire, with $6 donated to the respective organization for each of the 184 women who participated. A 3 × 1 between-subjects design was used in which the between-subject factor was package size (x units, 2x units, 3x units), and it was replicated across three brands (Crisco brand oil, Creamette brand spaghetti, and M&M's brand candy); package size was a between-subject factor, and brand was a within-subject factor. The volume of Crisco brand oil was determined by the bottle sizes in which it is sold (472, 944, and 1416 milliliters). The volume of Creamette brand spaghetti was similar in volume to three commonly sold packages (675, 1350, 2025 strands) and modifications were made to ensure an x, 2x, 3x unit relationship. Likewise, the volume of M&M's candy was similar in volume to three commonly sold package sizes, and modifications were made to ensure an x, 2x, 3x unit relationship (114, 228, and 342 candies). Products and quantities (x) were selected and calibrated on the basis of prestudies with a similar subject pool.

Each subject was met individually and told that some basic home economics–related information about three different types of products were being collected. The subject then entered one of three isolated cubicles in which there was one product representing one of the three package size conditions. The research assistant assigned to each cubicle described a brief scenario that involved the use of the product (Crisco brand oil: "You are frying chicken for a dinner for yourself and another adult"; Creamette brand spaghetti: "You are making spaghetti for yourself and another adult"; M&M's brand candy: "You are watching a movie on television by yourself"). The research assistant then asked the subject to indicate how much of the product she would use in this situation.

Again, package size was a between-subjects factor. A third of the subjects were presented the smallest size of the product, a third were presented the middle size, and a third were presented with the largest size. The subject indicated how much she would use and was then taken to the next cubicle to repeat the process for a second product. After finishing with all three products, she was escorted back to each of the three cubicles and asked how much money she estimated her use of each of the products would cost. After the subject left the room, the volume of intended use was measured for each of the three products, the next subject was invited in, and the procedure was repeated.

The dependent measure in this study is the volume of the product each subject indicated she would use. As in Study 1, subjects indicated their use of Crisco brand oil by pouring it into a frying pan; they indicated their use of spaghetti by placing it in a large pot; and they indicated their use of M&M's by scooping them into a bowl. Researchers measured the volume of Crisco brand oil by pouring the liquid into a narrow beaker. The volume of spaghetti was measured by holding the strands together and measuring the circumference with a tape measure. The volume of M&M's was measured by pouring them into a narrow beaker, noting the volume, and translating this volume measure to a close approximation of an individual count.

FIGURE 2
The Diminishing Impact of Package Size on Usage Volume

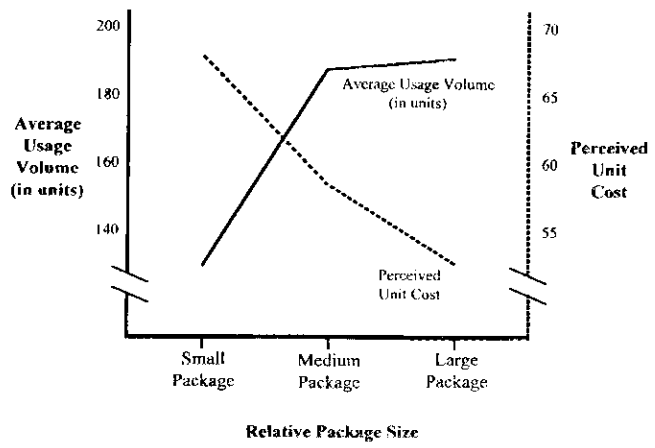


Results and Discussion

It was hypothesized that the relationship between package size and usage volume would be curvilinear, and that after a certain point, progressively larger sized packages of a product would have no impact on usage volume. As Figure 2 illustrates, this key relationship was found for each of the three brands.

One-way ANOVAs conducted across the three package size levels indicated there were mean level differences across package size and across the products for Crisco brand oil ($F_{2,181} = 6.3$; $p < .05$); M&M's brand candies ($F_{2,181} = 5.1$; $p < .05$), and Creamette brand spaghetti ($F_{2,181} = 5.5$; $p < .05$). Planned contrasts for all products revealed, however, that there were no differences in usage between the large- and medium-size packages, but that there was a significant difference between the small- and medium-size packages (Crisco oil: 99 milliliters versus 134 milliliters, $F_{1,181} = 4.6$, $p < .05$; Creamette spaghetti: 234 strands versus 331 strands,

FIGURE 3
The Relationship Between Unit Costs and Usage Volume



$F_{1,181} = 4.7$, $p < .05$; M&M's candy: 63 candies versus 103 candies, $F_{1,181} = 4.9$, $p < .05$). The variance in usage that could be attributed to package size was 7.6% ($F_{1,181} = 4.8$; $p < .05$) for Creamette spaghetti, 7.3% ($F_{1,181} = 4.6$; $p < .05$) for M&M's candy, and 6.8% ($F_{1,181} = 4.1$; $p < .05$) for Crisco cooking oil.

The nonlinear impact of package size on usage volume also was confirmed by analyzing the quadratic term in separate regressions for each brand. In regressing usage volume on package size and package size–squared, it was found that the package size–squared term was negative and statistically significant ($p < .05$) for both Creamette brand spaghetti ($t = 3.4$; $p < .05$) and Crisco brand oil ($t = 4.6$; $p < .05$), but not for M&M's brand candy ($t = .3$; ns).

As is illustrated in Figure 3, though inferences about unit costs continue to decline as package sizes became larger, these inferences have no impact on usage volume past a particular package level. At some point, the unit costs of a product have no impact on usage, and package size ceases to have any impact on usage.

These results were further supported by a follow-up questionnaire, which suggested that even though consumers believe "more is better" with usage variant products (e.g., foods and household cleaners), they also believe that it is possible to use too much. Of the 39 PTA parents responding to the questionnaire, an average of 34 (87%) agreed that "more is better" when using Mr. Clean or Tide, when eating spaghetti or M&M's, or when drinking soft drinks. Despite holding the "more is better" heuristic, an average of 37 (95%) also agreed that it is possible to use, eat, or drink too much of these products.

Study 5: The Effect of Package Size on Usage Volume in Laundromats

Because the impact of package size on usage volume has shown reliable results in the laboratory, a field study was designed to provide greater external validity. I expect that in a Laundromat setting, package size affects the usage volume of detergent but not of bleach (which is a usage invariant product).

Method and Procedure

The field study was conducted on three different days at a Laundromat in Sioux City, Iowa. As customers entered the Laundromat, they were greeted and told that a study was being conducted to determine the effectiveness of fabric softener sheets (i.e., Bounce brand fabric softener sheets). They were also told that because fabric softener sheets might react differently with different kinds of detergent and bleach, their use of Tide brand detergent and Clorox brand bleach would help standardize the results. Seventy-four women (94% of those asked) agreed to use the products and answer questions after they were done with their laundry. Of the customers who agreed to be in the study, all were given a box of Bounce brand fabric softener sheets and were randomly given either a 1.19 kilogram or a 2.72 kilogram box of Tide brand detergent and either a 1.89 liter or a 3.79 liter bottle of Clorox brand bleach. They were told they could keep whatever detergent, bleach, and fabric sheets they did not use.

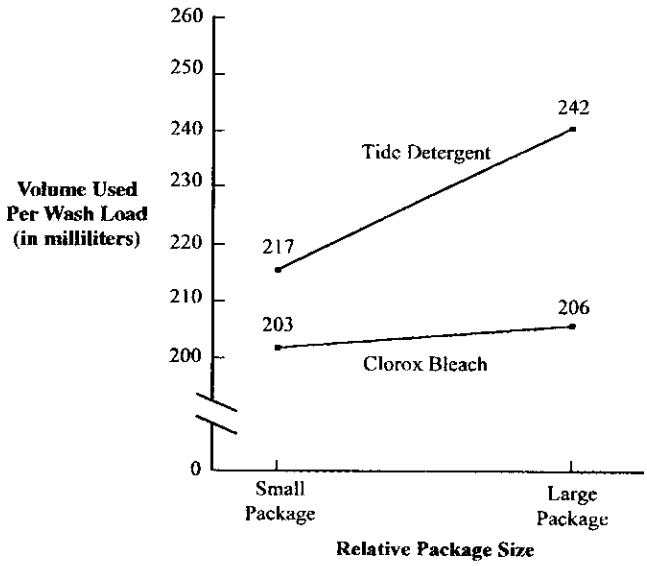
After each customer finished her laundry, she was escorted to her car and asked how many loads she washed that day and in how many she used bleach. Consistent with the cover story, she was then asked three attitude questions about the fabric softener sheets and two open-ended questions ("Do you think fabric softener sheets are effective?" and "Are they more effective on some types of clothes than on others?"). Following this, each customer noted how much she thought the amount of soap (bleach) she had poured would cost and how many ounces she believed she had poured.

Each customer's box of Tide brand detergent and bottle of Clorox brand bleach was weighed to determine the amount used per load. (The volume of what was used was later converted into milliliters per load for ease of comparison). She was then asked about her usage habits, brand preference, and whether she believed, "Using too much detergent (bleach) harms clothes," and whether "The more detergent (bleach), I use, the better." She then noted whether she used the same amount of detergent for each of the loads she had washed. These were answered on 5-point scales (1 = strongly disagree; 5 = strongly agree), and the order in which customers were asked about bleach and detergent was alternated across respondents. Finally, each subject was asked if she knew of the study prior to arriving at the Laundromat. The data from 14 customers were eliminated, because they claimed to have heard about the study from another (12), or had been involved in the study on a previous day (2).

Results and Discussion

It is believed that while detergent is a usage variant product, bleach is usage invariant. Because of this, customers with large boxes of detergent should use a greater volume than those with smaller boxes. In contrast, customers with large bottles of bleach should use a similar volume as those with small bottles. As can be seen in Figure 4, these expectations were supported.

FIGURE 4
The Effect of Package Size on Usage Volume in Laundromats



The average usage volume per load for the two detergent sizes was compared using a t-test. The results indicate that customers using a large package used 11% more detergent per wash load than those using a small package (242 versus 217 milliliters; $t_{59} = 2.4$; $p < .05$).[8] Customers also believed they used more detergent when pouring from large packages (267 versus 229 milliliters; $t_{59} = 2.7$; $p < .05$), thus indicating they were generally aware of the volume they poured. As in Study 2, these findings are suggestive of the notion that consumers are generally mindful of the cost of what they use. Indeed, though consumers poured more detergent from the large package, their price estimate of how much they poured was similar to the estimates of those pouring from the small packages (17.5¢ versus 17.1¢; p = ns).

As was expected, when comparing the two bottle sizes of bleach, there were no statistically significant differences in usage volume (203 milliliters versus 206 milliliters) or perceived usage volume (197 milliliters versus 210 milliliters). I hypothesized that this usage invariance existed because of the negative consequences to overusing bleach. Indeed, customers who used bleach (41 of 60) considered bleach as more likely to hurt clothes than detergent (6.8 versus 3.1; $t_{40} = 2.5$; $p < .05$) and less likely to help them (2.4 versus 5.5; $t_{40} = 2.5$; $p < .05$).

Based on the procedure outlined by Baron and Kenny (1986), the amount of detergent a person poured was found to be mediated by inferences about its unit cost. Although it was shown that package size is significantly related to the usage volume of detergent ($F_{1,59} = 5.7$; $p < .05$), so are perceptions of the unit cost ($F_{1,59} = 27.0$; $p < .01$). When perceived unit cost is added to the ANOVA with package size, the effect for package size is no longer significant ($F_{1,58} = 1.5$; ns), and the sums of squares falls from 260 to 39. Perceived unit cost, however, remains significant ($F_{1,58} = 22.8$; $p < .05$). This provides further statistical support for the notion that package size influences usage volume because large packages are perceived as less expensive to use.

The results from this study also indicate that package size can influence usage volume across multiple uses of the product. That is, whereas Studies 2, 3, and 4 examined an initial, "one shot" use from a full package, the average customer in this study washed 4.4 loads of laundry, thus pouring from a progressively less full package. These 4.4 loads resulted in a 109 milliliter difference between customers using the small package and those using the large package. This difference was likely to be the result of usage differences that persisted past the initial pour. Indeed, 57 of the 59 subjects "agreed" or "strongly agreed" that they used the same amount of detergent for each of the loads they washed. Therefore, it appears that this 109 milliliter aggregate difference in usage is the result of 20–30 milliliter differences on each pour and not simply a 109 milliliter difference on the first pour. These findings demonstrate that package size can influence usage volume across multiple uses of the product.

In summary, this final study provides a usage context in which the impact of package size on usage can be directly observed. In combination with the other studies, these findings provide further support for the argument that larger packages encourage greater usage. Moreover, they suggest that consumers are somewhat aware of how much of a product they are using, and this usage volume is associated with the product's unit cost.

Discussion

The results from all five studies show that large packages of familiar, branded products encourage more use than do small packages. Study 1 shows that as the size of a package increases, so does the volume of the product that a person uses. By controlling how full the different packages were, I was able to show that package size has an impact on usage that is independent of supply. This is a key departure from many scarcity theory-based studies, because it disentangles the confound between package size and supply. Study 2 further supports this conclusion by showing that package size influences usage volume only when accompanied with decreases in the product's unit cost. When increases in package size are not accompanied with decreases in perceived unit costs, this relationship is not found. This supports the notion that perceptions of a package's unit cost can influence usage and operate independently of the package size itself.

The results of Study 3 show that price promotions increased usage for two of three products. These results are consistent with the unit price explanation, and they indicate that if package size can alter unit cost perceptions, it also will affect usage. The unexpected finding in this study—the nonsignificant result for Clorox brand bleach—underscores that the usage of some products is more invariant than others. That is, with some products there is a diminishing re-

[8]Package size accounted for 9.7% ($F_{1,60} = 5.7$; $p < .05$) of the variance in the volume of detergent that was used.

turn, or even a negative return, to using a larger volume of the product.

Study 4 further explores this issue of diminishing returns across three different products. The results show that there is a point after which a package's size has no further impact on usage. In other words, at some point, usage becomes unaffected by decreases in unit costs and is similarly unaffected by further increases in package size. The results of Study 4 represent a generalized finding that is consistent with what was found in Study 3. There are certainly diminishing returns to using risky products (e.g., bleach), however, there are eventually diminishing returns to using any product.

Study 5 field-tested the effect of package sizes in a Laundromat. In combination with the other studies, these findings provide further support that compared to small packages, large packages can encourage greater aggregate usage volume. Furthermore, these results show that consumers are reasonably aware that they pour more from large packages and that this relatively greater degree of usage persists to at least the fourth or fifth use of the product. This is important because it indicates that package size continues to have an impact on usage as the fill level decreases.

In these studies, large package sizes consistently increased usage volume. This was true regardless of whether subjects actually used the product (Study 5), whether they indicated their usage intentions by pouring (Studies 1, 2, and 4), or whether they indicated these intentions with pencil and paper measures (Study 3). The importance of having these different methods triangulate on the same construct (usage volume) is underscored by multitrait, multimethod frameworks. Because these different methods concur, there is strong evidence that the phenomena is not simply an artifact of a single method.

The studies show that inferences about unit costs mediate the relationship between package size and usage volume, but it may be possible that other factors also contribute to this relationship. For example, some portion of usage variance also may be attributed to perceptions of replacement costs or the congruity between the package and the container into which the product is being poured. Furthermore, some portion of usage variance may be attributed to the notion that for some containers, the size of the opening increases with the size of the container. In such cases, if a person pours more from a large container than from a small container, it may be assisted by the larger opening. However, even if the size of an opening does influence usage volume, it appears to be overwhelmed by a package size effect: Package size effects were not found for Clorox brand bleach (which have progressively larger opening sizes), but they were found for products that had similar opening sizes (Crisco brand oil, Acme brand bottled water, M&M's brand candy, and Tide brand detergent). Although package size opening may influence usage volume under some circumstances, I am confident that they do not account for the differences in the usage volume reported here.

Managerial Implications

Developing an optimal portfolio of package sizes is becoming increasingly important as costs and competitive pressures force brand managers to reassess the package sizes they offer. Package-related decisions should take into account the size assortments offered by competitors, the size constraints faced by distributors and retailers, the size preferences of consumers (Wertenbroch 1995), and the package's shelf appeal (Garber 1995; Underwood, Klein, and Burke 1996) After accounting for these factors, however, it is important for a manager to realize that packaging influences consumer behavior long after it influences purchase. This has implications for managers who are making package size changes in an existing product line (Chong, Ho, and Tang 1995; Fader and Hardie 1996) and those who are making package decisions for new products (Bloch 1995).

Implications for Package Size Decisions

Package sizes can be modified to either accelerate or decelerate (conserve) usage. As a general rule, if a manager is trying to decide which of two packages to introduce—for example, 20 ounces versus 24 ounces—the larger of the two packages should encourage greater usage volume per usage occasion.

Part of the reason acceleration in usage volume occurs is because larger packages are perceived as less expensive to use than smaller packages. There is, however, a limit to how much spaghetti a consumer would want to eat and how much detergent he or she would want to use. Although this satiation point differs across individual people and products, once it is reached, a large package will have no additional impact on usage volume (recall Figure 2). Although satiation may commonly occur with a medium-size package in one product category, it may only occur with an extra-large package in another category. Before package size decisions are made for a given brand, a brand manager should determine the size at which a package no longer influences usage volume. This can be accomplished using the methodology described in Study 4.

In no context are extreme sizes of products as prevalent as they are at wholesale clubs. Nevertheless, this research indicates that the extreme sizes of packages sold at these clubs may encourage no greater usage volume during a single usage occasion than the next smaller size of that brand.[9] It may be, however, that the purchase of these extra-large packages influences usage frequency. Previous work has shown that such an increase could be sparked simply by the increased salience (Wansink 1994b) or presence of the product in household inventory (Ailawadi and Neslin 1996; Chandon and Laurent 1996; Wansink and Deshpande 1994). Moreover, high inventory carrying costs (i.e., a shortage of space) could accelerate usage volume of these large packages simply by encouraging consumers to "use them up and make more room."

[9]The findings from focus groups suggest that consumers *believe* they are more likely to "accidentally pour too much from a package than too little." With the availability of uncommonly large package sizes (such as three-liter bottles of soft drinks), this perception about unwieldy package sizes deserves further design consideration, especially insofar as packages can be designed to be more compact or to enable more accurate pouring.

Implications for Pricing and Promotion

One reason consumers use more from larger packages is because they perceive them as less expensive (per unit) than smaller packages. It is not surprising, therefore, that directly decreasing a product's price correspondingly increases usage volume. If perceptions of unit costs can accelerate usage volume, it appears that various retailer promotions, such as "2-fers" (buy two for the price of one), "BOGOs" (buy one, get one free), and multipacks may not only stimulate purchase but also stimulate greater usage frequency simply because of their reduced unit costs.

Although it would thus appear that simultaneously increasing package size and decreasing price (directly or through price promotions) have the maximum impact on usage acceleration, this may not occur. Combining large package sizes with a price promotion may drive the unit costs of a product down to a point at which any further reduction of unit cost (e.g., a deeper price cut or a larger package size) has no impact on usage volume but only leads to the diminishing returns that are noted in Figure 2. Although developing larger and larger package sizes and selling them at deeper and deeper discounts might influence purchase, it is unlikely to influence usage volume (Bawa and Shoemaker 1987).

Indeed, the robustness of the package size effect suggests that the impact might be most reliable across usage contexts if alterations are made in package size *instead* of price. That is, the impact of package size on usage volume may overwhelm any impact that a sales promotion or price change may have otherwise had. This would be especially true if the sales promotion is not salient at the point of usage. Given how inaccurately consumers recall the prices they have paid for products (Dickson and Sawyer 1990), a product that indicates on the package that it was bought on sale—by having a "cents-off" sticker on the label, for example—may have a better likelihood of increasing usage than one that does not.

Implications for Public Policy Decisions

The proliferation in the number of large and extra-large packages has been a response to consumer demand. Consider the soft drink industry, in which per capita consumption has risen from 37 gallons in 1972 to 48 gallons in 1992. This increase in demand allowed for the successful launch of one-liter single-serving bottles of Pepsi and three-liter multiserving bottles of Coca-Cola (Hine 1995, p. 163). Such economy is not without cost. Large packages increasingly require that consumers make a trade-off between the economy of large packages versus the serving convenience and handling ease of small ones.[10]

Any savings in buying large packages is lost, however, if part of the product is wasted. Indeed, public policy officials are concerned with the consumer waste that larger package sizes may encourage (Perkins 1995). Other research on usage has indicated that increases in a product's supply may cause consumers to waste money by "overdosing" (Folkes and Martin 1992). In addressing this concern, the results of Studies 3 and 4 show that though usage is related to package size, the relationship is curvilinear, and consumers seem to know when "enough is enough." Furthermore, Studies 2 and 5 demonstrate that consumers are generally aware of the volume they pour and are not pouring in a mindless manner. In combination, these findings suggest that consumers do not operantly respond to package size. Instead, they are aware of the unit cost differences between package sizes and are aware of what is "too much." In effect, when faced with a larger package size, a consumer might very well say, "This is cheaper, so I'll use more ... up to a point."

Research Implications

I demonstrate that larger package sizes can influence the usage volume of usage variant products, partially because larger packages are perceived to be less expensive to use. This relationship can be either enhanced or inhibited by product-, situation-, or package-related factors. Understanding how these factors influence behavior helps identify the products that respond most favorably to managerial actions and the circumstances under which such actions are most effective.

Product-Related Research Opportunities

Product type. I distinguish usage variant from usage invariant products. Developing a detailed study of the characteristics of usage variance is the province of further research. Unlike Clorox bleach, usage variant products are likely to be ones that have minimal consequences to overuse and are likely to include foods that can be easily substituted with other categories (Wansink 1994b). An empirical study that systematically identifies the characteristics and usage sensitivity of different product types would help managers identify the product categories that are most affected by changes in package size.

Aside from looking at the types of products that might be most influenced by fluctuations in package size, it is also worth examining other contexts in which similar principles might operate. For example, if researchers broaden their definition of package size to include container size, they also may expect that a family dinner served in large dishware stimulates greater consumption than one served in small dishware that is periodically refilled. Such also may be true with the all-you-can-eat buffets.

Product familiarity. In the studies reported here, people poured more from larger packages because they believed them to be less expensive. Their perceptions of cost were reasonably accurate (as is shown in pretests and in Study 5), because they poured familiar brands from regularly used product categories. The results from Folkes, Martin, and Gupta's (1993) seminal study initially appear inconsistent with my results. Their study showed that package size had

[10]To the extent a consumer is unwilling to make such a trade-off between economy and convenience, the editor of the *Tightwad Gazette* noted, "Some people ... (put) bulk-purchased items into smaller containers. But my advice is simply to be aware of [what Wansink (1995) notes as] the human tendency to overuse bulk-purchased items, and modify your behavior accordingly" (Dacyczyn 1995, p. 2).

no impact on the volume that college students poured from unbranded bottles of toilet cleaner. I suspect that part of the inconsistency between their results and mine is due to their use of an unbranded product from a product category that is unfamiliar to students: This is the province of further research. If estimates of unit cost mediate usage volume, I would not expect the package size of an unbranded, unfamiliar product to have any impact on usage volume. In essence, the real inconsistency would be if their results *had* shown a package size effect under these conditions.

Situation-Related Research Opportunities

Usage situation. Although a broad distinction was made between usage variant and usage invariant products, it is important to recognize that usage variance can be moderated by the usage situation. Different usage situations have different consumption goals associated with them (Huffman and Houston 1993; Ratneshwar and Shocker 1991). With respect to food consumption, environmental factors such as perceptions of time (Schachter and Gross 1968) and ambient noise levels (Ferber and Cabanac 1987) have proven to be powerful moderators of eating volume. When such moderators are present, any effect of package size may be overwhelmed. Similarly, the presence of other people has been shown to increase a person's usage volume of foods (Berry, Beatty, and Klesges 1985), but it is unclear whether usage-related differences in package size magnify or diminish this difference.

Constrained usage contexts. There are built-in constraints that limit usage in some contexts— drinking glasses and cereal bowls are a limited size. Regardless of whether a box of Wheaties is large or small, when the cereal bowl is full, no more cereal is poured. Although most marketers take constrained usage contexts as a given, others have pushed these constraints. A breakfast cereal company once gave away promotional cereal bowls that held 28% more volume than the typical breakfast bowl. Similarly, a soft drink bottler in Montana overcame drinking glass constraints by distributing half-gallon plastic glasses ("The Bigfoot"), complete with words of consumption encouragement written on them.

Another constrained usage context is one in which there is little tolerance for measurement error. When a consumer package good is a mix (e.g., Bisquick), or when it serves as a key ingredient (e.g., Gold Medal Flour) in a recipe, deviating from instructions can cause disappointing results. My research indicates that package size is one factor that can cause nonoptimal deviations in usage volume. Because any such deviations can ultimately hurt the equity of a brand, it is interesting to note that the test kitchens for some consumer packaged goods companies attempt to design robust recipes that can accommodate a 15% fluctuation in the usage volume of key ingredients.

Some constraints (e.g., cereal bowl size) are physical, whereas many others result from self-imposed usage habits (e.g., "I always eat only one bowl of cereal" or "I usually eat until I finish reading the newspaper"). Although a small cereal bowl represents a usage constraint when pouring one bowl, usage habits may be the constraint that prevent pouring a second bowl. It is not clear what types of usage habits or heuristics drive consumption behavior in a household. It is clear, however, that such findings are of interest to managers, academics, home economists, and consumers.

Fill level. The studies reported here demonstrate that when a package is full, consumers pour more from larger ones than from smaller ones. Study 5 shows this persists for the first few uses of a product, and it may well continue until the fill level drops to a relatively low level. When little of the product is left, however, usage volume is difficult to predict, because the product can either be carefully rationed out or quickly "finished off." The latter is most likely to occur when there is too little product for two uses, but too much for one use. This explains why the studies by Folkes, Martin, and Gupta (1993) were inconclusive when only small amounts of a product remained in supply.

An unexamined twist to any new product usage study is to determine how depletion behavior is modified when the product is one that is shared within a household. In many refrigerators, the nearly empty containers of milk, orange juice, ice cream, and salad dressing sit as a testament to people's unwillingness to be the one who finished a favored product (i.e., a social good). It is unclear whether this apparent hesitancy to deplete such a product is related to the transaction costs of depletion (i.e., disposal or restocking), or if it instead reflects an attempt to avoid accusations of selfishness or gluttony (socially tantamount to "taking the last piece of pizza.") The answer has implications for social psychologists, as well as for managers who would like to increase the replacement rate of these products.

Packaging-Related Research Opportunities

Sizes of package openings. The pour spout or diameter of a package's opening did not influence how much was poured in the case of the foods and cleaners used in these studies. Nevertheless, folk wisdom and anecdotes have suggested that increasing the size of a package's opening can either increase or decrease the usage volume of a product. For example, it has been suggested (though unsubstantiated) that a person uses more toothpaste when he or she squeezes from a tube that has a larger opening, and there are numerous accounts that "big mouth" beers are drunk more rapidly than those with conventional openings. Although no systematic statement can be made about the size of a package opening and usage volume, it would be valuable to know whether there are product categories or circumstances under which changes in the size of a package opening cause either an increase or decrease in usage volume.

Multiple-unit packaging. My general focus has been on full packages that contain multiple servings. There are, however, other supply scenarios that can be investigated. One question that has been raised in the context of multipacks is whether a two-liter bottle is consumed faster than two one-liter bottles or a six-pack of cans. Although all contain a similar volume of the product, it may be that there are significant discontinuities in usage that occur when a person must pause and consider whether to open an additional

package. If contribution margins across the products are similar and if repurchase occurs after depletion, the answer to this question has immediate bottom line implications.

Conclusion

I investigate a dependent variable—usage—that has been overlooked in packaged goods research for too many years. When consumers are loyal to a brand, usage naturally leads to repurchase. The basic question then is not only choice-related but also usage-related: What influences usage once a brand is in the house? Although previous research has demonstrated how usage-related advertising can accelerate *usage frequency* (Wansink 1994a; Wansink and Ray 1996), this research demonstrates how package size can accelerate *usage volume.*

The marketing field now needs a fundamental understanding about usage behavior to help provide the necessary foundation for the next generation of research in select areas. Such areas range from research involving brand loyalty and heavy users to that involving consumer promotions and stockpiling. Consider, for example, the basic finding that one reason consumers use more from large packages is because they perceive them as less expensive (per unit) than small packages. This leads to questioning the widely embraced assumption that consumers who stockpile price-promoted products consume them at a constant rate. These findings suggest that consumers may instead accelerate their consumption of such stockpiled products (see Wansink and Deshpande 1994).

Usage behavior is more ubiquitous than purchase behavior. Marketing-related variables once thought to only influence decisions to *choose*, now are discovered to influence decisions to *use*. Packaging represents one such variable. In effect, packaging influences usage behavior long after it has influenced purchase.

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