

# MARKETING SCIENCE INSTITUTE

---

## **Consumers' Perceptions of the Assortment Offered in a Grocery Category: The Impact of Item Reduction**

*Susan M. Broniarczyk  
Wayne D. Hoyer  
Leigh McAlister*

Working Paper  
Report No. 97-125  
December 1997



The authors thank the Marketing Science Institute, the University of Texas' Research Institute, the University of Texas Business School's Faculty Research Committee, a major convenience retailer, Hershey Chocolate USA, Miller Brewing Company, PepsiCo, and another major manufacturer for support. The authors also thank Texas MBA students Heidi Bicking, Stephanie Brendle, Lori Elliott, Chris Gibney, Amy Grace, Kristin Harding, Jay Lefforge, Lisa Love, Lenora Petty, Dina Reinhard, Clark Reinhard, Tony Rogers, and Roman Ross for their help. This paper has benefited from seminars at the University of Michigan, University of Notre Dame, Ohio State University, Stanford University, and Texas A&M University.

MSI was established in 1961 as a not-for-profit institute with the goal of bringing together business leaders and academics to create knowledge that will improve business performance. The primary mission was to provide intellectual leadership in marketing and its allied fields. Over the years, MSI's global network of scholars from leading graduate schools of management and thought leaders from sponsoring corporations has expanded to encompass multiple business functions and disciplines. Issues of key importance to business performance are identified by the Board of Trustees, which represents MSI corporations and the academic community. MSI supports studies by academics on these issues and disseminates the results through conferences and workshops, as well as through its publications series.

This report, prepared with the support of MSI, is being sent to you for your information and review. It is not to be reproduced or published, in any form or by any means, electronic or mechanical, without written permission from the Institute and the author.

The views expressed in this report are not necessarily those of the Marketing Science Institute.

Copyright © 1997 Marketing Science Institute  
Cambridge, Massachusetts

# Consumers' Perceptions of the Assortment Offered in a Grocery Category: The Impact of Item Reduction

*Susan M. Broniarczyk, Wayne D. Hoyer, and Leigh McAlister*

It has been suggested that retailers can significantly lower operating costs if they reduce the number of low-selling stock-keeping units (SKUs) in a category. Retailers, however, have resisted such cutbacks, fearing that shoppers would be less likely to shop in stores that they perceived as offering diminished assortments of products.

## **Study and Findings**

In this study, authors Broniarczyk, Hoyer, and McAlister examine the link between SKU count and assortment, as perceived by consumers. They suggest that cues other than simple SKU count, such as the availability of favorite products and the amount of shelf space devoted to the category, influence shoppers' assortment perceptions.

In two laboratory studies they demonstrate that:

- ❑ In the face of SKU reduction, consumers are less likely to lower their assortment perceptions if low-preference rather than high-preference SKUs are removed.
- ❑ In the face of SKU reduction, consumers are less likely to lower their assortment perceptions if the amount of space devoted to the category is held constant than if the space is reduced.

In a field study, they confirmed that as long as favorite products were available and shelf space remained constant, consumers' assortment perceptions were unaffected by moderate SKU reductions. Further, consumers reported stores with SKU reduction as easier to shop.

## **Implications**

This study suggests that retailers can make moderate reductions in SKU count—thus cutting back on warehouse inventory and related costs—without degrading their image of offering a good assortment. Further, retailers can expand facings of the most popular products, thereby reducing out-of-stocks and the costs associated with them.

In this way, traditional format retailers who streamline their operations should be able to compete effectively with the emerging alternative format retailers (e.g., Wal-Mart), whose superior operating systems currently provide a 26 percent cost advantage.

*Susan M. Broniarczyk is Assistant Professor of Marketing, Wayne D. Hoyer is the Tom E. Nelson, Jr. Regents Professor in Business, and Leigh McAlister is the H. E. Hartfelder / The Southland Corporation Regents Chair for Effective Business Leadership at the University of Texas at Austin.*

# Contents

Introduction .....	3
Assortment Perception Cues .....	5
Availability of Favorite Product.....	6
Category Space .....	7
SKU Count .....	7
Store Choice.....	8
Study 1 .....	9
Overview .....	9
Method .....	9
Results and Discussion .....	10
Study 2.....	13
Overview .....	13
Dependent Measures .....	15
Study 2 Results.....	17
Manipulation Checks .....	17
Assortment Perceptions .....	17
Store Choice.....	19
Discussion .....	23
Evidence from the Field.....	24
Assortment Cue Survey and Future Research .....	24
Limitations .....	25
Conclusion .....	27
Notes.....	29
References.....	31
Tables	
Table 1: Assortment Mean Differences from Study 1 .....	10
Table 2: Assortment Means from Study 2.....	18
Table 3: Test for Two-Stage Model of Assortment Perceptions.....	20
Figures	
Figure 1: Two-Stage Model of Assortment Perceptions and Store Choice .....	6



# Introduction

In the early 1990s, traditional format grocery retailers began losing sales to “alternative format retailers” (e.g., Wal-Mart), whose superior operating systems provided a 26 percent cost advantage (Food Marketing Institute 1992). A follow-up industry study (Kurt Salmon Associates 1993) suggested that to survive, traditional grocers need to reduce the costs (e.g., warehouse inventory and space occupancy) associated with carrying broad assortments. Moreover, these increased costs did not appear to be generating increased sales, with approximately one-quarter of items in grocery stores selling less than one unit per week (Jager 1996).

To lower operating costs, grocery retailers were urged to adopt “efficient assortment,” whereby low-selling stock-keeping units (SKUs) are eliminated from a category’s offerings (Kurt Salmon Associates 1993). Retailers have resisted the suggested cutback in category offerings based on research that shows assortment perceptions to be positively related to consumer attitudes toward the store (Arnold, Oum, and Tigert 1983; Craig, Ghosh, and McLafferty 1984; Louviere and Gaeth 1987). Assortment is defined by retailers as “the number of different items in a merchandise category” (Levy and Weitz 1995, p. 30). Retailers fear that shoppers will notice that the offering has been reduced, lower their assortment perceptions, and be less likely to shop in that store.

To resolve this dilemma, grocery retailers need a clear understanding of the link between the number of items offered in a category and assortment from the consumer’s perspective. In partial response, recent industry studies have examined the impact of SKU reduction on category sales. A 1993 Food Marketing Institute (FMI) study found that reducing the number of SKUs in six test categories (cereal, toothpaste, salad dressing, toilet tissue, spaghetti sauce, and pet food) in three retail chains resulted in no significant loss in category sales. Similarly, a study reported in *Progressive Grocer* (Krum 1994) found that reducing the number of SKUs from 26 to 16 in the cat box filler category resulted in no significant loss in category sales between the 23 control and 23 test stores.

Further, as part of a comprehensive grocery study, Dreze, Hoch, and Purk (1994) customized shelf space based on sales movement in eight test categories at a large grocery chain. Shelf facings of SKUs were either increased or decreased in proportion to historical sales, deleting approximately 10 percent of the less popular SKUs while holding shelf space constant. Interestingly, aggregate sales *increased* nearly 4 percent between the 30 control and 30 test stores.

Together these studies provide preliminary evidence that SKU reduction may not have the feared negative effects and may even result in considerable gains for the retailer. However, a null effect of SKU reduction on short-term category sales does not preclude a lowering of consumer assortment perceptions with a potential long-term negative impact on category sales and store choice. Since these previous studies did not directly measure consumer assortment perceptions, it is difficult to

draw any conclusions. Nevertheless, given the financial significance of this issue to today's grocery retailers, an understanding of those forces that drive consumer assortment perceptions is needed (Dreze et al. 1994).

In this paper, we present two controlled lab experiments that shed light on the links between the number of SKUs offered in a category, consumers' perceptions of the assortment offered, and store choice. Our purpose is to examine three research questions:

1. To what extent are consumers' assortment perceptions determined by the total number of SKUs on the shelf?
2. Are consumers' assortment perceptions driven by cues other than the total number of SKUs?
3. Do changes in assortment perceptions cause changes in store choice?



# Assortment Perception Cues

A key finding from previous research on decision making is that most choices made in grocery stores are very low in involvement, with consumers not actively processing available information about choice alternatives (Dickson and Sawyer 1990; Hoyer 1984). For example, a study by Inman, McAlister, and Hoyer (1990) demonstrated how shelf tag cues rather than actual price discounts were employed by less motivated consumers to determine if a brand was on sale. Given the limited in-store processing of consumers, we similarly make two basic assumptions: (1) consumers are unlikely to actively make assortment perceptions each time they are at a store and will do so only if there is a drastic change and (2) assessments of change are likely to be influenced by simple and potentially nondiagnostic cues.

Retailers have defined the assortment offered in a product category as the total number of SKUs offered on the shelf. However, to understand human perception of this variable, one must examine the lens through which the individual viewed the stimulus (Brunswik 1955). The objective of Brunswik's lens model was to identify the directly observed cues that make up this perceptual lens and assess the accuracy between an individual's utilization of these cues and their true relationship with a distal variable in the environment.

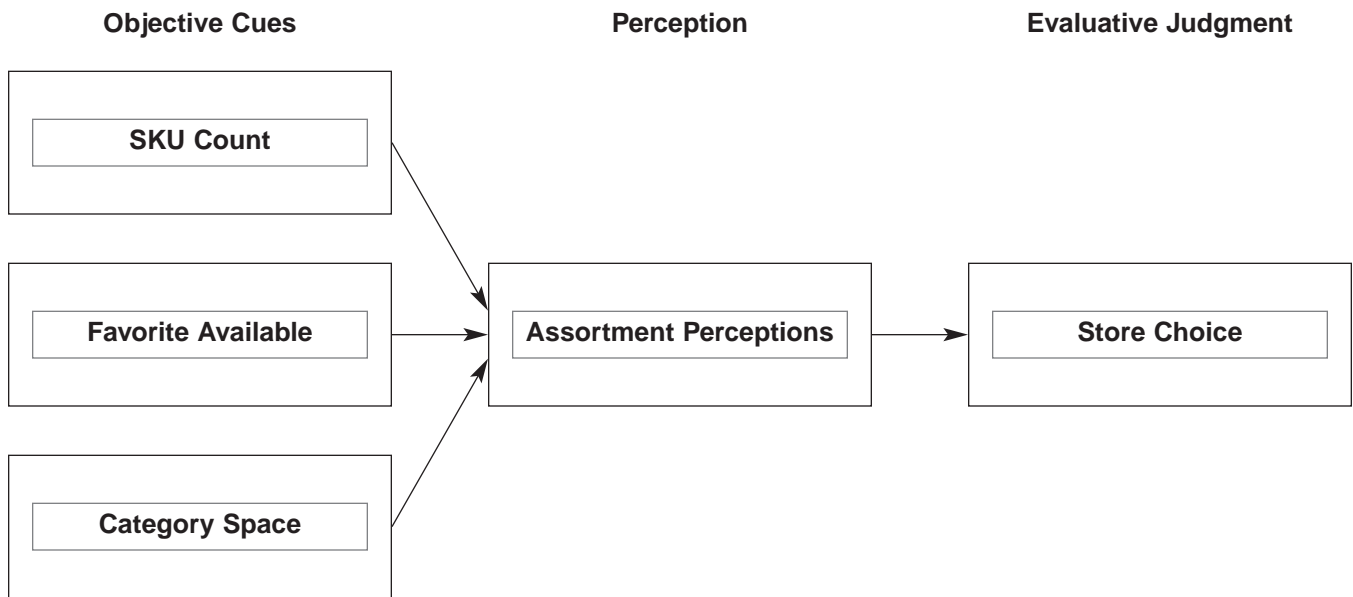
Retailers have assumed that there is a one-to-one correspondence between the distal stimulus of assortment and the cue of the total number of SKUs offered in that category. However, we argue that this correspondence may not hold for two reasons. First, given their limited processing and low cognitive effort, the lens through which consumers view assortment may be based on other more simple cues rather than an actual counting of the number of SKUs. While many potential cues exist, we narrowed our investigation to two cues that involved minimal cognitive effort and were most closely tied to the efficient assortment decision. Specifically, retailers focus on two key issues: what SKUs to eliminate and what to do with the resulting empty space in the category display. In light of this fact, cues related to the availability of a favorite product and the amount of shelf space devoted to the category were chosen for study. A key proposition is that it may be possible to eliminate SKUs without affecting these cues, thereby lessening the likelihood that assortment perceptions will be affected.

Second, psychophysics has shown that individuals are able to detect a change in the environment only when it surpasses a certain threshold or "just noticeable difference." Thus, consumers who are utilizing the total number of SKUs (SKU count) cue may not be able to detect small or moderate changes in the number of items offered. If this is the case, then assortment perceptions will be unaffected by a small or moderate reduction in SKUs.

Following Holbrook (1981), we extend Brunswik to a two-stage model to examine how these cues affect assortment perceptions, which in turn affect store choice (see Figure 1). That is, we first examine how the cues of SKU count, favorite available,

and category space are related to consumer assortment perceptions. We then examine whether assortment perceptions affect store choice. Finally, we attempt to determine whether these cues directly affect store choice or whether their impact occurs through assortment perceptions. The theoretical justification for this two-stage model and related hypotheses are now discussed.

**Figure 1. Two-Stage Model of Assortment Perceptions and Store Choice**



### Availability of Favorite Product

One way consumers reduce their cognitive effort is to quickly screen the alternative set and reduce it to a subset of alternatives that has the potential to meet their needs (Hauser and Wernerfelt 1990). Only those products within a consumer's consideration set receive further processing. For repeat purchase products, consumers are expected to have these consideration sets established in memory. The screening process may therefore occur automatically via selective perceptual attention at the shelf as products within the consideration set are perceptually enhanced and consequently the first products scanned (Alba, Hutchinson, and Lynch 1991). According to the principles of efficient assortment, it is the infrequent-selling SKUs that are the leading candidates for elimination. Therefore, we hypothesize that removing low-preference SKUs is likely to go unnoticed as there is a low probability that these alternatives belong to a consumer's consideration set and hence a low probability that they are perceptually scanned. Removing a consumer's favorite product, on the other hand, would almost surely be noticed and will negatively affect his or her perception of the assortment offered in the category.

The FMI (1993) industry study offers tentative support for consumer use of this cue to estimate assortment. In-aisle interviews with selected shoppers in test stores

conducted after product choice found that few shoppers noticed the moderate reduction in SKUs, and those that did tended to report that their favorite brand was unavailable. Thus, we hypothesize the following:

- H<sub>1</sub>: In the face of SKU reduction, consumers will be less likely to lower their assortment perceptions if low rather than high-preference SKUs are removed.

### **Category Space**

A second cue of interest is related to the display space for the category. The relationship between perception and size is one of the basic principles of Gestalt theory, with size being a fundamental cue in any perceptual representation (Berlyne 1971). Therefore, the general size of the category shelf display is expected to be noticed by consumers and to have a strong impact on their assortment perceptions. Research by Piaget (Easley 1978) suggests that young children believe that a one-to-one correspondence exists between the quantity of items and the amount of space they occupy. Instruction is necessary to teach children that the relationship between space and number of items is tenuous and that they must engage in more effortful processing to estimate quantity. In a grocery setting where the level of processing is likely to be limited, we expect that consumers may not go beyond their initial assessment and consequently may assume that a larger amount of category space means a larger number of products are being offered.

Thus, we hypothesize that if eliminating SKUs reduces the size of the display, consumers will be more likely to notice the change and lower their assortment perceptions. On the other hand, retailers may be able to attenuate the negative impact of SKU reduction by maintaining the size of the original category space. Thus we have Hypothesis 2:

- H<sub>2</sub>: In the face of SKU reduction, consumers will be less likely to lower their assortment perceptions if the amount of space devoted to the category is held constant than if the space is reduced.

### **SKU Count**

Assuming that consumers are not actively processing information about the product display, they are not expected to notice moderate changes in SKU reduction. Psychophysics recognizes that equal stimulus ratios do not produce equal sensory intervals and that sensory scales need to be constructed based on magnitude changes that result in a “just noticeable difference” (JND) in the eyes of the perceiver (Marks 1974). Only if the degree of reduction passes a certain level or threshold will these differences become salient. In other words, as long as the degree of SKU reduction is below a certain threshold, consumers will be less likely to notice the change.

The approximate level at which this threshold occurs, however, is an empirical question that will be partially investigated in the current study. Psychophysical laws by Weber and Fechner posit that JND is a proportion of the magnitude of the original stimulus (Marks 1974). Proliferation of line extensions has led to assort-

ments of increasing magnitude with category sizes ranging from 45 to 545 SKUs (FMI 1993) that would tax the information-processing abilities of most consumers. Thus, due to the existing high levels of assortment, we contend that consumers will not notice small to moderate reductions in SKUs. While no formal hypothesis is offered, Study 2 addresses this research question by examining different levels of SKU reduction.

### **Store Choice**

Several studies have shown that assortment is an important factor in store choice (Arnold et al. 1983; Craig et al. 1984; Louviere and Gaeth 1987). However, the preceding discussion argued that consumer utilization of the favorite available, category space, and SKU count cues to generate assortment perceptions may enable retailers to eliminate a moderate number of items without a negative effect on assortment perceptions. If these cues affect store choice through assortment perceptions, then store choice may also not be affected by moderate SKU reduction. Thus, we hypothesize the following:

H<sub>3</sub>: The effect of SKU reduction will affect store choice through consumer assortment perceptions.

We now present two studies that are designed to systematically examine the hypotheses. The favorite available cue is manipulated in Study 1 by eliminating the most popular SKUs, while Study 2 examines the more realistic case in which the least popular SKUs are dropped and the impact of the favorite available cue is measured. The category space cue is manipulated in both studies. The threshold below which SKU reductions go unnoticed and the impact of SKU reduction on store choice is assessed in Study 2.

# Study 1

## Overview

Study 1 provides a preliminary test of Hypotheses 1 and 2, examining the roles of the favorite available, category space, and SKU count cues. Subjects went on shopping trips for commonly purchased items with favorite available, category space, and SKU count manipulated on the last shopping trip and consumer ratings of assortment collected.

## Method

*Procedure.* Two hundred twelve undergraduate business students participated in the study for extra credit. Subjects went on six shopping trips and made a selection in the focal category of microwavable popcorn, as well as the filler categories of canned pasta, yogurt, toilet tissue, detergent, and peanut butter on each trip. To motivate realistic choices, subjects were told that they would receive one randomly selected choice as a free gift.

Stimuli were presented in booklet format; each product category was listed on a separate page and product lists described the brand name, flavor/form, size, and unit price of each SKU. At the end of each shopping trip, subjects answered a different set of five grocery questions and completed a puzzle to simulate the passage of time. On shopping trips 1-5, all subjects saw a base popcorn condition of 25 SKUs/25 slots/favorite available. The independent variables of SKU count, category space, and favorite available were manipulated in shopping trip 6. Measures of assortment perceptions in the popcorn category were collected only following shopping trips 1 and 6. The number of SKUs in the filler categories did not change over the six shopping trips.

*Experimental Design.* The base condition was the 25 SKUs/25 slots/favorite available cell where 25 SKUs each occupied one slot on the shelf. Stimulus selection for the favorite available factor was determined through a pretest in which 50 different undergraduate subjects evaluated 40 popcorn profiles for their preference. Based on these evaluations, the 25 SKUs were composed of 24 percent (6/25) most-preferred SKUs, 24 percent (6/25) least-preferred SKUs, and 52 percent (13/25) randomly selected midrange-preference SKUs.

On shopping trip 6, a control and three test conditions were examined in a between-subjects design. The control condition was the same as the base condition with 25 SKUs/25 slots/favorite available. The second condition was the 19 SKUs/19 slots/favorite available cell where the 6 least-favorite SKUs were deleted without replacement. The third condition was the 19 SKUs/19 slots/favorite not available cell, where the 6 most-preferred SKUs were deleted without replacement. The fourth condition was the 19 SKUs/25 slots/favorite not available cell, where the 6 favorite SKUs were deleted and the number of shelf slots was held constant at 25 by duplicating the facings of the 6 next-most-preferred SKUs (i.e., these 6 SKUs received 2 facings each).

*Dependent Variable.* Consumers' assortment perceptions in the popcorn category were assessed using a five-point scale that ranged from 1 = very little variety to 5 = excellent variety. The dependent variable consisted of the difference in assortment perceptions between shopping trips 6 and 1. The difference score would be negative if reductions to SKUs, favorite items, or category space negatively affected assortment perceptions.

## Results and Discussion

Tests of the hypotheses involved planned comparisons using the pooled mean squared error (MSE = 1.37) from the overall ANOVA model with 1 and 208 degrees of freedom (Keppel 1982).<sup>1</sup> Table 1 contains the means of the 4 conditions.

**Table 1. Assortment Mean Differences from Study 1**

	Condition				Mean	Standard Deviation	n
	Number of SKUs	Number of Slots	Favorite Available				
Cell 1	25	25	Yes		-0.07	0.91	88
Cell 2	19	19	Yes		-0.14	1.03	35
Cell 3	19	19	No		-0.90	1.53	40
Cell 4	19	25	No		-0.98	1.33	49

Notes:

Assortment perceptions were measured on a 5-point scale where 1 = very little variety and 5 = excellent variety.

Mean differences are the assortment rating of shopping trip 6 minus the assortment rating of shopping trip 1.

Cell 1 corresponds to control condition.

Hypothesis 1 predicted that the favorite available cue would moderate the effect of SKU reduction on consumer assortment perceptions. In support, the results show the influence of the favorite available cue with consumer assortment perceptions significantly higher when low-preference (cell 2 = -0.14) rather than high-preference (cell 3 = -0.90) SKUs are removed ( $F = 7.83, p < 0.01$ ). Moreover, a comparison to the control condition shows that when favorite alternatives are available, assortment perceptions are not adversely affected by reductions in category space and SKUs (cell 1 = -0.07 versus cell 2 = -0.14,  $F = 0.10, p > 0.74$ ). Thus, consumer use of the favorite available cue appears to allow retailers to reduce SKUs without lowering assortment perceptions.

Hypothesis 2 predicted that the category space cue would moderate the effect of SKU reduction on consumer assortment perceptions. Results show that holding category space constant (cell 4 = -0.98) rather than reduced (cell 3 = -0.90) had no effect in offsetting the negative reaction from SKU reduction and removal of favorite brands ( $F = 0.10, p > 0.74$ ). Thus, we do not see support for the category space cue. Note, however, that this was a tough test of Hypothesis 2, because category space was pitted against both SKU reduction and the favorite available cue. Study 2 provides a cleaner test of the effect of category space hypothesis.

In summary, Study 1 provides strong evidence of the influence of the favorite available cue. When favorite SKUs were available, consumer assortment perceptions were unaffected by a reduction in the number of SKUs offered or by changes in the category space. When favorite items were not available and SKUs were eliminated, consumers' assortment perceptions fell.





# Study 2

## Overview

In Study 2, we switched the focus to those situations in which favorite alternatives are available, since retailers altering categories will clearly try to maintain those items that their shoppers want. From Study 1 we saw that a 25 percent reduction in category space and items has no impact on assortment perceptions if the favorite alternatives are present. This study goes beyond the 25 percent level of space and item reduction to examine the impact of 50 percent and 75 percent reductions.

The study context involved subjects going on simulated shopping trips at two stores, a base store that offered the full range of SKUs and a test store that offered fewer SKUs. On each shopping trip, subjects made a selection in the focal category of microwavable popcorn. This allowed us to investigate the impact of changes in category space and SKU count on both assortment perceptions and store choice. If assortment perceptions are unaffected by changes in category space and SKU count, then store choice should be similarly unaffected.

Finally, we address some of the limitations of Study 1. First, the visual realism of the stimuli was increased by constructing full-size mock shelf displays using high-quality color copies of actual package facings. Adding the visual element offers a fairer test of the category space heuristic. Second, we moved to a more representative sample of “real world” consumers. Third, the assortment scale was reworded, and multi-item measures of assortment were collected. The rating scale used in Study 1 (very little to excellent variety) was a somewhat evaluative measure of subjects’ perceptions of the total number of items offered. In Study 2, subjects were asked directly whether they perceived more or less variety and number of items offered at the test compared to base store.

*Experimental Design.* In this study, a 3 (SKU count) x 2 (category space) x 2 (store order) x 2 (question order) between-subjects design was employed. The favorite available cue was measured as a covariate. The SKU count factor compared a base level of 48 SKUs to test levels of 36, 24, and 12 SKUs. Only low-preference SKUs were deleted. The 25 percent fewer SKUs (36 SKUs) was included for comparison to Study 1. The 50 percent fewer SKUs (24 SKUs) was included as a manipulation where differences may or may not be noticed, whereas the drastic change in the 75 percent fewer SKUs (12 SKUs) was expected to be noticed by consumers.

Category space was a factor that varied whether popcorn shelf space in the test store equaled or was less than popcorn category space in the base store. To reduce SKUs while holding category space constant means either that the eliminated SKU facings become empty space in the category display or the eliminated SKUs are replaced with duplicate facings of the retained SKUs. In line with efficient assortment principles, when category space was constant, facings of dropped items were replaced with duplicate facings of the most-preferred items.

The store order factor varied whether subjects saw the test store with fewer SKUs before or after the base store. The question order factor varied whether subjects responded first to the assortment perception or store choice question. Both factors were counterbalanced across subjects.

*Stimulus Materials.* The simulated shopping environment utilized mock shopping aisles with the focal popcorn category in the middle and the filler categories of laundry detergent and breakfast bars constant on either side. Each aisle was a constant 60" high. In the base store, the laundry detergent, popcorn, and breakfast bar categories covered 120, 80, and 80 linear inches, respectively. The popcorn shelf in the base store had 48 SKUs with one slot per item. To be consistent with actual store shelves and to make the shelves appear fully stocked, smaller boxes (three-pack and snack) were stacked so that there were two facings per slot. The layout of the category was a compilation of layouts from leading grocery stores in the test area.<sup>2</sup>

SKU reduction in the test store involved eliminating the low preference SKUs. A pretest was conducted using 70 staff members at a large university to assess SKU preference. Pretest subjects were shown a list of 48 microwavable popcorn items and asked to rank the 5 products that they would be most likely to buy.

Aggregating across subjects yielded a preference rank-order of the 48 test items. In the 25 percent, 50 percent, and 75 percent reduction conditions, the least-preferred 12, 24, and 36 SKUs were dropped, respectively.<sup>3</sup>

In the constant category space condition, additional slots of the most-preferred 12 SKUs were added to replace dropped items so that the total space allocated to the category remained the same. Thus, in the base store the top 12 SKUs received 1 slot each. These items received 2, 3, and 4 slots in the test stores for the 25 percent, 50 percent, and 75 percent SKU reduction/category space constant conditions, respectively. Special care was taken to have consistent item positioning between the different conditions. That is, if an item was positioned in the upper left-hand corner in the base shelf condition, it retained this position if available in other conditions.

*Procedure.* The study was conducted in conjunction with a statewide junior volleyball tournament that was taking place at a convention center in a medium-sized southwestern city. Two hundred twenty-nine subjects were recruited for participation and received a free gift and a financial donation to their volleyball organization for their participation. The sample appeared to be fairly representative of the primary target markets for microwavable popcorn (Blake 1995), with most subjects female (81 percent) and between the ages of 35 and 54 (54 percent) or teenagers (28 percent).

The experiment was conducted in a room adjacent to the tournament. Upon arrival at the experimental room, subjects were told that a consumer group was interested in how people buy products in a grocery store. They were told to imagine that they were at a grocery store, needed to buy a box of microwavable popcorn, and had five dollars to spend (the highest priced microwavable popcorn item was \$4.99 for a 10-pack box). To motivate both realistic choices and use of price,

they were told that their free gift would most likely be one of their selections and that the leftover money would be donated to their volleyball organization.<sup>4</sup>

After reading these instructions, subjects were led to the first store aisle. The order of stores was counterbalanced such that half of the subjects started with the base store and the other half began with the test store. Subjects were told to select a popcorn alternative as they normally would in a real store. After making a selection, subjects were asked to indicate which item they chose and why they selected it. No mention of assortment was made.

After completing this sequence, subjects were led to the second aisle, where the procedure was replicated. Subjects were instructed to imagine that one month had transpired since the first shopping trip and that they had eaten all the popcorn. They could buy the same or a different product from the one previously selected. After making a second selection and supplying their choice rationale, subjects were led to a table where they filled out a questionnaire containing the key dependent variables. The procedure took approximately 15 minutes to complete.

### **Dependent Measures**

The key dependent variables were perceptions of assortment and store choice. The order of assortment and store choice questions was counterbalanced. The availability of a subject's favorite popcorn alternative was measured and a manipulation check assessed perceptions of category space.

Perceived assortment was assessed on a relative scale that compared assortment at the first "store" to assortment at the second "store." Shoppers were first asked to rate the general relative assortment of microwavable popcorn offered at the stores on a nine-point scale where 1 = first store has much more variety than second store, 5 = first and second stores have about the same variety, and 9 = second store has much more variety than first store. On a following page, specific questions assessed six additional dimensions of assortment perceptions including the total number of items, brands, package sizes, price ranges, flavors, and nutrition types offered. All dimensions were assessed using a nine-point relative scale where 1 = first store has many more (items, brands, sizes, etc.) than second store, 5 = first and second stores have about the same (items, brands, sizes, etc.), and 9 = second store has much more space than first store.

To measure store choice, subjects were asked to indicate whether they would prefer to shop at the first store or the second store, or if they had no preference between stores. For each store, subjects were also asked to indicate on a yes/no scale whether their favorite popcorn alternative was available. Subjects were also asked to indicate their impression of the amount of shelf space devoted to the popcorn category on a nine-point scale similar to the one used for the assortment questions.



# Study 2 Results

## Manipulation Checks

The category space manipulation check confirmed that subjects were more likely to perceive that the test store had less space when the space was reduced ( $M = 3.66$ ) than held constant ( $M = 4.26$ ) [ $F(1,223) = 11.10, p < 0.001$ ]. Examination of the favorite available responses showed that the favorite item became less available as SKU reduction increased [ $F_{\text{linear}}(1,220) = 12.92, p < 0.001$ ] with the favorite unavailable for 7 percent, 21 percent, and 30 percent of subjects as SKU count was lowered in the test store by 25 percent, 50 percent, and 75 percent, respectively.

## Assortment Perceptions

A coefficient alpha was calculated for the seven questions dealing with assortment perceptions: general variety, total number of items, number of brands, number of package sizes, number of price ranges, number of flavors, and number of nutrition types. Two items were deleted due to low item-to-total correlations (the number of prices offered and the number of nutrition types), and the remaining five items had a coefficient alpha of 0.86 indicating sufficient reliability (Nunnally 1978). The composite assortment measure averaged these five questions. For reporting results, all rating scales were converted such that  $-4 =$  base store had more assortment than test store,  $0 =$  base and test store had same assortment, and  $+4 =$  test store had more assortment than base store.

The initial analysis was an ANCOVA with independent variables of SKU count, category space nested in SKU count, store order, question order, and with presence of favorite available as a covariate.<sup>5</sup> The factors of store order and question order were not significant ( $p > 0.20$ ) and hence all results are reported collapsing these factors. Means are presented in Table 2 with a negative cell mean indicating that the test store was perceived as offering less assortment than the base store.

**Table 2. Assortment Means from Study 2****A. Overall Means Adjusted for Favorite Available**

SKU	Space Constant			Space Reduced			Total
	Means	se	n	Means	se	n	
25%	+0.36	0.23	38	-0.33	0.24	37	+0.01
50%	-0.60*	0.24	38	-1.17*	0.23	38	-0.89*
75%	-1.07*	0.23	35	-1.99*	0.23	40	-1.53*
Total	-0.44*	0.14	111	-1.16*	0.13	114	

**B. Means for Favorite Available Only**

SKU	Space Constant			Space Reduced			Total
	Means	se	n	Means	se	n	
25%	+0.49*	0.20	35	-0.14	0.30	32	+0.17
50%	-0.43	0.25	32	-1.20*	0.30	28	-0.81*
75%	-0.94*	0.27	25	-1.99*	0.28	27	-1.46*
Total	-0.29	1.44	92	-1.11*	1.74	87	

**C. Means for Favorite Not Available Only**

SKU	Space Constant			Space Reduced			Total
	Means	se	n	Means	se	n	
25%	-.60	2.0	2	-1.60	0.58	3	-1.10
50%	-1.40*	0.44	6	-1.24*	0.43	10	-1.32*
75%	-1.60*	0.21	9	-2.22*	0.39	13	-1.94*
Total	-1.20*	1.07	17	-1.69*	1.38	26	

Notes:

Assortment perceptions were measured on 9-point scale with:

-4 = base store more assortment

0 = same assortment at test and base stores

+4 = test store more assortment

\* = cell difference from scale midpoint significant at  $p < 0.05$ 

se = standard error

n = sample size

The results show that the SKU count factor was significant ( $F(2,208) = 20.14$ ,  $p < 0.001$ ) with a significant linear trend such that assortment perceptions decreased as the magnitude of SKU reduction increased,  $F_{\text{linear}}(1,208) = 20.36$ ,  $p < 0.001$ ). Note, however, that the 75 percent reduction level was included as a condition that was highly likely to be noticed and to lower assortment perceptions. More importantly, one of the purposes of this study was to empirically examine whether there was a threshold at which consumers would perceive SKU reduction. Consistent with the results of Study 1, a SKU reduction of 25 percent appeared to go unnoticed by subjects ( $M_{25} = +0.01$ ). Analysis of the 25 percent SKU reduction mean relative to the scale midpoint (indicating that the base and test had about the same assortment) shows no significant difference ( $p > 0.93$ ). That is, subjects perceived that the base and test store offered the same level of assortment even though the test store actually offered 25 percent fewer SKUs. Thus, consumer assortment

perceptions were not a direct function of the number of SKUs as consumers did not appear to notice SKU reductions below a 25 percent level. On the other hand, consumers did perceive that the test store offered less variety than the base store when SKUs were reduced by 50 percent ( $M_{50} = -0.89$ ,  $p < 0.01$ ) and 75 percent ( $M_{75} = -1.53$ ,  $p < 0.01$ ).

Consistent with Hypothesis 1, the favorite available covariate was significant ( $F(1, 208) = 4.67$ ,  $p < 0.04$ ), indicating that assortment perceptions were a function of whether the favorite alternative was present. In the face of SKU reduction, subjects were less likely to lower their assortment perceptions when their favorite SKU was present ( $M = -0.62$ ) than absent ( $M = -1.63$ ).

Consistent with Hypothesis 2, maintaining the size of the category space was able to significantly attenuate the lowering of assortment perceptions due to elimination of SKUs ( $F(3,208) = 4.92$ ,  $p < 0.01$ ). Subjects were less likely to lower their assortment perceptions when the category space was held constant ( $M = -0.44$ ) than when it was reduced ( $M = -1.16$ ). Thus, when controlling for the favorite available cue, the category space cue exerted a significant influence on consumer assortment perceptions.

A further interesting issue is the sensitivity of consumers to SKU reduction when the favorite available and category space cues are positive (i.e., favorite item is available and shelf space is held constant). In this case, our results show that subjects were again sensitive to SKU reduction ( $F(1, 90) = 8.99$ ,  $p < 0.001$ ). However, examination of the cell means and comparison to the scale midpoint reveals several interesting findings. In the 25 percent SKU reduction condition, subjects actually perceived that the test store had *more* assortment than the base store ( $M = +0.49$ ) and this difference was significant ( $t(1, 34) = 2.40$ ,  $p < 0.03$ ). Thus, rather than SKU reduction lowering assortment perceptions, a moderate SKU reduction *increased* consumer assortment perceptions. Furthermore, although consumers lowered their assortment perceptions in the 50 percent condition ( $M = -0.43$ ,  $t(1,31) = 1.68$ ,  $p < 0.11$ ), this difference was not statistically significant. Though the low power of this test may be an issue, the fact that subjects are only marginally sensitive to a 50 percent reduction is provocative. Finally, as expected, subjects did significantly lower their assortment perceptions when SKU reduction reached a 75 percent level ( $M = -0.94$ ,  $t(1,24) = 3.43$ ,  $p < 0.01$ ).

### **Store Choice**

The third hypothesis examines the relationship between assortment perceptions and store choice. Following Holbrook's (1981) procedure, we tested a two-stage model wherein the objective cues (SKU count, favorite available, category space) determine assortment perceptions, which in turn affects store choice. Store choice was analyzed using logistic regression with the dependent variable dichotomized into choosing the test store or indicating no store preference (i.e., SKU reduction had a positive or null effect on test store choice) versus choosing the base store (i.e., SKU reduction had a negative effect on test store choice). The reported logits take as their dependent variable the probability of "choosing the test store or indicating no store preference" (hereafter referred to as test\* store).

The three-level factor of SKU count was converted to two variables, SKU50 and SKU75, that examine the effect of increasing SKU reduction relative to the 25 percent level. Note that the 25 percent SKU reduction level serves as an appropriate control, because an examination of store choice frequencies for this condition found the majority of subjects (61 percent) indicating no store preference where the rest were equally split between base (22 percent) and test (17 percent) preference ( $\chi^2 < 1$ ). Thus, a 25 percent reduction in SKUs had no effect on store choice. The two-stage model results with standardized beta coefficients are shown in Table 3.

**Table 3. Test for Two-Stage Model of Assortment Perceptions**

Link 1	Choice = +0.71* (AP)
Link 2	Choice = -0.21* (SKU50) - 0.29* (SKU75) - 0.43* (FAV) - 0.26* (SPACE)
Link 3	AP = -0.26* (SKU50) - 0.45*(SKU75) - 0.13* (FAV) - 0.22* (SPACE)
Link 4	Choice = +0.62* (AP) - 0.07 (SKU50) - 0.05 (SKU75) - 0.41* (FAV) - 0.14 (SPACE)

Notes:

Choice = probability of “choosing test store or no store preference” options over base store.

AP = assortment perceptions on 9-point scale where 1 = base store had more variety than test store and 9 = test store had more variety than base store

SKU50 compares the 50 percent to 25 percent SKU reduction level.

SKU75 compares the 75 percent to 25 percent SKU reduction level.

FAV compares favorite not available to favorite available.

SPACE compares category space reductions to category space constant.

\* = coefficient significant at  $p < 0.05$  level

To establish that assortment perceptions may be intervening variables between the objective cues and store choice, four paths or links must be established. The most critical link to establish is that assortment perceptions do indeed affect store choice. The logistic regression confirmed Link 1, with the probability of choosing the test\* store positively related to assortment perceptions of the test store ( $b = 0.71$ ,  $\chi^2 = 41.09$ ,  $p < 0.001$ ). That is, subjects were more likely to choose “the test store or indicate no store preference” as their perceptions of the assortment offered at the test versus base store increased.

Second, there must be a significant main effect for each of the objective cues on store choice. A logistic regression showed that Link 2 was satisfied, with the likelihood of choosing the test\* store significantly decreasing as the magnitude of the SKU reduction increased to 50 percent ( $b = -0.21$ ,  $\chi^2 = 3.90$ ,  $p < 0.05$ ) and 75 percent ( $b = -0.29$ ,  $\chi^2 = 7.50$ ,  $p < 0.01$ ), the favorite product was not available ( $b = -0.43$ ,  $\chi^2 = 22.87$ ,  $p < 0.001$ ), and the category space was reduced ( $b = -0.26$ ,  $\chi^2 = 8.44$ ,  $p < 0.01$ ). Thus, the cues of SKU count, favorite available, and category space were all significantly related to store choice.

The next link (Link 3) is that there must be a significant relationship between the objective cues and assortment perceptions. Consistent with the previously dis-



cussed ANCOVA results, the regression results confirm this link with assortment perceptions of the test store significantly decreasing as the magnitude of the SKU reduction increased to 50 percent ( $b = -0.26$ ,  $t = -3.83$ ,  $p < 0.001$ ) and 75 percent ( $b = -0.45$ ,  $t = -6.45$ ,  $p < 0.001$ ), the favorite product was not available ( $b = -0.13$ ,  $t = -2.19$ ,  $p < 0.03$ ), and the category space was reduced ( $b = -0.22$ ,  $t = -3.79$ ,  $p < 0.001$ ).

Finally, Link 4 shows that the objective cues influence store choice through assortment perceptions. Confirmation of the intervening assortment construct occurs if the effect of the objective features is significantly reduced when store choice is regressed on the objective cues plus assortment perceptions. Supporting Hypothesis 3, a logistic regression shows that when assortment perception is added to the model, the likelihood of choosing the test\* store is positively related to the assortment perception of the test store ( $b = 0.62$ ,  $\chi^2 = 23.86$ ,  $p < 0.001$ ) and the objective cues of SKU reductions of 50 percent ( $b = -0.07$ ,  $\chi^2 = 0.33$ ,  $p > 0.56$ ) and 75 percent ( $b = -0.05$ ,  $\chi^2 = 0.15$ ,  $p > 0.69$ ) and category space ( $b = -0.14$ ,  $\chi^2 = 2.02$ ,  $p > 0.15$ ) are no longer significant, although the favorite available cue remains significant ( $b = -0.41$ ,  $\chi^2 = 18.28$ ,  $p < 0.001$ ). Thus, it appears that the construct of assortment perception captures the effects of SKU count and category space on store choice, but the favorite available cue exerts a direct effect on store choice as well as an indirect effect through assortment perceptions.

In summary, we find support for the impact of the SKU count, favorite available, and category space cues on assortment perceptions and store choice. These cues were found to affect store choice through assortment perceptions, with the favorite available cue also having a direct link to store choice. Moderate reductions of 25 percent SKUs did not negatively affect consumer assortment perceptions nor store choice. Therefore, the threshold for consumer sensitivity to SKU reduction appeared, in this case, to be between 25 and 50 percent if favorite items were available and category space was not reduced.



# Discussion

The efficient assortment initiative proposed in the 1993 Kurt Salmon study, “Efficient Consumer Response: Enhancing Consumer Value in the Grocery Industry,” suggests that retailers might be able to reduce costs and therefore increase operating profit by reducing the number of items that they carry. Category managers have resisted this initiative based on a fear that eliminating items would lower assortment perceptions, store evaluations, and sales.

Results of our two studies suggest that the potential risk inherent in item reduction is more limited than one might initially guess. Consumer assortment perceptions were found to be significantly affected by the simple cues of availability of a favorite item and amount of space devoted to the category in addition to the more effortful cue of the total number of SKUs offered. Consumer utilization of these simpler cues appeared to enable 25 percent reductions in the number of items carried without a negative effect on assortment perceptions. Further, if favorite items are available and category space is held constant, our Study 2 results suggest that the threshold for perceiving a reduction in items is somewhere between 25 and 50 percent. Future research is needed to pinpoint this precise level.

It is important to note that this suggestion does not imply that actual SKU count is unimportant. Rather, the key point is that the cues of favorite available and category space may attenuate the impact of SKU reduction and raise the level of the threshold at which consumers notice a difference. An interesting topic for future research would be to identify individual differences (e.g., variety seeking, need for cognition) and situational factors (e.g., new store visit, memory-based versus in-store assessment) that may affect the influence of these cues in consumer assortment perceptions.

Study 2 results also show that the favorite available, category space, and SKU count cues affect store choice *through* assortment perceptions. Thus, if SKU reduction does not negatively affect assortment perceptions, there should be no adverse effect on store choice. In support, we found that a 25 percent reduction in SKUs had no impact on store choice. In fact, there may be a positive effect. In Study 2, we found that a 25 percent SKU reduction *increased* consumer assortment perceptions when low-preference SKUs were eliminated and their category space was replaced with duplicate facings of the most popular SKUs. Perhaps for subjects using the favorite available cue it was now easier to find their desired products.

Thus, given the current overproliferation of SKUs (Jager 1996), there may be considerable latitude for retailers to cut SKUs without negatively affecting the availability of favorite products for the majority of consumers. Using the simple rule of eliminating low-selling items, we found that a 25 percent SKU reduction resulted in only 7 percent of subjects finding their favorite product unavailable. Further, even if a few consumers perceive a marginal difference and slightly lowered assortment perceptions, increased profitability due to lower inventory and restocking costs as well as fewer out-of-stocks might still make these assortment reductions

worthwhile. Finally, more sophisticated rules for SKU elimination that factor in market segmentation and the substitutability of SKUs for satisfying each segment may allow for a greater magnitude of SKU reduction without negatively affecting the favorite available cue.

### **Evidence from the Field**

Since Studies 1 and 2 were conducted in tightly controlled laboratory environments, one could question the extent to which these findings would generalize to a “real world” shopping situation. Although not designed to specifically test the current hypotheses, as part of an ongoing project for a major convenience store chain, we were able to study shoppers’ reactions to dramatic item reductions in an actual store environment.<sup>6</sup> In two test stores, approximately half (54 percent) of the low-selling SKUs were eliminated in five categories (candy, beer, soft drinks, salty snacks, and cigarettes) that accounted for 80 percent of the convenience chain sales while holding category space constant. Results from these test stores were compared to two matched control stores.

In-store intercepts with 62 test and 80 control store shoppers who came to purchase one of the five target categories were conducted approximately two to three weeks after SKUs were eliminated. Each shopper was interviewed for one category purchase concerning his/her perception of assortment (1 = low variety to 5 = high variety), perceptions of category change, ability to find wanted items in that category, and ease of shopping (1 = very easy to 5 = very difficult). Results showed that for the five target categories in aggregate, there was no difference in perceptions of variety between the test ( $M = 3.99$ ) and control ( $M = 3.96$ ) stores ( $t(1,140) = -0.21$ , n.s.). Further, each of the five categories also showed nonsignificant changes in assortment perceptions. This null result may have been due to the fact that only one shopper reported not being able to find a desired item. Only 15 shoppers in the test stores noticed a change. However, 6 of these shoppers actually thought that more items were available. Thus, only 9 shoppers (15 percent) noticed that there were fewer items in the test stores. Further, respondents reported finding it easier to shop in the test store ( $M = 1.36$ ) than in the control store ( $M = 1.63$ ,  $t = 2.87$ ,  $p < 0.01$ ).

Thus, consistent with our laboratory experiments, the results of this field study show that eliminating half of the items in five key categories had little effect on shopper perceptions of the assortment offered as long as favorite items were available and category space held constant. Interestingly, although they were generally not aware of a reduction in the offerings at the test stores, shoppers did report that test stores were easier to shop. There was some indication that this positive impact carried over to sales with store sales higher (2 and 8 percent) at the test compared to control stores, although these increases were statistically nonsignificant.<sup>7</sup>

### **Assortment Cue Survey and Future Research**

The current research examined the impact of only two cues that may play a role in forming assortment perceptions. An interesting topic for future research would involve an identification of other important cues that may further influence this process. To get a sense of what assortment cues might be operating, we conducted a survey of 119 consumers from a medium metropolitan city. These consumers were

randomly polled by telephone to generate a list of assortment cues and to assess cue importance for assortment perceptions in one of four product categories (popcorn, salty snacks, laundry detergent, and soft drinks). Specifically, respondents were first asked to generate a list of assortment cues (using an open-ended question) as well as to rate the importance of nine preselected factors (on a scale of 1 = unimportant to 5 = very important for assortment). In the open-ended portion of the survey, some of the most frequently mentioned cues were the number of brands/items, the size of the shelf space, and the number of package colors. Note, however, that most of these cues (with the exception of shelf space) involve some counting or processing of the display. If low-involvement consumers do not process the display in detail (as we argued earlier), it may be that consumers use some other cues to make these quantity judgments. Thus, further research may be needed to uncover more subtle cognitive processes that are employed to make assortment perceptions.

In terms of importance, the highest ratings were given to “availability of favorite product” ( $M = 4.24$ ), “ease of finding products” ( $M = 4.02$ ), and “range of prices” ( $M = 3.77$ ). Taken together with the results of the open-ended responses, this suggests that there may be two dimensions of assortment perceptions.<sup>8</sup> One dimension focuses more on cognitive aspects related to the “count” of items available (e.g., number of brands, items, sizes, or flavors). The other dimension might be considered more affective in nature and relates to “fit to needs” (e.g., availability of favorite product or ease of shopping). The current study focused on the cognitive dimension and tapped only one cue that might be related to the affective dimension (i.e., availability of favorite). Note, however, that the results of Study 2 tentatively support this two-dimension model of assortment perceptions as the favorite available cue was shown to have a direct link to store choice that was not fully captured by our cognitive measure of assortment.

An interesting topic for future research might investigate the role of affectively based assortment perceptions more thoroughly, especially since the importance of these two dimensions might vary across consumers. For example, the “count” dimension might be important for consumers who do not possess strong preferences or whose needs change, requiring a wide selection. “Fit to needs,” on the other hand, might be more critical for those consumers who buy the same brands on a consistent basis or consumers with expertise in the product category, because they are more likely to have well-defined preferences.

### **Limitations**

A limitation of Studies 1 and 2 is that only one product category was examined. An important question for future research would focus on the extent to which the findings would generalize to other product categories. Note, however, that tentative results from the field study (where five different categories were examined) would suggest that these findings may be fairly robust. Nevertheless, there may be certain features of a category that make consumers more or less sensitive to SKU reductions. For example, in categories with fewer brands, a change may be more noticeable than in categories with a large number of brands. Likewise, categories with a smaller display may similarly be affected.

Future research is also needed to determine whether the assortment perceptions for certain categories play a more influential role in store choice than other product categories. In addition, Studies 1 and 2 did not examine the impact of SKU reductions and category space changes when multiple categories are altered. Again, the field study provides preliminary evidence that changing a number of key categories at the same time will not adversely affect assortment perceptions and store sales, but future research is still needed to address these important issues.

# Conclusion

Industry studies have urged grocery retailers to consider the cost of carrying such a broad number of SKUs in each product category. Grocery retailers have been hesitant to adopt efficient assortment because of concerns that reducing the number of SKUs they carry will lower consumer assortment perceptions and consequently reduce the likelihood that consumers will shop at their store. Our results suggest that grocers may make moderate reductions to the number of items offered without negatively affecting assortment perceptions.





# Notes

1. Consistent with Keppel (1982, p. 147), we restrict the number of comparisons to the number of degrees of freedom associated with the treatment source ( $df = 3$ ).
2. Generally, store brands were placed in the center of the category display and served as a boundary between Orville Redenbacher and Pop Secret. Six-pack sizes filled half of the display with butter flavors at eye level, extra butter on the top shelf, and low fat below eye level. Gourmet brands were placed on the bottom shelf.
3. Note that the pretest results have face validity with 1995 microwavable popcorn sales, with Orville Redenbacher accounting for 46 percent sales and butter flavor accounting for 83 percent in actual sales (Snack Food Association 1996) versus 50 percent and 75 percent in the pretest's most-preferred 12 SKUs, respectively. Furthermore, the most-preferred 12 SKU set had offerings appealing to both the health-conscious (light and low fat) and flavor-oriented (movie butter and cheddar cheese) segments and a range of different sizes.
4. When subjects were finished with the questionnaire, they rolled a die to determine their free product. In order not to draw undue attention to popcorn and the true nature of the study around the convention center, participants could receive either popcorn choice 1, popcorn choice 2, laundry detergent, or breakfast bars.
5. A MANOVA analysis produced the same pattern of results as did analyses using the single item measure of variety.
6. While convenience stores do not contain as many categories as the typical grocery store, a focus group study revealed that consumers perceived high assortment for single-serving packages within the key categories in the store (e.g., soft drinks, cigarettes) (Azzato 1997).
7. Analyses compared actual to predicted test store sales. A model was fit between test and control store sales using two years of weekly sales data. Based on this model, control store sales during the experimental period were then used to predict test store sales.
8. The authors would like to express their appreciation to an anonymous reviewer for suggesting this idea.



# References

- Alba, Joseph W., J. Wesley Hutchinson, and John G. Lynch, Jr. (1991), "Memory and Decision Making." In *Handbook of Consumer Behavior*, eds. Thomas S. Robertson and Harold H. Kassarian, 1-49. Englewood Cliffs, NJ: Prentice Hall.
- Arnold, Stephen J., Tae H. Oum, and Douglas J. Tigert (1983), "Determining Attributes in Retail Patronage: Seasonal, Temporal, Regional, and International Comparisons." *Journal of Marketing Research* 20 (May), 149-57.
- Azzato, Maureen (1997), "Consumer Focus Groups." *Convenience Store News* 33 (June 2), 79-82.
- Berlyne, D. E. (1971), *Aesthetics and Psychobiology*. New York, NY: Appleton-Century-Crofts.
- Blake, Judith (1995), "Pop Star: Long Part of Movie Ritual, Popcorn's Exploded at Home, Too." *Seattle Times* (March 22), F1.
- Brunswik, Egon (1955), "Representative Design and Probabilistic Theory in a Functional Psychology." *Psychological Review* 62 (May), 193-217.
- Craig, C. Samuel, Afijit Ghosh, and Sara McLafferty (1984), "Models of Retail Location Process: A Review." *Journal of Retailing* 60 (Spring), 5-36.
- Dickson, Peter R., and Alan. G. Sawyer (1990), "The Price Knowledge and Search of Supermarket Shoppers." *Journal of Marketing* 54 (July), 42-53.
- Dreze, Xavier, Stephen J. Hoch, and Mary E. Purk (1994), "Shelf Management and Space Elasticity." *Journal of Retailing* 70 (4), 301-26.
- Easley, J. A., Jr. (1978), "Four Decades of Conservation Research." In *Knowledge and Development: Piaget and Education*, Vol. 2, eds. J. M. Gallagher and J. A. Easley, Jr., 139-76. New York: Plenum Press.
- Food Marketing Institute (1992), "Alternative Store Formats: Competing in the Nineties." Report #9-511.
- \_\_\_\_\_ (1993), "Variety or Duplication: A Process to Know Where You Stand." Prepared by Willard Bishop Consulting and Information Resources, Inc., in cooperation with Frito Lay.
- Hauser, John R., and Birger Wernerfelt (1990), "An Evaluation Cost Model of Consideration Sets." *Journal of Consumer Research* 16 (March), 393-408.
- Holbrook, Morris B. (1981), "Integrating Compositional and Decompositional Analyses to Represent the Intervening Role of Perceptions in Evaluative Judgments." *Journal of Marketing Research* 18 (February), 13-28.

- Hoyer, Wayne D. (1984), "An Examination of Consumer Decision Making for a Common, Repeat-Purchase Product." *Journal of Consumer Research* 11 (December), 822-9.
- Inman, J. Jeffrey, Leigh McAlister, and Wayne D. Hoyer (1990), "Promotion Signal: Proxy for a Price Cut?" *Journal of Consumer Research* 17 (June), 74-81.
- Jager, Durk (1996), "General Session-Opening Remarks." *Presentation to Joint Industry ECR Conference*, Chicago Hilton Towers, March 21.
- Keppel, Geoffrey (1982), *Design and Analysis: A Researcher's Handbook*, 2nd ed. Englewood Cliffs, NJ: Prentice Hall.
- Krum, Franklin (1994), "Quantum Leap." *Progressive Grocer* (January), 41-3.
- Kurt Salmon Associates (1993), "Efficient Consumer Response: Enhancing Consumer Value in the Grocery Industry." Food Marketing Institute Report #9-526, Washington, D.C. (January).
- Levy, Michael, and Barton A. Weitz (1995), *Retailing Management*, 2nd ed. Chicago: Irwin.
- Louviere, Jordan J., and Gary J. Gaeth (1987), "Decomposing the Determinants of Retail Facility Choice Using the Method of Hierarchical Information Integration: A Supermarket Illustration." *Journal of Retailing* 63 (1), 25-48.
- Marks, Lawrence E. (1974), *Sensory Processes: The New Psychophysics*. New York, NY: Academic Press.
- Nunnally, J. C. (1978), *Psychometric Theory*, 2nd ed. New York, NY: McGraw-Hill.
- Snack Food Association (1996), personal communication, May 10.