

EFFECTS OF STOCKOUTS ON PURCHASE BEHAVIOR AND RETAIL PATRONAGE: AN EXPERIMENTAL INVESTIGATION

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ABSTRACT

A longitudinal field experiment was conducted to assess the effects of out-of-stock conditions both during and after the stockout occurred. Findings suggest that when a brand goes out of stock, low-share brands tend to pick up more sales than high-share brands. After the stockout brands were reintroduced a moderate negative carryover effect was the result, with other low-share brands reaping a moderate positive carryover effect. When a brand was reintroduced at a higher price (than its pre-stockout level) a moderate positive carryover effect resulted. During the stockouts, customers did shop in other outlets. However, no negative consequences seemed to be present in terms of patronage behavior once the brand was again available at the regular outlet.

INTRODUCTION

An area of major concern for many retailers and manufacturers is inventory control and availability of product brands at the retail level (Mason & Mayer 1984). Conventional marketing wisdom holds that stockout conditions are likely to lead to negative consequences, both short run and long run (Ingram, Brown & Earle 1969; Schary & Becker 1978). In the short run, immediate sales are lost due to unavailability of the manufacturer's brand at the point of purchase. In the long run, the manufacturer might face deterioration in brand loyalty. Customers who might otherwise have purchased the brand may switch to other brands in order to meet immediate needs. Trial purchase of competing brands may be initiated among those who would otherwise be loyal users of the affected brand. This may eventually lead to a permanent switch in some instances. Of most concern to retailers is the possibility that the customer will become dissatisfied at the product assortment offered by the affected merchant and look for the brand somewhere else.

The frustration of finding the product out-of-stock may generate negative feelings toward the manufacturer, the retailer, or both.

While brand loyalty and stockout condition issues are deemed important by most marketers and are given attention in most marketing textbooks, surprisingly little empirical research has been published in this area. While theoretical attention has been devoted to this issue in the past (see Ehrenberg 1972 and Jacoby and Chestnut 1978 for example), empirical field work regarding stockout conditions is rather sparse.

REVIEW OF LITERATURE

An early study reported by Peckham (1963) involved supermarket shoppers. Interviews were conducted with 1,173 shoppers to assess the impact of stockout conditions on purchase intentions. Findings suggested a maximum potential loss of sales to other brands of 58 percent during the duration of the stockout condition. However, the study

did not assess the long-term consequences of stockout conditions such as negative carryover effects for the affected brand. Also, purchase intention, not actual purchase behavior, was measured in the shopper interviews.

Walter and Grabner (1975) developed a model of retail stockout behavior which focused on consumer decision alternatives. In an empirical investigation designed to evaluate the model, questionnaires were completed by 1,443 customers of ten Ohio liquor stores who experienced a stockout of the brand they had intended to buy. The questionnaire was designed to measure purchase intention, eliciting the respondent's reaction and possible behavioral response to the stockout. Results indicated that cost effects of stockouts vary widely depending on the item. An advantage of the design of the present study is that the measure will be actual purchase behavior rather than purchase intent. Perhaps this feature will provide greater insight into what actually occurs in the marketplace.

Schary and Christopher proposed a process model of stockout behavior (1979). Empirical testing of the model was undertaken by collecting cross-sectional data from shoppers in two British supermarkets. A total of 1,167 consumers were interviewed. Of these, 343 reported that they had experienced a stockout condition. While reactions varied, 47.9 percent stated that they had decided to search for the affected brand in other stores. Since actual behavior was not recorded, it was impossible for the researchers to measure the direct impact of the stockout on the relative market shares of the affected brand and its competitors. The authors conclude that stockout conditions certainly warrant further exploration and experimentation. The current study permits investigation of market share effects of stockouts by utilizing longitudinal experiments with a focus on actual behavioral consequences rather than consumer forecasts of what

they might do.

A longitudinal investigation of out-of-stock conditions was conducted by Charlton and Ehrenberg (1976). The study was considered a semi-artificial field experiment since purchase opportunities occurred at the subject's residence rather than occurring at an ordinary retail outlet, and since artificially coded brands (e.g., Brand M) were used. A quota sample of 158 housewives were visited at their doorstep each week for 25 weeks and presented a portfolio of products. A stockout condition for "Brand M" detergent occurred toward the end of the experiment. Subjects were told that this brand was temporarily out-of-stock. Although competing brands gained sales during this period, sales returned to their premanipulation levels after Brand M was again made available. Thus, no negative carryover effect in terms of long run sales of the affected brand was observed.

Motes (1985), closely following the methodology of Charlton and Ehrenberg (1976), systematically replicated the out-of-stock condition. "Brand M" bread encountered an out-of-stock condition in weeks 7-9 of an 18 week study. Unlike Charlton and Ehrenberg (1976), subjects in this study were not verbally alerted to the out-of-stock situation, nor were they told that it would be temporary. Competitive brands gained sales during the stockout period, although the increases were not statistically significant. Upon reintroduction of Brand M in week 10, no significant carryover effects were observed.

Motes & Castleberry (1985) systematically replicated the earlier studies of Motes (1985) and Charlton and Ehrenberg (1976) by including a new product category (potato chips) and utilizing actual brand names (e.g., Lay's, Charles Chips) instead of artificial codes (e.g., Brand M). As in prior studies, competitive brands gained sales during the

stockout period, and no significant carryover effects were observed.

The current study is considered a systematic replication of Charlton and Ehrenberg (1976), Motes (1985), and Motes and Castleberry (1985) with several additions. First, a new product category is being used. Second, an attempt will be made to assess customers' reactions to a higher-priced reintroduced product. In all prior studies, the out-of-stock brand has been reintroduced at its pre-stockout price. However, retailers may desire, or be required, to reintroduce the out-of-stock product at a higher price. Third, an assessment will be conducted of purchases made at competing retail outlets. Thus, for the first time in this type of research, we will not only be able to assess changes in sales in our own "store," but also the changes in terms of retail patronage. In conclusion, this field experiment was designed to answer the following research questions:

1. What happens to relative market shares when a brand temporarily goes out-of-stock and is then reintroduced at its original price?
2. What happens to relative market shares when a brand temporarily goes out-of-stock and then is reintroduced at a higher price?
3. What happens to retail patronage when a desired brand goes out-of-stock?

METHODOLOGY

A total of 181 households in one southern city participated in the stockout study. Quota requirements for participants included that they be users of the products under study and that they be able to participate the entire ten weeks. Prospective households were recruited by students, who provided general information about the study along with a postage paid reply card. The card allowed them to express an interest in participating as well as

provide quota requirement information. The 181 households were randomly assigned to three groups, hereafter designated as Blue, Green, and Red, before the experimentation began.

One-third of the sample listed their occupation as housewife, while 25% were teachers, 24% were from other professional occupations, 14% were retired, and 12% were non-professional workers. The breakdown by age was under-34 (18%), 35-40 (31%), 41-54 (21%), 55-64 (15%), and 65-over (14%). Sixty-nine percent were college graduates, with an additional 21% having completed some college education. The average number of people in the household was 2.9, with most (74%) having an annual income in excess of \$30,000. Appropriate tests of significance revealed no statistically significant differences between groups.

Several criteria were used to determine the product to be used in this study. Ideally, the product would have a short purchase cycle and have wide appeal among families. The product should have a fairly long shelf life and be easy to store and transport to subject households. For these reasons, disposable eight-ounce drink-packs were chosen as the product for this study. Two national brands (Brands A and B) and one strong regional brand (Brand C) were included. [Please note that in this study, actual brand names were used; we have disguised them in this paper to insure confidentiality for the manufacturer who sponsored the study.] Initial prices for the drink-packs were established after a series of visits to local grocery stores where the products were available and were set to reflect relative market price.

Each household was visited at two week intervals over a period of ten weeks for a total of five visits. The interviewer was to enter the subject's home at the appointed time and display the available products on a table. The subject had the opportunity to purchase

any brand of drink-pack on the table, or to purchase nothing at all. In addition, subjects were free to make purchases outside the study at other retail outlets. In this manner, subjects could "change stores" if they desired to obtain a brand that was either available or unavailable for purchase in the experimental "store." Subjects were administered questionnaires on the first visit, prior to being shown the products available. Information was obtained regarding product usage rates, brand loyalty, relative importance of various product attributes, and household demographics. Purchase diaries were left behind at the conclusion of visits one through four in order to monitor purchases made from outside the study. These purchase diaries were collected at each of the regular bi-weekly visits to the households. At the conclusion of the fifth and final visit, subjects were given another questionnaire that assessed attitudes, purchase intentions, and their perceptions of the objectives of the study. The study was conducted on a double-blind basis in which neither the subjects visited nor the students making the visits had any knowledge of the purpose behind the manipulation being made.

LIMITATIONS OF THE STUDY

Numerous controls were instituted to strengthen the integrity of this study. All questionnaires were pretested and subsequently revised prior to actual field use. However, limitations exist in all studies. Perhaps the greatest limitation is that the study was conducted in a semi-artificial setting. Hence, at the time of each visit, subjects had the opportunity to purchase or not to purchase only the three brands presented at the table. Even though this loss of realism by conducting the study at subjects' residences might be considered a limitation, it was deemed necessary in order to maintain strict control over manipulation and sources of variation. Customers were free to purchase the

products at a regular retail outlet between visits, however.

Due to the limitation of the setting, generalizations of results to other populations or groups is not attempted. Statistical analysis beyond the rigor of the measurements will not be undertaken. However, it should be noted that findings of past studies under similar conditions and limitations have been shown to be consistent with behavior in the real marketplace (Ehrenberg and Charlton 1973; Charlton and Ehrenberg 1976; Motes 1985).

ANALYSIS OF FINDINGS

Blue Group

The Blue group provides information with which to explore the first research question. Note that in the initial visits, Brand C had relatively higher sales than Brands A or B (Table 1). This is not surprising since Brand C is a strong regional brand. During the stockout of Brand A, both remaining brands had increased sales (Table 1). The most dramatic increase, however, was evidenced by another low-share brand (Brand B) which increased its share of sales by some 18 share points. The high share brand (Brand C) experienced a relatively modest increase of 10 share points. Thus, when the low share brand went out-of-stock, another low-share brand benefited more than the high share brand.

When Brand A was reintroduced to the Blue group in visits 4 and 5, its sales went up but fell 13 points short of its previous level of 29% (Table 1). One might argue that a moderate negative carryover effect occurred for this brand. It appears that a positive carryover effect occurred for Brand B (the other low share brand) since a gain of 15 share points was maintained even after the reintroduction of Brand A (Table 1). No significant carryover effect seemed to occur for Brand C.

TABLE 1

Percentage of Sales Made Within the Study Before, During, and After Several Out-of-State Conditions

Group/Brand	SALES PERCENTAGES		
	Before	During	After
Blue/Brand A ¹	29%	0%	16%
Brand B	20	38	35
Brand C	52	62	49
Green/Brand A	23	43	39
Brand B ¹	39	57	31
Brand C ¹	39	0	31
Red/Brand A ²	22	0	32
Brand B	27	41	22
Brand C	51	59	46

¹This brand went out-of-stock and was then reintroduced at its pre-stockout price.

²This brand went out-of-stock and was then reintroduced at a price 14% higher than its pre-stockout price.

TABLE 2

A Percentage Breakdown of Total Sales of Out-of-Stock Brands¹

Group/Stockout Brand	Pre-stockout ²		Post-stockout ²	
	Inside	Outside	Inside	Outside
Blue Brand A	84%	16%	89%	11%
Green Brand C	89	11	100	0
Red Brand A	100	0	92	8

¹Only out-of-stock brands are included. The "inside vs. outside" sales of other brands was fairly constant.

²"Inside" refers to the percentage of total sales of that brand that occurred within the study itself.

"Outside" refers to the percentage of total sales of that brand that took place outside the study (recorded by purchase diaries).

Green Group

The Green group provides additional information for research question one. When Brand C went out-of-stock both remaining brands had increased sales, although the largest increase went to the relatively low-share Brand A (Table 1). When Brand C was reintroduced, its sales failed to reach its pre-stockout levels. However, the same can be said for Brand B, so this phenomenon is not necessarily due to consumers' adverse reaction to the stockout. Brand A retained its increased sales that it had gained during the stockout. Thus a moderate positive carryover effect seems to have occurred for Brand A. Slight negative carryover effects were apparent for Brands B and C.

Red Group

What happens to relative sales levels when a brand temporarily goes out-of-stock and then is reintroduced at a higher price? The Red group (Table 1) provides insight into this second research question. Once again, when viewing Table 1 in the premanipulation period, it appears that Brands A and B are low share brands relative to Brand C. When Brand A went out-of-stock, Brand B (another low-share brand) increased sales while Brand C's sales remained relatively constant. When it was reintroduced at a higher price, Brand A experienced an increase in sales over its pre-stockout levels, while the other two brands experienced slight decreases in sales over their pre-stockout levels. Thus, the increased price of Brand A, at the very least, did not appear to have an adverse impact on its reintroduction, and seemed in fact to have helped its reintroduction. Such conclusions are very preliminary, however, and need to be reinvestigated in additional studies.

Outside Purchases

In order to allow us to consider retail patronage effects of the ex-

perimental manipulations, subjects were asked to keep an accurate diary of all drink-pack purchases made outside of the study. Table 2 provides information to help us assess how other retailers benefited from the out-of-stock condition (research question three).

Turning first to the Blue group, we see that prior to the stockout condition 84% of all purchases of Brand A occurred within the study itself. Only 16% of Brand A was purchased from other retailers. After the stockout, the pattern of purchases returned to a level nearly that of the premanipulation state, with 89% of purchases of Brand A made within the study. One can conclude, therefore, that although competing retailers did gain some sales during the stockout, those sales returned to "our store" after the reintroduction of Brand A.

The results of the Green group (Table 2) for Brand C are even more favorable than those of the Blue group. After Brand C was reintroduced, other retailers lost all drink-pack sales to "our store."

The reader will recall that Brand A in the Red Group was reintroduced at a higher price. It is interesting to note that most sales of Brand A returned to our study, even though we were now charging a higher price for Brand A. Thus, it appears that our tactic of a price increase upon reintroducing the out-of-stock brand did not significantly harm us in terms of retail patronage.

DISCUSSION

Both retail managers and academic researchers are calling for increased usage of experimentation to help refine our understanding of how certain factors influence sales (Chapman 1986; Lodish 1982). The current study is designed to experimentally explore the nature of stockout conditions. What happens to market shares when a brand

temporarily goes out-of-stock? Findings from this study suggest that low-share brands tend to pick up more sales than high-share brands. After the stockout brand returns to the shelf a moderate negative carryover effect may be the result, with low-share brands reaping a moderate positive carryover effect. It should be noted that in prior studies (Charlton & Ehrenberg 1976; Motes 1985; Motes & Castleberry 1985) no significant carryover effects were observed. The reason for this inconsistency could be due to differences in the sample, the fact that a different product category was chosen, or the fact that this study was shorter in length. Our data does not provide the information needed to assess the reason. Hence, additional field experimentation is needed to check the consistency of results.

The second set of manipulations involved both a stockout condition and a price manipulation. What happens to market share when a low-share brand temporarily goes out-of-stock and is subsequently reintroduced at a higher price? Findings from the Red group in this exploratory study suggest that a moderate positive carryover effect may result for the stockout brand, while other brands, both high-share and low-share, may experience slight (perhaps insignificant) negative carryover effects. These findings are not consistent with what most marketers would consider to be "conventional wisdom." A decrease in market share is generally thought to follow an increase in price, especially when competing brands remain at the original price level. We expected such a decrease in this study, especially since initial interviews revealed that 75% of subjects in the Red group rated price as either "fairly important" or "very important" as a characteristic in determining which brand of drink-pack to select. This study suggests that one way to overcome the negative carryover effects often associated with a stockout condition with a low-share brand might be

to increase the price of that brand slightly upon its reintroduction. Perhaps consumers are using price as a guide to quality in this circumstance, viewing the higher price as an indication of better quality when the brand returns to the shelf. Future research is needed to substantiate this conjecture, however.

The third research question focuses on the extent to which stockout conditions affect shopping behavior in terms of retail patronage. Do customers want the brand badly enough to go elsewhere to purchase it? While only one product category was examined in this study, findings indicate that customers will shop elsewhere to find the product if it is unavailable at the regular retail location. This finding is not particularly surprising; it confirms conventional retailer wisdom in this area. Of greater interest is the finding that shopping for the product elsewhere dramatically decreased once the brand was available at the regular retail location once again. This was true even when the price was increased at the reintroduction of the affected brand. Thus, a negative short-term effect seems to be present in which some customers shop in other outlets for a brand that has become unavailable at the regular retail location. However, no negative consequences seemed to be present in terms of patronage behavior once the brand was again available at the regular outlet.

This study was exploratory in nature and conclusions should be viewed with caution, given the limitations of the study and the present lack of extensive research in this area. While the findings are intriguing and likely to be of interest to many retailers, they need to be reinvestigated in other studies. Future studies might aim at having larger sample sizes with more purchases in each cell. The carryover effects suggested by this study might be explored in greater depth if more visits could be incorporated into the design.

This would allow for more extensive examination of long-term effects. An additional area for future research would be to assess the effects of stockouts on consumer satisfaction and frustration. It may be that consumer frustration caused by stockouts might be manifested in ways that are not easily or quickly detectable in terms of sales. Given the importance of this issue to retailers it is imperative that such research be continued.

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The authors would like to thank Professor A. S. C. Ehrenberg and the Center of Marketing and Communication at the London School of Business for support and assistance in this project.