EFFECTS OF THE USE OF SPOT CASES IN THE SALE OF SELECTED DAIRY PRODUCTS IN RETAIL FOOD CHAINS

By J. W. Gruebele and James J. Miller

ABSTRACT: Although in-store promotion techniques are used extensively in supermarkets, there is limited information on the effects of these techniques on the sale of individual products. An experiment was used to determine the short-run effects of the spot case display on the sale of yogurt and colby cheese. Statistical tests revealed that the spot case display significantly increased the sale of yogurt, but that it did not have a significant effect on the sales of colby cheese.

Dairy products represent a significant proportion of total sales in a retail chain outlet. In a 1960 study, retailers indicated sales from their dairy departments averaged 11 percent of total store sales. In 1968 dairy sales represented 10.2 percent of total sales in food stores.

Dairy sales represented 10 to 15 percent of total sales in the food stores in the present study. Yet, there is a limited amount of information concerning the effects of in-store promotion on consumption of dairy products.

This study examined the short-run effects of the use of a special display container on specified products in the dairy case. The question of whether total store sales or store profits will be enhanced in the long run with the use of special display cases cannot be answered here. On the other hand, if the purchase of a particular product can be increased in the short run and if the increased purchases of that product do not replace the purchases of other products, then the profits of the department or the store can be improved in the short run. In fact, profits for a department or store can be larger even if the increase in sales of the displayed item results in a reduction in sales of other items, provided the store margin is larger for the displayed item than for the others.

One means of adding flexibility to refrigerated displays in retail food stores has been the use of small, self-contained units known as “spot cases.” These are capable of being placed in any area of free floor space that has access to an electrical outlet. They may be used in conjunction with other refrigerated cases or they may be placed in an entirely different area of the store from the department in which the product is usually found. Their purpose is to draw special attention to a product or to a small group of related products and thereby increase sales.

While there have been several studies dealing with in-store influences upon sales, they have tended to concentrate upon conditions pertaining to the normal product display. The effect of variations in the amount of shelf space allotted to a specific product has been tested by Cox, Frank and Massy, and others with effects differing with the products tested, stores used, etc.

In addition to testing the effects of changing shelf space, the Gruebele study tested the effectiveness of small, point-of-sale signs whose response varied with the product tested. The problem of special displays has very seldom been addressed, possibly due to problems of measuring most special displays. Adler suggests that special displays can be measured on the basis of square feet of display area. Spot cases provide a unique opportunity for measurement in that they have an inflexible amount of display area and can be treated as a yes-no treatment.

This study attempts to test whether spot cases can be used as an effective means of promotion. The specific objectives include:

1. Can the use of a spot case with or without a sign significantly increase the sales of yogurt in the short run?

2. Can the use of a spot case with or without a sign significantly increase the sales of one-pound, sliced colby cheese in the short run?

To answer these questions an in-store experiment was conducted during summer of 1971 in six East Central Illinois stores which were part of a corporate food chain.

Two dairy products, yogurt and sliced colby cheese, were selected for study. Dairy products were selected for several reasons. Dairy department
personnel were familiar with this type of promotion and fewer problems could be anticipated in the handling of the display and the prevention of out-of-stock situations than would be true of other departments. Not all of the stores had spot cases capable of handling frozen foods without product deterioration. It was desired that the product be one where the spot case would not be emptied in such a short time as to require large amounts of labor to keep the case full. This required either a product that moved at a low rate or that a large number of units of product could be placed in the spot case at one time.

One reason for selecting sliced colby cheese is that the store margins for that cheese is higher than for the block colby cheese or for some other types of cheese. The store margins for yogurt are relatively wide also.

Another reason for selecting yogurt and colby cheese is that they appear to have product characteristics which would help make an advertising promotion program successful. Dailey’s research showed that advertising a promotional effort will be more successful with products for which demand is increasing, products with few barriers to consumption, products which are relatively new, and products which are well differentiated. The demand for colby cheese and yogurt have increased. Total consumption of colby cheese was 15.2 percent higher in 1970 than in 1969 and 17.7 percent higher in 1972 than in 1970. The total consumption of yogurt was 89.4 percent higher in 1969 than in 1968, 21.4 percent higher in 1970 than in 1969, and 72 percent higher in 1972 than in 1971.

It is unlikely that there is a barrier to consumption for yogurt or colby cheese. According to Dailey, these barriers include price, lack of familiarity, poor quality, considerable preparation time, social stigma, and others.

The consumption of yogurt would be expected to respond to promotion because it is a relatively new product in this area. Colby cheese has been developed for some time and is likely to be well known.

Yogurt is a well differentiated product while colby cheese is less well differentiated.

Daily further states that powerful emotional motives such as the maintenance of health also influence the response to promotion. Differences in the consumption in dairy products are in part attributed to the consumers' preference for low-calorie diets. Based on consumption trends it appears that yogurt and colby cheese as well as all cheeses have a low-calorie image. Yogurt in particular has been acclaimed to have special health and therapeutic value for humans.

Store Experiment

The experiment was conducted in the summer of 1971 with the aid of a corporate food chain operating in East Central Illinois. The study was in three market areas each of which had approximately 100,000 inhabitants. The food chain has approximately 50 percent of the food sales in the market test area. As with most other corporate chains, the choices of items to display and promote were determined by the central office. Advertising in newspapers and on television were used to promote the low-price and high-quality image of the retail chain. Dairy products were not advertised in the newspapers on a regular basis.

The clientele of the test stores included all segments of the population. In some stores the primary clientele was young married people and in other stores it was primarily students and elderly or middle-aged persons.

Data on Sales of Tested Products

Since the number of customers for any store can vary from week to week, the data used for analysis were in terms of units of the product sold per thousand cash register tickets. This method probably represents the best estimate of the true customer count and it is easy to obtain. There are some limitations, however. Some people leave the store without purchasing anything and are not counted even though they were exposed to the spot case. Others may purchase products without coming into the area of the spot case. A husband and wife or children shopping together may represent more than one customer even though there is only one register tape.

Data were collected on Monday and Thursday morning. Exact inventories of the product in the stores and the amount the store received were used to determine the sales per thousand customers of that store for the period. Sales were determined in the experiment from:

\[ \text{Sales per thousand customers} = \frac{\text{Inventory week } i - 1 + \text{Amount received week } i}{\text{Number of cash register tapes (in thousands)}} \]

The chain handled three brands of yogurt. Two brands were packaged in eight ounce cups and one was packaged in two four ounce cups sold together. These different brands sold at the same price. Data were collected on the sales of all brands.

In the case of colby cheese, data were collected for the sliced product. Store personnel were interested to learn if sales of sliced colby cheese could be increased with the use of the spot display. Because of the wider margins on sliced colby cheese, increased sales of that product would be profitable even if it resulted in some reduction in sales of block colby cheese or some other types.

Because each store had a different physical layout, it was impossible to completely standardize the placement of the spot cases. The spot cases were located in the dairy area where they did not block other displays and
where they had access to an electrical outlet. While there were differences in the spot cases from store to store, the statistical models used in the analysis took account of their variation among the stores.

The experiment involved the use of a normal shelf display for each product, placing the product in the spot case in addition to the normal shelf display, and adding a hand-lettered sign to the spot case to further draw attention to it. Both products were tested in the same stores, with the yogurt experiment in the first three weeks of the study and the sliced colby cheese in the last three weeks.

Each treatment was changed early Monday morning. At that time and also on Thursday morning, data on sales of these products were collected. The data consisted of the number of units of product in the store determined by counting, the amount of product received by the store during the time period from store records, or four treatments.

Statistical Models

The double change-over model was used to analyze the effect of the use of spot cases and spot cases with signs on sales of yogurt. This model is designed for experiments where residuals cannot be eliminated or where residuals are of interest. It has the disadvantage of being limited to three or four treatments.13

A randomized-block analysis of variance was used to analyze the influence of the spot case on the sale of colby cheese in four stores. If it is found that the variation within treatments is less than the variation between treatments, then the treatment means are significantly different.14

Analysis of Experimental Results

One hypothesis of this study was that yogurt sales were not significantly increased by the use of spot cases. In most stores, sales were lower during the normal periods than when the spot cases with signs were used (Table 1).

After adjusting for the carryover effect, sales per thousand receipts was 12.12 percent higher when the spot case was used and 24.04 percent higher when a spot case with a sign was used than sales from normal shelf space (Table 2).15

The double-change-over test revealed that the increase in yogurt sales obtained by use of a spot case with a sign was significant at the 95-percent confidence level; that obtained by use of a spot case without a sign was significant at the 90-percent level.16,17

The first hypothesis that yogurt sales were not significantly increased was rejected. From this analysis it is apparent that spot cases, particularly with a sign, significantly increased the sale of yogurt in the short run.

Another hypothesis tested was that if a spot case treatment effectively in-

With the double-change-over model it is possible to determine the carryover effects of the treatments. In this model before the treatments were tested for significance, the residual effects were eliminated by adjusting the treatment means (Table 2). The mean for normal display was adjusted downward to take account of the carryover effects of the spot case treatments.

### Table 1. — Sales of Yogurt for Eight-Ounce Units per Thousand Cash Register Tickets for Six Stores During a Three-Week Period, 1971

<table>
<thead>
<tr>
<th>Store</th>
<th>Week</th>
<th>I</th>
<th>II</th>
<th>III</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. . .</td>
<td>N = 56.93</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. . .</td>
<td>S = 53.20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. . .</td>
<td>S = 52.39</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. . .</td>
<td>N = 41.30</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. . .</td>
<td>N = 16.70</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. . .</td>
<td>S = 51.46</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

N = Normal shelf sales.
S = Spot case without a sign.
Ss = Spot case with a sign.

### Table 2. — Mean Sales of Yogurt for the Six Stores for Normal Display, for Spot Case Display, and Spot Case with Sign, Unadjusted for Residual Effects and Adjusted for Residual Effects (Eight-Ounce Units Sold per 1,000 Customers)

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Unadjusteda</th>
<th>Adjusteda</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean Increase over normal</td>
<td>Mean Increase over normal</td>
</tr>
<tr>
<td></td>
<td>Units per thousand</td>
<td>Percentage</td>
</tr>
<tr>
<td>N . . . .</td>
<td>42.98</td>
<td>3.95</td>
</tr>
<tr>
<td>S . . . .</td>
<td>46.93</td>
<td>9.08</td>
</tr>
<tr>
<td>Ss . . .</td>
<td>12.12</td>
<td>9.08</td>
</tr>
</tbody>
</table>

**Notes:**

a Unadjusted means are average of raw data.
a Adjusted means take into account the effects of a treatment on sales in the following week as well as the effects of the preceding treatment on the sales for the present week. (See Federer, W. T., *Experimental Design*, pp. 450-451, The MacMillan Co., 1955.)

**Significant at the 95-percent confidence level.**
increased sales one week it would continue to be effective in the following week. In the case of yogurt, there was no pattern of decreased effectiveness in the second week. The analysis showed that in store 1 the sales in the third week with a spot case with a sign were larger than sales from a spot case without a sign in the preceding week. The same was true for store 2. For store 6, the sales from a spot case without a sign in week 2 was larger than sales in week 1 from a spot case with a sign. Only in store 4 were the sales in the succeeding week smaller than in the preceding week when the spot case treatments were used (Table 1). Thus, overall the evidence supported the hypothesis that spot cases would continue to effectively increase the sales of yogurt for a second week.

**Colby Cheese**

A third hypothesis was that spot case promotion does not significantly increase sales of sliced colby cheese. Due to data problems, only data from four stores could be used to test the promotion technique. Because of the data problems, it was not possible to use the double-change-over model. Two-way analysis of variance was used. One limitation of this was that in the double-change-over model, the standard error for residual effects is 1.25 when $Ee$ is the error mean square $\sum \epsilon^{2}$ and $n$ is the number of stores. See Federer, W. T., Experimental Design, p. 452, The MacMillan Co., 1955. For this analysis May's table of ranges or q times the standard error was used to test the adjusted means for significance. See May, J. M., Extended Points of the 'Studentized' Range, Biometrika 39:192-193, 1952. For three treatments the initial value at the 95-percent confidence level was 6.615. The differences in the treatment means are shown in Table 2. The Ss is significant and the S is not significant. By eliminating one of the extremes, the 95-percent level $q_{0.05}$(standard error) becomes 6.02 which does not change the results. Since with two means the $q_{0.05} = t_{0.05} \sqrt{2s_{0}}$ is least significant difference, it was possible to calculate the 90-percent confidence level for the treatment means. The test statistic with 4 degrees of freedom was 3.98 at the 90-percent confidence level.

The residual effects could not be taken into account. The residual effects in the yogurt experiment were relatively small.

Sales of sliced colby cheese were 14.26 percent higher than normal shelf sales with the spot case without a sign and 10.91 percent higher with the spot case with a sign (Table 3). However, the analysis-of-variance test revealed that the treatments of promotion techniques did not significantly affect sales. Even though the average sales of sliced colby cheese appeared to be larger during the periods when spot cases were used, further analysis indicated that these increases were far from significant. In addition, there was no significant difference in the sales of colby cheese among stores. Therefore, the hypothesis that use of spot cases would not increase sales of sliced colby cheese was accepted.

**Conclusions**

This study examined the short-run effects of spot case promotion techniques on the sale of yogurt and colby cheese in six East Central Illinois stores during two three-week periods in the summer of 1971.

The sales of yogurt were significantly higher when the spot case with a sign was used to promote the product than during periods of normal shelf display. The sales of yogurt with a spot case without a sign were not significantly different at the 95-percent level from either the normal display or the spot case with a sign. However, these differences were significant at the 90-percent confidence level. The addition of a sign can be accomplished very quickly and easily at almost no additional cost. The analysis also revealed that the spot case display for two weeks in succession would continue to effectively increase the sale of yogurt during the second week.

The study results showed that the spot case promotion technique did not affect the sales of all dairy products in the same way. The sales of sliced colby cheese were not significantly increased with the use of a spot case either with or without a sign. There were some limitations in the experiment with colby cheese. First, because the spot case design was not used for part of a week in two stores, the experimental data could not be used for these stores. This made it impossible to use the double-change-over technique to determine the effectiveness of the promotion. The analysis of variance technique does not take account of residual or carry over effects. Based on previous research experience, the residual effects are expected to be rather limited. Secondly, if the sales of sliced colby cheese had significantly increased, it would not have been possible, from the data available, to determine if this increase represented the substitution of sliced colby cheese for block colby cheese or for other kinds of cheeses such as muenster or even American cheese. From the retail food chain's viewpoint an increase in sales of sliced colby cheese would be beneficial even if the sales substi-

### Table 3. — Sales of Sliced Colby Cheese in One-Pound Units per Thousand Cash Register Tickets, by Treatment, for Four Test Stores; Mean Sales, by Treatment, for the Four Stores

<table>
<thead>
<tr>
<th>Store*</th>
<th>Mean (Units per thousand)</th>
<th>Increase over normal display (Per-cent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>14.16</td>
<td>10.45</td>
</tr>
<tr>
<td>2</td>
<td>14.51</td>
<td>11.98</td>
</tr>
<tr>
<td>3</td>
<td>14.27</td>
<td>11.59</td>
</tr>
<tr>
<td>4</td>
<td>14.96</td>
<td>11.45</td>
</tr>
<tr>
<td>5</td>
<td>15.27</td>
<td>11.54</td>
</tr>
<tr>
<td>6</td>
<td>15.12</td>
<td>11.49</td>
</tr>
</tbody>
</table>

N = Normal shelf sales.
S = Spot case without a sign.
Ss = Spot case with a sign.

* The data for store 2 and store 5 could not be used because the spot case was not on display for part of the week.
tuted for other cheese sales because the margin on such a product is higher than it is for block colby cheese and some other kinds of cheeses.

The differences in the experimental results for sliced colby cheese and yogurt is of significance. Yogurt is the type of a product that would be expected to respond well to promotion techniques. Its consumption has risen. It is an occasional rather than a customary purchase for many consumers. According to retail food chain executives, it seems to have appeal for younger consumers. Colby cheese on the other hand may be considered a staple by many of its customers. If a product is one that is usually kept on hand and replaced when used, it is not as likely that the product will respond to this kind of promotion. Customers usually respond to a sale price for such items, but this may simply substitute for later purchases of the same product.

The results of the study point out the importance of giving careful thought to selecting products to be placed in the spot case. The payoff from this kind of a promotional effort is likely to vary from product to product. Items considered to be an impulse item by most consumers would be expected to respond to a spot case display. The effectiveness of the spot case display on the sales of staple items may be rather limited.

This study was limited to determining the short-run effects of the use of the spot case design on the sales of specified dairy products. The long-run effects were not considered and are left for future research. The question of how often yogurt should be placed in a spot case remains unanswered. In an extended experiment it would be possible to determine not only the long-run effects of promotion technique on the sales of the promoted products, but also on the sales of competitive products or competitive stores. Future research could also involve additional products as well as other in-store promotion techniques and could involve the determination of the effect of these promotion techniques on overall store profits.

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