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# **Butter and Cheese**

## **Sales Changes Associated With Three Levels of Promotion**

ECONOMIC RESEARCH SERVICE • U.S. DEPARTMENT OF AGRICULTURE  
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BUTTER AND CHEESE; SALES CHANGES ASSOCIATED WITH THREE LEVELS OF PROMOTION.  
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#### ABSTRACT

Butter and cheese sales related to three levels of promotion investment were compared to sales with no promotion. The study period was May 1972-July 1973. For cheese, annual investments of 6 and 9 cents per capita produced sales gains of 15-18 percent in the test markets. Butter sales rose about 4.5 percent at the 9-cent promotion level, but showed no gains at lower levels, apparently because of the effect of counterpromotions for oleomargarine.

Projecting test market results to all U.S. supermarkets gave an increase of 244 million pounds in annual cheese sales, or the equivalent of 24.4 million hundredweight of fluid milk, for a promotion cost of \$12 million, or 50 cents per hundredweight for the additional milk sold. For butter, the increase would be 21 million pounds, unadjusted for oleomargarine advertising. The milk equivalent would be 4.5 million hundredweight, and the cost of the national promotion campaign, \$18 million. Adjusted for oleomargarine counterpromotion, the increase in butter sales would be 60 million pounds, or 12.7 million hundredweight of milk equivalent. The value of added milk sales would be about \$100 million, for a promotion cost of about \$1.42 per hundredweight.

Key Words: Butter, cheese, oleomargarine, marketing, promotion.

## PREFACE

This report summarizes a study of sales response and changes in consumer awareness and attitudes associated with different levels of promotion investment for butter and cheese. In 1972, these two products each accounted for about 19 percent of milk consumed in all forms; hence, changes in butter and cheese consumption exert a significant influence on prices received by dairy farmers.

The study is part of efforts by the Economic Research Service (ERS) to evaluate the efficiency of advertising and promotional investment for farm commodities, thereby reducing costs to producers and consumers.

The study was conducted in cooperation with the United Dairy Industry Association, which was solely responsible for the consumer phase of the research, and which financed the cost of advertising and related promotional activities. The association also employed field enumerators to collect sales and related merchandising data in test and control markets, and contributed funds to ERS to help defray travel costs connected with the research, analysis, and report preparation.

The retail food firms that cooperated in the study are gratefully acknowledged.

ERS economists Larry Traub, Lynn Sleight, and Cleveland P. Eley aided in designing this study, obtaining trade cooperation, and supervising data collection.

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## SUMMARY

A 9-cent per capita investment in promoting butter in controlled market tests resulted in a sales gain of about 4.5 percent over sales with no promotion. The study period was May 1972-July 1973. Sales dropped, however, by 4.5 percent when the investment level was 6 cents per capita, and by 3.5 percent at a 3-cent promotion level. The negative results were apparently due to counter-promotions for oleomargarine in the form of advertisements that offered cents-off coupons on oleomargarine.

When butter sales at each of the three promotion investment levels were adjusted for the average number of oleomargarine advertisements for all levels, sales gains were registered: 19 percent at the 3-cent promotion level, 16 percent at the 6-cent level, and 25 percent at the 9-cent level.

For cheese, the 3-cent-per-capita promotion level did not increase sales significantly. But gains of about 15 percent occurred at promotion levels of 6 and 9 cents. Moreover, for each 1-percent change in the number of trade advertisements for cheese (both retailer and manufacturer), cheese sales changed one-half of 1 percent in the same direction.

Analyses of differences in sales between test and control markets verified the results found in test markets for butter and cheese, as well as for oleomargarine. Sales trends in the two sets of markets indicated that the carry-over influence of the butter and cheese promotion was probably longer than 3 months, the time period used in the test markets.

Projecting test results for butter at the 9-cent promotion level (unadjusted for oleomargarine advertising) to the Nation's 40,600 supermarkets (which account for about 77 percent of all food store sales) gives an estimated annual increase in butter sales of 21 million pounds. The milk equivalent would be 4.5 million hundredweight, and the cost of the promotional campaign would be \$18 million. Gross receipts to farmers would increase about \$36 million, assuming no increase in market milk prices resulting from the increased demand. The promotional cost on added milk sales would be \$4 per hundredweight. Adjusted for oleomargarine promotion, the increase in butter sales would amount to 60 million pounds, or 12.7 million hundredweight of milk-equivalent. The value of added milk sales would be about \$100 million, for a promotional cost of about \$1.42 per hundredweight.

National level cheese sales would increase about 244 million pounds at the 6-cent per capita promotion level. The milk equivalent would be 24 million hundredweight. The campaign cost would be \$12 million. Farmers' receipts would increase about \$195 million. The promotional cost on the additional milk to meet the increased demand would amount to 50 cents per hundredweight.

A national program similar to the test market programs would undoubtedly have some influence on consumer purchase patterns in other retail outlets, and might influence volumes purchased at away-from-home eating establishments. However, the study did not estimate such influences. Promotional costs were projected on estimated added milk sales for each product rather than the total milk sold for all uses. That is, costs were projected on the basis of marginal

investments and production. The additional promotional cost, if based on total milk production and sales, would amount to only about 3 cents per hundredweight for campaigns supporting both butter and cheese and totaling \$30 million annually. In addition, increased demand for milk utilized in these products would probably exert some upward pressure on the price of milk utilized in other products.

Consumer surveys made during the promotion campaigns in the test markets showed that there was not a one-to-one relationship between attitude changes and changes in butter and cheese sales. However, the ratio of changes in attitude for the products was similar to the ratio of sales changes associated with intensified promotion levels. Approximately 50 percent of the respondents had recall of cheese advertisements before the test campaigns, in both test and control markets. In control markets, no significant change occurred in the percentage of respondents recalling cheese advertising during the promotion campaigns, but there was a 12-percent increase in the test markets. The rate of increase in recall was 6 percent per 3-month period for the first 6 months but then leveled off for the remaining 9 months of the test. Similar increases in recall occurred in the test markets with respect to the media used in the promotion campaigns and in the campaign themes. The cheese campaign also made respondents' attitudes more positive toward the use of cheese in the test markets.

Increased recall of butter advertising in test markets was about 30 percent --18 percent greater than the recall for cheese. However, the percentage of respondents seeing or hearing advertisements for butter before the campaigns was only about one-third that found for cheese. Again, the increase in recall scores occurred during the first 6 months of the test, leveling off at 45 to 50 percent during the following 9 months. The recall of media used was similar to total recall, but recall of themes used in campaigns was somewhat lower.

# BUTTER AND CHEESE: SALES CHANGES ASSOCIATED WITH THREE LEVELS OF PROMOTION

by

Peter L. Henderson 1/

## INTRODUCTION

Dairy farmers have supported advertising and related promotional activities for their products for several years. The major emphasis generally has been on fluid products. Previous research evaluating sales response to higher levels of promotional intensity for fluid milk showed that increased promotional expenditures would increase both the effectiveness and profitability of promotional investments. 2/

Emphasis has been placed on promotion of fluid products because dairy farmers receive a higher price for milk used in these products than for milk used in manufactured products. The price differential is necessary to induce farmers to produce milk for fluid uses, where additional production costs are incurred in meeting stringent health and sanitary regulations.

The output of dairymen producing milk primarily for fluid products exceeds requirements for the fluid market, largely because milk is highly perishable and cannot be stored to meet short-term fluctuations in demand. In addition, seasonal production patterns of dairy cows does not correspond to seasonal demand for fluid products. Milk production is generally highest when demand is lowest and lowest when demand is highest. Because it is not economically feasible to store fluid products for prolonged periods to balance the inverse production-demand situation, farmers tend to maintain herd sizes to meet peak demand requirements for fluid products. As a result, a significant amount of milk produced for fluid uses is utilized in manufactured products.

The excess production of milk produced for fluid uses competes with manufacturing grade milk (production by farmers producing for manufactured products) for utilization in manufactured products, and the price received for this milk is comparable to the price of manufactured grade milk. Thus, prices received by fluid product producers is a blend of prices received for milk used in fluid products, and the price received for milk used in manufactured products.

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1/ Peter L. Henderson, Economist, National Economics Analysis Division, Economic Research Service.

2/ Clement, Wendell E. et. al. The Effect of Different Levels of Promotional Expenditures on Sales of Fluid Milk, Econ. Res. Serv., U.S. Dept. of Agr., ERS 259, Oct. 1965, and Consumer Response to Various Levels of Advertising for Fluid Milk, Econ. Res. Serv., U.S. Dept. of Agr., Mktg. Res. Rpt. 805, Oct. 1967.



In 1972, milk utilized in manufactured dairy products accounted for over 50 percent of total U.S. milk production. 3/ Approximately 22.8 billion pounds of milk was used in butter production and also in cheese (other than creamed cottage cheese) production. These two leading manufactured products in 1972 accounted for almost three-fourths of all milk used in manufactured products and for almost 40 percent of total milk production.

The price received for milk (both fluid grade and manufacturing grade) used in butter, cheese, and other manufactured products depends on the amount used and the demand for the finished product. In the long run, demand for manufactured dairy products also exerts an indirect influence on prices farmers receive for milk used in fluid products, because of the premium, mentioned above, that is necessary to induce dairy farmers to produce milk for fluid uses.

An increase in either of these prices would raise the blend price received by fluid-milk producers proportionate to utilization in the product class. Thus, an increase in the price of manufacturing grade milk would benefit both fluid market and manufacturing grade producers. Similarly, changes in demand and price of milk for fluid products also affect prices received for manufacturing grade milk. Thus, an increase in the demand for either fluid milk products or manufactured dairy products resulting from advertising and promotions benefits producers of both products.

To maximize the results of promotional investments by farmers for various dairy products, investments should be allocated to each product so that marginal returns per unit of investment are equaled. Previously cited research provides a basis for estimating marginal returns for promotional investments for fluid products. 4/

The study presented here was undertaken in cooperation with the United Dairy Industries Association (UDIA). 5/ The objective was to determine the optimum level of promotion for both products from the standpoint of per unit cost; that is, what level of investment would minimize per unit advertising and promotional cost, consistent with obtaining maximum consumer awareness and acceptance.

### Study Plan

This study was designed to measure both the immediate and carryover effect of cheese and butter promotion into subsequent time periods in markets of approximately 500,000 population. The markets selected were representative of geographic areas covered by the American Dairy Association (ADA), the advertising

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3/ Utilization of milk in manufactured products has exceeded 50 percent of total production since 1967. See Production of Manufactured Dairy Products, Crop Reporting Board, Statistical Reporting Serv., U.S. Dept. of Agr., Various issues, 1961-73.

4/ Clement, W. E. et. al. op. cit.

5/ App. A outlines the basis of cooperation and responsibilities.

and sales promotion arm of UDIA, and contained no overlapping of advertising media. 6/ The stores selected represented a cross section of the area's population and accounted for over 50 percent of retail foodstore sales.

In developing this research, emphasis was placed on measuring: (1) Sales response in pounds, at the retail level, to the advertising and promotional inputs; (2) consumers' recall and recognition of advertisements; and (3) changes in consumers' attitudes associated with the campaigns.

To meet the criteria for measuring immediate and carryover effects of promotion, the Extra-Period Latin-Square Change-Over Experimental Design (tables 1 and 2) was selected to rotate treatments of three levels of advertising and promotion intensity and a no-advertising treatment among four test markets and five time periods of 3 months (13 weeks) each. This design equalizes differences in sales levels among the test markets and seasonal trends in sales at each promotional level tested. It also provides estimates of both the direct (immediate) response and the carryover influence of each promotional level. 7/ Four control markets (individually matched with each test market) were selected to serve as a check on results obtained in the test markets and to indicate the longer term carryover effects of promotional investments on sales performance.

The advertising agency of ADA furnished lists of media markets of approximately 600,000 total population with no serious overlapping of television and local newspaper coverage. 8/ Headquarters of chains, voluntary chains, retailer cooperative buying associations, and wholesalers were contacted to determine the availability and reliability of shipment data for butter, cheese, and oleomargarine to retail outlets during the preceding 12 months for the markets contained on the lists.

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6/ The population of media markets exceeds that of Standard Metropolitan Statistical Areas (SMSA's), which were used to define size of markets. That is, the media market encompasses the audience reach of television and radio stations located in SMSA's, as well as circulation area of metropolitan newspapers. SMSA's are defined to encompass boundaries of specific political jurisdictions, based on criteria of the Bureau of the Census. The reach of media generally extends to populations outside specified boundaries of SMSA's. Therefore, the populations of media markets are usually larger than SMSA populations. Media costs are generally based on population of media market. The populations of media markets used in this study were approximately 600,000.

7/ Henderson, Peter L., "Measuring Effects of Varying Levels of Advertising Investments on Sales of Fluid Milk," Business and Economic Statistics Proceedings, American Statistical Society, 1965.

8/ Multiple lists were required since markets selected for control markets in each geographic area had to be outside the range of local television and newspaper coverage of the test market. For example, in markets A, B, C, and D, media for: A overlaps B; B overlaps A and C; C overlaps B and D; and D overlaps C. Thus, pairs of markets could be selected from: A and C or D, and D with A or B, but not A and B, B and C, or C and D.

Table 1--Cheese: Experimental design for assigning promotional investment levels, by markets and time periods 1/

Time periods	Test markets				Control markets			
	Bing- hampton:	Rock- ford:	Albu- querque:	Chatta- nooga:	Utica- Rome:	Fort Wayne:	El Paso:	Mont- gomery
May-July 1972	A	B	C	D	A	A	A	A
Aug.-Oct. 1972	B	D	A	C	A	A	A	A
Nov. 1972-Jan. 1973	C	A	D	B	A	A	A	A
Feb.-Apr. 1973	D	C	B	A	A	A	A	A
May-July 1973	D	C	B	A	A	A	A	A

1/ Investment levels in cents per capita annually. A = 0 cents, B = 3 cents, C = 6 cents, D = 9 cents.

Table 2--Butter: Experimental design for assigning promotional investment levels, by markets and time periods 1/

Time periods	Test markets				Control markets			
	Bing- hampton:	Rock- ford:	Albu- querque:	Chatta- nooga:	Utica- Rome:	Fort Wayne:	El Paso:	Mont- gomery
May-July 1972	D	A	B	C	A	A	A	A
Aug.-Oct. 1972	C	B	D	A	A	A	A	A
Nov. 1972-Jan. 1973	B	C	A	D	A	A	A	A
Feb.-Apr. 1973	A	D	C	B	A	A	A	A
May-July 1973	A	D	C	B	A	A	A	A

1/ Investment levels in cents per capita annually. A = 0 cents, B = 3 cents, C = 6 cents, D = 9 cents.

Data were obtained on monthly shipments to retail outlets from four to six markets in the Northeast, Midwest, Southwest, and Southeast. Markets were matched on the basis of similar monthly sales patterns as reflected in the shipment data. Markets selected in each region as test and control markets were:

- (1) Northeast - Binghamton, N.Y., and Utica-Rome, N.Y.
- (2) Midwest - Fort Wayne, Ind., and Rockford, Ill.

- (3) Southwest - Albuquerque, N. Mex., and El Paso, Tex.
- (4) Southeast - Chattanooga, Tenn., and Montgomery, Ala.

Markets were assigned at random to the test and control group as shown in tables 1 and 2, except for the two New York State markets--Binghamton was assigned to the test group because of media cost. 9/

In each of the 8 markets, 25-30 stores were selected and cooperation obtained from management to audit sales performance and collect supplemental merchandising and pricing data. Stores selected represented a cross section of the area's supermarkets and data obtained on initial visits indicated approximately 95 percent of retail sales of butter, cheese, and oleomargarine were made through this type of outlet. Based on data supplied by local newspapers for each market, sample foodstores accounted for 70-80 percent of total foodstore sales in each of the eight markets. 10/

Sales data were collected by taking inventories of butter, cheese, and oleomargarine at the beginning and end of each 3-month period and by collecting data on incoming shipments each week. Supplemental data were obtained by weekly observations in sample stores and audits of foodstore and brand advertisements in newspapers.

#### Experiment Design

Albuquerque, Binghamton, Chattanooga, and Rockford were designated test markets, as previously described, and randomly assigned to columns of the change-over designs as shown in table 1 for cheese and table 2 for butter. Letters in the design represent the experimental treatments or levels of advertising and promotional intensity explained in footnotes to the tables.

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9/ Media cost for television commercials would have included Syracuse in addition to Utica-Rome; therefore, Utica-Rome was designated as a control market because of cost considerations.

10/ Initially, sample stores included small independent and convenience outlets. However, it was impossible to obtain accurate audits of sales in these outlets, primarily because store management did not maintain records of all shipments received and intrastore transfers. In view of the relatively small sales volume represented by these outlets and the cost of securing accurate data, these stores were dropped from the experiment in both test and control markets.

In addition, some of the larger stores originally selected were closed during the course of the experiment. Thus, due to dropping of smaller stores and closure of some larger stores, analysis and results are based on the average sales per period per supermarket of 25-30 supermarkets in each of the four test and control markets. The stores used represented an estimated 70-80 percent of foodstore sales in the markets and an even higher percentage of butter, cheese, and oleomargarine sales.

## FINDINGS

Test market sales data were tabulated and summarized by periods and markets (table 3). Average sales varied among markets and time periods. The magnitude of the variations between periods (seasons) for each market was associated with the market's average sales level; that is, seasonal variation was a percentage of the market average. Thus, it was necessary to transform actual data to logarithms in order to stabilize the variation in sales associated with time and any possible variation associated with treatments. 11/ The transformed data were subjected to analysis of variance procedures for the Extra-Period Latin-Square Change-Over Design. 12/

### Butter Sales

Analysis of butter sales revealed that they were only beneficially influenced at the highest level of advertising and promotional intensity--9 cents per capita annually. The sales gain for this level was about 4.3 percent of 127 pounds per supermarket per 3-month period (table 4).

Approximately four-fifths of the sales gains were attributed to direct or immediate effects and one-fifth to residual or carryover effects into the subsequent 3-month period (table 5). Because of the relatively short experiment periods, however, the residual or carryover influence of the advertising and promotional investments may have been underestimated (See pp. 27).

Sales per store per 3-month period for the other levels of advertising (3 cents and 6 cents per capita) were actually below that for periods of no advertising. The magnitude of the difference was statistically significant for the 6-cent advertising level, but not for the 3-cent level. In repeated tests of this type, differences in the magnitude found at the lower level could have varied a greater amount for sampling variability.

Weekly data were obtained on price, display space, and trade advertising (retailer and brand advertisements in newspapers) for butter, cheese, and oleo-margarine. Variations in these items among no promotion and the three promotional levels for butter were relatively small, except for the number and size of trade advertisements (table 6).

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11/ In using the design employed for this experiment, it is assumed that variations associated with each time period, market, and treatments are constant. That is, it is assumed that the influence of time period and markets on the treatments undergoing tests are constant and will be equalized if treatments are properly rotated. However, if average sales in market X are 100 pounds per period, and in market Y, 200 pounds per period, and there is a 10-percent difference in sales between period 1 and period 2 in the two markets, the pound difference would be 10 pounds for market X and 20 pounds for market Y, which would not be a constant effect. Logarithmic transformation is an acceptable method of stabilizing the influence of such variations.

12/ H. L. Lucas, "Extra-Period Latin-Square Change-Over Design," Journal Paper No. 752, N.C. State Experiment Station, Raleigh, N.C., July 1956.

Table 3--Butter, cheese, and oleomargarine: Average sales in test markets, by level of promotional intensity

Commodity and time period	Binghamton	Rockford	Albuquerque	Chattanooga	Average
	<u>Pounds per supermarket</u>				
<b>Butter:</b>					
May-July 1972	<sup>1/</sup> 3,727 (D)	3,394 (A)	2,165 (B)	1,481 (C)	2,692
Aug.-Oct. 1972	3,784 (C)	3,909 (B)	2,499 (D)	1,423 (A)	2,904
Nov. 1972-Jan. 1973	4,084 (B)	4,623 (C)	2,842 (A)	1,937 (D)	3,372
Feb.-Apr. 1973	3,700 (A)	3,937 (D)	2,594 (C)	1,566 (B)	2,949
May-July 1973	3,631 (A)	3,780 (D)	2,169 (C)	1,416 (B)	2,749
Average	3,785	3,929	2,454	1,565	2,933
<b>Cheese:</b>					
May-July 1972	7,360 (A)	11,258 (B)	11,800 (C)	7,776 (D)	9,548
Aug.-Oct. 1972	7,364 (B)	13,147 (D)	11,852 (A)	8,501 (C)	10,216
Nov. 1972-Jan. 1973	8,049 (C)	13,153 (A)	11,450 (D)	7,900 (B)	10,138
Feb.-Apr. 1973	9,010 (D)	13,880 (C)	12,089 (B)	7,557 (A)	10,634
May-July 1973	8,909 (D)	14,709 (C)	12,100 (B)	7,658 (A)	10,844
Average	8,138	13,229	11,858	7,878	10,276
<b>Oleomargarine:</b>					
May-July 1972	8,038 (D)	17,976 (A)	9,915 (B)	11,719 (C)	11,912
Aug.-Oct. 1972	8,500 (C)	19,866 (B)	10,722 (D)	13,393 (A)	13,120
Nov. 1972-Jan. 1973	9,320 (B)	21,184 (C)	11,478 (A)	12,439 (D)	13,605
Feb.-Apr. 1973	8,978 (A)	19,838 (D)	10,841 (C)	11,608 (B)	12,816
May-July 1973	8,625 (A)	18,102 (D)	10,113 (C)	10,702 (B)	11,886
Average	8,492	19,393	10,614	11,972	12,668

<sup>1/</sup> Letters in parentheses are investment levels in cents per capita annually. A = 0 cents, B = 3 cents, C = 6 cents, D = 9 cents.

Table 4--Butter: Sales response to three levels of promotion, compared with no promotion 1/

Promotion level	Total butter sales per 3-month period	Deviation from average sales, all levels of butter promotion (2,933 lbs).		Deviation from no-promotion sales <u>2/</u>	
	<u>Pounds</u> <u>3/</u>	<u>Pounds</u> <u>3/</u>	<u>Percent</u>	<u>Pounds</u> <u>3/</u>	<u>Percent</u>
0-cent level	2,959	+26	+ .9	Base	Base
3-cent level	2,860	-73	-2.5	-99	-3.4
6-cent level	2,830	-103	-3.5	-129*	-4.4*
9-cent level	3,086	+153	+5.2	+127*	+4.3*

\* Means significant at .05 probability level.

1/ Four test markets, per 3-month period between May 1972 and July 1973.

2/ Least significant difference between no promotion and other advertising at 0.05 probability level is plus or minus 111.4 lbs., or 3.8 percent of average.

3/ Per supermarket.

Table 5--Butter sales: Direct, carryover, and total effect of three levels of butter promotion, compared with no promotion 1/

Promotion level	Deviation from average sales, all promotion levels (2,933 lbs.)					
	Direct <u>2/</u>		Carryover <u>2/</u>		Total <u>2/</u>	
	<u>Pounds</u> <u>3/</u>	<u>Percent</u>	<u>Pounds</u> <u>3/</u>	<u>Percent</u>	<u>Pounds</u> <u>3/</u>	<u>Percent</u>
0-cent level	-97	-3.3	+123	+4.2	+26	+ .9
3-cent level	-76	-2.6	+3	+ .1	-73	-2.5
6-cent level	+44	+1.5	-147	-5.0	-103	-3.5
9-cent level	+132	+4.5	+21	+ .7	+153	+5.2

1/ Four test markets, per 3-month period between May 1972 and July 1973.

2/ Least significant difference between no promotion and other advertising, at 0.05 probability level, is plus or minus 69.5 lbs., or 2.3 percent of average, for direct effect; plus or minus 86.2 lbs., or 3.3 percent of average, for carryover effect; and plus or minus 111.4 lbs., or 3.8 percent of average, for total effect.

3/ Per supermarket.

Table 6--Butter: Changes in sales associated with three levels of promotion and no promotion, and variation of selected merchandising factors 1/

Item	Unit	Average, all levels of promotion <u>2/</u>	Deviation from mean by butter promotional level of--			
			0 cents	3 cents	6 cents	9 cents
Butter sales:						
Unadjusted	Percent	2,933 lbs.	0.9	-2.5	-3.5	+5.2
Adjusted for effect of oleo- margarine promotion <u>3/</u>	do.	---	-13.1	+3.6	+0.3	+9.2
Butter prices:						
Brand label	Cents/lb.	88 cents	-1.0	+1.0	+1.0	-1.0
Private label	do.	79 cents	-1.0	-1.0	+3.0	-1.0
Oleomargarine prices:						
Brand label	do.	35.0 cents	0	0	0	0
Private label	do.	22.3 cents	-.1	+7.7	-.5	-.1
Display space:						
Butter	Linear inches	50.0	+6	-2.3	+5	+1.2
Oleomargarine	Linear feet	23.7	-2.0	+2.0	+1.6	-1.6
Advertising space:						
Butter	Square inches	179	-43	+34	-4	+13
Oleomargarine	do.	1,000	-360	+238	+121	+1
Advertisements:						
Butter	Percent	31.2	+3.2	-2.2	-8.6	+7.7
Oleomargarine:						
Total	do.	180.0	-11.7	+7.3	+14.7	+10.3
Feature and semifeature	do.	47.2	-28.0	+12.9	+6.8	+8.3
Percentage change in oleo- margarine feature and semi- feature advertisements compared with 0-cent promo- tion level	Percent	---	0	+40.9	+34.8	+36.3

1/ Four test markets, per 3-month period between May 1972 and July 1973.

2/ Per 13-week period per market.

3/ Adjusted to average number of feature and semifeature oleomargarine advertisements.

Standard error of difference between adjusted means = 10 percent or 293 pounds at .05 probability level.



Sales data for butter and oleomargarine indicated that butter sales at the 3-, 6-, and 9-cent level of butter promotion may have been adversely affected by merchandising practices and advertising for both butter and oleomargarine. Generally, it is conceded that sales of competing products are influenced by relative prices and merchandising and promotional practices employed for each product. That is, if consumers are induced to buy one product because of price differences or merchandising and promotional support, less of the other product will be purchased. Each factor was subjected to analysis of variance to determine the statistical significance of the apparent variation associated with the test levels of butter promotion. Those with significant variation were then related to change in butter sales through regression analysis.

The only significant variation found among these variables was for the number of butter and oleomargarine advertisements (both total number and number of semi-feature advertisements for oleomargarine with cents-off coupons and feature advertisements with and without coupons) and the square inches of advertising space for oleomargarine. <sup>13/</sup> Oleomargarine advertisements were primarily for brand-name products rather than private label, and included feature and semi-feature ads by retailers as well as half-page and full-page ads by brand advertisers. All of the half-page and full-page advertisements by brand advertisers had coupons worth 10 and 12 cents toward the purchase of 1 pound of the advertised brand. The posted price of brand-name margarine did not vary among the test treatments (promotional levels) for butter.

Between treatment means, there appeared to be considerable variations in advertising space devoted to butter, but these differences were not statistically significant. Variations were not consistent among the markets. As a result, there were more variations within each treatment than between treatments. Moreover, the variation in advertising space devoted to butter among the promotional levels was apparently associated with variations in support given by food firms to butter during June dairy month. Most of these advertisements were exceptionally large and covered butter as well as other dairy products. In tabulating space for these advertisements, space was apportioned to the products included.

Variations in the number of advertisements for butter among the promotional levels were statistically significant. However, adjustments in butter sales for differences in trade advertising for each treatment were not made since the dairy association sought trade support for the test campaigns (thus some of the difference could be considered part of the test campaign). Except for the highest level of promotional intensity, the number of trade advertisements for butter were inversely related to the number of trade advertisements for oleomargarine.

Because of the inverse relationship between the advertisements for the two products and the greater number of oleomargarine trade advertisements (approximately a 6-to-1 ratio), the influence of oleomargarine advertisements overshadowed the influence of butter advertisements in the multiple regression analysis.

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<sup>13/</sup> Coupons with feature and semi-feature advertisement were generally worth 10-12 cents toward purchase of the advertised product. Semi-feature ads were 2.5-10 square inches. Feature ads were from 10 square inches to full page. Other advertisements included line ads of less than 2.5 square inches and semi-feature ads from 2.5-10 square inches without coupons.

Therefore, only the influence of variations in the number of oleomargarine advertisements among the different levels of butter promotion was determined. 14/

Calculations were made using the number of feature and semifeature advertisements for oleomargarine since these advertisements represented both advertising intensity for a competing product and a price concession. The influence of the price concession advertisements on butter sales was determined through regression analysis. The regression coefficient representing the influence of the oleomargarine advertisements was 0.48 in logarithms, that is, for each 1-percent change in the number of these types of advertisements for oleomargarine there was an opposite change of about one-half of 1 percent in butter sales.

Adjusting butter sales for the four promotion levels for difference in oleomargarine advertisement shows butter sales would have been significantly greater than with no promotion for all three intensified promotion levels if competition from oleomargarine had been equal. Estimated butter sales increases for the three levels of butter promotion with equal oleomargarine promotion is as follows: 3 cents--19 percent; 6 cents--16 percent; and 9 cents--25 percent. Thus, the negative sales found for the 3- and 6-cent levels of butter promotion were due to the counterstrategies for oleomargarine.

Apparently, oleomargarine producers became aware of the market tests and adopted counterstrategies to protect their share of the market. If this hypothesis is correct, then dairy farmers could expect some counter promotional strategies with a national advertising program for butter at the levels tested. However, it is unlikely that oleomargarine manufacturers, who are currently investing an estimated \$35 million in advertising and related promotion annually, would increase such investments to the extent observed in the test markets an increase of 35-40 percent in the number of feature and semifeature advertisements with coupons worth 10 cents on purchase of 1 pound of oleomargarine. 15/ It would appear that the cost of such increases in promotional strategy (increased advertising cost plus coupons equaling up to a one-third reduction in retail price) would be prohibitive on a long-term basis. That is, oleomargarine producers could afford to use counterstrategies of this nature and magnitude in a test market situation but not on a long-term national basis.

### Oleomargarine Sales

It was thought that if the intensified advertising and promotional investments had a beneficial influence on butter sales in the test markets and stores, oleomargarine sales might decline since the two products compete for many uses. Data on oleomargarine sales and trade merchandising and promotion practices were subjected to the same analytical procedures as for butter. Results showed that variations in oleomargarine sales associated with no advertising and with

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14/ On the basis of the ratio of number of ads and results of multiple regression analyses, it can be surmised that oleomargarine has priority over butter in trade advertising.

15/ Coupons, on average, equaled a price reduction of approximately one-third--a coupon worth 10-12 cents on purchase of a 35-cent pound of margarine.

advertising treatments for butter were not sufficiently consistent to be statistically significant at the .05 probability level (table 7 and 8). 16/ Variations in average sales were not consistent among the levels of butter promotion. The greatest difference observed was between the two highest levels of butter promotion (6- and 9-cent levels) followed by the difference between the highest level and no promotion.

It is logical to assume that promotion for one competitive product would detract from sales of its competitor. It is also logical to hypothesize that the adverse sales influence would be greatest at the highest level of promotional intensity for the competing product and become progressively less as levels of promotional intensity were reduced.

Margarine sales in the test markets did not support this hypothesis. Sales were lowest when butter was promoted at the 9-cent level. They were highest when butter promotion was at the 6-cent level, and next highest with no butter promotion. These findings suggest that oleomargarine sales are influenced to a greater extent by oleomargarine merchandising and promotional activities and other unexplained factors than by promotional activities for butter (table 9).

Table 9 shows that variations among treatments for all of the factors, except the number of advertisements placed in the food sections of newspaper by retailers and brand advertisers for oleomargarine, were no greater than could be expected from sample variation. As pointed out in the previous section for butter, a significant variation in the number of oleomargarine advertisements occurred among the intensity levels of butter promotion. The magnitude of variations was especially pronounced for the number of semifeature and feature advertisements with cents-off coupons.

The relationship between oleomargarine sales and the number of feature and semifeature advertisements with cents-off coupons was positive as shown by the regression coefficient of .06398. That is, for a 100-percent change in the number of such advertisements, oleomargarine sales changed about 6.5 percent in the same direction. 17/

Since the number of feature and semifeature advertisements was about 50 percent greater during the period of intensified butter promotion, observed sales of oleomargarine were about 3 percent higher than would have been expected with normal promotional support. Thus, it is apparent that the counterstrategy employed for oleomargarine counteracted any adverse sales impact which may have occurred from the intensified levels of butter advertising.

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16/ This does not mean that intensive advertising for butter (if effective in increasing butter sales), with no changes in advertising and promotion for oleomargarine, would not influence sales of oleomargarine. In the test markets, advertising and related promotion for oleomargarine was not held constant, nor did promotional activities vary in direct proportion to promotional intensity for butter.

17/ The percentage influence of oleomargarine advertisements on sales was significantly lower for oleomargarine than butter, but was similar when converted to pounds.

Table 7--Oleomargarine: Sales response to three levels of butter promotion, compared with no butter promotion 1/

Promotional for butter	Total oleomargarine sales per 3-month period	Deviation from average sales, all levels of butter promotion (12,668 lbs.)	Deviation from no-butter-promotion sales <u>2/</u>		
	<u>Pounds</u> <u>3/</u>	<u>Pounds</u> <u>3/</u>	<u>Percent</u>	<u>Pounds</u> <u>3/</u>	<u>Percent</u>
0-cent level	13,132	+354	+2.8	Base	
3-cent level	12,563	-215	-1.7	-569	-6.6
6-cent level	13,168	+389	+3.1	+36	+6
9-cent level	12,254	-529	-4.2	-878	-7.2

\* means statistically significant at .05 probability level.

1/ Four test markets, per 3-month period between May 1972 and July 1973.

2/ Least significant difference between no promotion and other levels at 0.5 probability level is plus or minus 938 pounds, or 7.4 percent of average.

3/ Per supermarket.

Table 8--Oleomargarine sales: Direct, carryover, and total effect of three levels of butter promotion, compared with no promotion 1/

Promotion level for butter	Deviation from average sales, all levels of butter promotion (12,776 lbs.)		
	Direct	Carryover	Total <u>2/</u>
	<u>Pounds</u> <u>3/</u>		
0-cent level:	+392	-38	+354
3-cent level:	-256	+41	-215
6-cent level:	+10	+379	+389
9-cent level:	-147	-382	-529

1/ Four test markets, per 3-month period between May 1972 and July 1973.

2/ Least significant difference at .05 probability level is plus or minus 938 pounds, or 7.4 percent of average.

3/ Per supermarket.

Table 9--Oleomargarine: Changes in sales associated with three levels of butter promotion and no promotion, and variation of selected merchandising factors 1/

Item	Unit	Average, all levels of butter promotion	Deviation from mean by butter promotional level of--			
			0 cents	3 cents	6 cents	9 cents
			<u>Percent</u>			
Sales:						
Unadjusted for butter promotion <u>2/</u>	Pounds	12,668	+2.8	-1.7	+3.1	-4.2
Adjusted for butter promotion <u>2/</u>	do.	---	+5.8	-4.0	+2.6	-4.4
Price:						
Private label	Cents/lb.	22.3	-.4	+3.1	-2.2	-.4
Brand label	do.	35.0	0	0	0	0
Display space	Linear ft.	23.7	-2.0	+2.0	+1.6	-1.6
Advertisements:						
Total	Number	180.0	-11.7	+7.3	+14.7	+10.3
Feature and semifeature <u>3/</u>	do.	---	-28.0	<u>4/</u> +12.9	<u>5/</u> +6.8	<u>6/</u> +8.3

1/ Four test markets, per 3-month period between May 1972 and July 1973.

2/ Least significant difference at 0.05 probability level between means is equal to plus or minus 7.4 percent of average for adjusted sales, and plus or minus 9.0 percent of average for unadjusted sales.

3/ Semifeature and feature advertisements by retailers and brand advertisers with cents-off coupons.

4/ Includes average of 2 full-page or half-page brand-label advertisements (1 10¢ coupon and 1 12¢ coupon) per market per 13-week period.

5/ Includes average of 2 full-page or half-page brand-label advertisements (all 12¢ coupons) per market per 13-week period.

6/ Includes average of 3 full-page or half-page brand-label advertisements (all 10¢ coupons) per market per 13-week period.

## Cheese Sales

Statistical analysis of the data indicated that the difference in average sales per store between no advertising and the 3-cents per capita annual level was no greater than could be expected from the estimated error attributable to sample variation (approximately 600 pounds per store per 3-month period). However, sales were significantly higher for the 6- and 9-cents per capita levels of promotional expenditures. The observed sales increase was greater for the 6-cent level, but the observed difference was within the confidence range of sampling variability if there had been no real difference in sales (table 10).

The average sales increase for the higher two levels of intensified advertising and promotional investments over no advertising and promotion were about evenly divided between immediate response during a 3-month period and carryover influence into the next 3-month period (table 11). The estimated sales gain for the two higher levels of promotional investments for cheese was 15 percent or 1,500 pounds per supermarket per 3-month period (6,000 pounds annually).

Variations in price, display space, and trade advertising (retailer and brand advertisements) for cheese among the promotional levels were relatively small, except for the number of cheese advertisements and the square inches of advertising space devoted to cheese per 13-week period (table 12). Analysis of variance showed that only the variation in the number of trade advertisements among treatments was statistically significant.

Regression analyses were made to quantify the relationship between number of trade advertisements for cheese and the level of cheese sales. <sup>18/</sup> The findings showed a positive relationship between the number of advertisements and the level of cheese sales. For each 1-percent change in the number of cheese advertisements, sales changed about one-half of 1 percent in the same direction (regression coefficient = .54 in logs). Retailers advertised cheese most during periods when the ADA was conducting no promotion and next most frequently at the lowest level of promotion. Apparently, retailers thought that the intensified promotion by the ADA was sufficient at the higher spending levels; or perhaps retailers were confused about the various promotional levels for cheese, since the tests for butter and cheese were conducted in the same markets and the sequence of intensity levels for butter was different from that for cheese. If the retail firms had based their support for the cheese test campaign on the schedule of treatments (promotional levels) for butter, the level of retailer support would have been more directly related to that sponsored by the ADA. Data support the latter hypothesis in some of the markets, but variations were not consistent over all markets or over all firms in individual markets.

Regardless of why retailer's advertising practices for cheese did not correspond to the ADA test campaigns, there was a positive relationship between retailer advertising and the level of cheese sales. If cheese sales are adjusted to a constant level of retailer advertising (average for all treatments), sales

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<sup>18/</sup> Computations were made on log transformation since variations in cheese sales within cities were proportional to average sales of each city. A similar pattern of variations in the number of cheese advertisements was also evident. In addition, the regression coefficients can be interpreted in percentage changes.

Table 10--Cheese: Sales response to three levels of promotion, compared with no promotion 1/

Promotion level	: Total : : cheese : Deviation from average sales, : Deviation from : sales per : all levels of cheese promotion : no-promotion : 3-month : (10,276 lbs.) : sales <u>2/</u> : period :		
	: Pounds <u>3/</u>	: Pounds <u>3/</u> <u>Percent</u>	: Pounds <u>3/</u> <u>Percent</u>
0-cent level	: 9,454	-822    -8.0	Base    ---
3-cent level	: 9,563	-713    -6.9	+109    1.2
6-cent level	: 11,168	+892    +8.7	+1,714    18.1*
9-cent level	: 10,920	+644    +6.3	+1,466    15.5*

\* means significant at .05 probability level.

1/ Four test markets, per 3-month period between May 1972 and July 1973.

2/ Least significant difference between no promotion and other advertising at 0.05 probability level is plus or minus 617 lbs., or 6.0 percent of average.

3/ Per supermarket.

Table 11--Cheese sales: Direct, carryover, and total effect of three levels of cheese promotion and no promotion 1/

Promotion level	: Deviation from average sales, all levels of cheese : promotion (10,276 lbs.)					
	: Direct <u>2/</u> :		: Carryover <u>2/</u> :		: Total <u>2/</u>	
	: Pounds <u>3/</u>	: <u>Percent</u>	: Pounds <u>3/</u>	: <u>Percent</u>	: Pounds <u>3/</u>	: <u>Percent</u>
0-cent level	: -365	-3.6	-457	-4.4	-822	-8.0
3-cent level	: -459	-4.5	-254	-2.5	-713	-6.9
6-cent level	: +497	+4.8	+395	+3.8	+892	+8.7
9-cent level	: +328	+3.2	+316	+3.1	+644	+6.3

1/ Four test markets, per 3-month period between May 1972 and July 1973.

2/ Least significant difference between no promotion and other advertising, at 0.05 probability level, is plus or minus 432 lbs., or 4.2 percent of average, for direct effect; plus or minus 462 lbs., or 4.5 percent of average, for carryover effect; and plus or minus 617 lbs., or 6.0 percent of average, for total effect.

3/ Per supermarket.

Table 12--Cheese: Sales associated with three levels of promotion and no promotion, and variation in selected merchandising factors 1/

Item	Unit	Cheese promotion level				Average, all promotion levels, per 13-week period per market
		0 cents	3 cents	6 cents	9 cents	
Sales.....	Pounds	9,454	9,563	11,168	10,920	10,276
Deviation from average, all promotion levels (10,276 lbs.).....	Percent	-8.0	-6.9	+8.7	+6.3	---
Price:						
Cheddar, private label.....	Dol./lb.	1.13	1.10	1.13	1.13	1.12
American processed, brand label..	do.	1.01	1.07	1.04	1.04	1.04
Colby, private label.....	do.	1.00	1.03	1.01	1.03	1.02
Display space.....	Linear ft.	66.9	67.4	62.7	68.5	66.3
Advertisements.....	Number	217.0	202.1	146.0	163.6	182.2
Advertising space.....	Square inc.	683.9	498.3	595.4	411.8	547.4

1/ Four test markets, per 3-month period between May 1972 and July 1973.



increases attributable to the intensified levels of promotion by the ADA are more pronounced. The sales increase for the 3-cent level approaches statistical significance at the .10 probability level. Comparisons of the number of cheese advertisements with cheese sales (unadjusted and adjusted for difference in number of retailer advertisements) for the four promotional levels are shown in table 13.

The adjusted means for no advertising and the three levels of intensified ADA advertising are unbiased estimates of the relative effectiveness of the test campaigns with constant retailer support. However, the unadjusted treatment means probably provide more realistic estimates of sales response to a national program which is not dependent on intensive dealer service representatives or trade incentives to generate greater retailer support.

### Sales in Control Markets

Sales data for butter, cheese, and oleomargarine collected in control markets were subjected to the same analysis of variance procedures as performed on data for test markets. Treatment sequences for the test markets were superimposed on the individually matched control market for these analyses. As expected, the only significant variations in sales levels were between markets and time periods. Differences for the assumed treatments were no greater than could be expected from sampling variation. As expected, the magnitude of sampling errors for butter and cheese were greater in the control markets than in the test markets since the ADA advertising influenced scheduling of promotional activities of retailers and suppliers.

Further analyses compared sales differences in test and control markets. Since average sales in each pair of test and control markets were not equal, it was necessary to adjust sales in each control market. This consisted of adjusting logs of sales for each control market for each period for the difference between the means of the control and adjusted means of test markets. Test market means were adjusted for direct and carryover influence of promotion levels for butter, cheese, and oleomargarine in test markets. The adjusted sales in each control market for each period was used as an unbiased estimate of expected sales of butter, cheese, and oleomargarine without promotion in each pair of markets. The deviation of observed sales in each test market from the expected sales in the control market with which it was paired were calculated as shown in table 14.

These deviations were then subjected to an analysis of variance to determine the direct and carryover effects of the promotions on butter, cheese, and oleomargarine. These analyses generally support the finding of the statistical analysis of data for the test markets (table 15).

The only significant difference was that butter sales increased substantially at both the 6-cent and 9-cent levels of promotional intensity. For the test market data, however, only the highest level resulted in a significant increase in sales. This probably resulted from the greater intensity of oleomargarine promotion at the higher levels of butter promotion in the test markets.

Table 13--Cheese: Sales and retailer advertisements, by three levels of promotional intensity and no promotion 1/

Promotion level	: Total cheese sales :		: Deviation of retailer :		: Deviation from no promotion in terms of--		
	: per 3-month period 2/	:	: advertisements from average:	:	Number of advertisements:	: Cheese sales 2/	: Unadjusted: Adjusted
	: Unadjusted:	: Adjusted:				: Unadjusted:	: Adjusted
	: Pounds 3/	: Pounds 3/	: Number	: Percent	: Percent	: Percent	: Percent
0 cent level	: 9,454	: 8,547	: +32.7	: +17.9	: Base	: Base	: Base
3 cent level	: 9,563	: 8,976	: +17.7	: +9.7	: -8.2	: +1.2	: +5.0
6 cent level	: 11,168	: 12,195	: -31.8	: -17.4	: -35.3	: +18.1	: +42.7
9 cent level	: 10,920	: 11,385	: -18.5	: -10.2	: -28.1	: +15.5	: +33.2
Average, all levels	: 10,276	: 10,276	: 182.2	: 0	: -23.9	: +11.6	: +27.0

1/ Four test markets, per 3-month period between May 1972 and July 1973.

2/ Least significant difference between means at 0.05 probability level is 617 lbs., or 6.0 percent of average.

3/ Per supermarket.

Table 14--Butter, cheese, and oleomargarine: Deviations of observed sales in test markets from sales in control markets

Time period 1/	Binghamton- Utica-Rome	Rockford- Ft. Wayne	Albuquerque- El Paso	Chattanooga- Montgomery	Total
<u>Logarithms 2/</u>					
Butter:					
I	+ .03830	A+ .04417(A)	B- .05504	C+ .01768	+ .04511
II	- .00244	B- .03036(D)	D+ .01569	A+ .04625	+ .02864
III	+ .03066	C- .08028(C)	A+ .00720	D- .01881	- .06123
IV	2/ - .03966	D+ .06388(D)	C+ .03354	B- .01998	+ .03778
V	- .03009	D+ .03568(D)	C+ .01948	B- .02199	+ .00308
Total	- .03009	+ .03309	+ .02087	+ .00315	.05338
Cheese:					
I	A+ .02598	B+ .02526	C+ .00790	D+ .04224	+ .01038
II	B- .01709	D+ .03210	A+ .02971	C+ .02911	+ .07383
III	C+ .04491	A+ .01887	D- .02682	B+ .00587	+ .04283
IV	D+ .05276	C- .00070	B- .00395	A- .03586	+ .01225
V	D+ .03962	C+ .06242	B+ .01817	A- .00726	+ .11295
Total	+ .14618	+ .13795	+ .02501	+ .03410	.34324
Oleomargarine:					
I	D+ .00869	A- .00125	B- .01337	C- .00165	- .00758
II	C- .03253	B- .02393	D+ .00543	A+ .04144	- .00959
III	B+ .00907	C+ .01712	A- .04096	D- .03357	- .04834
IV	A- .00479	D+ .00073	C- .00420	B- .02064	- .02890
V	A+ .00344	D- .01483	C- .03936	B- .01158	+ .01639
Total	- .01612	- .02216	- .01374	- .02600	- .07802

1/ Time periods are: I--May-July 1972; II--Aug.-Oct. 1972; III--Nov. 1972-Jan. 1973; IV--Feb.-Apr. 1973; and V--May-July 1973.

2/ A = 0 cent promotion level; B = 3 cents; C = 6 cents; D = 9 cents.

3/ Special promotion for butter in control market by one of the largest food firms during this period.

Table 15--Butter, cheese, and oleomargarine: Sales response to three levels of promotion and no promotion, four test markets vs. four control markets 1/

Item	Base	Promotion level of--			
		0 cents	3 cents	6 cents	9 cents
	<u>Pounds</u>			<u>Percent</u>	
Butter sales:					
Test markets--					
Deviation from average sales	: 2,933	: +.9	: -2.5	: -3.5	: +5.2
Deviation from no promotion sales <u>2/</u>	: 2,959	: ---	: -3.4	: -4.4*	: +4.3*
Control markets--					
Deviation from average sales	: 2,933	: -2.6	: -12.4	: +8.8	: +6.2
Deviation from no promotion sales <u>2/</u>	: 2,857	: ---	: <u>3/</u> -10.0	: +11.8*	: +9.1*
Cheese sales:					
Test markets--					
Deviation from average sales	: 10,276	: -8.0	: -6.9	: +8.7	: +6.8
Deviation from no promotion sales <u>2/</u>	: 9,454	: ---	: +1.2	: +18.1*	: +15.5*
Control markets--					
Deviation from average sales	: 10,276	: -8.4	: -2.4	: +7.6	: +3.2
Deviation from no promotion sales <u>2/</u>	: 9,413	: ---	: +6.5	: +17.4*	: +12.7*
Oleomargarine sales:					
Test markets--					
Deviation from average sales	: 12,668	: +2.8	: -1.7	: +3.1	: -4.2
Deviation from no promotion sales <u>2/</u>	: 13,132	: ---	: -6.6	: -.6	: -7.2
Control markets--					
Deviation from average sales	: 12,668	: -1.6	: -.6	: +8.2	: -5.9
Deviation from no promotion sales <u>2/</u>	: 12,460	: ---	: +1.0	: +11.0	: -4.3

\* Sales statistically significant from 0 level.

1/ Per 3-month period between May 1972 and July 1973.

2/ Influenced by Special promotion for butter in one control market.

3/ Sales significantly different from zero level.

Average sales per supermarket per time period were indexed to the first time period in each group of markets to compare sales trends in the two groups of markets (table 16). Divergence in sales trends between the test and control markets over time serves as an indicator of the longer term carryover influence of promotion.

Seasonal trends in sales were similar in test and control markets for both butter and oleomargarine. The third period, which included the Thanksgiving and Christmas holidays, encompassed the peak sales months, and May, June, and July (period 1 and 5) had the lowest sales for these products. Compared to 1972, average butter sales per store were slightly higher for the May, June, and July period of 1973, while oleomargarine sales were slightly lower in both test and control markets.

Seasonal trends in cheese sales show a different pattern. In both the test and control markets, sales were lowest during May-July 1972 with peaks in August-October and February-April, and a slight dip in November-January. During May-July 1973, sales returned to the previous year's low level in the control markets, but remained near the seasonal peak in the test markets. This divergence indicates that the residual, or carryover, influence of promotional activities affecting cheese sales in test markets may last longer than 3 months.

Also, the advertising and promotional activities for cheese possibly were complemented or reinforced by the heavy media publicity given to high meat prices and recommendations for substituting lower priced cheese dishes to fulfill nutritional requirements. However, the same publicity appeared in the control markets (without additional advertising and promotional support by the ADA), and had no apparent effect on cheese sales as reflected by the index of average sales per supermarket during a comparable time period.

#### IMPLICATIONS OF FINDINGS

An objective of this study was to determine not only the impact of intensified promotion on sales of butter, cheese, and oleomargarine through retail food stores, but also to appraise the impact on per unit promotional cost and marketing returns to dairy farmers. Promotional investments tested were projected to an annual total for national programs. Also, sales increases per supermarket for promotional levels that significantly affected sales were projected to the Nation's 40,600 supermarkets to obtain estimates of total annual increases in pounds of butter and cheese sales through these outlets (table 17). These projected annual sales increases were converted to pounds and hundredweights of milk equivalent to obtain estimates of additional milk sales by dairy farmers (table 18).

These projections are based on promotional investments of 9 cents for butter and 6 cents for cheese, as lower levels did not benefit either product. For cheese, the 9-cent level gave no better response than the 6-cent level. Butter projections are based on 4.3-percent sales increase over no promotion, unadjusted for oleomargarine promotion, and 12.5-percent sales increase adjusted for oleomargarine promotion. This is only about half the estimated influence found for the counterstrategies employed for oleomargarine, since it is reasonable to assume that some counterpromotion for oleomargarine would occur if butter were promoted at this level on a national basis.

Table 16--Butter, cheese, and oleomargarine: Index of sales, four test markets and four control markets 1/

Time period	Butter		Cheese		Oleomargarine	
	Test	Control	Test	Control	Test	Control
	markets	markets	markets	markets	markets	markets
	<u>May-July 1972 = 100</u>					
May-July 1972	100.0	100.0	100.0	100.0	100.0	100.0
Aug.-Oct. 1972	107.9	107.2	107.0	106.3	110.1	117.8
Nov. 1972-Jan. 1973	125.3	125.1	106.2	104.5	114.2	117.1
Feb.-Apr. 1973	109.5	121.0	111.4	108.0	107.6	112.2
May-July 1973	102.1	101.1	113.6	100.6	99.8	96.2

1/ Trend in butter sales influenced by retailer promotion in largest control market for butter during the fourth period. Sales were about 50 percent above third-period sales in this market. Sales were about 10 percent above May-July 1972 sales in other control markets.

Table 17--Butter and cheese: Summary of significant sales increases attributable to intensified promotion, compared with no promotion 1/

Promotion level	Cost extrapolated: to national level	Sales increase per test supermarket			
		Butter		Cheese	
		3 months	Year	3 months	Year
		-----Pounds <u>2/</u> -----			
0 cent level	--	no change	no change	no change	no change
3 cent level	6	no change	no change	no change	no change
6 cent level	12	no change	no change	1,710	6,840
9 cent level (unadj.)	18	130	520	1,470	5,880
9 cent level (adj.) <u>3/</u>	18	370	1,480	---	---

1/ Four test markets, per 3-month period between May 1972 and July 1973.

2/ Per supermarket. Estimated sales increases rounded to 10 lbs.

3/ Estimated sales increase of 12.5 percent adjusted for oleomargarine counter promotion that occurred at 9-cent level of butter promotion.

Table 18--Butter, cheese, and milk equivalent: Projected annual sales increases with 9-cent promotion level for butter and 6-cent level for cheese, national basis 1/

Item	Increase in annual sales		
	Per supermarket	Total, 40,600 supermarkets	Milk equivalent, 40,600 supermarkets <u>2/</u>
	<u>Pounds</u>	<u>Pounds</u>	<u>100 Pounds</u>
Butter sales (unadj.)	520	21,112,000	4,454,632
Butter sales (adj.) <u>3/</u>	1,480	60,088,000	12,678,568
Cheese sales	6,000	243,600,000	24,360,000

1/ Projections are limited to the 40,600 supermarkets with annual sales of \$500,000 and over.

2/ Milk equivalents: 1 lb. butter = 21.1 lbs. milk; 1 lb. cheese - 10 lbs. milk.

3/ Estimated sales increase of 12.5 percent adjusted for oleomargarine counter promotion that occurred at 9-cent level of butter promotion.

The increase in dairy farmers' gross receipts from marketing to meet this projected increased demand at current prices would amount to \$36 and \$101 million for butter (on an unadjusted and adjusted basis) and about \$195 million for cheese. The associated advertising and promotion costs to produce these additional revenues would be \$18 million for butter and \$12 million for cheese (table 19). The promotional costs per hundredweight of additional milk utilized would be \$4.04 and \$1.42, respectively, on an unadjusted and adjusted basis for butter and 50 cents for cheese. 19/

As a result of promotional investment, net returns from marketing additional milk at current prices would amount to \$3.96 (unadjusted) and \$6.58 (adjusted) for butter and \$7.50 for cheese. At 1973-74 market milk prices, it does not appear that net returns to farmers over promotional cost would cover production costs on the added milk that would be required to produce additional butter. However, net returns for milk to produce additional cheese might be profitable for efficient producers.

Moreover, since the projected increase in milk required to produce cheese to meet the additional demand represents a significant portion of total milk produced in 1972, the impact would no doubt put upward pressure on milk prices for

19/ These are marginal costs on projected net increases in milk sales. Total promotional cost of \$30 million annually for both products spread over 1972 total milk production would amount to approximately 3 cents per hundredweight,

Table 19--Advertising costs, estimated increase in gross receipts, and net returns for additional milk required to produce additional butter and cheese 1/

Item	Advertising cost		Increase	Returns per cwt. on added milk less advertising costs
	Total	Per cwt. of added milk	in gross receipts	
	Million Dollars	Dollars	Million Dollars	Dollars
Butter sales (unadj.)	18	4.04	35.6	3.96
Butter sales (adj.) <u>2/</u>	18	1.42	101.4	6.58
Cheese sales	12	.50	194.9	7.50

1/ Based on study in four test markets, July 1972-June 1973. Increased sales as projected in table 18.

2/ Estimated sales increase of 12.5 percent adjusted for oleomargarine counterpromotion that occurred at 9-cent level of butter promotion.

all uses. If average prices for all milk increased more than 3 cents per hundred-weight (the per hundredweight cost of promotion of all milk), it would pay farmers to promote both products.

The extent of upward pressure on prices received by dairy farmers for milk utilized in other forms depends upon several factors: stability of demand for other products, volume of cheese imports, and supply response to increased milk prices. Assumptions concerning changes in these factors, and relationships among them, would affect estimates of the price farmers would receive for milk used for fluid consumption and manufactured products, given the sales gains resulting from the promotional activities. 20/

Changes in underlying or basic forces affecting these interrelationships are difficult to predict. For example, recent unforeseen fuel shortages and adverse weather have affected production of feed grains, soybeans, and other oilseeds. Not only have production costs been affected, but also cost-price interrelationships in the demand for fluid milk, manufactured dairy products, and competing products. During 1973, moreover, import quotas were relaxed, resulting in increased imports of dairy products of 25-30 million hundredweight milk equivalent.

No attempt was made to estimate the overall impact on prices received by dairy farmers for estimated sales increases associated with the intensified cheese promotion.

20/ See app. B for further details.



When a campaign is carried on over a period of time, advertisers often attempt to measure changes in consumer awareness of the advertising and promotion, and attitude changes due to the campaign. It is generally believed that sales increases cannot be expected unless attitude changes occur among consumers, and that attitude changes cannot be expected unless there is substantial awareness to the campaign. Measuring awareness and attitude changes is also a diagnostic tool for interpreting sales results.

In this study, the UDIA employed a commercial marketing research firm to interview consumers in each of the eight markets in six different waves of interviews. Interviewing was done just prior to the start of the campaign and again at the end of each of the five time periods. The interviewees were female heads of households selected from telephone directories on a random probability basis. Interviewing was done by telephone. In each wave, 400 interviews were conducted in each of the four test markets and 300 interviews for each wave in the four control markets.

### Cheese Promotion

Television advertising accounted for about 90 percent of the budget for cheese promotion. Point-of-purchase material was on display in most supermarkets when the 6-cent and 9-cent promotion levels were in effect. Some print advertising was run at the 6-cent and 9-cent levels. A cheese recipe booklet was prepared and promoted for sale at 25 cents. Food publicity personnel prepared and distributed photos and recipes for newspapers, and appeared on television and radio food editor programs.

Television commercials showed appetizing ways to use different kinds of cheese. One set of commercials featured famous New York chefs preparing foods and discussing cheese used in lasagna, apple pancakes (crepes), cheese pie (quiche), and a special sandwich. Another set of commercials featured simpler recipes. The theme was "Cheese - It Gives You Ideas."

### Awareness

During the telephone interviews, respondents were asked: "During the past 2 or 3 months, do you remember seeing or hearing any advertising about cheese?" They were then asked where they had seen or heard it, and what was said or shown in the advertising. Table 20 provides the essential data in relation to the campaign.

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21/ This section was prepared by G. G. Quackenbush, Director, Economic and Marketing Research, United Dairy Industries Association, Chicago, Ill.

Table 20--Cheese: Percentage of respondents giving answers to selected awareness questions, by waves of interviews, four test markets vs. four control markets

Item	Wave I (before campaign)	Wave II (end of 1st period)	Wave III (end of 2nd period)	Wave IV (end of 3rd period)	Wave V (end of 4th period)	Wave VI (end of 5th period)
	<u>Percent</u>					
Saw or heard campaign:						
Test markets	49	56	61	60	61	58
Control markets	45	40	51	46	52	49
Saw or heard on TV:						
Test markets	32	38	47	48	46	45
Control markets	31	25	34	31	34	33
Mentioned dishes, recipes:						
Test markets	15	24	29	31	29	29
Control markets	13	12	15	11	18	14

From wave I (prior to the campaign) through wave III (at the end of the second time period), a build-up of awareness occurred in the test markets. In the second period, all four markets had been exposed to advertising, and awareness appeared to level off. This was expected, however, because interviewers were asked only about the last 2 or 3 months, and in the aggregate of the four test markets, no increase in promotional activity was taking place.

Since this was a one-time experiment, there are no norms by which to judge whether the increase in awareness to cheese advertising was relatively high, medium, or low. Among dairy products, cheese is quite heavily advertised. One would expect that it would take quite a large increase to be noticed. However, the main appeal of the campaign--dishes, recipes, uses--resulted in about twice the degree of awareness in the test markets as in the control markets. This would appear to be a substantial difference.

Another approach to measuring changes in awareness, in addition to comparing the test and control markets, is to insert the awareness figures for just the four test markets into the Latin Square Design, and solve for differences among levels of promotion. Results showed awareness to "any cheese advertising in the past 2 or 3 months" to be 52 percent at the 0-cent level, 58 percent at the 3-cent level, 63 percent at the 6-cent level, and 64 percent at the 9-cent level. The increase was greatest from 0 to 3 cents and tended to level off at the higher levels. As expected, no carryover effect was evident because of the question asked about advertising in only the last 2 or 3 months.

On the main campaign idea--dishes, recipes, uses--recall increased from 19 percent at the 0-cent level to 24 percent at the 3-cent level, 34 percent at the 6-cent level, to 37 percent at the 9-cent level. Here we find the greatest gain between the 3-cent and 6-cent levels. Again, this was all direct effect, giving at least a clue that the 6-cent level might be an optimum.

### Attitude Changes

During the interview, respondents were given a series of attitude statements about cheese and asked to respond on a 6-point disagree and agree scale.

The method of analysis was to use only the four test markets, insert the mean values obtained in each market at the end of each 3-month period into the Latin-Square Design, and solve for any statistical difference at the .10 probability level. Statements indicating a change in attitude as a result of the intensified promotion were:

- Cheese adds something special to your daily meals.
- Cheese adds the kind of variety I'm looking for in meal planning.
- Sophisticated people eat more varieties of cheese.
- Cheese is the product for me.
- Cheese is a good source of high quality protein.
- American Cheddar is a favorite with me.
- I (don't) worry about cholesterol from cheese.

The magnitude of the attitude change was not great, however. The improvement in attitude, as measured by changes in means values, using the 6-point scale, did not exceed .15.

It is interesting to observe the type of attitude changes that took place from the "Cheese--It Gives You Ideas" campaign. Some of the above items can easily be conceived as part of the campaign. However, the protein and cholesterol issues were not a part. This illustrates that a change in one set of attitudes may change or reinforce others associated with a product, though not intended in the campaign. Of further interest, two items that would have been expected to improve did not, namely, "cheese can be a part of many recipes" and "I plan to use cheese in recipes more often in the future". The only positive way to know what attitudes have changed is to measure them.

### Butter Promotion

Television spots used about 90 percent of the promotion budget. At the 6- and 9-cent levels, point-of-purchase material was in most of the supermarkets in the areas. Printed advertisements, which were also used at the 6- and 9-cent levels included articles about butter and recipes based on butter. In general, food publicity included guest appearances by food experts on radio and television programs.

Television commercials for butter stressed advantages over margarine, as evidenced by the theme of the campaign--"Butter is what margarine would like to be." The superior flavor of butter and its naturalness were major themes. Each commercial had a mechanical cow representing margarine. Research showed that consumer motivation was not increased greatly, that the emphasis on flavor was not a strong appeal, and that the mechanical cow attracted so much attention among viewers that they often missed the message.

### Awareness

During the telephone interviews, respondents were asked: "During the past 2 or 3 months, do you remember seeing or hearing any advertising about butter?" They were then asked where they had seen or heard it, and what was said or shown (table 21).

There was little advertising for butter before the campaign started or in the control markets over the full time period. Recall of any butter advertising jumped substantially during the campaign, and recall of television as the source was up substantially. The mechanical cow was the high item of recall, but the campaign theme was at a considerably lower level of recall. While there are no norms for recall for butter advertising, it would appear that a fairly high share of the people were aware of this campaign.

When the awareness data were further analyzed, using the Latin-Square Design, an increase in awareness was apparent as levels of promotion were increased. Recall of any butter advertising increased from 18 percent at the 0-cent level to 32 percent at the 3-cent level, 42 percent at the 6-cent level, and 48 percent at the 9-cent level. Recall of the mechanical cow increased from 10 to 20 to 34 to 36 percent. The greatest increases were from 0 cents to 3 cents. In neither case was there much increase from the 6-cent to the 9-cent level. A 10 percent awareness of the mechanical cow at the 0-cent level includes some carryover effect, but the experimental design did not allow the direct effect to reach zero, even accounting for differences in time, markets, and levels of promotion.



## Attitude Changes

Housewives were asked to respond to a series of believe-disbelieve statements, using a 6-point scale. The mean values were placed in the Latin-Square Design. Items which improved at levels of promotion above the 0-cent level were as follows:

- Butter is a good value for the money.
- Butter is a higher quality product than margarine.
- A natural product like butter is better for you than a manmade product like margarine.
- No one has ever made anything that can match butter.
- Butter is healthful.

These items were significant at the .10 probability level.

This list of items reflects the campaign fairly well since there were inferences or copy points about them. Although the differences were significant statistically, they were not large absolutely, being only about .3 on a 6-point scale. Neither were they consistently higher as levels of promotion increased.

## Summary of Results

Awareness of any advertising of the products increased much more for butter than for cheese, but cheese started at a much higher level. Items of recall, however, may have been more in line with the intended campaign messages for cheese than for butter. Awareness increased most from the 0-cent to the 3-cent level and increased little from the 6-cent to the 9-cent level for both products. Some attitudes improved for both butter and cheese, and the items which improved reflected the intended campaigns fairly well.

The greater increase in awareness and the apparently greater improvement in attitudes, for butter than for cheese, wasn't followed by greater sales of butter than cheese. This could be due to the differences in campaigns in that more motivating attitudes may have been changed for cheese than for butter, or to external influences such as unmeasured competitive activity in the market.

## APPENDIX A: BASIS OF COOPERATION AND RESPONSIBILITIES

The United Dairy Industry Association (UDIA) and subsidiary organizations, organized and supported by dairy farmers and their cooperative associations, are responsible for coordinating and conducting research, market development, product development, educational, and advertising and sales promotion programs for the dairy industry.

The Marketing and Economic Research Division of UDIA provides economic and marketing intelligence to its members, directors, and management. The primary objective of this research is to maximize the efficiency and effectiveness of funds contributed by members. In this respect, officials of UDIA asked the Economic Research Service (ERS), U.S. Department of Agriculture, to cooperate in research to determine the optimum allocation of advertising and promotional investment for butter and cheese, the two leading manufactured dairy products based on utilization of fluid milk.

Briefly, responsibilities of the cooperating parties in the conduct of this research were as follows: (1) The overall study was jointly planned and designed by the cooperating parties. (2) UDIA and the American Dairy Association (ADA--the advertising and sales promotion arm of UDIA) developed and financed all advertising and related promotional activities, financed the cost of collecting sales and other data, and contributed \$50,000 to ERS to help defray cost of travel and added professional and clerical personnel time required to supervise field work and to analyze data. UDIA was solely responsible for conducting the consumer phase of the research to determine changes in consumer attitudes, purchase behavior, and other factors related to the test promotional campaigns. (3) ERS was primarily responsible for supervision, analysis, and reporting the results of the retail store phase of the research.

APPENDIX B: INFLUENCE OF INCREASED DEMAND FOR BUTTER AND CHEESE RESULTING FROM  
INTENSIFIED PROMOTION ON PRODUCER MILK PRICES

Boyd N. Buxton and Richard Fallert, Economists, ERS, presented a paper at the annual meeting of the American Agricultural Economics Association, College Station, Texas, August 1974, reporting the results of an analysis of the influence of imports of dairy products on prices U.S. farmers receive for milk. Results showed that importing an additional 500 million pounds (5 million hundredweight) of milk equivalent in dairy products would reduce U.S. milk prices received by farmers (utilized for all purposes) an estimated 13 cents per hundredweight.

If assumptions made in this study on supply and demand relationships hold over time, it can be surmised that a reduction of the same magnitude in imports, or an increase in demand of the same magnitude, would exert an equal influence. On this basis, the projected increase in sales for cheese found in this study (approximately 25 million hundredweight, milk equivalent) with no increase in milk production would have a positive influence on prices received by dairy farmers of 60-65 cents per hundredweight.

The sales increase found for butter (unadjusted for oleomargarine promotion), approximately 5 million hundredweight, milk equivalent, would have a positive influence on prices received by farmers of about 13 cents, or a total for the two products of 73-78 cents per hundredweight.

It is highly unlikely that farmers would experience gains of this magnitude, however, for several reasons: (1) the consumption of some manufactured dairy products is declining, which would free some milk for added butter and cheese production; (2) without an increase in production, consumer prices for cheese would increase and further intensify current consumer resistance to higher prices, thus reducing projected demand; (3) higher prices and increased consumption would make the U.S. market more attractive to foreign competitors; and (4) higher prices would encourage producers to increase production. The combined influence of each of these counteracting influences would significantly reduce the potential rise in prices received by farmers. But if the net gain were only 15 cents per hundredweight, it would pay farmers to make the added promotional investments. Net returns over promotional costs for both products would be about five times greater than the investment; that is, a gross return of 15 cents for each 3 cents invested based on the total volume of U.S. milk marketed in 1972.