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THE CONSUMPTION AND USE OF DAIRY PRODUCTS AND THEIR SUBSTITUTES IN METROPOLITAN SALT LAKE CITY

by

Jerry Lee Calley

A thesis submitted in partial fulfillment
of the requirements for the degree

of

MASTER OF SCIENCE

in

Agricultural Economics

Approved:

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Major Professor

_____
Head of Department

_____
Dean of Graduate Studies

UTAH STATE UNIVERSITY
Logan, Utah

1968

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Jerry Lee Calley

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ABSTRACT

The Consumption and Use of Dairy Products and Their Substitutes in Metropolitan Salt Lake City

by

Jerry Lee Calley, Master of Science

Utah State University, 1968

Major Professor: Dr. Rondo A. Christensen
Department: Agricultural Economics

Consumption and use patterns for selected dairy products and their substitutes were described and related to certain socio-economic variables for consumers living in the Salt Lake City metropolitan area. The data for this thesis were gathered by means of a survey conducted from April 1967 through June 1967.

Salt Lake City households were large consumers of fluid milk, evaporated milk, butter, margarine, fruit juice and fruitade when compared to the western region and the nation.

By calculating the income elasticities for each of the four types of products, all were shown to be superior products with the exception of canned milk.

Age, education and employment status of the homemaker generally exerted a positive influence on the per capita family consumption of the four product-groupings. Age and sex of the individual were both significant in determining the amount of fluid milk consumed.

People tended to drink more milk for breakfast, then lunch, dinner and between meals respectively.

(101 pages)

INTRODUCTION

Scope

The production of milk and dairy products is an important segment of the Utah agricultural industry. According to the Utah Census of Agriculture (USDA, 1964), the value of dairy products sold accounted for 17 percent of the value of all farm products sold. It was surpassed only by the value of cattle and cattle products sold which accounted for approximately 21 percent of the value of all farm products sold. In a United States Department of Agriculture publication entitled Milk: Production, Disposition, and Income (April 1967), it was reported that the 1966 cash receipts from the marketing of milk and cream in Utah reached an all time high of approximately 35 million dollars. This was the amount paid to farmers and does not include any value added by processing or distributing the final product. It was also shown from this same publication that per capita production of milk was relatively high in Utah. Based on 1966 population estimates, per capita production of milk for Utah totaled 728.7 pounds while the United States as a whole totaled 610.8 pounds.

The above figures point up the size and value of dairy production in Utah. However, this is only one side of the ledger. What is the degree of acceptance of dairy products by Utahans? How do consumption and use patterns in Utah compare with the rest of the nation? A regional survey conducted by the USDA during the July 1957 - June 1958

period reported annual per capita purchases of fluid milk of 86.6 quarts for the Southwest-Mountain area compared to 98.4 quarts for the United States. With the exception of the Southeast area, the Southwest-Mountain area had the lowest per capita purchases of fluid milk. If these regional data characterize the state of Utah, it would appear beneficial to do more research to determine the causes of the different levels of consumption.

At present there are little data available concerning the relationships between milk and milk product consumption and the certain social and economic variables that may influence it. Many hypotheses have been put forth to try to indicate which are the most influential consumer variables affecting dairy product consumption, but there is still a lack of quantitative data. Many decisions in dairy marketing depend on the knowledge of the relationship between the consumer and his socio-economic environment. This study is designed to make available such information to those concerned with the production, marketing, and consumption of milk and dairy products.

Consumption is determined by the action of several environmental forces, one of which may be economic. The cross-sectional data used in this study are actually photographs of these forces at work as of a given time period. Therefore, ". . . the results of this study represent the relationships peculiar to the time of the study and the particular market" to be studied--in this case Salt Lake City (Baum and Corbridge, 1953, p. 1).

Area Description

In view of the fact that this study will attempt to define certain economic and social characteristics which tend to influence the consumption of milk and milk products in Salt Lake City, it would seem appropriate to describe the economic and social setting of the city and the state. This will be of value in the interpretation of the results.

Salt Lake City has been called the "Crossroads of the West." It is located at the geographic center of a four-state marketing area known as the Inter-Mountain market. This large trading area includes eastern Nevada, Utah, southern Idaho and western Wyoming. "The entire region is stocked and serviced from Salt Lake City, the only metropolitan-sized city within it." (Newspaper Agency Corporation, 1967).

Salt Lake City is the principal city in the Great Basin federal milk marketing order. Roland Bartlett (1957) has suggested that some milk marketing orders have acted as barriers to increased milk consumption when they have maintained high prices while supplies of milk available were large. This does not appear to be the case with the Great Basin marketing order. Dr. Rondo Christensen (1965, p. 46) reports "While not the lowest, wholesale and retail prices and margins in Salt Lake City are lower than average of other principal cities in the Mountain and Pacific federal order markets." These facts are mentioned only to recognize that a federal marketing order may be influential in determining the consumption of dairy products.

One of the notable characteristics of the Salt Lake metropolitan

area and the state of Utah is the extreme minority of non-white races. The Census of Population (1960) reported that 1.40 percent of the Utah population was of the non-white racial group, compared to 12.0 percent for the nation as a whole. If race proves to be a significant factor in Utah as it has in other states (Baum and Corbridge, 1953; Scott, Lau and Nakashima, 1960; Walters and Parry, 1964), then the extreme minority of non-white races in Utah may be very important. In this thesis race was not evaluated as a factor of consumption because of the low number of non-white households interviewed.

Salt Lake City is also the center of the "Mormon" religion. Reliable estimates of the percent of "Mormons" (members of The Church of Jesus Christ of Latter-Day Saints) residing in metropolitan Salt Lake City are unavailable. The results of the survey used in this thesis indicate that approximately 70 percent of the households in the Salt Lake area are affliliated with the LDS Church. The Latter-Day Saint religion has as one of its basic tenets the abstention from coffee, tea, tobacco and alcoholic beverages.

Since whole milk is considered in certain instances a substitute product for coffee and tea (Dickens and Fanelli, 1956), it may be hypothesized that membership in the Latter-Day Saint Church is a significant factor influencing the consumption of whole milk. Religion is one of the variables considered in this thesis.

There are some state wide statistics that might possibly have some bearing on the per capita consumption of milk and dairy products. Utah has the third highest birth rate and the fourth lowest death rate. Under such conditions the number of people per household in

Utah is high. The high birth rate indicates that Utah has a high percent of young people--46.1 percent are under 20 years of age (Newspaper Agency Corporation, 1967). If age proves to be directly and significantly related to consumption, then a high percent of young people will mean high total per capita consumption for the state.

The Newspaper Agency Corporation (1967, p. 6) states that "Utah leads all states in the percent of the population in colleges and universities." It also leads the nation in the percent of its population who have received a high school education or more, 55.8 percent. If education is found to be directly related to consumption then this could be important in determining total consumption. These data pertain to the state as a whole, but probably also apply to the Salt Lake area as well.

OBJECTIVES OF THE STUDY

The objectives of this study are:

1. To describe consumption and use patterns for selected dairy products and their substitutes in metropolitan Salt Lake City, Utah.
2. To analyze reasons for variations in consumption of selected milk products as related to consumer characteristics. The variables to be considered are: income, household composition, age of the homemaker, education of the homemaker, religion, employment status of the homemaker, food expenditure, and age and sex of the individual.
3. To determine the purchasing practices of consumers in metropolitan Salt Lake City, noting especially the size of the unit purchased, the place of purchase and the prices paid for various units.

The first objective is descriptive in nature. Its purpose is to describe the type, quantity and use of dairy products and their substitutes being consumed in the Salt Lake metropolitan area. The second objective is analytical in nature and is an attempt to explain the consumption patterns described in objective one. The third objective is composed of descriptive material of secondary importance but which still will be of interest in describing preferences and purchasing practices of consumers.

REVIEW OF LITERATURE

This review of literature will not attempt to review all of the literature available on the subject of consumption and demand of milk and other dairy products, for to do so would be a monumental task. It will include those studies that have obtained their data from a household survey and were generally local in character.

One of the more prominent studies in the field of consumption of dairy products was the work of Baum and Corbridge in Seattle, Washington (1953). They studied the extent to which consumption of milk, cream, evaporated milk, butter, margarine, ice cream and cottage cheese was affected by certain social and economic variables. The variables considered were income, household size, age, education of homemaker, sex, ethnic background and race. "Regression analysis was used to determine that household size was significantly related to total milk consumption whereas household income was not." Size of household was also significantly related to household consumption of butter and margarine while household income was directly related to the consumption of butter. It was determined through covariance analysis that race and sex were significant variables influencing the per capita consumption of milk. Negroes and Orientals consumed smaller amounts of milk and cream than white households, and males consumed greater amounts of milk than females.

Blakely, McMullin and Boggs (1955) related the consumption of milk and dairy products to family size and income and the age and sex of the individual in Oklahoma City. One of their more interesting

analyses was the use of regression analysis to determine that age was a significant influence on female consumption of milk but not male consumption of milk. Males consumed more milk over-all than females. Through tabular analysis it was determined that consumers generally preferred quart size containers and that lower income and smaller size families preferred to purchase their milk at the store.

The two Hawaiian cities of Honolulu and Kailua were surveyed in 1958 to determine the consumer demand for dairy products. Scott, Lau and Nakashima (1960) were concerned with relating milk consumption to income, national origin, age of the population and price of milk. Through tabular analysis they found that income, nationality and age influenced consumption. The per capita consumption of milk in Honolulu and Kailua was compared to that of the U.S. mainland and was found to be lower. This was attributed to a high price for milk and to the fact that Hawaii's population was largely composed of several Asiatic nationalities not considered to be great drinkers of milk.

Walters and Parry (1964) measured the change in milk product consumption patterns by comparing a survey taken in 1961 to one taken in 1953. The city under observation was Memphis, Tennessee, and it was hypothesized here that race would be an influential factor affecting milk product consumption due to the high percent of Negroes. Fluid milk, skim milk products, cream products, cottage cheese, and butter consumption were related to variables such as family income, race and consumption of competing products. Percentages were used in this study to show the degree of acceptance of a product by certain income and racial groups. Income did not have any effect on

the percentage of families using fluid milk products but it did on cream products, cottage cheese and butter. All the dairy products were used in a larger percent of white households.

Dickens and Fanelli (1956) conducted a subjective survey of homemakers in the state of Mississippi regarding the usual drink consumed during various mealtimes compared to a drink they would have preferred to have consumed during those meals. Among the conclusions derived from tabular analysis were that teenagers most often drank milk at the evening meal and that more older women than younger preferred milk at certain mealtimes.

Alabama urban homemakers were surveyed as to their milk and milk product consumption patterns by Hammet and Blackstone (1964). The results were converted to whole milk equivalents and then associated with various family characteristics. Through tabular analysis it was determined that race, meal equivalent size of household, per capita income and per capita meal costs were the most influential variables affecting the consumption of whole milk equivalents. Family composition, age of youngest family member, age of homemaker, education of homemaker and occupation of homemaker were considered less important factors but did provide a background for understanding the more closely related family characteristics.

A highly technical and well written regional analysis was authored by Joseph C. Purcell from the University of Georgia (1957). The first part of a twofold objective was to measure the effect on the consumption of fluid milk and fluid milk substitutes of income, fluid milk prices, race, household size and composition. The second part was to evaluate the use of geographic cross-sectional data in demand

studies. The data provided for this study were taken from a survey of twelve southeastern cities. Multiple regression analysis showed that income had a positive significant effect on fluid milk substitute consumption. The price of fluid milk had a positive significant effect on the consumption of fluid milk substitutes. Race, household size and composition had a highly significant effect on weekly household consumption of fluid milk. The evaluation of the results of this study indicated that cross-sectional data were more effective than time series data in providing larger price and factor variation in milk consumption studies.

METHOD OF PROCEDURE

Sample

The basic data used in this study were cross-sectional in nature and were obtained from a survey of metropolitan Salt Lake City families. This survey was taken from April 1967 through June 1967. The sampling method was set up in the following manner:

Salt Lake City, the largest city in Utah, was chosen to be surveyed so that the data collected here might be included in a regional analysis of milk consumption being conducted in large cities of eight other western states. The term metropolitan Salt Lake City as it was used in this study was defined in the same manner as the "Salt Lake Metropolitan Statistical Area" used in the 1960 Census of Population. The metropolitan area was divided into 90 geographic tracts of approximately equal population. These 90 tracts were then grouped into 30 districts each containing three adjacent tracts. This was done to insure the widespread distribution of the sample.

From the 30 districts, the following were selected by the use of a table of random numbers: (1) one tract was selected from each district, (2) three blocks were selected from each tract, and (3) one corner was selected from each block.

From the corner thus selected, the enumerator began the survey in a clockwise manner interviewing the first respondent she came to. After the first respondent, the enumerator was to skip the next house or apartment and was to interview the next respondent she

found at home, thus continuing around the block until a total of four households had been surveyed. If she did not find the homemaker at home during her first visit, the enumerator was to call back at a different hour or make specific appointments until the questionnaire was completed. There was a total of 360 respondents surveyed.

Occupants of institutional housing units such as motels, hotels, or rest homes were not interviewed because of their transient condition, and because we were interested in patterns of consumption and use in individual households where purchase decisions were made in that household.

Enumeration

The questionnaire itself was designed to obtain information from the respondents which would describe their consumption and use patterns for milk and milk products. Questions were also asked to ascertain social and economic characteristics of the household. The enumerator was asked to interview the homemaker in that she (or he) would be more aware of the consumptive practices of the family. In order to insure a reasonable degree of accuracy, the homemaker was not asked to recall consumptive practices further in the past than one week. Lack of cooperation in answering these questions on the part of homemakers was rare.

Question one of the questionnaire was used to determine what dairy products and possible substitutes the family had consumed during the past week, where they had purchased the product, the size and price of the unit purchased, and the percent of the product put to different uses. The quantity consumed was that amount used in the

household by household members or pets. Homemakers were also asked to report the source of purchase of certain products whether they were purchased through home delivery or bought at the store. Items that were produced or prepared at home because of their insignificance were classified as bought at the store.

Question number two was designed to supply more detailed information concerning actual per capita consumption of fluid milk during the day. Each member of the household living at home during the previous week was listed according to his sex and age. The milk reported here was consumed on the day immediately preceding the interview, or the previous Friday if the interview took place on Monday. There were no interviews on Sunday. Consumption was to include milk drunk with meals at home as well as at school or at restaurants.

The last section of the questionnaire was designed to provide information concerning the social and economic status of the family. This section was placed at the end of the questionnaire to avoid any undue influence the answering of these questions might have on the willingness of the respondent to give consumption data. The name and telephone number were taken down in order to clarify or complete any unanswered question from the questionnaire. The telephone was used several times in order to clarify answers. Only a very few of the respondents did not remember or did not want to give their disposable income. In this case their income was estimated by considering occupation, age, family size, and other variables indicative of income.

Analysis

Once the data had been screened for accuracy and clarified by telephone, the data were coded numerically and punched onto machine

data processing cards. Most of the analysis was performed on the computer.

Due to the large number of products considered and the limited amount of time and money available, the best and most complete method of analysis to be used was tabular analysis. This, of course, meant the sorting of data according to the social and economic characteristics being considered in this study. Through tabular analysis the actual per capita consumption for various consuming groups was shown. With the data in graphic or tabular form, consumptive trends could be found and tested. Most of the tables presented in this study were designed to allow for a more penetrating analysis of the data by providing in addition to per capita consumption such items as total consumption, number of consumers, and certain descriptive elements of the social and economic variables. Conclusions and notes of interest accompany each of the tables.

In several cases, if a definite relationship existed between the the dependent variable and certain independent variables, the proper statistical test was applied to the data to see if the relationship was significant. This was not done on each dependent and independent variable as that would have been too costly and time consuming. Simple linear regression was used at times to fit trend lines and derive testable coefficients.

CONSUMPTION AND USE OF MILK AND DAIRY PRODUCTS

The purpose of this section is to describe consumption and use patterns for milk, dairy products, and their substitutes in metropolitan Salt Lake City and to compare levels of consumption with both regional and national levels. Consumption is described in terms of weekly per capita consumption unless otherwise stated. Per capita consumption is always in terms of the total number of people in the sample or sub-sample and not just the number of consumers of the product in the sample or sub-sample.

Certain similar products have been grouped to present an over-all picture of the consumption of that type of product. For example, whole milk, two percent milk, skim milk, buttermilk, and chocolate milk are combined into a fluid milk category. Nonfat dry milk and powdered two percent milk[1] are combined into two groups depending on whether each was utilized in its powder or reconstituted liquid form in the home. Canned milk is a composite of condensed and evaporated milk, while frozen desserts include sherbert, ice milk and ice cream.

Consumption and Acceptance of Dairy Products and Their Substitutes

Total, per household, and per capita family consumption of all the products considered in this survey are presented in Table 1. The

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[1]Powdered two percent milk includes all powdered milk containing milk fat, except powdered whole milk. An example is "Milk Man" which contains one percent milk fat.

Table 1. Weekly consumption of dairy and non-dairy products in metropolitan Salt Lake City, 360 households and 1,349 household members, spring, 1967

Product	Size of unit	Number of units consumed	Consumption per household	Consumption per capita	Households consuming	
					Number	Percent
Whole milk	Qt.	2,723.00	7.564	2.019	274	76.1
Two percent milk	Qt.	1,046.00	2.906	.775	98	27.2
Skim milk	Qt.	181.50	.504	.135	34	9.4
Buttermilk	Qt.	70.00	.194	.052	40	11.1
Chocolate milk	Qt.	53.50	.149	.040	23	6.4
All fluid milk	Qt.	4,074.00	11.317	3.021	348	96.7
Nonfat dry milk (liquid)	Qt.	371.25	1.031	.275	75	20.8
Powdered two percent milk (liquid)	Qt.	25.00	.069	.018	5	1.4
All powdered milk (liquid)	Qt.	396.25	1.100	.293	79	21.9
Nonfat dry milk (dry)	Oz.	668.50	1.857	.496	30	8.3
Powdered two percent milk (dry)	Oz.	0.00	.000	.000	0	0.0
All powdered milk (dry)	Oz.	668.50	1.857	.496	30	8.3
Condensed milk	Oz.	127.50	.354	.095	4	1.1
Evaporated milk	Oz.	4,805.00	13.347	3.562	189	52.5
All canned milk	Oz.	4,932.50	13.701	3.657	192	53.3
Dry Infant formula	8 oz.	62.00	.172	.046	3	0.8
Fluid infant formula	8 oz.	352.37	.979	.261	12	3.3

Table 1. Continued

Product	Size of unit	Number of units consumed	Consumption per household	Consumption per capita	Households consuming	
					Number	Percent
Canned milk shake	Oz.	4.45	.012	.003	1	0.3
Coffee	Cup	8,249.00	22.914	6.115	217	60.3
Tea	Cup	1,314.00	3.650	.974	94	26.1
Beer	12 oz.	723.34	2.009	.536	76	21.1
Wine	Qt.	14.87	.041	.011	14	3.9
Dry metrecal	8 oz.	2.00	.006	.001	1	0.3
Fluid metrecal	8 oz.	34.25	.095	.025	5	1.4
Fruit drinks	Qt.	713.75	1.983	.529	121	33.6
Fruit juices	Qt.	1,122.38	3.118	.832	272	75.6
Diet soft drinks	12 oz.	903.00	2.508	.669	78	21.7
Nondiet soft drinks	12 oz.	1,339.24	3.887	1.037	162	45.0
Sherbert	Qt.	35.84	.100	.027	25	7.0
Ice milk	Qt.	37.67	.105	.028	26	7.2
Ice cream	Qt.	446.13	1.239	.331	214	59.4
All frozen desserts (excluding ice cream bars and popsicles)	Qt.	519.65	1.443	.385	246	68.3
Ice cream bars	Serv.	275.00	.764	.204	42	11.7
Popsicles	Serv.	423.50	1.176	.314	56	15.6
Half and half cream	Pt.	73.25	.203	.054	51	14.2
Whipping cream	Pt.	65.00	.181	.048	85	23.6
Powdered non-dairy whipping cream	Oz.	127.25	.353	.094	43	12.0
Dairy whip topping (can)	Oz.	47.50	.132	.035	6	1.7
Non-dairy whip topping (can)	Oz.	31.00	.086	.023	4	1.1

Table 1. Continued

Product	Size of unit	Number of units consumed	Consumption per household	Consumption per capita	Households consuming	
					Number	Percent
Powdered dairy creamer	Oz.	20.00	.056	.015	4	1.1
Powdered non-dairy creamer	Oz.	70.25	.195	.052	17	4.7
Sour cream	Pt.	42.00	.117	.031	51	14.2
Sour cream substitute (IMO)	Pt.	12.81	.036	.009	17	4.7
Yogurt	Pt.	15.00	.042	.011	13	3.6
Cottage cheese	Pt.	294.75	.819	.218	212	58.9
Cheese	Oz.	3,484.50	9.679	2.583	285	79.2
Cream cheese	Oz.	197.00	.547	.146	24	6.7
Cheese spreads	Oz.	133.00	.369	.099	28	7.8
Butter	Lb.	193.49	.537	.143	185	51.4
Margarine	Lb.	332.79	.924	.247	276	76.7

percentage of families using each product is also shown in Table 1. While the percent of families consuming a product is not to be considered a measure of the rate of consumption, it does give an indication of the degree of general acceptance of these products by the public.

The most widely used group of products considered in this survey of Salt Lake City families was fluid milk. Approximately 97 percent of the families in the survey had consumed some type of fluid milk during the week previous to the survey. Per capita family consumption of fluid milk amounted to over three quarts per week. Other products close behind fluid milk in their order of acceptance were hard cheese (cheddar, swiss, etc.), margarine and fruit juice. All of these products were consumed in over three-fourths of the sample households.

The consumption data of chocolate milk powder, cocoa and ovaltine, and instant breakfast are reported in Appendix 1. Of these three milk additives, cocoa and ovaltine were the most popular, followed by instant breakfast and chocolate milk powder. Per capita family consumption of cocoa and ovaltine was 0.209 cup per week followed by 0.159 cup for instant breakfast and 0.127 cup for chocolate milk powder. The milk used with these milk additives was reported as regular whole milk and two percent milk in Table 1. In order to avoid confusion and double counting of this milk, these items were presented separately.

Whole milk was more widely accepted and used in Salt Lake City households than other beverages which might be considered substitutes for whole milk. Regular whole milk was consumed in 76.1 percent of the households compared to 75.6 percent for fruit juices, 60.3 percent

for coffee and 27.2 percent for two percent milk. Per capita family consumption of regular whole milk amounted to 2.019 quarts per week compared to 0.832 quarts for fruit juice, 0.775 quarts for two percent milk and 1.529 quarts for coffee (four cups are equivalent to one quart).

Comparisons between other products thought to be substitutes for each other showed that 59.4 percent of the families consumed ice cream while only 7.2 percent consumed ice milk and 7.0 percent consumed sherbert. Diet soft drinks were consumed in only 21.7 percent of the households while non-diet soft drinks were consumed in 45.0 percent of the households. About 77 percent of the families in Salt Lake City used margarine but only 51.4 percent used butter.

Also of interest was the degree to which newly marketed dairy and non-dairy products had cut into markets once held exclusively by older dairy products. A case in point is that of whipping cream and the new whip toppings. Powdered non-dairy whipping cream was consumed in 12.0 percent of the households compared to almost 24 percent for regular whipping cream. This was a substantial percent considering that powdered non-dairy whipping cream was unknown a few years ago. Dairy and non-dairy whip toppings in aerosol cans were used in only 1.7 and 1.0 percent respectively of the sampled households.

The consumption of sour cream substitute instead of sour cream is another case in point. Per capita family consumption of sour cream substitute amounted to 0.009 pint compared to 0.031 pint for sour cream. Sour cream substitute was consumed in 4.7 percent of the households while sour cream was used in 14.2 percent of the households.

The relatively new product of powdered two percent milk had found relatively little success in competing with nonfat dry milk. It was

used in 1.4 percent of the households as compared to 20.8 percent for nonfat dry milk. The sample households used powdered two percent entirely in its liquid reconstituted form.

Comparison to National and Regional Data

Per capita consumption of selected beverages and dairy products in metropolitan Salt Lake City were compared with national and regional consumption levels so that intensities of consumption could be evaluated. The results of these comparisons are presented in Table 2. The national and regional data were obtained from a preliminary report published by the USDA Agricultural Research Service (1967). The scope and method of procedure of the survey presented in this thesis and the ARS survey were quite similar. Sample households were selected in a random manner and respondents were questioned in a personal interview. The respondent in each household was the person most often in charge of meal preparation. He or she was asked to recall what their family's consumption of certain products had been during the seven-day period preceding the interview. Both surveys were conducted in the spring of the year. Any variation in the figures due to seasonality should be negligible. There may be some variation due to the fact that the two surveys were taken two years apart. This is probably small, however, because eating patterns tend to change slowly from year to year. Conversion factors used in deriving comparable equivalent units are included in Appendix 2.

Average household size was found to be larger for metropolitan Salt Lake City than for urbanized areas of the U.S. or the western region. This will undoubtedly have some effect on the per household consumption of Salt Lake City families.

Table 2. A comparison of weekly household consumption of selected beverages and dairy products, urban areas of the United States and the western region, and metropolitan Salt Lake City

Product	Unit	United States[a]	Western Region[a]	Metropolitan Salt Lake City[b]
Household size	Persons	3.16	3.05	3.75
		Consumption		
Total fluid milk	Qt.	8.55	8.05	11.32
Skim milk	Qt.	.67	1.07	.50
Evaporated milk	Oz.	8.80	9.60	13.35
Nonfat dry milk	Oz.	3.52	5.12	5.16
Cream	Pt.	0.26	0.40	0.38
Ice cream, sherbert	Qt.	1.27	1.21	1.34
Cottage cheese	Pt.	0.47	0.72	0.82
Other cheese	Oz.	10.72	10.24	9.68
Butter	Lb.	0.40	0.34	0.54
Margarine	Lb.	0.75	0.82	0.92
Fruit juice	Qt.	1.85	1.69	3.12
Coffee	Cup	36.00	34.00	23.00
Soft drinks	12 Oz.	7.04	5.31	3.99
Fruitade, punch	Qt.	0.52	0.35	1.98
Whiskey, beer, wine	Qt.	1.29	1.22	0.79[c]

[a]Surveyed Spring 1965. Obtained from preliminary report of USDA Agricultural Research Service 1967.

[b]Surveyed Spring 1967.

[c]Does not include whiskey.

The consumption data for metropolitan Salt Lake City proved to be similar to that for the region with a few notable exceptions. Salt Lake City consumers were high in their total consumption of fluid milk, evaporated milk, butter, fruit juice and fruitade, but were low in their consumption of coffee, soft drinks, beer and wine. One explanation for these differences might be the high percentage of "Mormons" in the Salt Lake City population. With some abstaining for religious reasons from such beverages as coffee, tea, certain soft drinks, and whiskey, beer, and wine, they have undoubtedly consumed more of some other substitute beverages. These substitute beverages are probably those for which we find an abnormally high per household consumption, namely: fluid milk, fruit juice and fruitade. The analysis of the influence of certain social and economic factors will follow in a later section.

Products whose consumption was only slightly higher than the national or regional consumption figures were nonfat dry milk, ice cream and sherbert, cottage cheese and margarine. Skim milk, cream and other cheese consumption was found to be slightly lower in Salt Lake City than in the western region.

In Table 3 a comparison was made between the whole milk equivalent per capita consumption of all dairy products in the United States and in Salt Lake City. The results showed that per capita consumption of all dairy products combined was higher in Salt Lake City than in the nation as a whole.

Table 3. A comparison of estimated yearly per capita consumption of milk on a whole milk equivalent basis, United States and metropolitan Salt Lake City

Area	Fat solids	Nonfat solids	Whole milk equivalent, fat solids basis[a]	Whole milk equivalent, nonfat solids basis[b]
			Pounds	
United States[c]	21.5	39.5	584	462
Metropolitan Salt Lake City	26.7	49.5	722	574

[a]Per capita consumption of fat + 3.7 percent fat in whole milk = whole milk equivalent, fat solids basis.

[b]Per capita consumption of nonfat solids + 8.62 percent nonfat solids in whole milk = whole milk equivalent, nonfat solids basis.

[c]United States data obtained from Dairy Situation (1967).

The basic assumption underlying the calculation of whole milk equivalents on data taken from the Salt Lake City survey is that the use of dairy products during the seven-day period which the interview covered was representative of the consumption throughout the year. This technique has been used in other food consumption surveys taken previously. Another basic assumption made in this calculation was of fat and nonfat solids were typical of the actual consumption. The conversion factors found in Appendix 3 were taken from the United States Department of Agriculture Economics Research Service bulletin of 1965.

Daily Consumption of Dairy Beverages

In addition to asking homemakers what their families' consumption was during the seven-day period preceding the interview, they were also asked to indicate the per capita consumption of selected dairy beverages consumed during the previous day by individual family members. If the previous day was Saturday or Sunday, respondents were requested to report on consumption the previous Friday instead of the previous day. Thus, daily average per capita consumption actually refers to a week-day average per capita consumption. Daily consumption also included amounts consumed at home and away from home. It was felt that this type of information would provide a clearer insight into the variations in consumption during various meals of the day.

The daily average per capita consumption of all dairy beverages amounted to 2.25 glasses[2] according to the figures in Table 4. Approximately three-fourths of a glass was consumed at breakfast, one-half glass each for lunch and supper, and one-third of a glass as an in-between-meal snack. It is obvious that milk is used most as a beverage at breakfast time and least in-between meals.

Regular whole milk was by far the most popular of all of the dairy beverages consumed at any meal time or between meals. It was followed by two percent milk, skim milk and a fluid-powder milk mixture, in that order. On an individual basis, most of the products

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[2]The term "glasses" as it is used here is an arbitrary measurement. For this study we shall assume that "glasses" are of a constant volume but we will not define what that volume is. Other studies indicate that the number of glasses per quart varies from four to six (Blakely, McMullin and Boggs, 1955; Baum and Corbridge, 1953).

had the highest percent use at breakfast and lowest in-between meals according to Table 5. One exception to this generality was buttermilk which was most popular at lunch time and least popular at supper.

Table 4. Daily per capita consumption of selected dairy beverages at various times during the previous day, 1,349 people, metropolitan Salt Lake City, Utah, spring, 1967

Product	Breakfast	Lunch	Supper	Between meals	Total
			Glasses		
Regular whole milk	0.51	0.46	0.43	0.26	1.66
Two percent milk	0.14	0.08	0.12	0.06	0.40
Skim milk	0.03	0.02	0.02	0.01	0.08
Buttermilk[a]	----	0.01	----	----	0.01
Chocolate drink[a]	----	----	----	----	----
Non-fat dry milk (liquid)[a]	0.01	0.01	0.01	----	0.03
Powdered 2 percent milk (liquid)[a]	----	----	----	----	0.01
Fluid-powder milk mixture	0.02	0.02	0.01	0.01	0.06
Total for all beverages[b]	0.72	0.59	0.59	0.35	2.25

[a]Dashes indicate that per capita consumption was less than 0.005 glasses.

[b]May not add exactly due to rounding.

Use Patterns

The degree of utilization of several products and the relative importance of different uses is shown in Table 6. This information was provided by the homemaker for each family. Its purpose was to show how the selected dairy products were actually being consumed in the home.

Table 5. Percent of total consumption of selected dairy beverages consumed previous day, 1,349 people, metropolitan Salt Lake City, Utah, spring, 1967

Product	Breakfast	Lunch	Supper	Between meals
		Percent		
Regular whole milk	30.85	27.63	25.73	15.79
Two percent milk	35.91	20.57	28.87	14.64
Skim milk	32.87	23.68	28.97	14.48
Buttermilk	21.05	57.89	5.26	15.79
Chocolate drink	33.33	33.33	33.33	0.00
Non-fat dry milk (liquid)	36.08	25.95	26.58	11.39
Powdered two percent milk (liquid)	33.33	33.33	0.00	33.33
Fluid-powder milk mixture	34.95	26.56	25.27	13.22
Total for all beverages	31.95	26.41	26.22	15.43

Fluid milk was used mostly for eating or drinking. Approximately 87 percent of the total fluid milk was used in this way while only 12 percent was used in baking or cooking and less than 1 percent was consumed by pets. Regular whole milk, two percent milk and buttermilk had the highest percentage of their total consumption devoted to baking or cooking. The other two milk products were used almost exclusively for eating or drinking.

Approximately two-thirds of nonfat dry milk was used in its liquid form for eating or drinking and one-third for baking or cooking. These figures were just reversed when it was used in its dry form. Powdered two percent milk was used exclusively in its liquid form of which 80 percent was devoted to eating or drinking and 20 percent to baking or cooking.

Table 6. Percent of selected dairy products put to different uses in the home, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Product	Family use		
	Baking or cooking	Eating or drinking	Fed to pets
Regular whole milk	12.6	87.0	0.4
Two percent milk	13.0	86.7	0.2
Skim milk	5.9	94.1	0.0
Buttermilk	10.0	90.0	0.0
Chocolate drink	3.7	96.3	0.0
Total fluid milk	12.3	87.4	0.3
Powdered nonfat dry milk (liquid)	34.1	65.8	0.1
Powdered two percent milk (liquid)	20.0	80.0	0.0
Total powdered milk (liquid)	33.2	66.7	0.1
Powdered nonfat dry milk (dry)	68.3	31.7	0.0
Condensed sweetened milk	83.5	16.5	0.0
Evaporated milk	74.0	24.0	2.0
Butter	11.0	89.0	---
Margarine	37.5	62.5	---

Both condensed and evaporated milk had a higher percentage usage for baking or cooking than for eating or drinking. A larger percentage of evaporated milk was used for eating or drinking than condensed sweetened milk, probably because of its use as a baby formula and as an additive to coffee and tea. Although the proportion was small, a larger percentage of evaporated milk was fed to pets than any of the other products.

Butter and margarine were used more for eating at the dinner table than for baking and cooking. However, butter had a higher percent of usage for eating than did margarine.

MILK AND DAIRY PRODUCT CONSUMPTION RELATIONSHIPS

Milk and dairy product consumption is a function of many different variables. This section will relate the consumption of milk and dairy products as stated in the first section to a certain few of these influential variables. The socio-economic variables to be considered in this section are: per capita family income, religion, employment status of homemaker, education of homemaker, per capita family food expenditure, age of the homemaker and family composition. The relationship between per capita consumption of fluid milk and the age and sex of the consumer is also discussed in this section.

The aforementioned variables are of course not the only variables which may influence consumption. These were chosen because (1) they were considered to be most influential in metropolitan Salt Lake City and (2) they have proven to be important in several previous consumption studies. Two of the more important consumption variables--price of the product and race of the consumer--were not considered in this study due to a lack of sufficient variation in the data. On a household basis, non-white racial groups accounted for only 1.39 percent of the total sample group.

Since income is generally recognized as one of the major determinants of consumption, the data were first sorted into income groups before analyzing the effect of each of the other independent variables on consumption, except for religion. The purpose was to hold the effect of income constant while analyzing the separate effect of the other variables. If no deinite correlation could be distinguished,

then the primary sort on income was dropped and the data were recombined to consider the other independent variable by itself.

Income, consumption and food expenditure were all calculated on a per capita family basis unless otherwise stated. This means that these three variables were calculated by dividing the family totals by the family size and then classifying them accordingly. For example, per capita family income would be calculated by dividing the total family income by the number of family members.

Income as used in this section is disposable income, or income after taxes. Since consumer decisions seem to be more dependent on disposable income than on total income, it was felt that disposable income would present a clearer picture of the income relationship.

Consumption referred to in this section is weekly per capita family consumption, with the exception of when it is described in the fluid milk sub-section under the titles of age and sex, and time of day by age and sex. Consumption under these titles is daily per capita consumption.

Due to a lack of resources, statistical tests were not used in determining significance among the data presented in this section. This will have to be left for a further study. However, through tabular analysis we were able to indicate certain trends and relationships among the data.

Fluid Milk

Per capita family income

The amount of fluid milk consumed by individuals in households having different per capita family incomes is shown in Table 7.

Per capita consumption of fluid milk generally increased as per

Table 7. Per capita family consumption of fluid milk during the previous week, by income groups, metropolitan Salt Lake City, Utah, spring, 1967

Per capita family income	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			(Qts.)	(Qts.)	
$ 0- 999	60	263	694.00	2.639	6.7
1,000-1,499	53	274	835.00	3.047	0
1,500-1,999	93	347	1,080.00	3.112	5.4
2,000-2,499	51	198	630.00	3.182	2.0
2,500-2,999	45	131	395.50	3.019	2.2
3,000 or more	58	136	439.50	3.232	1.7

capita family income increased. On the average it increased 0.12 quarts for every $500 increase in per capita family income. The income elasticity for fluid milk (Appendix 4) had a positive sign, thus indicating that it was a superior product, or that consumption increased with income. The magnitude of the income elasticity +0.06 was smaller than the 0.25 to 0.50 range cited as the "usual" income elasticity for agricultural products (Gisser, 1966).

Per capita family income was not only influential in determining the amount of fluid milk consumed but also in determining which families consumed milk. Although the percents of non-consuming families were small, the largest of them seemed to be clustered in the lower income groups.

Religion

The highest per capita milk consuming group among the religious bodies was the Catholics, followed by the "Mormons," "Other" religions, and then Protestants (Table 8). However, per capita family consumption of

fluid milk among Catholics, "Mormons" and other religious groups was only separated by 0.193 quart. Per capita family consumption by Protestants was 0.234 quart less than the "Other" religious group.

Table 8. Per capita family consumption of fluid milk during the previous week,by religious preference, metropolitan Salt Lake City, Utah, spring, 1967

Religion	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			(Qts.)	(Qts.)	
Catholic	31	123	386.50	3.142	0
Protestant	54	156	423.50	2.715	3.7
Mormon	249	972	2,975.00	3.061	4.0
Other	26	98	289.00	2.949	0

The data presented in Table 8 only partially substantiated the hypothesis suggested in the introduction that "Mormons" drink more milk than other religious groups because of their abstinence from such beverages as coffee, tea, beer, wine and whiskey. "Mormon" families did not drink as much fluid milk per person as Catholics but they did consume more than the "Other" religious group and Protestants. The per household consumption of fluid milk of 11.95 quarts per week is well above the national and regional levels presented in Table 2. The above was also true for Catholics and the "Other" religious group but milk consumption by Protestants was lower than both the national and regional levels.

One possible explanation for the high per capita consumption of fluid milk among Catholics was that Catholic families in the sample were on the average younger and larger than families of other religious

groups. If age and family size have any influence on milk consumption, then these two factors may be distorting the picture somewhat. The fact that the average age of the Catholic homemaker was 38 compared to 45 and 48 for "Mormon" and Protestants respectively, lends credence to the explanation offered above.

Employment status of the homemaker

Families of working homemakers consumed appreciably less fluid milk on a per capita basis than did families of the non-working homemakers (Table 9). Also, the working homemaker group had a higher percent of non-using families. The reason for the above situation is not readily apparent from this study. One possibility might be that the working homemaker had less time to actually purchase milk so that when milk ran low at home there was little opportunity to go out and purchase more. Another possibility may be that due to her hours spent out of the home, the working homemaker was not influenced by milk advertisements appearing on radio, television and newspapers.

Table 9. Per capita family consumption of fluid milk during the previous week, by employment status of homemaker, metropolitan Salt Lake City, Utah, spring, 1967

Employment status of homemaker	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			(Qts.)	(Qts.)	
Working	57	222	598.00	2.694	7.0
Non-working	303	1,127	3,476.00	3.084	2.6

Education of homemaker

Per capita family consumption of fluid milk generally increased with the education of the homemaker (Table 10). This was possibly due to an increased awareness of the more educated homemaker to recognize the family's nutritional requirements and the value of fluid milk as a health food.

Table 10. Per capita family consumption of fluid milk during the previous week, by education of homemaker, metropolitan Salt Lake City, Utah, spring, 1967

Education of homemaker	House-hold	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			(Qts.)	(Qts.)	
Below high school	94	288	825.00	2.865	2.1
High school	147	590	1,735.00	2.941	4.1
After high school	119	471	1,514.00	3.214	3.4

Per capita food expenditures

With an increase in per capita family food expenditure for food eaten at home, families consumed more fluid milk per person (Table 11). The amount of change between families spending 0-$4.99 on home food expenditures and those spending $5.00-9.99 was 0.216 quart. Between the $5.00-9.99 expenditure group and the $10.00 or more group the difference in per capita family consumption amounted to 0.296 quart. The comparatively large rates of change between these groups probably indicate that this was a significant variable.

Per capita family food expenditure showed some interrelationship with income and household size. Families spending 0-$4.99 per capita for food were found most often in the 0-$1,499 per capita family income group, those in the $5.00-$10.00 food expenditure group were most

often found in the $1,500-3,499 income group, and those spending $10.00 or more for food were found most often in the $3,500 or more per capita income bracket.

Table 11. Per capita family consumption of fluid milk during the previous week, by expenditures on food consumed at home, metropolitan Salt Lake City, Utah, spring, 1967

Per capita family food expenditure	House-hold	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			(Qts.)	(Qts.)	
$0-4.99	69	391	1,111.00	2.841	2.9
5.00-9.99	223	802	2,451.50	3.057	3.6
10.00 or more	61	132	442.50	3.352	3.3
Don't know	7	24	69.00	2.875	0

Per capita family food expenditure showed an inverse relationship with family size.

Age of homemaker

Families whose homemaker was in the 35-49 age bracket had the highest per capita consumption of fluid milk (Table 12). Families in this category were also larger than families in other categories. The high per capita consumption of fluid milk in the 35-49 age of homemaker category is probably a reflection of the number of teenagers in the family. Teenagers, as shown later in the thesis, are high consumers of fluid milk.

Families having a homemaker that was 18-34 years old had the least amount of per capita family consumption of fluid milk--2.790 quarts. Children in these families were younger.

Families with older homemakers had a higher per capita consumption

than did the families with the youngest homemakers. What few children were in these families were probably teenagers.

Table 12. Per capita family consumption of fluid milk during the previous week, by age of homemaker, metropolitan Salt Lake City, Utah, spring, 1967

Age of homemaker	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			(Qts.)	(Qts.)	
18-34 years	117	507	1,414.50	2.790	2.6
35-49 years	110	564	1,832.00	3.248	2.7
50 or more years	113	278	827.50	2.977	4.5

Family composition

Table 13 shows the fluid milk consumption relationships between families with no children, 1-2 children and 3 or more children. Children were classified as anyone in the home 18 years or younger and unmarried.

There appeared to be little appreciable difference between these three groups. The difference in consumption between the highest per capita consumption and the lowest was less than 0.1 quart.

The percent of non-consuming families was greatest among those which had no children. There were several elderly families in this group who consumed little or no milk at all.

Table 13. Per capita family consumption of fluid milk during the previous week, by family composition, metropolitan Salt Lake City, Utah, spring, 1967.

Family composition	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			(Qts.)	(Qts.)	
No children	137	249	751.50	3.018	5.8
1-2 children	118	437	1,338.00	3.062	2.5
3 or more children	105	663	1,984.50	2.993	1.0

Age and sex

Information was obtained from the homemaker as to the amounts of fluid milk consumed by each member of the household during various time periods of the previous day. This included such milk products used for drinking as regular whole milk, two percent milk, skim milk, buttermilk, chocolate milk, nonfat dry milk, powdered two percent milk, or any mixture of fluid and powdered milk. The number of glasses of milk consumed the previous day by each individual was related to the age and sex of the individual.

Through simple regression analysis it was determined that age had a highly significant effect on consumption of milk throughout the lifetime of the male (Appendix 5). The number of glasses of fluid milk drunk by males increased through the teenage years and then generally declined thereafter (Figure 1). One exception to this generality was the 50-59 age group which showed a definite rise in consumption compared to other age groups over 20 years.

Male teenagers had the highest daily per capita consumption of fluid milk. According to Table 14 they drank an average of 3.604

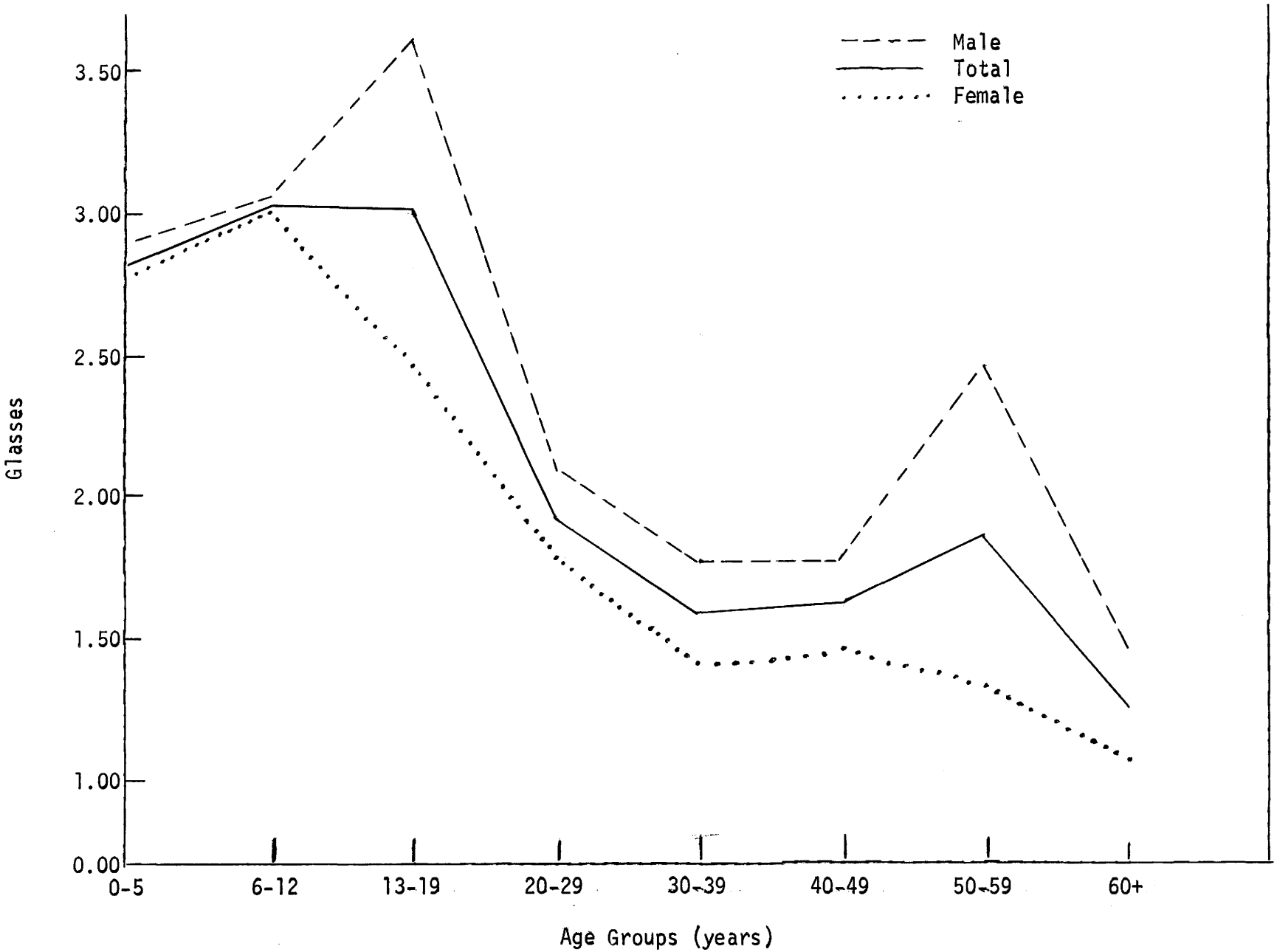

Figure 1. Per capita consumption of fluid milk during the previous day, by age group, 669 males and 680 females, metropolitan Salt Lake City, Utah, spring, 1967.

glasses of milk per day. Males in general consumed an average of 2.5 glasses of milk per day. Milk was consumed sometime during the day by 88 percent of the males.

Age proved to be a highly significant variable affecting the consumption of milk by females (Appendix 6). Female consumption of milk increased slightly from birth through the pre-teenage years (Figure 1). Thereafter it declined with almost perfect linearity. There was an almost imperceptible rise in per capita consumption of milk among females in the 40-49 age group.

The lowest per capita consumption of milk among all age groups was that registered by elderly females in the 60 or more age category (Table 14). They drank slightly more than one glass of milk per day. Females in general averaged 2.0 glasses of milk consumed during the day. Slightly more than 82 percent of all females drank milk sometime during the day.

Sex of the individual was also a significant variable influencing the per capita consumption of fluid milk (Appendix 7). Per capita consumption of milk for drinking by females was significantly lower than per capita consumption by males in every age group. One of the probable reasons for males consuming more milk than females in each age group is the generally recognized fact that ". . . males have greater nutritional requirements than females and that this difference exists at all age levels." (Roberts, 1958, p. 23) The age levels of greatest divergency between male and female per capita consumption of fluid milk occurred in the 13-19 and 50-59 age groups.

Table 14. Per capita consumption of fluid milk and percent using fluid milk during the previous day, by sex and age, 669 males and 680 females, metropolitan Salt Lake City, Utah, spring, 1967

Sex and age	Total number of people	Average age	Percent users	Total consumption	Consumption per capita
		Years	Percent	Glasses	
Male					
0-5	124	2.0	93.6	359.38	2.898
6-12	146	8.0	99.3	445.01	3.048
13-19	72	15.0	97.2	259.50	3.604
20-29	67	25.0	83.6	140.60	2.098
30-39	89	35.0	71.9	157.62	1.771
40-49	61	44.0	86.9	108.75	1.783
50-59	41	53.0	80.5	101.00	2.463
60+	69	68.0	75.4	101.74	1.474
All	669	26.1	88.0	1,673.60	2.502
Female					
0-5	105	2.0	92.4	291.66	2.778
6-12	115	8.0	99.1	345.00	3.000
13-19	80	15.0	90.0	197.00	2.462
20-29	83	24.0	74.7	148.00	1.783
30-39	93	34.0	67.7	130.75	1.406
40-49	64	44.0	70.3	93.00	1.453
50-59	48	54.0	79.2	63.70	1.327
60+	92	70.0	69.6	99.00	1.076
All	680	28.8	81.6	1,368.11	2.012
Total					
0-5	229	2.0	93.0	651.04	2.823
6-12	261	8.0	99.2	790.01	3.027
13-19	152	15.0	93.4	456.50	3.003
20-29	150	24.0	78.7	288.60	1.924
30-39	182	34.0	69.8	288.37	1.584
40-49	125	44.0	78.4	201.75	1.614
50-59	89	53.0	80.0	164.70	1.850
60+	161	70.0	72.0	200.74	1.247
All	1,349	27.5	84.8	3,041.71	2.254

Mealtime, by age and sex

As a group, people in the study consumed the most milk for breakfast, then lunch and dinner, and the least amount of milk between meals (Table 15). People in the sample consumed an average of 0.72 glass for breakfast, 0.60 glass for lunch, 0.59 for dinner and 0.35 for a between meal snack. All age groups did not follow this pattern, however. People in the 13-19, 20-29, 30-39, 40-49, 50-59 age categories consumed more milk for dinner than for lunch while those in the 0-5, 6-12 and 60 or more age categories consumed more milk for lunch than for dinner.

When the sample was further sub-divided by sex (Tables 16 and 17), males in general consumed more milk for breakfast than any other time, and more for dinner than for lunch. Females also consumed the most milk for breakfast, but unlike males, they consumed more for lunch than for dinner.

The people represented in Table 15 were easily divided into two groups - those that were high per capita consumers of milk and those that were low. The high consuming group consisted of those people in the 0-5, 6-12, and 13-19 age groups. Of these three age levels, the 6-12 age group generally had the greatest amount of per capita consumption and the highest percent of consumers at any mealtime. However, between meals the 0-5 age group had the highest per capita consumption and the highest percent of consumers. Probably one of the main reasons for this relationship was the fact that many of the individuals in the 0-5 age group were still being bottle fed and needed extra nourishment between meals.

Age levels in the low per capita consumption group were the 20-29, 30-39, 40-49, 50-59, and 60 or more categories. People in the 60 or

Table 15. Per capita consumption of fluid milk during the previous day, by age and mealtime, 1,349 household members, metropolitan Salt Lake City, Utah, spring, 1967

Age	No. of respondents	Breakfast		Lunch		Dinner		Between meals	
		Per capita consumption	Percent users	Per capita consumption	Percent users	Per capita consumption	Percent users	Per capita consumption	Percent users
		Glasses	%	Glasses	%	Glasses	%	Glasses	%
0-5	229	0.83	87.3	0.76	84.7	0.70	76.9	0.56	45.4
6-12	261	0.98	96.6	0.90	90.4	0.79	74.7	0.34	30.7
13-19	152	0.95	84.2	0.75	67.8	0.78	62.5	0.53	35.5
20-29	150	0.67	62.0	0.47	36.7	0.53	44.7	0.25	22.7
30-39	182	0.57	52.2	0.36	30.8	0.48	41.2	0.17	15.9
40-49	125	0.49	51.2	0.41	34.4	0.44	37.6	0.28	21.6
50-59	89	0.54	64.0	0.39	28.1	0.52	42.7	0.40	22.5
60 or more	161	0.40	44.7	0.38	34.8	0.29	29.2	0.18	16.1
All	1,349	0.72	71.2	0.60	56.9	0.59	54.9	0.35	27.7

Table 16. Per capita consumption of fluid milk during the previous day, by age and mealtime, 669 males, metropolitan Salt Lake City, Utah, spring, 1967

Age	No. of respondents	Breakfast		Lunch		Dinner		Between meals	
		Per capita consumption	Percent users	Per capita consumption	Percent users	Per capita consumption	Percent users	Per capita consumption	Percent users
		Glasses	%	Glasses	%	Glasses	%	Glasses	%
0-5	124	0.84	89.5	0.75	82.3	0.72	76.6	0.60	44.4
6-12	146	1.00	96.6	0.90	91.1	0.78	76.7	0.36	30.1
13-19	72	1.12	87.3	0.82	68.1	0.88	62.5	0.78	45.8
20-29	67	0.73	61.2	0.50	29.9	0.60	43.3	0.26	23.9
30-39	89	0.61	51.7	0.38	28.1	0.57	44.9	0.21	21.3
40-49	61	0.50	52.5	0.45	34.4	0.53	47.5	0.30	24.6
50-59	41	0.65	56.1	0.60	36.6	0.73	48.8	0.49	22.0
60 or more	69	0.43	50.7	0.46	36.2	0.39	40.6	0.20	14.5
All	669	0.78	73.5	0.65	58.3	0.67	59.0	0.41	30.0

Table 17. Per capita consumption of fluid milk during the previous day, by age and mealtime, 680 females, metropolitan Salt Lake City, Utah, spring, 1967

Age	No. of respond-ents	Breakfast		Lunch		Dinner		Between Meals	
		Per capita consumption	Percent users	Per capita consumption	Percent users	Per capita consumption	Percent users	Per capita consumption	Percent users
		Glasses	%	Glasses	%	Glasses	%	Glasses	%
0-5	105	0.81	94.3	0.77	87.6	0.67	77.1	0.52	46.7
6-12	115	0.97	96.5	0.90	89.6	0.81	74.8	0.32	31.3
13-19	80	0.79	81.3	0.68	67.5	0.69	62.5	0.30	26.3
20-29	83	0.63	62.7	0.44	42.2	0.48	45.8	0.24	21.7
30-39	93	0.52	52.7	0.35	33.3	0.40	37.6	0.13	10.8
40-49	64	0.47	50.0	0.38	34.4	0.35	28.1	0.26	18.8
50-59	48	0.45	50.0	0.21	20.8	0.33	37.5	0.33	22.9
60 or more	92	0.38	40.2	0.32	33.7	0.21	20.7	0.17	17.4
All	680	0.66	69.0	0.55	55.6	0.52	50.7	0.29	25.4

more age category on the average consumed less than other age groups for breakfast and dinner. People in the 30-39 age category consumed less than other age groups for lunch and between meals. People in the 50-59 age group had the least amount of variance in their consumption of milk during the day, i.e. they consumed almost a constant amount of milk for each meal throughout the day. The older age groups did not consume much milk for lunch or at least it was not reported they did. There may have been some underreporting of the amount of milk consumed by this group. Housewives, who generally were the respondents, may not have known as completely how much milk their husbands consumed for lunch, particularly if they ate away from home, compared with herself and the children, most of whom either ate lunch at home or routinely ate school lunch.

The per capita consumption of all milk used for drinking by milk drinkers only is presented in Table 18. These data were calculated by dividing the per capita consumption figures of Table 15 by the percent of consumers in each age group drinking milk during each respective mealtime. Similar adjustments were made to the data in Tables 16 and 17. The results are found in Appendixes 8 and 9.

On comparing the per capita consumption of milk drinkers only to the per capita consumption of all individuals, the trends stated on page 41 were reversed. Instead of consumption decreasing in the latter part of the day, as in the case of per capita consumption for all household members, the per capita consumption of milk by milk drinkers only increased in the latter part of the day. The average size serving of milk drunk for breakfast was 1.01 glasses, 1.05 glasses for lunch, 1.07 glasses for dinner, and 1.26 glasses between meals.

Teenage milk drinkers consumed the most milk per consumer of any of the age groups. When male teenage consumers drank milk, they drank

Table 18. Per capita consumption of fluid milk during the previous day by milk drinkers only, by age and sex, 1,349 household members, metropolitan Salt Lake City, Utah, spring, 1967

Age group	Breakfast	Lunch	Dinner	Between meals	Total for day
			Glasses		
0-5	0.95	0.90	0.91	1.23	3.04
6-12	1.02	1.00	1.06	1.11	3.05
13-19	1.13	1.11	1.25	1.49	3.22
20-29	1.08	1.28	1.19	1.10	2.44
30-39	1.09	1.17	1.17	1.07	2.27
40-49	0.96	1.19	1.22	1.30	2.06
50-59	0.84	1.39	1.00	1.78	2.31
60 or more	0.89	1.09	1.07	1.12	1.73
All	1.01	1.05		1.26	2.66

an average of 3.71 glasses per day, while female teenage milk drinkers consumed only 2.74 glasses (Appendix 8). Male consumers in the 50-59 age group drank over 3 glasses per day with the greatest portion of that being drunk between meals. Consumers 60 years of age or older drank the least amount of milk when they consumed milk (Table 18).

Three glasses of milk per day were consumed by consumers in the 0-5, 6-12, and 13-19 age groups. The other groups of consumers drank a little more than two glasses of milk per day.

Canned Milk

Because the metropolitan Salt Lake Area exhibited a high per capita consumption of evaporated milk according to Table 2, it was decided that an analysis of possible causes of this occurrence might prove valuable. Canned milk as it was used in this section refers to both evaporated milk and condensed sweetened milk.

Per capita family income

At first glance, Table 19 reveals no consistent relationship between per capita family consumption of canned milk and per capita family income. However when a regression line was fitted through the data there was some indication that per capita consumption may decrease with per capita family income. The income elasticity of canned milk at the midpoint of the regression line was -.079 (Appendix 4). This shows that canned milk was an inferior product or that as income increased the consumption decreased. The magnitude of the income elasticity was low, however. The percent of non-using families appeared to be higher among families in the higher per capita income brackets.

Table 19. Per capita family consumption of canned milk during the previous week, by income group, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Per capita family income	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			Ounces	Ounces	Percent
$0-999	60	263	1,046.50	3.979	40.0
1,000-1,499	53	274	816.75	2.981	35.8
1,500-1,999	93	347	1,532.50	4.416	44.1
2,000-2,499	51	198	553.50	2.795	60.8
2,500-2,999	45	131	594.00	4.534	33.3
3,000 or more	58	136	389.25	2.862	69.0

Religion

Among religious groups, the "Mormon" group had the highest per capita consumption of canned milk at 3.959 ounces per day (Table 20). It was followed by the "Other" religious group, Protestants and Catholics.

Table 20. Per capita family consumption of canned milk during the previous week, by religious preference, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Religion	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			Ounces	Ounces	Percent
Catholic	31	123	273.50	2.224	54.8
Protestant	54	156	493.00	3.160	63.0
Mormon	249	972	3,848.25	3.959	43.8
Other	26	98	317.75	3.242	38.5

When consumption data were placed on a per household basis, differences in consumption became even more noticeable. On a per household basis "Mormons" consumed 15.45 ounces of canned milk per week, "Other" religious groups used 12.22 ounces, Protestants consumed 9.31 ounces and Catholics 8.82 ounces. Comparing the per household consumption calculated here with that presented in Table 2, the "Mormon" and the "Other" religious group consumed far more than the national and regional average consumption, while Catholic and Protestant groups consumed about the same as the national and regional figures.

Employment status of homemaker

Families with the homemakers working consumed only 3.319 ounces per person while those with the homemaker at home consumed 3.723 ounces per person (Table 21). The difference in consumption here can possibly be attributed to the fact that the working homemaker probably has less time to spend in the kitchen baking or cooking than does the non-working homemaker, and thus has less need for canned milk as an ingredient.

Table 21. Per capita family consumption of canned milk during the previous week, by employment status of homemaker, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Employment status of homemaker	Households	Household members	Total consumption	Per capita consumption	Percent of non-using families
			Ounces	Ounces	Percent
Working	57	222	736.75	3.319	45.6
Non-working	303	1,127	4,195.75	3.723	47.5

Education of the homemaker

Per capita family consumption of canned milk was lowest for families whose homemaker had received the most education (Table 22). Families in which the homemaker had less than a high school education had a weekly per capita consumption of 5.376 ounces. This decreased to 3.590 ounces for families whose homemaker had completed high school, and to 2.688 ounces for families whose homemaker went beyond high school. The percent of non-using families also increased with an increase in the education of the homemaker.

Table 22. Per capita family consumption of canned milk during the previous week, by education of homemaker, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Education of homemaker	Households	Household members	Total consumption	Per capita consumption	Percent of non-using families
			Ounces	Ounces	Percent
Below high school	94	288	1,548.25	5.376	42.6
High school	147	590	2,118.25	3.590	42.9
After high school	119	471	1,266.00	2.688	56.3

Per capita family food expenditure

According to the data in Table 23, as per capita family expenditure for food eaten at home increased, per capita family consumption of canned milk increased. In going from the low per capita family food expenditure group to the high group the per capita consumption of canned milk more than doubled, increasing from 2.924 ounces to 5.858 ounces. Three families in the high per capita family food expenditure group reported consuming as many as 7 to 10 15-ounce cans of canned milk per week. This rather high consumption of canned milk probably accounts for the high per capita family consumption figure for families in the high per capita family food expenditure group.

When consumption was calculated on a per household basis, it was shown to have an inverse relationship with per capita family food expenditure. Families spending 0-$4.99 per person for food consumed 16.6 ounces of canned milk, those spending $5.00-$9.99 per person for food consumed 13.4 ounces and those spending $10.00 or more for food per person consumed only 12.7 ounces.

Table 23. Per capita family consumption of canned milk during the previous week, by expenditure on food consumed at home, 360 households, metropolitan Salt Lake City, Utah, spring, 1967.

Per capita family food expenditure	House-holds	House-hold members	Total consumption	Per Capita consumption	Percent of non-using families
			Ounces	Ounces	Percent
$0.4.99	69	391	1,143.25	2.924	40.6
5.00-9.99	228	802	2,980.50	3.716	46.1
10.00 or more	61	132	773.25	5.858	52.5
Don't know	7	24	35.50	5.071	71.4

The percent of non-using families showed a direct relationship with per capita family food expenditure. This would indicate that canned milk was less well accepted in the higher per capita family food expenditure groups, but the users in this group consumed greater quantities.

Age of homemaker

There was a direct relationship between per capita family consumption of canned milk and age of the homemaker. Per capita family consumption of canned milk among families whose homemaker was 50 years old or older was by far the highest of the three age of homemaker categories. Families whose homemaker was under 35 consumed the least per person (Table 24).

Homemakers 50 years old or older may have been more aware of the useful baking or cooking qualities of evaporated milk than were many of the younger homemakers. Older homemakers may also, by habit, be more accustomed to using evaporated milk and to cooking and preparing more of their food in the home.

Table 24. Per capita family consumption of canned milk during the previous week, by age of homemaker, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Age of homemaker	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			Ounces	Ounces	Percent
18-34 years	117	507	1,434.00	2.828	53.8
35-49 years	110	564	1,714.50	3.040	42.7
50 or more years	133	278	1,784.00	6.417	45.1

Family composition

As the number of children in the household increased, the per capita consumption of canned milk went down. Table 25 shows that those families having no children had by far the highest per capita family consumption of canned milk. Families with no children consumed more than twice the amount per person than either the families with 1-2 children or those with three or more. However, there was little difference between the per capita family consumption of families with 1-2 children and those with 3 or more children.

Table 25. Per capita family consumption of canned milk during the previous week, by family composition, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Family composition	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			Ounces	Ounces	Percent
No children	137	249	1,836.75	7.377	45.3
1-2 children	118	437	1,310.50	2.999	53.4
3 or more children	105	663	785.25	2.693	42.9

Butter

Per capita family income

Butter was another important dairy product whose per household consumption was considered to be slightly higher in metropolitan Salt Lake City than in either the western region or the United States as a whole. The effect of per capita family income on the consumption of butter is presented in Table 26.

Table 26. Per capita family consumption of butter during the previous week, by income group, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Per capita family income	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			Pounds	Pounds	Percent
$0- 999	60	263	26.25	.100	58.3
1,000-1,499	53	274	33.25	.121	50.9
1,500-1,999	93	347	42.12	.135	26.9
2,000-2,499	51	198	26.75	.135	49.0
2,500-2,999	45	131	29.75	.227	42.2
3,000 or more	58	136	35.37	.260	34.5

Per capita family consumption of butter is shown to have a direct relationship with per capita family income. It increased from a 0.100 pound per week at the 0-$999 per capita family income level to 0.260 pound at the $3,000 or more income level. This was a difference of almost one-sixth of a pound over a $3,000 per capita family income range.

The income elasticity of butter at the midpoint of the regression line was 0.734. Butter was not only a superior product but it had the greatest magnitude of income elasticity of either fluid milk, canned milk or margarine. The magnitude of the income elasticity was greater than the 0.250 to 0.500 standard for most agricultural commodities (Gisser, 1966, page 48).

The percent of families not using butter in the home demonstrated an inverse relationship with per capita family consumption and income.

Religion

Among religious groups, families of the Catholic religion consumed the greatest amount of butter per person. This amounted to .179 pound per person (Table 27). The "Other" religious group was next in order

of per capita family consumption of butter, followed by "Mormons" and Protestants. Those religious groups which had a high percent of non-users were also those which had a low per capita family consumption of butter.

Table 27. Per capita family consumption of butter during the previous week, by religious preference, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Religion	House-hold	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			Pounds	Pounds	Percent
Catholic	31	123	22.00	.179	29.0
Protestant	54	156	20.50	.131	57.4
Mormon	249	972	135.24	.139	50.2
Other	26	98	15.75	.161	38.5

Employment status of the homemaker

Table 28 shows that per capita family consumption of butter changed little between families whose homemaker was employed and those whose homemaker was not working.

Per capita family consumption of butter between the lower and middle per capita family income brackets was higher in those families where the homemaker was employed. However, in the $2,500 or more per capita family income level the families with a non-working homemaker consumed 0.257 pound compared to 0.181 pound for those families having a working homemaker.

Table 28. Per capita family consumption of butter during the previous week, by employment status of homemaker, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Per capita family income & employment status of homemaker	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			Pounds	Pounds	Percent
$0-1,499					
Working	14	93	12.50	.134	28.6
Non-working	99	444	47.00	.106	58.6
$1,500-2,499					
Working	23	82	11.62	.142	52.2
Non-working	121	463	57.25	.124	51.2
$2,500-or more					
Working	20	47	8.50	.181	50.0
Non-working	83	220	56.62	.257	34.9
All incomes					
Working	57	222	32.62	.147	45.6
Non-working	303	1,127	160.87	.143	49.2

Education of homemaker

Those families whose homemaker had received less than a high school education had a higher per capita consumption of butter than those families whose homemaker had at least a high school diploma or more (Table 29). There was little difference between the per capita family consumption of butter by families whose homemaker had a high school diploma and those whose homemaker had received an education beyond the high school level.

Table 29. Per capita family consumption of butter during the previous week, by education of homemaker and income group, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Education of homemaker	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			Pounds	Pounds	Percent
Below high school	94	288	46.37	.161	53.2
High school	147	590	80.87	.137	49.7
After high school	99	471	66.25	.141	52.5

Per capita family food expenditure

Families spending larger amounts of money per capita for food eaten at home also consumed larger amounts of butter per person (Table 30). This change was especially evident between the lowest per capita food expenditure group and the middle food expenditure group. From the 0-$4.99 to the $5.00-$9.99 level, per capita consumption of butter practically doubled. Thereafter the rate of increase was not as great.

Table 30. Per capita family consumption of butter during the previous week, by expenditure on food consumed at home, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Per capita family food expenditure	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			Pounds	Pounds	Percent
$0-4.99	69	391	33.25	.085	59.4
5.00-9.99	223	802	129.12	.161	44.8
10.00 or more	61	132	26.12	.198	52.5
Don't know	7	24	5.00	.208	28.6

Age of the homemaker

Per capita family consumption of butter increased with the age of the homemaker (Table 31). The lowest per capita consumers of butter were families in which the homemaker was in the 18-34 year age category. They consumed 0.128 pound per person per week. It is entirely possible that some of these homemakers have never seen butter used in the home before. Families whose homemaker was 50 years old or older had the highest per capita family consumption of butter and yet the greatest percent of non-using families was in this category. Butter is probably a well known product to families in the 50 or more age of homemaker category.

Family composition

Table 32 shows that per capita family consumption of butter decreased as the number of children per family increased. The percent of families not using butter also decreased with the number of children per family.

Table 31. Per capita family consumption of butter during the previous week, by age of homemaker, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Age of homemaker	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			Pounds	Pounds	Percent
18-34 years	117	507	65.12	.128	44.4
35-49 years	110	504	82.50	.146	43.6
50 or more years	133	278	45.87	.165	56.4

Table 32. Per capita family consumption of butter during the previous week, by family composition, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Family composition	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			Pounds	Pounds	Percent
No children	137	249	47.24	.190	75
1-2 children	118	437	60.25	.138	60
3 or more children	105	663	86.00	.130	40

Margarine

Since margarine is considered one of the more important products in competition with butter, it will be studied in this sub-section.

Per capita family income

The data presented in Table 33 seem to indicate that per capita family consumption of margarine had a direct relationship with per capita family income. This relationship was not very strong, however. Two of the per capita family consumption figures did not follow in a progressive sequence. In fact the difference between the per capita family consumption figure at the low per capita family income bracket and the high per capita family income bracket amounted to only 0.007 pound.

Table 33. Per capita family consumption of margarine during the previous week, by income group, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Per capita family income	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			Pounds	Pounds	Percent
$0- 999	60	263	62.32	.237	21.7
1,000-1,499	53	274	67.75	.247	15.1
1,500-1,999	93	347	82.88	.239	19.4
2,000-2,499	51	198	47.75	.241	23.5
2,500-2,999	45	131	38.87	.297	17.8
3,000 or more	58	136	33.22	.244	43.1

The income elasticity at the midpoint of the regression line amounted to 0.063. This means that margarine was a superior product, but the magnitude of the elasticity indicates that it was only slightly superior. The income elasticity of margarine was much lower than that of butter signifying that a one percent change in income will bring about a much smaller change in the per capita consumption of margarine than it would in butter.

The greatest percent of non-using families was in the $3,000 or more per capita family income group.

Religion

According to the data of Table 34, families of the "Mormon" religion consumed the most margarine per person. They also had the lowest percent of families not using margarine. They were followed in order of their per capita family consumption by the "Other" religious group, Protestants and Catholics.

Table 34. Per capita family consumption of margarine during the previous week, by religious preference, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Religion	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			Pounds	Pounds	Percent
Catholic	31	123	17.25	.140	29.0
Protestant	54	156	31.74	.203	33.3
Mormon	249	972	260.05	.268	20.1
Other	26	98	23.75	.242	26.9

There was a certain degree of substitution implied in comparing the per capita family consumption of butter and margarine among religious groups. For instance, Catholics had the highest per capita family consumption of butter and the lowest per capita family consumption of margarine, whereas this condition was practically reversed for the "Mormons." Protestants and "Other" religious groups did not show this same relationship.

Employment status of the homemaker

In general families of the working homemaker consumed more margarine per person than did families of the non-working homemakers (Table 35).

Table 35. Per capita family consumption of margarine during the previous week, by employment status of homemaker and income group, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Per capita family income and employment status of homemaker	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			Pounds	Pounds	Percent
$0-1,499					
Working	14	93	19.25	.207	14.3
Non-working	99	444	110.82	.250	19.2
$1,500-2,499					
Working	23	82	21.50	.262	39.1
Non-working	121	463	109.13	.236	17.4
$2,500 or more					
Working	20	47	15.00	.319	30.0
Non-working	83	220	57.09	.259	32.5
All incomes					
Working	57	222	55.75	.251	29.8
Non-working	303	1,127	277.04	.246	22.1

This is approximately the same relationship that was exhibited between consumption of butter and employment status of the homemaker. The one exception to this rule was for families in the lowest per capita income bracket where families of non-working homemakers consumed the greatest amount of margarine per capita.

Education of the homemaker

Per capita family consumption of margarine exhibited the same relationship to education of the homemaker as did the per capita family consumption of butter. The per capita family consumption of margarine was lowest for families whose homemaker had the most education (Table 36). Those families whose homemaker received less than a high school education consumed not only the most margarine per capita but also the most butter per capita.

Table 36. Per capita family consumption of margarine during the previous week, by education of homemaker, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Education of homemaker	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			Pounds	Pounds	Percent
Below high school	94	288	82.45	.286	31.9
High school	147	590	146.10	.248	21.8
After high school	119	471	104.24	.221	18.5

The percent of families not using margarine also decreased with education of the homemaker.

Per capita family food expenditure

Table 37 presents the data illustrating the direct relationship between per capita family consumption of margarine and per capita family food expenditure. As per capita family food expenditure increased so did the per capita family consumption of margarine. The families spending $10.00 or more for food eaten at home consumed almost double the amount per person consumed by the other groups. Families in this upper food expenditure group could probably afford to use margarine (the same for butter) in baking and cooking and other secondary uses.

The percent of families not using margarine increased slightly as per capita family food expenditure increased.

Age of the homemaker

The age of the homemaker had about the same direct effect on the per capita family consumption of margarine as it did on the per capita family consumption of butter (Table 38). Again families with the home-

Table 37. Per capita family consumption of margarine during the previous week, by expenditures on food consumed at home, 360 households, metropolitan Salt Lake City, Utah, spring, 1967.

Per capita family food expenditure	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			Pounds	Pounds	Percent
$0-4.99	69	391	81.33	.208	21.7
5.00-9.99	223	802	195.24	.243	22.9
10.00 or more	61	132	52.10	.397	24.6
Don't know	7	24	4.12	.172	42.9

maker in the 50 years old or older category had a much higher per capita family consumption of margarine than the younger homemakers' families. The highest percent of families not using margarine was among families whose homemaker was between the ages of 35 and 40. However, the difference between the percents of non-user families was small and probably not significant.

Table 38. Per capita family consumption of margarine during the previous week, by age of homemaker, 360 households, metropolitan Salt Lake City, Utah, spring, 1967.

Age of homemaker	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			Pounds	Pounds	Percent
18-24 years	117	507	94.00	.185	23.9
35-49 years	110	564	138.35	.245	28.4
50 or more years	133	278	100.44	.361	26.3

Family composition

Family composition also exhibited the same inverse relationship with consumption of margarine as it did with butter (Table 39). Per capita

family consumption of margarine decreased as the number of children per family increased. Families with no children consumed by far the greatest amount of margarine per person. The percent of families not using margarine in their home also displayed an inverse relationship to the increase in the number of children per family, but the differences were small.

Table 39. Per capita family consumption of margarine during the previous week, by family composition, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Family composition	House-holds	House-hold members	Total consumption	Per capita consumption	Percent of non-using families
			Pounds	Pounds	Percent
No children	137	249	92.54	.371	24.8
1-2 children	118	437	106.25	.243	22.8
3 or more children	105	663	134.00	.202	21.9

MISCELLANEOUS MARKET RELATIONSHIPS

This section is designed to show certain secondary market relationships concerning the purchasing practices and preferences of metropolitan Salt Lake City consumers. Included in this section will be sub-sections dealing with sources of purchase, container preference and prices paid by consumers.

Preference as it is used throughout this section must be considered more of a realized preference than an actual preference. The questions answered by the respondent were by nature objective rather than subjective. The respondent reported what he or she actually bought on the market place and not what he or she would have preferred to buy had other choices been available.

Sources of Fluid Milk Purchases

Over 54 percent of the households purchased some type of fluid milk from stores while only 48.6 percent purchased fluid milk via home delivery (Table 40). This trend generally held true for individual products as well, with the exception of skim milk. More families purchased skim milk through home delivery than at the store. It should be recognized that some families not only had regular amounts of milk delivered, but also bought supplemental quantities of milk at the store.

Although fewer families had their milk delivered, the greatest volume of milk purchased was still through home delivery. This was because the larger families were the ones having their milk delivered, and also because some families only bought extra milk at the store when they ran out of the milk delivered to the home.

Table 40. Types of milk consumed, by source of purchase, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Type of milk and source of purchase	Households purchasing milk from each source				Quarts of milk purchased from each source		
	Number of households	Number of household members	Percent of all households	Average size of family	Total	For households purchasing: Average per household member	For households purchasing: Average per household
Regular whole milk							
Home delivery	132	529	36.7	4.0	1,257.00	9.52	2.38
Bought at store	151	545	41.9	3.6	1,466.00	9.71	2.69
Two percent milk							
Home delivery	50	235	13.9	4.7	673.00	12.74	2.86
Bought at store	51	183	14.2	3.6	373.00	7.31	2.04
Skim milk							
Home delivery	23	97	6.4	4.2	118.00	5.13	1.22
Bought at store	11	32	3.1	2.9	63.50	3.95	1.98
Buttermilk							
Home delivery	11	40	3.1	3.6	18.00	1.64	0.45
Bought at store	30	114	8.3	3.8	52.00	1.73	0.46
Chocolate milk							
Home delivery	7	35	1.9	5.0	12.00	1.71	0.34
Bought at store	16	62	4.4	3.9	41.50	2.59	0.67
Fluid milk							
Home delivery	175	732	48.6	4.2	2,078.00	11.87	2.84
Bought at store	195	704	54.2	3.6	1,996.00	10.24	2.84

Smaller families tended to buy their milk at the store, possibly because carrying home the smaller amounts of milk required by them was less of an inconvenience than taking home the larger amounts required by larger families. Also, with the tendency toward once a week shopping, smaller families were probably more able to store a week's supply. Families having milk delivered need only have enough space to store the amount left each delivery, which is usually two or three times a week.

Family per capita consumption of all fluid milk was the same, regardless of whether milk was bought at the store or whether it was delivered. Individually, more regular whole milk, skim milk, and chocolate milk was consumed per capita by families buying them at the store; more two percent milk was consumed per person by families having it delivered.

Size of Container

"The preference of the housewife for the size of container when milk is delivered to the home could be quite different from the preference when milk is purchased at the grocery store." (Blakely, McMullin, and Boggs, 1955, p. 28).

Lake City homemakers for different sizes of containers for certain dairy products is presented in Table 41.

Quart size containers were the most widely accepted containers for such specialty products as skim milk, buttermilk and chocolate milk. Among the families buying these products through home delivery, 85 to 100 percent preferred the quart size container. Among the families buying skim milk, buttermilk and chocolate milk from the store, 50-90 percent preferred the quart size container. The half-gallon container was seldom used with these specialty products, ex-

cept for chocolate milk purchased in the store where 50 percent of the families preferred the quart size and 50 percent the half gallon size container.

Quart size containers seemed to be a little more popular with the families buying fluid milk products through home delivery than with the families buying their fluid milk at the store. This generally held true for all of the individual products, except two percent milk. Families buying two percent milk both at the store and through home delivery showed very little preference for quart size containers.

Families buying whole milk and two percent milk found the half-gallon container the most preferable. About 80 percent of the families buying whole milk at the store and about 90 percent of all families buying two percent milk at the store preferred half-gallon containers. Of families buying whole milk through home delivery, 58.9 percent compared to 95.8 percent of families buying two percent milk through home delivery preferred half-gallon containers. Only a minority of families preferred quart size containers of whole milk or two percent milk.

Gallon containers were relatively little known or preferred at the time of the survey. There were some families buying whole milk and two percent milk who reported buying these products in gallon containers. Families buying their regular whole milk and two percent milk at the store seemed to show a greater acceptance of gallon containers than families buying through home delivery.

The one-half gallon package was the most widely accepted container for families purchasing any of the frozen desserts. Ice milk was almost exclusively purchased in the one-half gallon container. The

Table 41. Percent of families purchasing selected dairy products by sizes of containers, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Type of fluid milk	Source of purchase	Quart	Half gallon[a]	Gallon[a]
			Percent	
Regular whole milk	Store	14.8	79.6	5.6
	Delivery	38.7	58.9	2.4
Two percent milk	Store	8.3	89.6	2.1
	Delivery	4.2	95.8	---
Skim milk	Store	72.7	27.3	---
	Delivery	85.7	14.3	---
Buttermilk	Store	92.3	7.7	---
	Delivery	100.0	----	---
Chocolate milk	Store	50.0	50.0	---
	Delivery	85.7	14.3	---

Type of frozen dessert	Pint	Quart	Half gallon[a]	Gallon	2 gallons[a]	2½ gallons[a]
			Percent			
Sherbert	12.0	36.0	48.0	4.0	---	---
Ice milk	4.0	4.0	84.0	4.0	---	4.0
Ice cream	3.2	15.0	68.4	3.7	4.3	5.4

Type of powdered milk	9-5/8 ozs.[a]	1 lb. 10 ozs.[a]	2 lbs. 6 ozs.	4 lbs.	5 lbs.[a]	25 lbs.[a]
			Percent			
Nonfat dry milk	6.8	9.6	8.3	50.7	17.8	6.8
powdered two percent	---	---	75.0	25.0	----	---

Type of spread	¼ lb.[a]	½ lb.	1 lb.
		Percent	
Butter	1.8	4.7	93.5
Margarine	---	2.5	97.5

Type of canned milk	6 ozs.[a]	14 ozs.[a]	15 ozs.
		Percent	
Condensed milk	---	100.0	----
Evaporated milk	11.5	-----	88.5

[a]Dashes indicate that no observations were obtained in that size category.

largest percent of families preferring the pint and quart size container were those buying sherbert. Of the families purchasing ice cream, 68.4 percent preferred the half gallon container, 15 percent the quart container and approximately 5 percent preferring each of the other sizes available.

The 4 and 5 pound packages of powdered nonfat milk seemed to be the most popular among purchases of that product. Approximately 50 and 18 percent of the nonfat dry milk purchasers preferred the 4 and 5 pound bags, respectively. Only 32 percent of the purchasers desired other bag or package sizes.

Powdered two percent milk was only purchased in the 2 pound-6 ounce and 4 pound packages of which the 2 pound-six ounce package was the most popular. Three times as many consuming families preferred the 2 pound-6 ounce package over the 4 pound package.

Of course the most popular size package of butter and margarine with consumers was the one pound size. However, butter did show a slightly stronger tendency to be preferred in some size less than one pound than did margarine.

Consumers of evaporated milk purchased the 15 ounce can much more frequently than the 6 ounce can.

Prices Paid for Dairy Products

One of the more important variables affecting the consumption of any product is the price of that product. There was little price-quantity variation among the various dairy products on the market at the time of the survey. The mean prices paid by households are recorded in Table 42. Observations that could not be clarified by telephone but that were in obvious error were excluded from the calculation of the mean. Those

prices where editing was necessary are footnoted. Some prices may possibly be more representative than others because of the larger numbers of observations or because of the accuracy in reporting actual prices by the homemaker.

As could be expected, fluid milk in general was more costly delivered than bought in the store. The average amount of price increase that could be expected in changing from buying fluid milk at the store to buying it through home delivery was 0.7 cent increase on quart containers and a 1.0 cent increase on half gallon containers. There were not enough data on the gallon container to make a prediction.

Buttermilk and chocolate milk were the higher priced milk products costing an average of 27.0 and 26.5 cents per quart when bought at the store. Whole milk, two percent milk and skim milk followed in that order costing on the average 26.0, 24.0 and 23.2 cents per quart respectively. At the store, whole milk cost an average of 48.6 cents per half gallon compared to 44.5 cents per half gallon for two percent milk and 41.0 cents per half gallon for skim milk. A consumer purchasing a gallon of whole milk paid 72 cents for it.

The half-gallon package of ice cream cost the Salt Lake City consumer on the average 80.5 cents. This compared to 67.5 cents and 64.5 cents, respectively, for ice milk and sherbert. Depending on the size of ice cream desired, consumers paid from 35.8 cents for a pint, up to $2.98 for a 2½ gallon container.

For the 4 pound bag of nonfat dry milk, Salt Lake consumers paid $1.65 and $1.85 for the 4 pound bag of powdered two percent milk. On the average, prices ranged from 30.6 cents for the 9-5/8 ounce bag to $8.45 for the 25 pound bag.

Table 42. Mean prices paid for selected dairy products, by size of container, 360 households, metropolitan Salt Lake City, Utah, spring, 1967

Type of fluid milk	Source of purchase	Quart[a]	Half gallon[a]	Gallon[a]
			Cents	
Whole milk	Store	26.0	48.6	71.9
	Delivery	26.3	50.0	72.0
Two percent	Store	24.0[b]	44.5	----
	Delivery	----	45.4	----
Skim milk	Store	23.2	41.0	----
	Delivery	23.3	41.7	----
Buttermilk	Store	27.0	----	----
	Delivery	28.6	----	----
Chocolate milk	Store	26.5	44.2	----
	Delivery	27.6[b]	----	----

Type of frozen dessert	Pint[a]	Quart[a]	Half gallon[a]	Gallon[a]	2 gallons[a]	2½ gallons[a]
			Cents			
Sherbert	25.0[b]	53.4	64.5	----	----	----
Ice milk	----	----	67.5	----	----	259.0
Ice cream	35.8	69.1	80.5	162.0	212.7	298.0

Type of powdered milk	9 5/8 ozs.[a]	1 lb. 10 ozs.[a]	2 lbs. 6 ozs.	4 lbs.	5 lbs.[a]	25 lbs.[a]
			Cents			
Nonfat dry milk	30.6	87.6	111.2	165.2	170.8	844.6
Powdered two percent	----	----	150.0	185.0	-----	-----

Type of spread	¼ lb.[a]	½ lb.[a]	1 lb.
			Cents
Butter	20.7	48.2	77.7
Margarine	----	----	39.7

Type of canned milk	6 ozs.[a]	14 ozs.[a]	15 ozs.[a]
			Cents
Condensed milk	---	----	19.0[b]
Evaporated milk	8.9	14.9	----

[a]Dashes indicate that either no or too few observations were obtained in that size category.

[b]Values where some editing was necessary.

Salt Lake consumers paid almost twice the amount for a pound of butter as they did for a pound of margarine. A pound of butter averaged 77.7 cents compared to 39.7 cents per pound for margarine.

Approximately 15 cents was the average price paid for a large can of evaporated milk and approximately 9 cents for a small can. The large can of condensed sweetened milk cost 19 cents.

SUMMARY AND CONCLUSIONS

One of the primary objectives of this study was to describe consumption and use of dairy products and their substitutes by people living in metropolitan Salt Lake City, Utah. Once that consumption of these products had been established, the variation in consumption among the sample consumers was related to certain consumer characteristics. The characteristics under observation were income; religion; employment status, education and age of the homemaker; food expenditure; family composition; and age and sex of the individual. Of secondary importance to this study was the description of certain purchasing practices by Salt Lake City consumers.

The cross-sectional data used in this study were gathered from a survey of households in metropolitan Salt Lake City, Utah, from late April through early June 1967.

Whole milk was more widely accepted and used in Salt Lake City households than other beverages which might be considered substitutes for whole milk such as two percent milk, coffee, and fruit juices. Approximately 97 percent of the families in metropolitan Salt Lake City consumed some type of fluid milk during the previous week. Per capita family consumption of regular whole milk was 2.019 quarts per week. Per capita family consumption of other important beverages was 0.832 quarts for fruit juice, 0.775 quarts for two percent milk and 1.529 quarts for coffee.

Salt Lake City households consumed more fluid milk, evaporated milk, butter, margarine, fruit juice and fruitade than households in

the western region and the nation. Salt Lake consumers were low in their per household consumption of such non-dairy items as coffee; soft drinks; and whiskey, beer and wine. The per capita consumption of all dairy products, based on their whole milk equivalent (fat solids basis), was 24 percent higher in Salt Lake City than in the nation as a whole.

Regular whole milk was the most popular dairy beverage consumed at any mealtime or between meals.

Fluid milk and nonfat dry milk were used most extensively for eating or drinking. Three-fourths of all canned milk was used in baking or cooking. Only 11 percent of all butter was used in baking or cooking.

The per capita family consumption of fluid milk exhibited a direct relationship with per capita family income. The income elasticity was calculated to be 0.061, which showed that fluid milk was a superior product. Catholic families had the highest per capita family consumption of fluid milk followed by "Mormon", "Other" and Protestants.

Families with working homemakers tended to drink less milk than those families where the homemaker wasn't working. Per capita family consumption among families of the more educated homemaker was higher than among families with a less educated homemaker. Per capita family food expenditure also exerted a direct influence on per capita family consumption. Families with a homemaker in the 35-49 age category generally consumed the greatest amount of fluid milk per capita. Family composition exerted relatively little influence on per capita family consumption.

Age and sex of the individual were significant in determining the amount of fluid milk consumed by the individual. Males drank an aver-

age of 2.5 glasses of milk per day while females consumed only 2.0 glasses. Male teenagers consumed the largest amount of milk and drank 3.604 glasses of milk per day. Elderly females in the 60 or more age group consumed the least amount--1.076 glasses of milk per day.

Females in the 13-19 and 50-59 age groups consumed noticeably less than their male counterparts. Advertising directed at these two age groups may be successful in increasing the sale of milk.

When per capita consumption was based on the total number of people in the sample, people tended to drink more milk for breakfast, then lunch, dinner and between meals, in that order. However, when per capita consumption was based only on the number of people actually consuming milk, the greatest quantity was consumed in between meals, then at dinner, lunch and breakfast.

Since milk drinkers drink more fluid milk as a between meal snack, current advertising by the dairy industry glamorizing the use of milk between meals should be effective at increasing milk sales.

Canned milk was shown to be an inferior product with an income elasticity of -.079. "Mormons" tended to consume the greatest amounts of canned milk per capita. Families whose homemaker was working and those whose homemaker had received less than a high school education had a lower per capita family consumption of canned milk. Those families spending larger amounts on food eaten at home also had a higher per capita consumption of canned milk. Per capita consumption among families whose homemaker was 50 years old or older and also among families having no children was comparatively large.

Per capita family consumption of butter exhibited a strong linear relationship with per capita family income. Income elasticity of

butter was 0.734 and was the highest for the four products being analyzed by factors of consumption. Catholic families consumed the largest amounts of butter per capita followed by "Other", "Mormon", and Protestants. Employment status of the homemaker had very little influence upon the per capita family consumption of butter except in the higher income brackets. The families where the homemaker received less than a high school education consumed the greatest amounts of butter. Families spending larger amounts of money per capita for food eaten at home consumed larger amounts of butter. Per capita family consumption of butter increased with the age of the homemaker. Families with no children consumed the most butter per capita.

According to the data used in this study, margarine was a superior product with an income elasticity of 0.063. "Mormon" families tended to consume the most margarine per person. In general, families of the working homemaker consumed slightly larger amounts of margarine. Per capita family consumption was highest for families whose homemaker had the least education. Per capita family food expenditure and age of the homemaker had a direct relationship with the per capita family consumption of margarine. Family composition showed an inverse relationship to per capita family consumption of margarine.

Only 48.6 percent of the families in the sample had regular amounts of milk delivered; however, home delivery accounted for the greatest volume of milk purchased. This shows that home delivery is still an important source of milk. Smaller families tended to buy their milk at the store. Over-all family per capita consumption of fluid milk was the same regardless of whether it was bought at the store or whether it was delivered.

Quart size containers were the most widely accepted containers for skim milk, buttermilk and chocolate milk. People buying milk through home delivery preferred the quart container more than those buying milk at the store. The half-gallon container was more popular with families buying regular whole milk or two percent milk. Gallon containers were seldom used or preferred at the time of the survey.

The half-gallon container was the most preferred container for ice cream, ice milk and sherbert. Purchasers of nonfat dry milk and powdered two percent milk preferred the 4 pound and the 2 pound 6-ounce packages. There was some tendency on the part of butter purchasers to prefer a size smaller than 1 pound.

The average difference in price between buying fluid milk products at the store and having it delivered amounted to 0.7 cents for a quart container and 1.0 cent for a half-gallon container. Buttermilk and chocolate milk were the higher priced milk products followed by whole milk, two percent milk and skim milk in that order. The half-gallon of ice cream cost the Salt Lake City consumer an average of 80.5 cents. The 4 pound bag of nonfat dry milk cost an average of $1.65 while butter averaged 77.7 cents per pound.

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APPENDIXES

Appendix 1. Per capita consumption of chocolate milk powder, cocoa, ovaltine, instant breakfast during the previous week, 360 households and 1,349 household members, metropolitan Salt Lake City, Utah, spring, 1967

Product	Size of unit	Number of units consumed	Consumption per household	Consumption per capita	Households consuming	
					Number	Percent
Chocolate milk powder	Cup	171.00	0.475	0.127	18	5.0
Cocoa, ovaltine	Cup	282.00	0.783	0.209	26	7.2
Instant breakfast	Cup	214.40	0.596	0.159	23	6.4

Appendix 2. Conversion factors used in changing units reported in the U.S.D.A. Agricultural Research Service survey to the equivalent units reported in the Salt Lake City survey

Evaporated milk	lbs. X $\frac{16 \text{ ozs.}}{1 \text{ lb.}}$ = ozs.
Nonfat dry milk	lbs. X $\frac{16 \text{ ozs.}}{1 \text{ lb.}}$ = ozs.
Cream	qts. X $\frac{2 \text{ pts.}}{1 \text{ qt.}}$ = pts.
Cottage cheese	lbs. X $\frac{1 \text{ pt.}}{1 \text{ lb.}}$ = pts.
Other cheese	lbs. X $\frac{16 \text{ ozs.}}{1 \text{ lb.}}$ = ozs.
Fruit juice	lbs. X $\frac{0.5 \text{ qts.}}{1 \text{ lb.}}$ = qts.
Coffee	lbs. X $\frac{50 \text{ cups}}{1 \text{ lb.}}$ = cups
Soft drinks	lbs. X $\frac{16 \text{ ozs.}}{1 \text{ lb.}}$ X $\frac{0.83 \text{ (12 oz.)}}{1 \text{ oz.}}$ = 12 ozs.
Fruitade, punch	lbs. X $\frac{0.5 \text{ qts.}}{1 \text{ lb.}}$ = qts.
Whiskey, beer, wine	lbs. X $\frac{0.5 \text{ qts.}}{1 \text{ lb.}}$ = qts.

Appendix 3. Conversion factors for determining consumption of milk fat solids and nonfat solids

Product	Unit	Factors for converting one unit of product to:	
		Pounds of fat solids	Pounds of nonfat solids
Regular whole milk	Qt.	0.07560	0.18576
Two percent milk	Qt.	0.04320	0.21500
Skim milk	Qt.	0.00215	0.19310
Buttermilk	Qt.	0.01075	0.19008
Chocolate milk	Qt.	0.05724	0.18060
Nonfat dry milk (liquid)	Qt.	0.00140	0.19060
Nonfat dry milk (powder)	Oz.	0.00044	0.05956
Powdered two percent (liquid)	Qt.	0.01155	0.20790
Powdered two percent (powder)	Oz.	0.00312	0.05625
Condensed sweetened milk	Oz.	0.00531	0.01219
Evaporated milk	Oz.	0.00494	0.01125
Infant milk formula (dry & liquid)	8 Oz.	0.01750	0.04320
Canned milk shake	Qt.	0.18464	0.27184
Cocoa, ovaltine[a]	Cup	0.00042	0.01768
Metrecal, sego (dry & liquid)	Qt.	0.00218	0.39485
Instant breakfast[a]	Qt.	0.00172	0.27937
Sherbert-water ices	Qt.	0.04300	0.04300
Ice milk	Qt.	0.10750	0.24725
Ice cream	Qt.	0.25686	0.21405
Ice cream bar	Serving	0.03000	0.02500
Whipping cream	Pt.	0.37800	0.06012
Coffee (table) cream	Pt.	0.21275	0.07627
Half and half cream	Pt.	0.12315	0.09638
Pressure can dairy whip topping	Oz.	0.01875	0.00391
Powdered dairy creamer	Oz.	0.00044	0.05956
Sour cream	Pt.	0.19716	0.09059
Yogurt	Pt.	0.02380	0.21362
Cottage cheese	Pt.	0.00324	0.22356
Cheese (cheddar, etc.)	Oz.	0.02012	0.01925
Cream cheese	Oz.	0.02312	0.00750
Cheese spreads and mixes	Oz.	0.01250	0.01250
Butter	Lb.	0.80300	0.01000

[a]Conversion factor does not include milk used in mixture.

Appendix 4. Calculation of income elasticities[a] based on the mean per capita family income and the mean per capita family consumption of fluid milk, canned milk, butter and margarine, metropolitan Salt Lake City, Utah, spring, 1967

Fluid milk

Consumption function = $\hat{Y} = 2.72 + .00165X + e$

$\hat{Y}$ = Weekly per capita family consumption of fluid milk in quarts

X = Per capita family income in dollars

Income elasticity at $\overline{Y}$, $\overline{X}$

$$\eta I = \frac{dY}{dX} \cdot \frac{\overline{X}}{\overline{Y}} = (.000165) \times \frac{1{,}958.33}{3.04} = .106$$

Canned milk

Consumption function = $\hat{Y} = 3.89 - (.000146) X + e$

$\hat{Y}$ = Weekly per capita family consumption of canned milk in ounces

X = Per capita family income in dollars

Income elasticity

$$\eta I = \frac{dY}{dX} \cdot \frac{\overline{X}}{\overline{Y}} = (-.000146) \times \frac{1{,}958.33}{3.60} = -.079$$

Butter

Consumption function = $\hat{Y} = .04 + (.00060) X + e$

$\hat{Y}$ = Weekly per capita family consumption of butter in pounds

X = Per capita family income in dollars

Income elasticity

$$\eta I = \frac{dY}{dX} \cdot \frac{\overline{X}}{\overline{Y}} = (.00060) \times \frac{1{,}958.33}{0.16} = .734$$

Appendix 4. Continued

Margarine

Consumption function = $\hat{Y} = .23 + (.000008)\ X$

$\hat{Y}$ = Weekly per capita family consumption of margarine in pounds

X = Per capita family income in dollars

Income elasticity

$$\eta I = \frac{dY}{dX} \cdot \frac{\overline{X}}{\overline{Y}} = (.000008)\ X\ \frac{1{,}958.33}{0.25} = .063$$

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[a]Income elasticities were calculated by fitting a regression line through the data found in Tables 8, 20, 27, 34, and calculating the elasticity at the mean value for per capita family consumption and per capita family income. This gave an approximate idea of the elasticity for each product.

Appendix 5. Simple linear regression analysis for the quantity of fluid milk consumed daily by 669 males in 360 sample households by age, Salt Lake City, Utah, spring, 1967

Variables:

(Y) glasses of fluid milk consumed daily

(X) age of individual

Consumption function = $\hat{Y} = 3.208 - .0266\ X$

$r = -0.3210$

Regression SS = 220.63

$s^2 = 2.88$

$F = 76.61^*$ with 1 and 667 d.f.

* Significant at .01 level.

Appendix 6. Simple linear regression analysis for the quantity of fluid milk consumed by 680 females in 360 sample households by age, Salt Lake City, Utah, spring, 1967

Variables:

(Y) glasses of fluid milk consumed daily

(X) age of individual

Consumption function = $\hat{Y} = 2.913 - .0301\ X$

$r = -0.4542$

Regression SS = 327.46

$s^2 = 1.86$

$F = 176.05^*$ with 1 and 678 d.f.

*Significant at .01 level.

Appendix 7. Test of significance between the regression coefficients of the male and female regression equations, Salt Lake City, Utah, spring, 1967

Hypotheses:

Ho: $bm = bf$

Ha: $bm \neq bf$

Variables:

(bm) male regression coefficient

(bf) female regression coefficient

Statistic:

$$t = \frac{bm - bf}{\sqrt{\frac{s^2}{\Sigma (x-\bar{x})^2}}} = 114.98^*$$

*Significant at .01 level.

Appendix 8. Per capita consumption of fluid milk by 669 male consumers during the previous day, by age and mealtime, metropolitan Salt Lake City, Utah, spring, 1967

Age group	Breakfast	Lunch	Dinner	Between meals	Total for day
			Glasses		
0-5	0.94	0.91	0.94	1.35	3.10
6-12	1.04	0.99	1.04	1.20	3.06
13-19	1.29	1.20	1.41	1.70	3.71
20-29	1.19	1.67	1.39	1.09	2.51
30-39	1.18	1.35	1.27	0.99	2.46
40-49	0.95	1.31	1.12	1.22	2.05
50-59	1.16	1.64	1.50	2.23	3.06
60 or more	0.85	1.27	0.96	1.38	1.95
All males	1.06	1.11	1.14	1.37	2.84

Appendix 9. Per capita consumption of fluid milk by 680 female consumers during the previous day, by age and mealtime, metropolitan Salt Lake City, Utah, spring, 1967

Age groups	Breakfast	Lunch	Dinner	Between meals	Total for day
			Glasses		
0-5	0.86	0.88	0.87	1.11	3.01
6-12	1.01	1.00	1.08	1.02	3.03
13-19	0.97	1.01	1.10	1.14	2.74
20-29	1.01	1.04	1.05	1.11	2.39
30-39	0.99	1.05	1.06	1.20	2.08
40-49	0.94	1.11	1.30	1.38	1.42
50-59	0.90	1.01	0.88	1.44	1.68
60 or more	0.95	0.95	1.01	0.98	1.55
All females	0.96	0.99	1.03	1.14	2.47

VITA

Jerry Lee Calley

Candidate for the Degree of

Master of Science

Thesis: The Consumption and Use of Dairy Products and Their Substitutes in Metropolitan Salt Lake City

Major Field: Agricultural Economics

Biographical Information:

Personal Data: Born at Omaha, Nebraska, April 22, 1942, son of Dr. John Harry and Geraldine Calley; married Virginia L. Cooley, December 18, 1965; one child--David Michael.

Education: Attended elementary school in Williams, Arizona; graduated from Williams High School in 1960; attended one year at Arizona State College at Flagstaff, Arizona, 1960-61; attended two years at Utah State University, 1961-1963; attended three months at Brigham Young University, 1963; received Bachelor of Science degree from Utah State University, with a major in Agricultural Economics and a double minor in Spanish and Business Administration, 1966; completed requirements for the Master of Science degree, with a major in Agricultural Economics, at Utah State University, 1967.

Professional Experience: 1967, student research assistant, Department of Agricultural Economics, Utah State University; 1966-1967, statistical analyst, Department of Extension Economics, Utah State Extension Service; 1962, research assistant on Davis Co. Watershed for the U.S. Forest Service in Farmington, Utah.