HOUSEHOLD SHOPPERS' FOOD PREFERENCES FROM SCANNING DATA

by Joe W. Koudele and Arlin M. Feyerherm

Research Report #9

Department of Agricultural Economics

Kansas State University

HOUSEHOLD SHOPPERS' FOOD PREFERENCES FROM SCANNING DATA

by

Joe W. Koudele and Arlin M. Feyerherm

ACKNOWLEDGMENTS

LIST OF TABLES

TABLE OF CONTENTS

INTRODUCTION

Importance of Scanning in Food Stores

A news release of the A. C. Nielsen Company dated June 4, 1986, states: "Scanner-equipped supermarkets are increasing at a rapid rate in the United States, creating a data explosion in the market research field.

Back in the late 1960's manufacturers and retailers initiated a program that resulted in the Universal Product Code—the coding of products and the equipping of supermarkets with electronic front-end scanners.

At the end of 1985 there were 11,660 scanner-equipped supermarkets in the U.S. accounting for nearly half of all grocery store dollar sales. Ninety percent of all scanner-equipped supermarket installations were in stores that averaged $80,000 or more per week in sales, or $4 million plus per year. The percent of total food store business accounted for by this group will rise gradually to over 60% by the end of the 1980's.

Retailers and manufacturers use the scanning data collected by Nielsen to track sales, and even evaluate shelf space, retail prices and the impact on the consumer of in-store displays and product promotion offers."

Related Research

The Nationwide Food Consumption Survey for the United States was conducted during 1977-78. Trained interviewers collected most of the data by personal interviews with homemakers. Household food consumption information was obtained using a list to aid the respondent in recalling the kind, form, quantity, and cost of purchased food used (at home and away from home) during the previous 7 days (spring, 1977). Respondents also supplied information on household characteristics (income, etc.) believed to affect food consumption.[1] Food reported as eaten by 9,620 individuals, based on 24-hour dietary recall of the day preceding the interview, was summarized into 10 major food groups including (1) meat, poultry, and fish; (2) milk and milk products; (3) eggs; and (4) legumes, nuts, and seeds. These foods largely supplied protein in the diet.

Beef was the most popular meat reported (35 percent); pork cuts (26 percent); poultry (18 percent); frankfurters, sausages, luncheon meats, and spreads (28 percent); fish or shellfish (9 percent); cheese (25 percent); eggs (33 percent); legumes, nuts, and seeds (20 percent).[2] These data provide useful benchmarks for comparisons in new research.

---

[1]1977-78 Nationwide Food Consumption Survey (USDA).

[2]Food and Nutrient Intakes of Individuals in 1 Day in the United States. Spring 1977, pp. 5-6.

A telephone survey of 1,000 homemakers in the Topeka (Kansas) Metropolitan Area during November-December, 1980, provided updated information on shopping and buying practices of household consumers for meat (particularly beef). It also showed consumers' preferences for different kinds of meat, the frequency of preparing various kinds of beef (steaks, roasts, and other beef) during the last year, reasons for homemakers' first choice preference for beef and chicken, and the importance to homemakers of certain factors when selecting beef at retail stores.[3]

Reasons for Study

Consumers are the only ones with insights into their own preferences and values and these change over time. There is continual need for updated information concerning consumer preferences.

During the 1950's and early 1960's, there was considerable research on consumer aspects of meat marketing. State agricultural experiment stations and the U. S. Department of Agriculture made studies of consumer demand for meat, preferences for beef, preferences for certain retail cuts of beef, factors motivating consumers' choice of meat, acceptance of fresh vs. frozen meats, visual preferences for retail beef grades, consumer preferences for grass-fed beef vs. grain-fed beef, sales responses to prepackaged meats, and merchandising practices of retailers.

Research techniques have included the survey method, taste panels, retail store tests, continuous household consumer purchase panels, and more recently, econometrics. However, the procedure of collecting data by scanning the market baskets of food shoppers has seldom been used before to measure consumer preferences (purchases). It was pilot tested in this study. Consumer purchases are a true indicator of individual and/or family choices (or preferences) at a particular time.

Objectives of Study

1. To try out (pilot test) and evaluate a market research procedure for obtaining basic data on household shoppers' food purchases or preferences.

2. To relate purchases (for major groups of foods or individual foods) to certain socio-economic characteristics of households and primary food shoppers.

----

[3]Meat Purchasing, Preferences, Storage, and Preparation by Households, 1983.

Consumers' preferences were measured by actual purchase decisions in the marketplace. Basic data were obtained from a sample of household food shoppers patronizing a warehouse food store through in-store interviews and electronic scanning of shoppers' food market baskets (shopping carts).

Individual food preferences were determined by purchases data (specific items and dollar values) printed on cash register tapes that food shoppers gave to trained interviewers, who also obtained information on socio-economic characteristics of households and primary food shoppers.

Food preferences were revealed by the number and percentage of food shoppers who purchased various food items in one market (a large retail food store) over a week's period of time. Consumers' purchases were summarized by major groups and specific categories of foods.

Basic data were collected at Food 4 Less, a busy warehouse store at Manhattan, Kansas. The store had 10 check-out stations and was equipped with electronic scanners.

Three trained women pretested the research procedure during the afternoon of June 10, 1983 (Friday). They then interviewed food shoppers daily during the week of June 12-18 (Sunday through Saturday) during the hours 10 a.m. to 12 p.m., 1 to 6 p.m., 7 to 9 p.m., as well as 8 to 10 a.m. on Saturday. In sampling, the number of shoppers interviewed during each day of the week was roughly proportional to daily customer counts for the previous two weeks (Table 1). The store's customer count for the week of June 12-18 was 10,561. Thus, the sample of 1,047 completed interviews included approximately one-tenth of the store's customers.

Table 1. Interviews with Sample of Food Shoppers, Food Market Basket Study, Food 4 Less Warehouse Store, Manhattan, Kansas, by Day of Week, June 12-18, 1983.

Item	Number	Percent
Day of week:		
Sunday	32	3.1
Monday	124	11.8
Tuesday	135	12.9
Wednesday	156	14.9
Thursday	211	20.1
Friday	185	17.7
Saturday	204	19.5
TOTAL	1,047	100.0

Each interviewer, who wore a purple and white KSU name badge, introduced herself to a food shopper standing in line at a checkout station beside a shopping cart reasonably well filled with food including some red meats or meat substitutes. The interviewer explained that she represented Kansas State University, which was trying to determine consumers' preferences for certain foods. She asked the shopper if she might ask a few questions and if the shopper would give KSU the cash register tape (receipt) for research purposes. She further explained that participation was voluntary and information would be treated confidentially.

If the shopper agreed to cooperate, a two-page questionnaire (stapled in a folder) was shown to the shopper so she (he) could follow along by looking at the questions being asked. This speeded up the interview considerably and avoided misunderstandings. After filling out the questionnaire, the interviewer followed the shopper as the groceries were checked out by scanning. After she was given the cash register tape, the questionnaire code number was recorded on the tape, and it was stapled to the questionnaire. This completed the interview.

If the shopper refused to cooperate with the interviewer, she (he) was asked the reason, and it was recorded. If the shopper desired to keep the cash register tape to check grocery items and prices at home, she (he) was asked to return the tape to KSU if provided with a business reply envelope. The questionnaire code number was recorded on both the tape and envelope. Then the tape was stapled to the envelope and given to the shopper. A short letter from the Project Leader explaining the purpose of the study and urging cooperation in returning the tape was put inside each envelope.

SOCIO-ECONOMIC CHARACTERISTICS OF SAMPLE OF FOOD SHOPPERS

Socio-economic characteristics provide descriptive information about the sample of food shoppers interviewed. Eight characteristics were: Identity and age of the primary food shopper, type of household, size of household, lifestage of "family" households, educational level of the primary food shopper, annual income of the household, wife's employment status, and race.

Most (95%) of those interviewed were primary food shoppers. Three-fourths of the primary food shoppers were under age 50, 45% were in the age group 18-34, and 17% were senior citizens, age 55 and over (Table 2). Store customers were probably attracted by the economy appeal of a warehouse food store and were quite price conscious.

The sample consisted largely of "family" households (89%) but in a University community such as Manhattan, Kansas, about 11% of the households were "nonfamily" (Table 3). It is likely that most of the nonfamily households consisted of single persons living alone or students living together in apartments.

Table 2. Identity and Age of Primary Food Shopper in Household.

Item	Percent
Primary food shopper	
Yes	95.1
No	4.5
TOTAL	99.6*
Age of primary food shopper	
18-24	16.2
25-34	29.0
35-44	23.5
45-49	6.6
50-54	7.7
55-64	10.5
65 & over	6.5
TOTAL	100.0

*Does not total 100% because of nonresponses.

Table 3. Type of Household of Food Shoppers.

Type of household	Percent
Family	89.1
Nonfamily[1]	10.9
TOTAL	100.0

[1]A household maintained by a man or woman living alone or with unrelated persons.

The size of household of food shoppers is indicated in Table 4. Two-member and three-to-four member households comprised nearly three-fourths of the total. However, about 20% were five-or-more member households.

Table 5 shows the lifestage and composition of "family" households. Approximately 28% of the family households consisted of married couples who either had no children or there were no children at home. Most (72%) of the family households had children of various ages, but predominantly through 12 years of age.

Table 4. Size of Household of Food Shoppers.

Number of members	Percent
One	6.2
Two	29.5
Three to four	44.2
Five or more	19.9
TOTAL	99.8*

*Does not total 100% because of nonresponses.

Table 5. Lifestage and Composition of "Family" Households.

Lifestage and composition	Percent
Young married couple, no children	10.6
Couple and children through 12 years	36.8
Couple, children through 12 years and 13-18 years	13.1
Couple, children through 12 years, 13-18 years and over 18 years	1.2
Couple, children through 12 years and over 18 years	1.3
Couple, children 13-18 years	8.2
Couple, children 13-18 years and over 18 years	2.0
Couple, children over 18 years	9.3
Older married couple, no children at home	17.5
TOTAL, all groups	100.0

The educational level of primary food shoppers is presented in Table 6. Slightly over half (55%) had attended college or were college graduates. This was to be expected in a University community.

Table 7 shows the estimated annual income of households, both family and nonfamily. Most of the households were "family" type, so the estimates are probably fairly accurate. However, income data are at best "estimates." Roughly 20% of the households had annual incomes under $10,000. Nearly 39% had incomes between $10,000 and 25,000. Approximately 23% had incomes between $25,000 and $40,000, and 9% had incomes of $40,000 and over. Ten percent of the food shoppers refused to provide an income estimate. This is normal in personal interview surveys.

Table 8 describes the marital status of food shoppers and the wife's employment status. Most (84%) food shoppers were married. In approximately one-half of the married households, the wife was employed outside the home, generally on a full-time basis.

Table 6. Educational Level of Primary Food Shoppers.

Last year of school completed	Percent
Grade school and/or some high school	7.5
High school graduate	37.7
Vocational school or some college	27.9
College graduate/post graduate	26.9
TOTAL	100.0

Table 7. Estimated Annual Income of Households.[1]

Annual income	Percent
Under $5,000	7.4
$ 5,000-$ 7,499	6.3
$ 7,500-$ 9,999	6.8
$10,000-$14,999	11.7
$15,000-$19,999	12.8
$20,000-$24,999	14.4
$25,000-$29,999	10.6
$30,000-$39,999	11.0
$40,000-$49,999	4.9
$50,000 and over	4.0
Refused to answer	10.1
TOTAL	100.0

[1]For 1982.

Table 8. Marital Status of Food Shoppers and Wife's Employment Status.

Item	Percent
Married	
Yes	83.6
No	16.2
TOTAL	99.8*
Wife employed outside the home	
Full time	31.3
Part time	18.0
No	49.8
TOTAL	99.1*

*Does not total 100% because of nonresponses.

Table 9 shows the race of food shoppers. Most (92%) were white. There were a few blacks. Other races represented were "brown" (from India and Pakistan) and "yellow" (primarily Vietnamese and Chinese).

Table 9. Race of Food Shoppers.

Race	Percent
White	92.1
Black	3.1
Other	4.8
TOTAL	100.0

SHOPPING AND BUYING PRACTICES

Table 10 shows how often food shoppers would shop for food. Once per week (50%) was most common. Approximately 26% shopped quite frequently (at least twice per week), whereas the remaining 24% shopped less than once per week.

Table 11 may indicate whether there was any impulse buying of food. A majority (55%) of shoppers relied on a written list. However, a large percentage of shoppers did not use a list.

Table 10. The Frequency of Shopping for Food.

Frequency	Percent
More than twice per week	9.5
Twice per week	16.6
Once per week	50.0
Less than once per week	23.6
TOTAL	99.7*

*Does not total 100% because of nonresponses.

Table 11. Use of Written Food List by Shoppers.

Used a list	Percent
Yes	54.7
No	45.0
TOTAL	99.7*

*Does not total 100% because of nonresponses.

Major Food Groups and Selected Nonfoods

Table 12 shows purchases of major food groups and selected nonfoods by 1,047 food shoppers. Data show the number and percent of 1,047 shoppers who purchased each major food group and its rank (or preference). Data do not show the frequency of purchasing any individual food(s) within a group.

In summarizing data, the groups "fruits" and "vegetables" included both fresh and processed forms. The ranks of these groups may have been different, and perhaps higher, if some of the 351 food shoppers purchasing "produce" were added to the other group totals. The term "produce" meant fresh fruits and/or vegetables. At the time, some produce items were not all coded with a UPC symbol. Therefore, it was not possible to make a distinction when summarizing data.

A higher percentage of food shoppers purchased "processed" meats than "fresh and frozen" meats. Potatoes and sweet potatoes ranked 10th in priority.

Table 12. Purchases of Major Food Groups and Selected Nonfoods by 1,047 Food Shoppers.

Item	Number	Percent	Rank
Shoppers purchasing:			
Breads, cereals, grains & bakery products	944	90.2	1
Fruits (fresh and processed)	792	75.6	2
Vegetables (fresh and processed)	767	73.3	3
Processed meats	763	72.9	4
Beverages	750	71.6	5
Dairy products	689	65.8	6
Fats and oils	654	62.5	7
Fresh and frozen meats[1]	647	61.8	8
Desserts and sweets	610	58.3	9
Potatoes and sweet potatoes	570	54.4	10
Produce (fresh fruits and/or vegetables)	351	33.5	11
Nonfoods:			
Pet Food	267	25.5	1
Alcohol (beer, etc.)	152	14.5	2
Tobacco	126	12.0	3

[1]The number purchasing beef was 362; pork, 165; and other fresh and frozen meats, 120 shoppers.

Rank of Purchases

Table 13 shows the rank of purchases of individual foods and beverages by 1,047 food shoppers. Fifty percent or more of the shoppers purchased these items. The list includes several convenience foods, most of which are in processed form.

Table 13. Rank of Purchases of Individual Foods and Beverages by 1,047 Food Shoppers.

Item	Percent purchasing item(s)	Rank
Breads and crackers	69.6	1
Carbonated beverages	60.5	2
Processed vegetables	59.9	3
Spices and flavorings	59.0	4
Fresh fruits	54.2	5
Fresh vegetables	57.8	6
Milk and cream (fluid)	56.5	7
Processed fruits	54.2	8
Cheese	52.7	9
Bakery items	50.0	10

Fresh and Frozen Meats, Processed Meats and Meat Substitutes

Table 14 shows purchases of fresh and frozen meats, processed meats, and meat substitutes by 1,047 food shoppers. These foods provide protein in the diet.

Under the UPC, "meat" was too "non-specific" to be useful in determining food preferences. Ground beef ranked first among purchases of fresh and frozen meats. Purchases of poultry were surprisingly low, considering U. S. per capita consumption trends. A wide variety of processed meats was purchased. There was also a wide selection of meat substitutes purchased. Cheese, pasta, and pizza were purchased by a high percentage of shoppers (Table 14).

Other Foods and Beverages

Table 15 shows purchases of other (non-protein) foods and beverages by 1,047 food shoppers.

The data show the high popularity and preferences for carbonated beverages. A high percentage of food shoppers purchased cereals, breads, crackers, and bakery goods. There was little difference in preferences for "fresh vs. processed" fruits and vegetables. Processed potatoes and sweet potatoes were preferred over fresh. Vegetable fats and oils were clearly preferred over animal sources. A high percentage of shoppers purchased sugar, syrups, and toppings. Fluid milk and cream were much preferred over condensed and powdered milk (Table 15). These purchase data are consistent with national trends in consumption of foods and beverages.

Table 14. Purchases of Fresh and Frozen Meats, Processed Meats, and Meat Substitutes by 1,047 Food Shoppers.

Item	Number purchasing item(s)	Percent purchasing item(s)
Fresh and frozen meats:		
Meat (non-specific)	441	42.1
Ground Beef	240	22.9
Beef Steaks	151	14.4
Pork Steaks	117	11.2
Beef Roasts	45	4.3
Fish & seafoods	43	4.1
Other Pork	40	3.8
Other Beef[1]	25	2.4
Pork Roasts	22	2.1
Poultry[2]	7	0.7
Variety meats[3]	4	0.4
Processsed meats:		
Canned Meats[4]	355	33.9
Frankfurters	326	31.1
Luncheon meats	298	28.5
Meat Pot Pies[5]	227	21.7
Bacon	207	19.8
Sausage	106	10.1
Ham	71	6.8
Other	43	4.1
Meat substitutes:		
Cheese[6]	552	52.7
Pasta & Pizza[7]	430	41.1
Eggs	364	34.8
Soup[8]	285	27.2
Pork and Beans	236	22.5
Dry beans, peas and nuts	169	16.1
Peanut Butter	148	14.1
Rice	127	12.1
Yogurt	88	8.4
Gelatin	5	0.5

[1]Sides, quarters, bundles and veal.
[2]Chicken, turkey, and duck.
[3]Liver, tongue, heart, etc.
[4]Beef, poultry, fish, pork, and dried, chipped beef.
[5]TV dinners, stews.
[6]Processed, cottage, spreads.
[7]Noodles, spaghetti, macaroni, hamburger helper, pizzas, and pasta mixes.
[8]Regular, chunky.

Table 15. Purchases of Other Foods and Beverages by 1,047 Food Shoppers.

Item	Number purchasing item(s)	Percent purchasing item(s)
Beverages:		
Carbonated beverages	633	60.5
Coffee, tea, cocoa	322	30.8
Breads, cereals, grains and bakery products:		
Cereals	501	47.8
Bread and crackers	729	69.6
Flour and flour mixes	334	31.9
Bakery goods	524	50.0
Corn chips and pretzels	289	27.6
Popcorn and cheese puffs	122	11.7
Produce: (fresh fruits and/or vegetables)	351	33.5
Fruits:		
Fresh	612	58.5
Processed*	567	54.2
Vegetables:		
Fresh	605	57.8
Processed*	627	59.9
Potatoes and sweet potatoes:		
Fresh	295	28.2
Processed	404	38.6
Fats and oils:		
Animal (butter, lard)	44	4.2
Vegetable (margarine, shortening)	475	45.5
Other edible fats and oils (Sour cream, dips)	132	12.6
Dressing (salad)	298	28.5
Desserts and sweets:		
Sugar, syrups and toppings	439	41.9
Candy	246	23.5
Jellies, jams, pectin	114	10.9
Pudding and jello	150	14.3
Dairy products:		
Milk and cream (fluid)	591	56.5
Milk (condensed and powdered)	63	6.0
Ice cream	236	22.5
Other:		
Spices and flavorings	618	59.0
Babyfood	48	4.6
Miscellaneous food products	42	4.0

*Included juices (canned or frozen).

Purchases of some food groups or individual foods were related to certain socio-economic characteristics of food shoppers. Relationships were tested for statistical significance. The influence of socio-economic characteristic on "average value of purchases" was tested by one-way analysis of variance. Average value of purchases is defined as the average expenditure on the food item(s) by those food shoppers who actually purchased the item(s). Differences among the "percent purchasing item(s)" as related to socio-economic characteristic were tested by chi-square analysis. Statistical significance levels are shown on tables as footnotes.

Fresh and Frozen Meats

Purchases of fresh and frozen meats as related to income level of food shoppers are shown in Table 16. Income level had no significant effect on the average value of purchases or on the percent purchasing the items.

Table 17 shows purchases of fresh and frozen meats as related to wife's employment status--whether she worked full or part time or was not employed outside the home. The wife's employment status did not significantly affect the average value of purchases.

A higher percent of shoppers purchased fresh and frozen meats if the wife worked than if she were not employed outside the home. Also, a higher percent purchased fresh and frozen meats if the wife worked "full" time rather than "part" time. Differences were significant (Table 17).

Purchases of fresh and frozen meats as related to the lifestage of "family" households are presented in Table 18.

Sociologically, there are three "family" life stages--a young married couple with no children, a couple with children of various ages, and an older married couple with no children at home. Lifestage had a significant effect on the average value of fresh and frozen meat purchases. Average value of purchases was highest for couples with children, followed by young married couples without children, and was lowest for older married couples with no children at home.

The percent of households purchasing fresh and frozen meats was highest for young married couples with no children, followed by couples with children of various ages, and lowest for older married couples with no children at home. Differences by lifestage were not significant (Table 18).

Processed Meats

Table 19 shows purchases of processed meats as related to income level of food shoppers. Processed meats included canned meats, frankfurters, luncheon meats, meat pot pies, bacon, sausage, ham, and other items.

There was no discernible trend in the average value of purchases. Households with the highest income level ($50,000 and above) had the highest average expenditure ($8.69) for processed meat purchases. Examination of data revealed purchases ranging from $0.79 to $50.15 and included five large purchases averaging $26.65. Differences by income level were significant.

A higher percent of shoppers purchased processed meats as income increased up to $25,000. At income levels above $25,000, the percent purchasing processed meats declined. Differences by income level were significant (Table 19).

Purchases of processed meats as related to wife's employment status are shown in Table 20.

Differences in the average value of purchases were not significant. A higher percent of shoppers purchased processed meats if the wife worked than if she were not employed outside the home. This was especially true for wives working full-time. Differences by wife's employment status were significant (Table 20).

Table 21 shows purchases of processed meats as related to the lifestage of "family" households.

Couples with children of various ages accounted for the highest average value of purchases, followed by young married couples with no children. Older married couples with no children at home had the lowest average expenditures for processed meats. However, differences by lifestage were not significant. Similar relationships were found for the percent of shoppers purchasing processed meats. Differences by lifestage were significant (Table 21).

Meat Substitutes

Purchases of meat substitutes as related to the lifestage of "family" households are presented in Table 22.

Couples with children of various ages had the highest average value of purchases, followed by young married couples with no children. Older married couples with no children at home had the lowest average value of purchases. Differences were highly significant.

The percent of households purchasing meat substitutes was highest for young married couples with no children, followed by couples with children of various ages. Differences were not significant (Table 22).

Breads, Cereals, Grains and Bakery Products

Table 23 shows purchases of breads, cereals, grains, and bakery products as related to the lifestage of "family" households.

The average value of purchases was highest for couples with children of various ages, followed by young married couples with no children. It was lowest for older married couples with no children at home.

Differences by lifestage were highly significant. The average value of purchases for all groups was $6.46. Similar relationships by lifestage were found for the percent of shoppers purchasing these items (Table 23).

Beef

Purchases of beef as related to age of the primary food shopper are shown in Table 24. Ages 35-44 had the highest average expenditures for beef. Average expenditures remained high through ages 55-64 and then declined sharply for ages 65 and over. Differences by age in average value of purchases were significant.

One-half of the shoppers in ages 18-24 purchased beef. The percent of households purchasing beef then declined as age of food shoppers increased, particularly after ages 45-49. Differences by age were highly significant (Table 24).

Milk

Purchases of milk as related to the lifestage of "family" households are presented in Table 25.

Couples with children had the highest average value of purchases, followed by older married couples with no children at home. Differences were significant. Two-thirds of young married couples with no children purchased milk, followed by approximately 58% of the couples with children of various ages, and 44% of the older married couples with no children at home. Differences by lifestage were significant (Table 25).

Eggs

Table 26 shows purchases of eggs as related to age of the primary food shopper.

Appoximately 35% of the 1,047 shoppers purchased eggs. The percent of shoppers purchasing eggs was greatest for ages 18-24. At higher ages, the percent of shoppers purchasing eggs declined.

For all age groups, 57% of the shoppers purchased only one dozen eggs, 32% purchased two dozen eggs, 7% purchased three dozen eggs, and only 3 percent purchased four or more dozen eggs. Differences by age in the percent of shoppers purchasing one to four or more dozen eggs were not significant (Table 26).

Purchases of eggs as related to educational level of the primary food shopper are shown in Table 27.

Differences by educational level in the percent of shoppers purchasing one to four or more dozen eggs were not significant (Table 27).

Carbonated Beverages

Table 28 shows purchases of carbonated beverages as related to age of the primary food shopper.

Three-fifths of the 1,047 shoppers purchased this item. The average value of purchases was $3.80. About 71% of shoppers in ages 35-44 made purchases. For ages 65 and over, the percent purchasing carbonated beverages declined sharply. Differences by age were highly significant (Table 28).

Purchases of carbonated beverages as related to income level are presented in Table 29.

Both the average value of purchases and the percent of shoppers purchasing carbonated beverages trended upward with income levels to $30,000. Differences, by income level, in average expenditures and the percent purchasing the item were significant (Table 29).

Tobacco

Table 30 shows purchases of tobacco as related to age of the primary food shopper.

Twelve percent of the shoppers purchased tobacco, and the average value of purchases was $10.12. The percent purchasing the item trended upward through ages 50-54. Differences by age were significant (Table 30).

Purchases of tobacco as related to income level are shown in Table 31. At higher income levels, the average value of purchases trended upward but differences were not significant. There was no discernible trend in the percent of shoppers purchasing the item, but differences by income level were significant (Table 31).

Pet Food

Table 32 shows purchases of pet food as related to income level. Sales of petfood are important in food stores. One-fourth of the shoppers purchased this item. The average value of purchases was $3.99. Even shoppers with relatively low annual incomes purchased pet food. Differences by income level were not significant. The percent of shoppers purchasing this item trended upward with income levels to $40,000. Differences by income level were significant (Table 32).

Table 16. Purchases of Fresh and Frozen Meats as Related to Income Level.

Annual income	Number purchasing items	Average value of purchases[1]	Percent purchasing items[2]
Under $5,000	46	$ 7.13	59.7
$ 5,000-$ 7,499	44	10.73	66.7
$ 7,500-$ 9,999	43	12.38	60.6
$10,000-$14,999	81	11.10	65.8
$15,000-$19,999	81	11.18	60.4
$20,000-$24,999	94	12.00	62.2
$25,000-$29,999	71	12.03	64.0
$30,000-$39,999	71	12.22	61.7
$40,000-$49,999	32	10.21	62.7
$50,000 and above	24	10.12	57.1
Refused to answer	58	11.31	54.7
TOTAL, all groups	645	$11.18[a]	61.6

[1]Differences not significant (P > 0.26).
[2]Differences not significant (P > 0.91).
[a]Weighted average.

Table 17. Purchases of Fresh and Frozen Meats as Related to Wife's Employment Status.

Employment status	Number purchasing items	Average value of purchases[1]	Percent purchasing items[2]
Wife working full time	188	$11.58	68.4
Wife working part time	98	10.61	62.0
Wife not employed outside the home	251	11.76	57.3
TOTAL, all groups	537	$11.49[a]	61.6

[1]Differences not significant (P > 0.65).
[2]Differences significant (P < .05).
[a]Weighted average.

Table 18. Purchases of Fresh and Frozen Meats as Related to the
Lifestage of "Family" Households.

Lifestage	Number purchasing items	Average value of purchases[1]	Percent purchasing items[2]
Young married couple, no children	66	$11.31	66.7
Couple and children (various ages)	424	12.04	63.2
Older married couple, no children at home	90	8.95	55.2
TOTAL, all groups	580	$11.48[a]	62.2

[1]Differences significant (P < .05).
[2]Differences not significant (P > 0.47).
[a]Weighted average.

Table 19. Purchases of Processed Meats as Related to Income Level.

Annual income	Number purchasing items	Average value of purchases[1]	Percent purchasing items[2]
Under $5,000	46	$3.62	59.7
$ 5,000-$ 7,499	43	4.44	65.2
$ 7,500-$ 9,999	50	5.68	70.4
$10,000-$14,999	91	4.92	74.0
$15,000-$19,999	100	4.34	74.6
$20,000-$24,999	123	4.43	81.5
$25,000-$29,999	87	5.04	78.4
$30,000-$39,999	85	5.03	73.9
$40,000-$49,999	35	4.33	68.6
$50,000 and above	29	8.69	69.1
Refused to answer	74	5.05	69.8
TOTAL, all groups	763	$4.86[a]	72.9

[1]Differences significant (P < .01).
[2]Differences significant (P < .05).
[a]Weighted average.

Table 20. Purchases of Processed Meats as Related to Wife's Employment Status.

Employment status	Number purchasing items	Average value of purchases[1]	Percent purchasing items[2]
Wife working full time	224	$5.25	81.5
Wife working part time	116	4.41	73.4
Wife not employed outside the home	316	4.79	72.2
TOTAL, all groups	656	$4.88[a]	75.0

[1]Differences not significant (P > 0.38).
[2]Differences significant (P < .01).
[a]Weighted average.

Table 21. Purchases of Processed Meats as Related to the Lifestage of "Family" Households.

Lifestage	Number purchasing items	Average value of purchases[1]	Percent purchasing items[2]
Young married couple, no children	76	$4.77	76.8
Couple and children (various ages)	523	5.17	77.9
Older married couple, no children at home	101	4.07	62.0
TOTAL, all groups	700	$4.97[a]	75.0

[1]Differences not significant (P > 0.32).
[2]Differences significant (P < .01).
[a]Weighted average.

Table 22. Purchases of Meat Substitutes as Related to the Lifestage of "Family" Households.

Lifestage	Number purchasing items	Average value of purchases[1]	Percent purchasing items[2]
Young married couple, no children	87	$5.05	87.9
Couple and children (various ages)	580	5.72	86.4
Older married couple, no children at home	131	3.31	80.4
TOTAL, all groups	798	$5.25[a]	85.5

[1]Differences highly significant (P < .001).
[2]Differences not significant (P > 0.16).
[a]Weighted average.

Table 23. Purchases of Breads, Cereals, Grains, and Bakery Products as Related to the Lifestage of "Family" Households.

Lifestage	Number purchasing items	Average value of purchases[1]	Percent purchasing items[2]
Young married couple, no children	91	$5.10	91.9
Couple and children (various ages)	619	7.09	92.2
Older married couple, no children at home	135	4.48	82.8
TOTAL, all groups	845	$6.46[a]	90.6

[1]Differences highly significant (P < .001).
[2]Differences significant (P < .01).
[a]Weighted average.

Table 24. Purchases of Beef as Related to Age of Primary Food Shopper.

Age	Number purchasing item	Average value of purchases[1]	Percent purchasing item[2]
18-24	86	$7.29	50.6
25-34	109	8.14	36.0
35-44	81	9.05	32.9
45-49	22	7.82	31.9
50-54	19	7.50	23.5
55-64	26	7.55	23.6
65 and over	19	4.13	28.0
TOTAL, all groups	362	$7.84[a]	34.6

[1]Differences significant (P < .05).
[2]Differences highly significant (P < .001).
[a]Weighted average.

Table 25. Purchases of Milk as Related to the Lifestage of "Family" Households.

Lifestage	Number purchasing item	Average value of purchases[1]	Percent purchasing item[2]
Young married couple, no children	66	$2.07	66.7
Couple and children (various ages)	386	2.80	57.5
Older married couple, no children at home	72	2.24	44.2
TOTAL, all groups	524	$2.63[a]	56.2

[1]Differences significant (P < .01).
[2]Differences significant (P < .05).
[a]Weighted average.

Table 26. Purchases of Eggs as Related to Age of Primary Food Shopper.

Age	Number purchasing item	Percent purchasing item	Dozen eggs purchased			
			1	2	3	4 or more
			Percent of shoppers[1]			
18-24	78	45.9	61.5	29.5	6.4	2.6
25-34	116	38.3	56.0	31.9	7.8	4.3
35-44	83	33.7	53.0	35.0	7.2	4.8
45-49	21	30.4	47.6	42.9	9.5	0.0
50-54	18	22.2	61.1	27.7	5.6	5.6
55-64	33	30.0	60.6	30.3	9.1	0.0
65 & over	15	22.1	73.3	26.7	0.0	0.0
TOTAL, all groups	364	34.8	57.4	32.2	7.1	3.2

[1]Differences not significant (P > 0.26) based on chi-square test.

Table 27. Purchases of Eggs as Related to Educational Level of Primary Food Shopper.

Last year of school completed	Number purchasing item	Percent purchasing item	Dozen eggs purchased			
			1	2	3	4 or more
			Percent of shoppers[1]			
Grade school and/or some high school	32	41.0	46.9	43.8	3.1	6.2
High school graduate	126	31.9	52.4	34.9	9.5	3.2
Vocational school or some college	102	34.9	63.7	27.4	6.9	2.0
College graduate/ post graduate	104	36.9	60.6	29.8	5.8	3.8
TOTAL, all groups	364	34.8	57.4	32.2	7.1	3.2

[1]Differences not significant (P > 0.56) based on chi-square test.

Table 28. Purchases of Carbonated Beverages as Related to Age of Primary Food Shopper.

Age	Number purchasing item	Average value of purchases	Percent purchasing item[1]
18-24	111	$2.96	65.3
25-34	192	3.72	63.4
35-44	174	4.54	70.7
45-49	45	4.15	65.2
50-54	47	3.92	63.0
55-64	51	3.40	46.4
65 and over	13	1.89	19.1
TOTAL, all groups	633	$3.80[a]	60.5

[1]Differences highly significant (P < .001).
[a]Weighted average.

Table 29. Purchases of Carbonated Beverages as Related to Income Level.

Annual income	Number purchasing item	Average value of purchases[1]	Percent purchasing item[2]
Under $5,000	42	$2.44	54.5
$ 5,000-$ 7,499	33	2.94	50.0
$ 7,500-$ 9,999	39	3.45	54.9
$10,000-$14,999	78	3.10	63.4
$15,000-$19,999	73	3.66	54.5
$20,000-$24,999	100	4.00	66.2
$25,000-$29,999	82	5.09	73.9
$30,000-$39,999	70	4.10	60.9
$40,000-$49,999	27	4.18	52.9
$50,000 and above	29	3.45	69.0
Refused to answer	60	4.02	56.6
TOTAL, all groups	633	$3.80[a]	60.5

[1]Differences highly significant (P < .001).
[2]Differences significant (P < .05)
[a]Weighted average.

Table 30. Purchases of Tobacco as Related to Age of Primary Food Shopper.

Age	Number purchasing item	Average value of purchases	Percent purchasing item[1]
18-24	10	$ 6.28	5.9
25-34	31	8.41	10.2
35-44	30	12.02	12.2
45-49	9	8.75	13.0
50-54	18	12.41	22.2
55-64	16	10.89	14.5
65 and over	12	9.60	17.6
TOTAL, all groups	126	$10.12[a]	12.0

[1]Differences significant (P < .01).

Table 31. Purchases of Tobacco as Related to Income Level.

Annual income	Number purchasing item	Average value of purchases[1]	Percent purchasing item[2]
Under $5,000	2	$ 9.56	2.6
$ 5,000-$ 7,499	2	6.92	3.0
$ 7,500-$ 9,999	13	8.12	18.3
$10,000-$14,999	13	9.62	10.6
$15,000-$19,999	24	9.13	17.9
$20,000-$24,999	16	12.06	10.6
$25,000-$29,999	19	9.49	17.1
$30,000-$39,999	11	12.39	9.6
$40,000-$49,999	6	13.01	11.8
$50,000 and above	3	9.17	7.1
Refused to answer	17	10.95	16.0
TOTAL, all groups	126	$10.19[a]	12.0

[1]Differences not significant (P > 0.78).
[2]Differences significant (P < .01).
[a]Weighted average.

Table 32. Purchases of Pet Food as Related to Income Level.

Annual income	Number purchasing item	Average value of purchases[1]	Percent purchasing item[2]
Under $5,000	7	$3.24	9.1
$ 5,000-$ 7,499	10	4.85	15.1
$ 7,500-$ 9,999	16	4.58	22.5
$10,000-$14,999	29	4.29	23.6
$15,000-$19,999	35	3.85	26.1
$20,000-$24,999	47	4.02	31.1
$25,000-$29,999	29	3.91	26.1
$30,000-$39,999	41	3.16	35.7
$40,000-$49,999	13	3.65	25.5
$50,000 and above	13	5.60	31.0
Refused to answer	27	3.99	25.5
TOTAL, all groups	267	$3.99[a]	25.5

[1]Differences not significant (P > 0.86).
[2]Differences significant (P < .01).

EVALUATION OF RESEARCH METHODOLOGY

Scanning data provide timely, accurate, detailed information on consumer purchases or store sales at the point of purchase. Purchase data obtained in this study were a fairly reliable indicator of household food choices or preferences in a specific market (Manhattan, Kansas) at a particular time. Preferences appeared to be consistent with broad national trends in consumption of selected foods.

Preferences for most kinds of red meats, poultry, and produce (fresh vegetables or fruits) were not obtained, because these foods either were not item coded or did not carry the UPC symbol at the time.

The research procedure required full cooperation by the retail store management and by checkout clerks. It involved much labor both to collect and summarize the basic data.

Table 33 shows how successful interviewers were in completing attempted interviews, both during the pretest and the full week of June 12-18. Nearly 83% of the interviews were completed. This was a remarkably high rate.

Table 34 shows reasons for not completing interviews with food shoppers. Out of 1,268 attempted interviews, 221 were not completed. An interview could not be completed unless both the interview and cash

register tape were obtained. The main reason given by 100 shoppers was that they needed to keep the tape. The reasons were very legitimate. A total of 78 shoppers refused to be interviewed, refused to answer questions on demographics, or did not wish to take time for the interview. Some shoppers promised but never mailed back the sales tape.

Table 33. Interviewing Success Rate, Food Market Basket Study.

Food shopper interviews	Pretest on June 10		Week of June 12-18[1]	
	Number	Percent	Number	Percent
Attempted	31	100.0	1,268	100.0
Completed	27	87.1	1,047	82.6
Not completed	4	12.9	221	17.4

[1]Scanners at two checkout stations were not working late on the afternoon of Friday, June 17. This created longer customer lines at the remaining eight stations and a slowing of the checkout process. Interviewing was discontinued that afternoon and the following day (Saturday) until the scanners could be serviced. Interviewing resumed a week later (Saturday, June 25) in order to provide basic data for a full week.

Table 34. Reasons for Not Completing Interviews with Food Shoppers.

Reason	Number
Language problem - no interview	5
Interviewed before	2
Refused to be interviewed	32
Refused to answer questions on demographics	12
No time for interview	34
Promised but never mailed back sales tape	35[a]
Need tape to show others	7
Need tape for business records (restaurants, day-care center, etc.)	11
Need tape for tax purposes	31
Need tape for home records	37
Need tape for rebates, refunds	10
Need tape to check prices	4
Offered tape only for $5.00	1
TOTAL	221

[a]60 percent mailed back sales tapes.

One large private research company has developed a wide variety of marketing research services for food retailers (supermarkets, etc.) and food manufacturers. It has experimented with both store and diary panel scan data. It concludes that scanning information much more accurately reflects consumer sales and behavior than previous reporting systems.[4]

An executive of another company reported on a market research method in which the dynamics of consumer purchasing behavior in the food industry can be examined very precisely at the household and individual store levels. It involves establishment of an electronic scanner panel of 2,500 households within each of several small cities or mini-markets. Panelists are trackable. The combination of UPC code and trackable panelist makes this method effective.[5]

This method is a superior, more technologically advanced, more complex, and more cost-effective version of the market research procedure that was pilot tested in this study.

---

[4]Nielsen Scanning-Based Information Systems--A New Generation of Research, 1986, pp. 7-8.

[5]Electronics and Food Distribution: New Opportunities in Market Research, 1985, pp. 57-59.

This study had two objectives: 1) to try out (pilot test) and evaluate a market research procedure for obtaining basic data on household shoppers' food purchases or preferences and 2) to relate purchases for major groups of foods or individual foods to certain socio-economic characteristics of households and primary food shoppers.

Food preferences were indicated by actual purchase decisions. Basic data were obtained through in-store interviews and electronic scanning of food market baskets of a sample of food shoppers patronizing a warehouse food store.

Individual food preferences were determined by purchases data (specific items and dollar values) printed on cash register tapes that food shoppers gave to trained interviewers who also obtained information on socio-economic characteristics of households and primary food shoppers.

Food preferences were revealed by the number and percentage of food shoppers in one market who purchased various food items over a week's time period. Purchases were summarized by major food groups and specific categories of foods.

Examples of food preferences were as follows. Among fresh and frozen meats, "ground beef" ranked first, followed by beef steaks, pork steaks, beef roasts, and fish and seafoods. Among processed meats, preferred items, in order, were: canned meats, frankfurters, luncheon meats, meat pot pies, and bacon. Preferred meat substitutes, in order, were: cheeses, pasta and pizza, eggs, soups, pork and beans, dry beans, peas and nuts, and peanut butter.

Preferences for most kinds of red meats, poultry, and produce (fresh vegetables or fruits) were not obtained because these foods either were not item coded or did not carry the UPC symbol at the time.

The research methodology was "innovative." Shopper cooperation was considered excellent. In 1,268 attempted interviews, 1,047 (82.6%) were successfully completed in terms of usable questionnaires and related sales tapes.

The research procedure required full cooperation by the retail store management and by checkout clerks. It involved much labor both to collect and summarize the basic data.

An example of the relationship between purchases of an individual food and a socio-economic characteristic is given for "beef." Purchases of beef were related to age of the primary food shopper. Differences by age in "average value of purchases" were significant statistically. Differences in the "percent of households" purchasing beef were highly significant statistically.

REFERENCES

U. S. Department of Agriculture, 1977-78 Nationwide Food Consumption Survey.

U. S. Department of Agriculture, Science and Education Administration. "Food and Nutrient Intakes of Individuals in 1 Day in the United States, Spring 1977." NFCS 1977-78 Prel. Report No. 2, September 1980.

Koudele, Joe W., Arlin M. Feyerherm, and David E. Schafer. "Meat Purchasing, Preferences, Storage, and Preparation by Households." Report of Progress 424, Kansas AES, Kansas State University, January 1983.

A. C. Nielsen Company, The Nielsen Researcher, A Publication of Nielsen Marketing Research, "Nielsen Scanning-Based Information Systems--A New Generation of Research," Volume 1, Number 1, Fall 1986.

MacNeary, Tony, "Electronics and Food Distribution: New Opportunities in Market Research." Journal of Food Distribution Research, Volume XVI, Number 1, February 1985.

APPENDIX

Questionnaire for Shopper Interviews

Kansas State University and
Food 4 Less, Manhattan, Ks.,
cooperating

Questionnaire No. (Code) _____

Interviewer's Initials _____

CONSUMER PREFERENCES--MARKET BASKET INVENTORY STUDY
(Pilot Test)

Date: _____ / _____ / 83   Day of Week: _____   Time: _____ AM PM
    (Mo.:Day:Yr.)

- -

"Hello - I'm _____(Interviewer's name)_____ representing Kansas State University. We are trying to determine consumers' preferences for certain foods. Your participation is voluntary. You may choose not to answer any questions but we hope you'll cooperate. Information will be treated confidentially."

**"WOULD YOU MIND GIVING KSU YOUR GROCERY SALES TAPE FOR MARKET RESEARCH PURPOSES?"

If agreeable, say "THANK YOU" and say "I NEED TO ASK YOU A FEW QUESTIONS ABOUT YOUR HOUSEHOLD. IT WON'T TAKE LONG."

If consumer refuses
1. Ask and record reason _____

2. If consumer desires to keep sales tape to check grocery items and prices at home, ask "WOULD YOU BE WILLING TO SEND THE TAPE LATER TO KSU IF WE GIVE YOU A SELF-ADDRESSED, POSTAGE-PAID ENVELOPE?"
   Yes _____   No _____

3. If necessary, say "WE CAN'T PAY YOU FOR YOUR GROCERY SALES TAPE, BUT IF WE COULD, WOULD YOU GIVE IT UP FOR
   ( ) a dime?" Yes ___ No___   ( ) a quarter?" Yes ___ No ___

QUESTIONS FOR PERSON BEING INTERVIEWED

1. How often do you usually shop for food?
   ( ) a. More than twice per week.
   ( ) b. Twice per week.
   ( ) c. Once per week.
   ( ) d. Less than once per week.

2. Did you use a written shopping list for food today? Yes ___   No ___

3. Are you the "primary food shopper" in your household? Yes ___ No ___

4. What is the age of the "primary food shopper" in your household?
   ( ) a. 18-24   ( ) e. 50-54
   ( ) b. 25-34   ( ) f. 55-64
   ( ) c. 35-44   ( ) g. 65 & over
   ( ) d. 45-49   ( ) h. Refused

5. For how many people is food usually prepared in your household?
   ( ) a. One
   ( ) b. Two
   ( ) c. Three to four
   ( ) d. Five or more

6. What is the last year of school completed by the "primary food shopper?"
   ( ) a. Grade school and/or some high school.
   ( ) b. High school graduate.
   ( ) c. Vocational school or some college.
   ( ) d. College graduate/post graduate.
   ( ) e. Refused.

7. Are you married? Yes _____ No _____
   If yes,
   a. Is the husband employed? Yes _____ No _____
   b. Is the wife employed outside of the home? Yes _____ No _____
      If yes, Full time ( ) Part time ( )

8. Describe your "type" of household.
   ( ) a. Family household (a married couple, or a man or a woman
          with children, or any other combination of relatives living
          together).

   ( ) b. Nonfamily household (maintained by a man or woman living
          alone or with unrelated persons).

   If a family household
   ( ) a. Young married couple, no children.
   ( ) b. Household with children (through 12 yrs.).
   ( ) c. Household with children (through 12 yrs.) and teenagers
          (13-18 yrs.).
   ( ) d. Household with teenagers only (13-18 yrs.).
   ( ) e. Household with older children (over 18 yrs.).
   ( ) f. Older married couple, no children in the home.
   ( ) g. Other (explain) _____

9. What would you say was your annual "family or nonfamily" household income last year?
   ( ) a. Under $5,000   ( ) f. $20,000-24,999
   ( ) b. $5,000-7,499   ( ) g. $25,000-49,999
   ( ) c. $7,500-9,999   ( ) h. $30,000-39,999
   ( ) d. $10,000-14,999   ( ) i. $40,000-49,999
   ( ) e. $15,000-19,999   ( ) j. $50,000 & over
                              ( ) k. Refused

10. Race. (from observation)
    ( ) White
    ( ) Black
    ( ) Other

11. Description of shopper(s). (_from observation_)
    ( ) Adult male only.
    ( ) Adult female only.
    ( ) Adults shopping together.
    ( ) Adult(s) shopping with children.
    ( ) Teenager(s) (13-18) shopping alone or together.

OBTAIN GROCERY SALES TAPE.	Then 1.	RECORD QUESTIONNAIRE NO. (CODE) ON TAPE.
OR	2.	STAPLE TAPE TO QUESTIONNAIRE.
IF CONSUMER AGREES TO SEND SALES TAPE LATER TO KSU	THEN 1.	RECORD QUESTIONNAIRE NO. (CODE) ON BOTH TAPE AND ENVELOPE.
	2.	STAPLE TAPE TO ENVELOPE AND GIVE TO CONSUMER.

Result of interview:
    ( ) Completed (including sales tape).
    ( ) Not completed.
        ( ) Refused sales tape.
        ( ) Refused sales tape today but will mail it in.
        ( ) Refused to answer questions on demographics, etc.