MEAT BUYING PRACTICES OF CAUCASIANS, MEXICAN-AMERICANS AND NEGROES

by

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CONTENTS

ACKNOWLEDGMENTS	ii
LIST OF TABLES	v
I. INTRODUCTION	1
Purpose and Scope of the Dissertation	1
Review of Previous Research	2
Food Purchasing Practices of Ethnic Groups	2
Methods of Obtaining Food Buying Information	5
Studies on Meat Buying	8
Definition of Term	12
II. METHODS AND PROCEDURES	13
Preliminary Study	13
Method Selection to Obtain Data	13
Store Selection	15
Month, Week, Day and Time, and Number of Subjects	15
Persons to Record Data	16
Statistical Methods	16
Chi-Square Analysis	17
Least Squares Analysis	17
Multiple Regression Analysis	18
III. FINDINGS AND INTERPRETATIONS	19
Preliminary Study	19

Chi-Square Analysis of Discrete Data	20
Least Squares Analysis of Continuous Data	20
Final Study	21
Chi-Square Analysis of Discrete Data	23
Least Squares Analysis of Continuous Data	37
Correlation Analyses of Continuous Data	60
Card Questionnaire Scores	68
Multiple Regression Analysis of Continuous Data	68
Comparison of Findings with Results of Other Studies	75
IV. SUMMARY AND CONCLUSIONS	81
LIST OF REFERENCES	85
APPENDIX	88

LIST OF TABLES

1.	Test of Independence for Ethnic Group and Discrete Socioeconomic and Meat Buying Variables	24
2.	Chi-Square Analysis of Discrete Socioeconomic and Meat Buying Variables of Ethnic Groups	26
3.	Meat Cuts Bought by Ethnic Group in Order of Frequency and Related Chi-Square Values	30
4.	Means for Continuous Variables by Ethnic Group	41
5.	Least Squares Analysis of Variance for Continuous Data	44
6.	Least Squares Means for Continuous Meat Buying Variables	52
7.	Correlation Analysis 1: Simple Correlation Coefficients for Selected Variables	62
8.	Correlation Analysis 2: Simple Correlation Coefficients for Selected Variables	64
9.	Correlation Analysis 3: Simple Correlation Coefficients for Selected Variables	66
10.	Means for Socioeconomic Variables in Regression Analysis	69
11.	Analysis of Variance for Final Regression Equations	71
12.	Final Multiple Regression Equations	74

CHAPTER I

INTRODUCTION

Purpose and Scope of the Dissertation

The purpose of this research was to determine meat buying practices of three ethnic groups, Caucasians, Mexican-Americans and Negroes. These three groups are market target groups for much of the United States (Fitzhugh, 1969), as well as for West Texas and Lubbock, where the study was made. No study has been found by this investigator of observed meat buying practices and no information has been published concerning meat buying practices in West Texas. Uvacek (1968) emphasized that consumers' final choices are the key to meat industry demands and livestock production needs. Information regarding consumer purchasing habits of meat can be useful in many ways: planning of marketing and promotional programs, evaluation and explanation of trends in consumption, and calling attention to potential product development and avenues for increasing consumption. Knowledge of current meat buying practices is necessary to plan effective food and nutrition education programs. Information concerning meat buying practices of these three ethnic groups can be valuable to food producers, retail marketers and educators. Fitzhugh (1969) describes ethnic marketing as an exciting new challenge. The study will provide current information on meat buying practices which is especially needed since food prices and consumption, particularly for meat, changed dramatically in 1973 (U. S. D. A., 1973).

In determining the meat buying practices of Caucasians, Mexican-Americans and Negroes, the following overall hypotheses were tested:

1. There is no significant difference in the ethnic area, supermarket chain or day on which Caucasians, Mexican-Americans and Negroes buy meat.
2. There is no significant difference in the amount of meat bought by Caucasians, Mexican-Americans and Negroes.
3. There is no significant difference in the cost of meat bought by Caucasians, Mexican-Americans and Negroes.
4. There is no significant difference in types of meat according to species and form of meat bought by Caucasians, Mexican-Americans and Negroes.
5. There is no significant difference in the types of retail meat cuts bought by Caucasians, Mexican-Americans and Negroes.

Additional purposes of the research were to investigate the relationships of certain socioeconomic factors to meat buying practices, to determine the accuracy of questionnaires completed by consumers as sources of food buying information, and to investigate a new approach to obtaining food buying information (observing and recording the data in the grocery store while not interfering with normal marketing procedures).

Review of Previous Research

Food Purchasing Practices of Ethnic Groups

An examination of race as a factor in Negro-white consumption patterns (Sawyer, 1962) showed that the then prevailing theory that

Negroes save more and thus spend less than whites was not true. Sawyer concluded that race did not determine consumption.

To answer the question, "Does a Negro market exist?," Stafford, Cox and Higginbotham (1968) studied consumption patterns of urban whites and Negroes in Houston, Texas. Personal interviews were conducted with 1546 housewives of which 211 were Negroes. For the five product categories studied (food, soft drinks, liquor, personal hygiene products and major home appliances), variations in consumption by Negroes and whites were found. Most, but not all, of the differences were explained by income or sociodemographic data (occupation; education, sex and age of head of household; number employed in household; number living in household; and stages in life cycle). No meats were included in the study. The conclusion was that a Negro market does exist. Negro households in similar economic circumstances as white do not buy the same products. The Negro spends a larger proportion of income on food, drink, clothing and home entertainment than the white person.

An ethnic market does exist, according to Fitzhugh (1969), Vice President in Special Markets of Pepsi-Cola Company. An ethnic group may consume two to three times as much of a product per capita as other groups. In terms of volume of purchases, the prime ethnic market targets for many consumer products are black consumers all over the country and Spanish-language consumers in many sections of the nation.

Sexton (1972) noted that income's role in determining buyer behavior has been overlooked in studies of differences between black

and white consumers. He examined studies from the marketing literature of the last decade and concluded that income level is the primary determinant of black buyer behavior. An implication he noted was that as black income levels rise many of the apparent differences between "black" and "white" markets will diminish.

Recent studies have investigated food prices. Captain and McIntire (1969) found in Omaha, Nebraska, stores that the most striking price differences were between neighborhood and chain stores, rather than between poverty and affluence areas. Chain stores provided lower prices. Neighborhood stores were more widely distributed in poverty areas than were chain stores. Lack of transportation and sparsity of chain stores in poverty areas were problems. Hamburger was the only meat studied, and was of higher price and poorer quality in poverty areas. Prices for 20 food products in the major supermarket chains in Philadelphia were studied by Dixon and McLaughlin (1970). The only meats included were pork chops, whole cut up fryer and tuna. The conclusion was that chain supermarkets do not discriminate against low income consumers because prices were not highest in the lowest income area. Price differences seemed to be related to competition, which benefits consumers in areas of the city other than the low income areas. Sexton (1971) reviewed the cost of food to blacks and to whites. He concluded that the majority of studies (10 out of 15) show that blacks are not charged more.

Purchasing practices of Negro, Mexican-American and Caucasian high school students in Ector County, Texas, were studied using questionnaires (Dunias, 1971). Meat was not reported in the study.

Significant differences occurred between reported purchasing practices of Caucasians and Negroes, but not between Caucasians and Mexican-Americans or between Mexican-Americans and Negroes.

Methods of Obtaining Food Buying Information

Most studies on food buying, such as the ones discussed previously and the egg study by Skala (1965) using 598 females, are based on questionnaires administered to consumers. Another source of marketing information is consumer panels, which is discussed by Sudman (1964a, 1964b). Consumer panels are household samples which obtain continuous information on household purchases. They have been a major source of market research information since World War II. Research on consumer panels has revealed the following relevant information:

1. Recall methods result in serious overstatements of consumption.
2. A weekly diary gives more complete results than a monthly one.

The National Consumer Panel is the largest consumer panel in the U. S. Members of this panel keep diaries for a week and turn them in at the end of the week. The best way to validate consumer panel results would be to secretly follow panel members and note items purchased. The cost and difficulty have prevented such direct validation to date. Another way of validating consumer panel data was evaluated. Panel data was compared to client shipment data. The following results were found:

1. Recording was most accurate for items at the front of the diary.
2. Products at the top of the page were more accurately recorded.
3. Infrequently purchased items and those not purchased by the housewife were less accurately recorded.

Sudman (1964b) discussed the two major types of diaries:

1) ledger diary listing the items to be entered, and 2) journal diary in which purchases are entered in time sequence. The ledger gives more complete recording. The biggest study completed by the National Consumer Panel was the Menu Study, in which 4000 households kept records of all meals prepared at home for 2 weeks. From this study Sudman concluded that if household panels are given sufficient compensation they will keep special diaries.

According to Padberg, Walker and Kepner (1967), the three methods used to study consumer behavior are:

1. Consumer surveys which project behavior based on attitudes
2. Panels of consumers who record purchases
3. Direct observation of behavior.

The main problem with the first method is that people are asked to explain motivations they do not understand. Obvious problems with the second method include errors in recording, forgetting to record items, etc. The third method is the most recent approach. Its advantages are that consumers are not aware that they are participating in a test, and that they do not have to explain behavior which they do not understand. An additional great advantage to the third method is that consumers are not required to expend any additional effort for the data to be collected. The third method was used in the present study. Padberg, et al. (1967), stated that five factors are known to influence product sales of brands of a product class in a supermarket situation: prices, space allotted to each

brand, quality of display space, advertising and promotion, and consumer brand attitudes and preferences. In studies of milk brand sales in retail food stores, most customers preferred the nationally advertised brand. Consumer brand preference was higher in high income areas than in low ones.

Kepner, Logan and Anderson (1967) said that no study had compared consumer behavior in an actual market situation and in an experimental laboratory approach. They devised an experiment to test whether consumers making an artificial selection react similarly to normal conditions. The space-sales relationship of two brands each of five items sold in an actual market situation and in an experimental laboratory situation was studied. In the experimental laboratory situation 300 customers were invited as they entered a store to select one of each brand for the five items. Simple linear regression of proportion of sales of a brand to the proportion of display space of the brand was used. In the actual market situation eight out of ten space-sales relationships were significantly related. In the experimental laboratory situation only two out of ten were significantly related and two were negatively related. In the experimental laboratory situation the effect of display space on sales was weaker. Thus, the experimental laboratory situation overestimated the degree of brand preference. Canned beef stew was the only meat item used. This study supports the idea of observing actual consumer behavior in a market situation without interfering with the customer before the meat is bought.

Meat is an important factor in supermarket selection (Skinner, 1969). A questionnaire was administered to 300 consumers in Columbus,

Ohio. Factor analysis of 87 statements resulted in eight factors listed in order of weighting: pleasant shopping experience, prices, social influences, proximity to other services, meats, advertising, conveniences and location. The same questionnaire was administered to 186 members of the food industry, who indicated how they thought consumers would respond. The food industry members omitted three factors: pleasant shopping experience, meats and location, and listed instead: friendliness, perishables, front end, modern appearances and trading stamps. Thus, meats were more important to consumers than food industry members realized. Statements listed under the meats factor, in order of weighting, by consumers were: tender meat is sold, fresh bright appearing meat is sold, high quality meat, wide selection of meat, and meat is free of excess fat. Statements regarding meat also appeared under other factors: prices - low fresh meat prices, meat special regularly featured; conveniences - packaged meats offered.

Studies on Meat Buying

Several studies on meat buying have been reported. Phillips (1964) studied meat purchasing practices of 103 urban Wisconsin homemakers by using personal interviews. Beef was the preferred meat in 85% of the households. Ground beef was the most popular cut of beef. Income was positively related to increased consumption of meat, especially more expensive steaks and roasts. Homemakers shopped at a chain store about 1 mile from home an average of once or twice a week and spent \$25 to \$30 per week for food.

Glover (1964) studied consumer preferences for ground beef. Mail questionnaires from 271 households in 4 Texas cities were used.

Respondents indicated the beef dish they would serve in various meal situations, factors they looked for in shopping for ground beef, and reasons for each. A consumer panel composed of 150 households in Dallas and 150 households in Houston was used to test four fat levels in ground beef (16, 20, 25 and 30%). Ground beef containing 20% fat was rated highest and that containing 30% was rated lowest.

Mize (1972) studied consumer acceptance of ground beef by using a consumer panel of approximately 600 urban households from five southern states including Texas. More than two-thirds of the households were white. In 1967-68 the panel was interviewed. The panel also tested ground beef with three fat levels and with 100% ground beef and ground beef containing 2% soybits. Beef was the type of meat preferred by more than three-fourths of all families. Beef steak was the meat cut preferred by most families. Most (81%) homemakers generally bought ground beef in supermarkets. Negro homemakers showed less discrimination about the ground beef samples than did white homemakers. The samples of ground beef with 15% fat, both with and without soybits, received higher palatability scores.

Sales of soy-ground beef blends in selected stores was reported by Gallimore (1974). A soy-ground beef blend was introduced in retail grocery stores in March, 1973. Data from a sample of three grocery chains covering 30 weeks of sales indicated that the soy-ground beef blend accounted for 26% of ground beef sales. Most blends on the market contain 25% rehydrated soy by weight and usually are priced 15 to 20 cents a pound below regular ground beef.

Homemakers' opinions about selected meats were obtained from a year-long, nationwide survey conducted in 1967 by the U. S. P. A. (1969), in cooperation with the National Live Stock and Meat Board. Data were obtained through personal interviews with 3,099 homemakers in 48 states. Interviews were conducted during each of the four seasons. Questionnaires used contained 85 questions concerning socioeconomic data, frequency of serving various meats, and attitudes concerning meats. Most criticisms concerning meat were directed at prepackaged meat and at the price of meat. Sixty percent of homemakers indicated that price specials influenced their meat purchases.

Consumer response to meat-price specials was investigated by Neigh and Trotter (1970). The data were collected from 668 households in Erie, Pennsylvania, by means of a mailed "diary type" form on which homemakers recorded meat purchase information for one week, followed by a personal interview. Meat purchase information was collected during April and May of 1963. Analysis of variance and chi-square analysis were used. The factors investigated (income, size of household, household composition, occupation of head of household, and education, age and religious preference of the homemaker) showed no statistically significant relationships with purchase of retail meat-price specials. Households most responsive to meat specials were those of medium income, with four or five family members, with children less than 17 years of age, with homemakers between the ages of 21 and 45 years, and with homemakers who had completed only high school. No relationship was found between the

availability of freezer space and the purchasing of meat specials. Meat specials accounted for 13% of all meat purchases. Ground beef was purchased on special twice as frequently as any other cut. Conclusions were that consumers purchased more ground beef and fryer chicken at regular and at special prices than any other cuts and that factors other than socioeconomic ones are important in determining consumer response to meat-price specials.

The national food situation with particular reference to meat at the time of the current study is of interest (U. S. D. A., 1947a). In 1973, retail food prices averaged 14.5% above the 1972 increase, representing the largest increase in a quarter century. Grocery store food prices were up about 16%. A large part of this rise reflected the 22% increase for foods derived from livestock products. Among livestock related products, prices of poultry and eggs were up 40-50%, while red meat prices increased about 25% and fish and dairy prices advanced less sharply. After adjustment for price increases, real food purchases showed the sharpest decline in over four decades. Monthly participation in the U. S. D. A. family food programs averaged 14.8 million persons, the same as in 1972. Increases in Food Stamp Program participation rose about 12% to almost \$2.2 billion, reflecting higher participation and adjustments due to cost of living increases. Per capita food consumption declined 2% in 1973, with all of the decline due to lower consumption of livestock related products. Per capita meat consumption dropped sharply in 1973, to the lowest point since 1966. The 175 lb.

(carcass equivalent) consumed per person in 1973 compares with 189 lb. in 1972 and the record-high 192 lb. in 1971. Average per capita consumption in 1973 of meat, fish and poultry was as follows: meat (carcass weight) 175.0 lb., with beef 109.3, veal 1.8, lamb and mutton 2.8, and pork 61.1; fish (edible weight) 12.1 lb.; and chicken and turkey (ready-to-cook) 41.9 lb. and 8.5 lb., respectively. Per capita consumption of livestock related food in the first quarter of 1974 will be less than for the rest of 1974, due to reduced meat and dairy product consumption.

Definition of Term

Mexican-American refers to persons who speak Spanish as a means, in part or in total, of communicating with other people and whose families have been or presently are citizens of Mexico.

CHAPTER II

METHODS AND PROCEDURES

Preliminary Study

A preliminary study was made to become familiar with the stores, train the workers in their respective stores, and develop and test the data form and card questionnaire. The preliminary study was similar to the final study except that in the preliminary study: 1) only five subjects were observed in each store on each day; and 2) socioeconomic data was not obtained for all subjects. The preliminary study was made in early February, one month before the final study. Data from the preliminary study were analyzed by the statistical methods which follow.

Method Selection to Obtain Data

To obtain accurate data on meat buying practices and avoid the limitations and problems of usual methods (Sudman, 1964a and 1964b; Kepner et al., 1967; and Padberg et al., 1967), consumer behavior was observed in retail grocery stores under typical marketing conditions. The consumers were unaware that a test was being conducted until after their purchases were made. An observer stood at the checkout counter in the store and recorded: ethnic group and sex of purchaser; kind, price per pound, and total cost of meat bought; total amount of money spent; and whether U. S. D. A. food

stamps were used. After the customer stepped away from the checkout counter to leave the store the observer asked two questions:

1. How many people did you buy meat for?

2. How often do you buy meat?

In the final study four additional questions were asked to obtain socioeconomic data. The data form on which the information was recorded in the final study is shown in Appendix A.

Then the observer handed a post card to the customer and said, "Please help us in our research at Texas Tech University by completing this card and mailing it today." The card was used in the preliminary study to obtain income and education level data which are important factors in regard to consumer behavior (Woods and Nettles, 1962; Sawyer, 1962; Stafford et al., 1968; and Hammett and Van de Mark, 1973). The investigator in the current study became interested in the accuracy of questionnaire records completed by consumers as sources of food buying information. Since observed consumer behavior was being objectively recorded, a unique opportunity existed (Sudman, 1964a) to compare the known behavior with that reported on questionnaires by consumers. Since observed consumer behavior is rarely reported and is considered accurate, and since questionnaires completed by consumers are frequently used in studies, this comparison would indicate the accuracy of questionnaires. Therefore, a section was added to the card questionnaire for the consumer to record kind, amount and price of meat purchased. In the final study the card questionnaire was used only for the consumer to record kind, amount and

price of meat purchased. A sample of the card questionnaire used in the final study is included in Appendix B. Postage on the card was prepaid.

Store Selection

Lubbock, with a population of approximately 149,000 at the 1970 census (U. S. Bureau of the Census, 1970), was divided into three ethnic areas according to the Ethnic Makeup Percentage Distribution by Census Tract in 1970, Appendix C. The yellow pages of the local telephone directory were used for a listing of retail grocery stores. Only three supermarket chains had stores in all three ethnic areas. Two of the chains sell Proten beef; therefore, only one of these was used along with the third chain which does not sell Proten beef. One store of each chain was located in the Mexican-American area and one in the Negro area; therefore, these stores were used. The Caucasian area contained six stores for each chain. A store from each chain was selected after considering income and ethnic makeup of the tracts in which the stores were located. Two chains in each of the three areas made a total of six stores used. Locations of ethnic areas, chains and stores are shown in Appendix D.

Month, Week, Day and Time, and Number of Subjects

Because meat buying probably varies according to the week of the month in which the pay check is received, buying will probably not be as extreme during the second week as at the first or last of the month. Therefore, the second week of the month was used. March was selected for the month. Shopping varies according to day of the

week. Wednesday was selected to represent weekday shopping, probably mainly by homemakers who do not work outside the home, and also because Wednesday is double-stamp day in Lubbock. Saturday was used to represent weekend shopping, perhaps by homemakers who work outside the home during the week and to include shopping for guests. To include different times of day a morning and an afternoon were used in each store, i.e., Wednesday morning and Saturday afternoon or vice versa. March 6 and 9, 1974, were selected for test days.

Fifty consumers were observed in each store each day. Therefore, data from 100 consumers in each of six stores resulted in data for a total of 600 consumers.

Persons to Record Data

Since data was taken in three stores simultaneously, three workers were used: a Caucasian in the Caucasian area stores, a Mexican-American in the Mexican-American area stores, and a Negro in the Negro area stores. The workers were upper level university students.

Statistical Methods

Preliminary calculations were made. The meat purchased was classified according to species and form, Appendix E. Data were processed at the Texas Tech University Computer Center. Histograms, means, means for ethnic groups, and one-way analysis of variance by ethnic groups for the continuous data were obtained. The 59 variables for continuous data are listed in table 4. The statistical

design was factorial: 3 ethnic areas X 2 retail chains in each X 2 days of the week X 3 ethnic groups. The level of significance selected for rejection of the null hypotheses was $P < .05$.

Chi-Square Analysis

Chi-square analysis was used to test the null hypotheses of independence for the discrete variables (Nie, Bent and Hull, 1970).

Null hypotheses for the discrete variables were:

Ethnic groups (Caucasian, Mexican-American and Negro) and each of the attributes listed in tables 1, 2 and 3 are independent of each other.

In cases where chi-square values were significant, additional chi-square analyses were used to test the null hypotheses for the discrete variables using two ethnic groups in a comparison.

Least Squares Analysis

The continuous data were analyzed by the method of least squares (Harvey, 1960). Four main factors (ethnic area, chain, day and ethnic group) and the six 2-factor interactions (area X chain, area X day, area X group, chain X day, chain X group, and day X group) were used in the statistical model. When a significant effect was shown in a main factor, Newman and Keuls' method (Snedecor and Cochran, 1969) was used to test the differences between means. The null hypothesis for the continuous data was: There is no significant difference among the means of the 59 variables listed in table 4 for Caucasians, Mexican-Americans and Negroes.

Overall means for and a simple correlation analysis of the association among the 59 continuous variables were obtained from the least squares analysis of data. Since the program used limits dependent variables in an analysis to 35, three correlation analyses were made in order to include all the associations desired. The continuous variables used in the correlation analyses are listed in tables 7, 8 and 9.

The card questionnaires which were returned were scored for accuracy in kind, amount and cost of meat bought. Scores were analyzed by use of the method of least squares with ethnic group as the main factor. The null hypothesis was: There is no significant difference among mean scores for accuracy in kind, amount and cost of meat recorded on the card questionnaires by Caucasians, Mexican-Americans and Negroes.

Multiple Regression Analysis

In order to obtain a quantitative measure of the relationships between certain continuous meat buying variables and socioeconomic variables, multiple regression analysis was used, with ethnic group as the main factor. Variables used in the analysis are listed on page 69. Regression equations for dependent variables were obtained. The coefficient of determination was obtained from the regression analysis and indicated the amount of variation in the dependent variable that was accounted for by the socioeconomic variables.

CHAPTER III

FINDINGS AND INTERPRETATIONS

Preliminary Study

The data form was revised after the first trial because of information gained from the trial. The frequency of kinds of meat purchased was ascertained in the first trial and the data form was revised to list the most frequently purchased kinds of meat. The revised form saved time in recording data in the store. Items concerning the use of food stamps and the number of people who did not buy meat were added to the data form. Data columns were rearranged to conform to the arrangement of data on meat package labels.

The main idea learned from the preliminary study which necessitated a change in plans for the final study was that the return of the card questionnaire would not be sufficient to obtain the needed socioeconomic data. Only 20% were returned. Therefore, in the final study, socioeconomic questions were asked the shoppers before they left the store instead of being included on the card questionnaire. The card questionnaire was retained with the amounts and kinds of meat bought in order to validate the questionnaire method against the observed behavior method.

The results from the preliminary study were similar to results from the final study. Therefore, tables of results for the preliminary study were not included. Subjects in the preliminary study included 34 Caucasians, 14 Mexican-Americans and 12 Negroes.

Chi-Square Analysis of Discrete Data

Chi-square analysis of the 71 discrete variables by ethnic group showed that only two variables, ethnic area and frozen whiting fish, were not independent of ethnic group. The numbers of Caucasians who shopped in the Caucasian, Mexican-American and Negro areas were 18, 10 and 6, respectively. The numbers of Mexican-Americans who shopped in the areas were 2, 10 and 2, respectively. All 12 Negroes shopped in the Negro area. Only Negroes bought frozen whiting fish. Of the 66 meat cuts purchased, the 10 meat cuts purchased by the most subjects were, in order: bacon, ground sausage, regular pork chops, whole chicken, regular ground beef, bologna, wieners, cut-up chicken, lean ground beef, and extra lean ground beef. Chi-square analysis is valid for large samples; therefore, while most variables were independent of ethnic group in the preliminary study using 60 subjects, more variables may not be independent of ethnic group in the final study using 600 subjects.

Least Squares Analysis of Continuous Data

The 54 continuous dependent variables used were the ones listed in table 4 except for the age, education and income variables. Least squares analysis, described on page 17, showed results similar to those of the final study.

To determine whether to use all 600 subjects in the analysis for the final study or whether to equalize the numbers of subjects from ethnic groups, the data from the preliminary study were analyzed using two numbers of subjects (49 and 60). In using 49 subjects, one

Caucasian subject was eliminated at random from 11 of the store-day cells (no Caucasian was in the 12th cell). The numbers of significant effects were similar when 49 subjects were used and when 60 subjects were used. Chi-square analysis of discrete data using 49 subjects and using 60 subjects showed the same variables were independent of ethnic group. In three cases, a meat cut was not bought when 49 subjects were used as it had been when 60 subjects were used.

Disadvantages of using the smaller number of subjects were: 1) fewer meat cuts were represented; 2) the factorial design would be unbalanced for ethnic area, day and chain if equal numbers of each ethnic group were used; and 3) data for some people in the final study would not be used and therefore less representation of what people do would be reported. For these reasons it was decided to use data from all 600 subjects in the statistical analyses in the final study.

Final Study

Of the 600 subjects included in the final study 364 were Caucasians, 162 were Mexican-Americans, and 74 were Negroes. The percent distribution was 60.7, 27.0 and 12.3, respectively. Percent distribution of the groups in Lubbock is 77.3, 15.3 and 7.4, respectively. Therefore, Mexican-Americans and Negroes were represented in the study to a greater degree than they are represented in the population of Lubbock.

When a worker was ready to record meat data for a shopper and the shopper bought no meat, the worker recorded that the shopper bought no meat and recorded his ethnic group. In addition to the 600 subjects who bought meat, 325 subjects bought no meat. The distribution was as follows: 194 Caucasians, 109 Mexican-Americans and 22 Negroes.

An attempt was made to obtain the number of customers in the stores for the days included in the study. The information was not available for supermarket chain A. The total volume in dollar sales for the test week was greatest on Wednesday (21.5%) and next greatest on Saturday (20.6%), which were the two days used in the study. The number of shoppers who made purchases in stores of chain B on the Wednesday of the study was 622 in the Caucasian area, 1536 in the Mexican-American area, and 1020 in the Negro area. The number of shoppers in stores of chain B on the Saturday of the study was 1086 in the Caucasian area, 1518 in the Mexican-American area, and 1059 in the Negro area. The total number of shoppers was 6841. For two chains, the estimated total was 13,682. A total of 925 shoppers was observed in the study. Seven percent (925 of 13,682) of the shoppers in the stores on the test days were included in the study.

Meat prices advertised in the newspaper during the week of the study for the two chains are listed in Appendix F.

Chi-Square Analysis of Discrete Data

Results of chi-square analysis of the 212 discrete variables by ethnic group are shown in tables 1 through 3. The null hypotheses on page 17 were rejected for the variables in table 1, with the exception of day and sex. Excluding cuts of meat, the 12 of the 14 variables tested in table 1 which were not independent of ethnic group were: ethnic area, chain, use of stamps, return of card questionnaire, education of head of household, annual family income by six and by three groups, education of food shopper, age of food shopper by five and by three groups, and annual per capita income by six and by three groups. Day and sex were the 2 of the 14 variables which were independent of ethnic groups.

TABLE 1. TEST OF INDEPENDENCE FOR ETHNIC GROUP AND DISCRETE SOCIOECONOMIC AND MEAT BUYING VARIABLES

Variable	Ethnic group			Total	df	Chi-square value
	Caucasian	Mexican-American	Negro			
Number of subjects						
Ethnic area					4	284.34**
Caucasian	192	7	1	200		
Mexican-American	92	106	2	200		
Negro	80	49	71	200		
Percent of subjects						
Chain					2	9.00*
A	53	40	57	50		
B	47	60	43	50		
Day					2	0.26
Wednesday	49	50	53	50		
Saturday	51	50	47	50		
Sex					2	1.77
Female	83	84	89	84		
Male	17	16	11	16		
Use of stamps					2	57.50**
Yes	3	22	22	10		
No	97	78	78	90		
Return of card					2	42.53**
Yes	31	8	9	22		
No	69	92	91	78		
Education of head of household					10	223.24**
Elementary school or less	4	45	15	16		
Some high school	15	37	32	23		
Completed high school	30	11	28	25		
Some college	26	4	12	18		
Completed 4 years college	17	3	12	13		
Some graduate school	8	0	0	5		
Annual family income, \$					10	100.25**
Less than \$5,000	22	48	55	33		
5,000-7,499	20	29	18	22		
7,500-9,999	13	16	12	14		
10,000-12,499	16	5	7	12		
12,500-14,999	7	1	4	5		
15,000 and over	22	1	4	14		

TABLE 1-Continued

Variable	Ethnic group				df	Chi-square value
	Caucasian	American	Negro	Total		
Percent of subjects						
Annual family income, \$					4	94.82**
Less than 5,000	22	48	55	34		
5,000-9,999	34	45	30	36		
10,000 and over	44	7	15	30		
Education of food shopper					10	229.82**
Elementary school or less	3	31	7	11		
Some high school	16	51	46	29		
Completed high school	31	13	20	25		
Some college	32	3	16	22		
Completed 4 years college	15	2	11	11		
Some graduate school	3	0	0	2		
Age of food shopper, years					8	17.20*
Less than 30	33	47	35	38		
30-39	21	23	19	21		
40-49	19	17	23	19		
50-59	14	7	12	11		
60 and over	13	6	11	11		
Age of food shopper, years					4	19.01**
Less than 30	33	47	35	38		
40-49	40	40	42	40		
50 and over	27	13	23	22		
Annual per capita income, \$					10	174.05**
Less than 1,000	7	39	39	19		
1,000-1,499	7	25	23	14		
1,500-1,999	13	12	10	13		
2,000-2,499	12	6	8	10		
2,500-2,999	8	2	4	6		
3,000 and over	53	15	16	38		
Annual per capita income, \$					4	143.00**
Less than 1,000	7	39	39	19		
1,000-2,499	32	43	41	37		
2,500 and over	61	17	20	44		

*P<.05, **P<.01.

In cases where chi-square values were significant, additional chi-square analyses were used with two ethnic groups in a comparison. Results were summarized in table 2.

TABLE 2. CHI-SQUARE ANALYSIS OF DISCRETE SOCIOECONOMIC AND MEAT BUYING VARIABLES BY ETHNIC GROUPS

Variable	df	Chi-square value		
		Caucasian versus Mexican- American	Caucasian versus Negro	Mexican- American versus Negro
Ethnic area	2	120.64**	149.06**	88.12**
Chain	1	6.96**	0.21	5.02*
Use of food stamps	1	50.87**	35.93**	0.00
Return of card questionnaire	1	30.77**	13.06**	0.01
Education of head of household	5	210.52**	34.36**	34.07**
Education of food shopper	5	213.28**	41.76**	35.99**
Age of food shopper by five categories	4	15.96**	1.16	6.40
Age of food shopper by three categories	2	18.93**	0.46	6.53*
Family income by six categories	5	77.34**	39.09**	7.64
Family income by three categories	2	74.16**	37.77**	5.90
Per capita income by six categories	5	149.26**	90.41**	1.21
Per capita income by three categories	2	121.23**	74.85**	0.21

*P<.05, **P<.01.

No ethnic group was independent of ethnic area, tables 1 and 2. This result was expected since ethnic areas for the study were selected on the basis of the largest percent of the inhabitants being members of a certain ethnic group and most people shop for food near their homes.

Unlike Caucasians and Negroes, more Mexican-Americans shopped in chain B. Approximately one-half of each ethnic group shopped on Wednesday and one-half on Saturday. Most shoppers (84%) were females. One observation made during the study which is not reflected in the recorded data is that more Mexican-American males accompanied the females and took active roles in food shopping, i. e., noticing whether purchases were rung up correctly on the cash register and paying for groceries, than for the other two ethnic groups.

Use of food stamps and return of the card questionnaire were not independent of ethnic group. Significantly fewer Caucasians than Mexican-Americans or Negroes used food stamps. More Caucasians (31%) than either Mexican-Americans (8%) or Negroes (9%) returned the card questionnaires.

The education of head of household and of food shopper were not independent of ethnic group. Each of the ethnic groups differed significantly from each other group in education variables. Caucasians had the most years of education and Mexican-Americans least. No Mexican-Americans or Negroes reported any graduate study.

The age of food shopper was not independent of ethnic group. More Caucasians were older than Mexican-Americans. When age by three categories was used, more Negroes as well as Caucasians were older than Mexican-Americans. The main differences were at the extremes of age: more Mexican-Americans were in the youngest category and fewer in the oldest category. Approximately one-third of the Caucasians and the Negroes and approximately one-half of the Mexican-Americans were less than 30 years old.

Both annual family income and per capita income were not independent of ethnic group. More Caucasians reported higher incomes than Mexican-Americans or Negroes. Although Mexican-Americans and Negroes did not differ significantly in income, a greater percent of Negroes reported extremes in annual family income. However, annual per capita income was similar for these two groups. Average number of people in the family for each ethnic group was 3.1 Caucasians, 4.9 Mexican-Americans and 4.2 Negroes.

Discrete variables not shown in tables 1 and 2 were meat cuts purchased. Results concerning meat cuts purchased were summarized in table 3. All cuts were fresh unless otherwise noted except that fish was frozen and soups were canned.

The 12 meat cuts purchased by the most people (10% or more) were, in order: bacon, whole chicken, bologna, lean ground beef, canned tuna, extra lean ground beef, regular pork chops, wieners, regular ground beef, ground sausage, round steak, and cut up chicken. Thus, while a large number (198) of meat cuts were bought, only a few of them (12) were bought by at least 10% of the shoppers. Other meat cuts purchased by at least 10% of an ethnic group were boneless beef (stew) by Mexican-Americans and Negroes and boneless steak by Negroes.

Chi-square values indicated that the purchase of the following 37 of the 198 meat cuts (19%) were not independent of ethnic group: whole chicken, bologna, canned tuna, regular pork chops, regular ground beef, round steak, boneless beef, frozen dinner, wafer thin pork chops, hot links, boneless steak, chorizo, chuck steak, pork ribs, canned chili

with beans, chicken and rice soup, ham slice (steak), beef liver, chicken breasts, chicken legs, chitterlings, pork neck bones, chicken fried steak, fresh ham hocks, tripe, chicken wings, English cut roast, arm steak, Cornish game hen, whiting fish, liver loaf, canned macaroni and beef, frozen meatballs, smoked picnic ham, shrimp bits, wafer thin steak and turkey wings. Therefore, the null hypothesis on page 17 was rejected for these 37 meat cuts.

Results of chi-square analyses with two ethnic groups in a comparison for meat cuts were shown in table 3. Fewer Caucasians than Mexican-Americans or Negroes bought whole chicken, regular pork chops, boneless beef (stew), wafer thin pork chops, hot links and chuck steak. More Mexican-Americans than either of the other groups bought bologna and chorizo. More Caucasians than Mexican-Americans or Negroes bought tuna. More Negroes than Caucasians or Mexican-Americans bought boneless steak, ham slice (steak) and chitterlings. More Negroes than Caucasians bought pork ribs, pork neck bones, tripe, chicken wings and English cut roast. More Mexican-Americans than Caucasians bought canned chili with beans and round steak. In general, more Negroes than Caucasians or Mexican-Americans bought pork cuts and more Mexican-Americans than Caucasians or Negroes bought beef cuts. In general, the cuts which were bought by more Negroes than Caucasians were less expensive cuts on a cost per pound basis. Null hypotheses on page 17 were rejected when the meat cuts were not independent of ethnic group.

TABLE 3. MEAT CUTS BOUGHT BY ETHNIC GROUP IN ORDER OF FREQUENCY
AND RELATED CHI-SQUARE VALUES

Meat cut	Ethnic group			Total	Fre- quency	Chi-square value ^c (df=2)
	Cau- casian	Mexican- American	Negro			
	Percent					
Bacon	30.5	29.6 _b	28.4 _b	30.0	180	0.15
Chicken, whole	15.1 _a	26.5 _b	31.1 _b	20.2	121	15.35**
Bologna	15.9 _a	27.2 _b	13.5 _a	18.7	112	10.78**
Ground beef, lean	14.0	18.5 _b	13.5	15.2	91	1.95
Tuna, canned	18.7 _a	9.9 _b	9.5 _{ab}	15.2	91	8.89*
Ground beef, extra lean	12.4	17.3 _b	18.9 _b	14.5	87	3.52
Pork chop, regular	7.7 _a	23.5 _b	24.3 _b	14.0	84	30.61**
Wieners	14.3	14.2 _b	8.1 _{ab}	13.5	81	2.10
Ground beef, regular	9.9 _a	17.3 _b	8.1 _{ab}	11.7	70	6.98*
Sausage, ground	10.7	11.7	13.5	11.3	68	0.51
Round steak	8.0 _a	16.7 _b	8.1 _{ab}	10.3	62	9.61**
Chicken, cut up	9.3	9.3 _b	14.9 _b	10.0	60	2.22
Boneless beef (stew)	5.2 _a	12.3 _b	12.2 _b	8.0	48	9.72**
Chili, canned, no beans	3.6	6.2	9.5	5.0	30	5.13
Fish sticks	5.2	4.3	2.7	4.7	28	0.94
Cooked ham	5.8	3.1	0.0	4.3	26	5.77
Chuck roast, boneless	4.4	5.6	0.0	4.2	25	4.05
Frozen dinner (TV)	5.5	2.5 _b	0.0 _b	4.0	24	6.19*
Pork chop, wafer thin	1.4 _a	7.4 _b	6.8 _b	3.7	22	13.84**
Spam	3.3	4.9	1.4	3.5	21	2.05
Vienna sausage	2.5	5.6	4.1	3.5	21	3.23
Salami	1.9	5.6	5.4	3.3	20	5.72
Sirloin steak	3.3	3.1 _b	2.7 _b	3.2	19	0.08
Hot links	0.8 _a	4.3 _b	9.5 _b	2.8	17	18.44**
Rump roast	3.3	1.2	4.1	2.8	17	2.19
T-bone steak	3.6	0.6	4.1	2.8	17	4.01
Boneless oven roast	2.7	0.6	5.4 _b	2.5	15	5.01
Boneless steak	0.5 _a	2.5 _a	12.2 _b	2.5	15	34.03**
Chicken noodle soup	2.7	2.5	1.4	2.5	15	0.49
Chicken pot pie	3.0	1.2	1.4	2.3	14	1.93
Chorizo	0.0 _a	8.6 _b	0.0 _a	2.3	14	38.76**
Chuck steak	0.5 _a	5.6 _b	4.1 _b	2.3	14	13.43**
Pork ribs	1.1 _a	3.1 _{ab}	5.4 _b	2.2	13	6.27*
Beef cutlets	2.2	2.5	0.0	2.0	12	1.76
Cube steak	1.9	2.5	1.4	2.0	12	0.35

TABLE 3-Continued

Meat cut	Ethnic group			Total	Fre- quency	Chi-square value (df=2)
	Cau- casian	Mexican- American	Negro			
	Percent					
Pizza with meat	2.7	0.6	1.4	2.0	12	2.77
Rib steak	1.9	2.5	1.4	2.0	12	0.35
Wieners with vegetable protein	1.6	3.7	0.0	2.0	12	4.14
Breaded chicken fried beef fritters	1.6	1.2	4.1	1.8	11	2.42
Chicken thighs	1.4	1.9	4.1	1.8	11	2.46
Chili with beans, canned	0.8 ^a	4.3 ^b	1.4 ^{ab}	1.8	11	7.73*
Cream of chicken soup	2.2	1.9	0.0	1.8	11	1.65
Patty mix	1.9	2.5	0.0	1.8	11	1.76
Sirloin tip steak	1.9	2.5	0.0	1.8	11	1.76
Chicken rice soup	1.1	3.7	0.0	1.7	10	6.07*
Chicken vegetable soup	1.6	2.5	0.0	1.7	10	1.89
Club steak	2.2	0.6	1.4	1.7	10	1.76
Fish, turbot	2.2	0.0	2.7	1.7	10	3.86
Ground sirloin patties	2.5	0.0	1.4	1.7	10	4.23
Liver, calf	1.9	1.9	0.0	1.7	10	1.43
Summer sausage	0.8	2.5	4.1	1.7	10	4.79
Canned ham	0.8	1.9	4.1	1.5	9	4.52
Chopped ham	1.6	1.2	1.4	1.5	9	0.14
Lunch meat	1.1	2.5	1.4	1.5	9	1.44
Salmon, canned	2.5	0.0	0.0	1.5	9	5.92
Salt pork	1.1	3.1	0.0	1.5	9	4.28
Arm roast	1.1	1.9	1.4	1.3	8	0.48
Ham slice (steak)	0.5 ^a	0.6 ^a	6.8 ^b	1.3	8	18.88**
Potted meat	1.4	1.2	1.4	1.3	8	0.02
Sardines	0.8	3.1	0.0	1.3	8	5.50
Short ribs	0.8	1.9	2.7	1.3	8	2.10
Spaghetti with meat, canned	1.1	2.5	0.0	1.3	8	2.74
Beef liver	0.3 ^a	3.7 ^b	0.0 ^{ab}	1.2	7	12.43**
Chicken breasts	1.1 ^{ab}	0.0 ^a	4.1 ^b	1.2	7	7.28*
Chicken legs	0.3	2.5	2.7	1.2	7	6.41*
Chitterlings, frozen	0.3 ^a	0.0 ^a	8.1 ^b	1.2	7	35.35**
Family steak	1.1	1.9	0.0	1.2	7	1.55
Link sausage	1.4	0.6	1.4	1.2	7	0.58
Liver, chicken	1.4	0.6	1.4	1.2	7	0.58
Pork roast	0.8	2.5	0.0	1.2	7	3.63

TABLE 3-Continued

Meat cut	Ethnic group			Total	Frequency	Chi-square value (df=2)
	Cau- casian	Mexican- American	Negro			
	Percent					
Beef stew, canned	1.1	1.2	0.0	1.0	6	0.87
Chicken gizzards	1.1	1.2	0.0	1.0	6	0.87
Devilled ham	1.1	1.2	0.0	1.0	6	0.87
Ground beef patties	1.4	0.6	0.0	1.0	6	1.50
Ham and cheese loaf	1.1	0.6	1.4	1.0	6	0.37
Pickle loaf	1.4	0.6	0.0	1.0	6	1.50
Pork neck bones	0.0 ^a	1.2 ^{ab}	5.4 ^b	1.0	6	18.27**
Shrimp, breaded pieces	1.4	0.6	0.0	1.0	6	1.50
Beef vegetable soup	0.5	1.9	0.0	0.8	5	3.01
Pike's Peak roast	0.8	0.6	1.4	0.8	5	0.33
Porterhouse steak	1.4	0.0	0.0	0.8	5	3.27
Beef, cooked sliced	0.8	0.6	0.0	0.7	4	0.64
Catfish	0.8	0.6	0.0	0.7	4	0.64
Cooked link sausage	1.1	0.0	0.0	0.7	4	2.61
Corn dog	0.8	0.6	0.0	0.7	4	0.64
Halibut steak	0.5	1.2	0.0	0.7	4	1.36
Ham, boneless cooked	0.5	0.6	1.4	0.7	4	0.61
Olive loaf	0.8	0.0	1.4	0.7	4	1.75
Pastrami	1.1	0.0	0.0	0.7	4	2.61
Pork steak	0.5	0.6	1.4	0.7	4	0.61
Ranch steak	0.5	1.2	0.0	0.7	4	1.36
Shoulder or chuck roast	0.3	1.9	0.0	0.7	4	4.78
Turkey, cooked sliced	1.1	0.0	0.0	0.7	4	2.61
Beef pot pie	0.5	0.6	0.0	0.5	3	0.43
Breakfast steak	0.3	0.6	1.4	0.5	3	1.49
Chicken fried steak	0.3	0.0	2.7	0.5	3	8.40*
Chicken salad	0.5	0.6	0.0	0.5	3	0.43
Corned beef, canned	0.8	0.0	0.0	0.5	3	1.95
Fried fish fillet	0.8	0.0	0.0	0.5	3	1.95
Ground chuck	0.5	0.6	0.0	0.5	3	0.43
Ham hocks, fresh	0.3	0.0	2.7	0.5	3	8.40*
Liver cheese	0.5	0.0	1.4	0.5	3	1.91
Luncheon loaf	0.5	0.6	0.0	0.5	3	0.43
Pigs feet, fresh	0.5	0.0	1.4	0.5	3	1.91
Shrimp, breaded	0.3	1.2	0.0	0.5	3	2.50

TABLE 3-Continued

Meat cut	Ethnic group			Total	Fre- quency	Chi-square value (df=2)
	Cau- casian	Mexican- American	Negro			
	Percent					
Treet	0.3	1.2	0.0	0.5	3	2.50
Tripe	0.0 ^a	0.6 ^{ab}	2.7 ^b	0.5	3	9.09*
Beef ribs with barbecue sauce, frozen	0.3	0.6	0.0	0.3	2	0.68
Barbecue pork chops	0.3	0.6	0.0	0.3	2	0.68
Beef pot roast	0.5	0.0	0.0	0.3	2	1.30
Beef soup bone	0.0	1.2	0.0	0.3	2	5.43
Boneless canned chicken	0.5	0.0	0.0	0.3	2	1.30
Boneless canned chicken spread	0.5	0.0	0.0	0.3	2	1.30
Brisket roast	0.5	0.0	0.0	0.3	2	1.30
Chicken fried beef finger steaks	0.0	1.2	0.0	0.3	2	5.42
Chicken gumbo, canned	0.5	0.0	0.0	0.3	2	1.30
Chicken wings	0.0 ^a	0.0 ^a	2.7 ^b	0.3	2	14.26**
Chili, refrigerated	0.3	0.0	1.4	0.3	2	2.89
Corned beef, sliced	0.5	0.0	0.0	0.3	2	1.30
English cut roast	0.0 ^a	0.0 ^a	2.7 ^b	0.3	2	14.26**
Eye of round steak	0.3	0.6	0.0	0.3	2	0.68
Fish fillet	0.0	0.6	1.4	0.3	2	3.92
Flounder fillet	0.5	0.0	0.0	0.3	2	1.30
Ham, boneless cooked water added	0.5	0.0	0.0	0.3	2	1.30
Hot dog with chili, canned	0.3	0.6	0.0	0.3	2	0.68
Liver sausage	0.5	0.0	0.0	0.3	2	1.30
Mackerel, canned	0.0	0.6	1.4	0.3	2	3.92
Ox tails	0.0	1.2	0.0	0.3	2	5.43
Pigs feet, canned	0.0	1.2	0.0	0.3	2	5.43
Polish sausage	0.5	0.0	0.0	0.3	2	1.30
Ravioli with meat, canned	0.5	0.0	0.0	0.3	2	1.30
Rib eye steak	0.3	0.6	0.0	0.3	2	0.68
Salisbury steak, frozen	0.5	0.0	0.0	0.3	2	1.30
Shrimp	0.5	0.0	0.0	0.3	2	1.30
Spam with cheese	0.5	0.0	0.0	0.3	2	1.30
Superdogs	0.5	0.0	0.0	0.3	2	1.30
Swiss steak	0.0	0.6	1.4	0.3	2	3.92
Tamales, canned	0.0	1.2	0.0	0.3	2	5.43
Turkey noodle soup	0.0	1.2	0.0	0.3	2	5.43
Turkey pot pie	0.0	1.2	0.0	0.3	2	5.43

TABLE 3-Continued

Meat cut	Ethnic group			Total	Frequency	Chi-square value (df=2)
	Cau- casian	Mexican- American	Negro			
	Percent					
Beef arm steak	0.0	0.0	1.4	0.2	1	7.12*
Bacon, unsliced	0.3	0.0	0.0	0.2	1	0.65
Barbecue brisket	0.3	0.0	0.0	0.2	1	0.65
Beans and sliced wieners, canned	0.3	0.0	0.0	0.2	1	0.65
Beef burritos, frozen	0.3	0.0	0.0	0.2	1	0.65
Beef enchiladas, frozen	0.3	0.0	0.0	0.2	1	0.65
Beef patties, lean	0.3	0.0	0.0	0.2	1	0.65
Boston butt roast	0.0	0.6	0.0	0.2	1	2.71
Butterfly pork chops	0.3	0.0	0.0	0.2	1	0.65
Canned sliced pork	0.3	0.0	0.0	0.2	1	0.65
Chicken and dumplings, canned	0.3	0.0	0.0	0.2	1	0.65
Chicken and stars soup	0.3	0.0	0.0	0.2	1	0.65
Chicken chow mein, frozen	0.3	0.0	0.0	0.2	1	0.65
Chicken loaf, canned	0.3	0.0	0.0	0.2	1	0.65
Chicken necks	0.3	0.0	0.0	0.2	1	0.65
Chicken pulley bone	0.3	0.0	0.0	0.2	1	0.65
Chicken salad spread, canned	0.0	0.6	0.0	0.2	1	2.71
Chunky burger soup	0.3	0.0	0.0	0.2	1	0.65
Chunky turkey soup	0.3	0.0	0.0	0.2	1	0.65
Clams, canned	0.3	0.0	0.0	0.2	1	0.65
Corned beef hash, canned	0.0	0.6	0.0	0.2	1	2.71
Cornish game hen, frozen	0.0	0.0	1.4	0.2	1	7.12*
Devilled crab	0.3	0.0	0.0	0.2	1	0.65
Devilled ham spread	0.3	0.0	0.0	0.2	1	0.65
Fish cakes, frozen	0.3	0.0	0.0	0.2	1	0.65
Fish, whiting	0.0	0.0	1.4	0.2	1	7.12*
Flank steak	0.3	0.0	0.0	0.2	1	0.65
Perch fillets	0.0	0.6	0.0	0.2	1	2.71
Ham salad, refrigerated	0.0	0.6	0.0	0.2	1	2.71
Ham salad spread, refrigerated	0.3	0.0	0.0	0.2	1	0.65
Imitation vienna sausage	0.3	0.0	0.0	0.2	1	0.65
Jerky	0.3	0.0	0.0	0.2	1	0.65
Liver loaf	0.0	0.0	1.4	0.2	1	7.12*
Lobster paste	0.3	0.0	0.0	0.2	1	0.65
Macaroni and beef, canned	0.0	0.0	1.4	0.2	1	7.12*

TABLE 3-Continued

Meat cut	Ethnic group			Total	Fre- quency	Chi-square value (df=2)
	Cau- casian	Mexican- American	Negro			
	Percent					
Macaroni and beef soup	0.3	0.0	0.0	0.2	1	0.65
Meatballs, frozen	0.0	0.0	1.4	0.2	1	7.12*
New York steak	0.3	0.0	0.0	0.2	1	0.65
Oysters	0.3	0.0	0.0	0.2	1	0.65
Picnic ham, smoked	0.0	0.0	1.4	0.2	1	7.12*
Pimiento loaf	0.3	0.0	0.0	0.2	1	0.65
Pork chops, barbecued cooked	0.3	0.0	0.0	0.2	1	0.65
Pork rinds, cooked	0.3	0.0	0.0	0.2	1	0.65
Rib roast, beef	0.3	0.0	0.0	0.2	1	0.65
Shrimp bits	0.0	0.0	1.4	0.2	1	7.12*
Shrimp and egg rolls, frozen	0.3	0.0	0.0	0.2	1	0.65
Shrimp chow mein, canned	0.3	0.0	0.0	0.2	1	0.65
Shrimp, cooked, frozen	0.3	0.0	0.0	0.2	1	0.65
Sirloin tip roast	0.3	0.0	0.0	0.2	1	0.65
Sliced chicken, cooked	0.3	0.6	0.0	0.2	1	2.71
Smoked ham shank	0.3	0.0	0.0	0.2	1	0.65
Spice loaf	0.3	0.0	0.0	0.2	1	0.65
Wafer thin beef steak	0.0	0.0	1.4	0.2	1	7.12*
Sweetbreads	0.3	0.0	0.0	0.2	1	0.65
Thuringer slices	0.3	0.0	0.0	0.2	1	0.65
Turkey wings, frozen	0.0	0.0	1.4	0.2	1	7.12*
Veal birds, frozen	0.3	0.0	0.0	0.2	1	0.65

*P<.05, **P<.01.

^{ab} Values in a row with different superscripts are significantly different from each other according to chi-square analysis using 2 ethnic groups in a comparison.

^c Chi-square analyses were based on actual frequencies.

In conclusion, most discrete variables other than meat cuts were not independent of ethnic group. Of the 198 meat cuts bought, 37 (19%) were not independent of ethnic group. A large number of meat cuts were bought but only a few cuts, 12 of 198, were bought by 10% or more of the shoppers. Because one-half of the 12 meat cuts bought by the most people and 19% of all meat cuts purchased were not independent of ethnic group, an important consideration in marketing of meat and in food and nutrition education concerning meat should be the ethnic group of the shoppers or audience.

A general guideline concerning marketing of meat would be that meat cuts shown to be independent of ethnic group could be widely marketed (sold in supermarkets regardless of ethnic group of the customers). However, meat cuts which were not independent of ethnic group would not be marketed as widely. They should be offered and would be expected to sell in greater volume where customers are of certain ethnic groups, as indicated earlier in this paper. A general guideline concerning food and nutrition education regarding meat is that education programs should take into consideration that the three ethnic groups buy different meat cuts. Include the cuts characteristically bought by the group being taught. For example, with a group containing Negroes, use meat examples for nutritive value discussion and food preparation which include less expensive meats on a cost per pound basis, pork in general, and cuts such as boneless steak, pork neck bones and whole chicken. Similarly, in teaching Mexican-Americans include beef in general and bologna, canned chili,

chorizo and round steak. In education programs for Caucasians include some more expensive cuts of meat. Include the Mexican-American man in food marketing and education programs since he takes an active part in food buying.

Least Squares Analysis of Continuous Data

Overall means and means for ethnic groups are listed in table 4. One-way analysis of variance showed that 40 of the 59 variables were significant for ethnic group. A comparison of results of the final study, table 4, and of the preliminary study showed that overall means and means for ethnic groups were similar although many more variables were significant for ethnic group comparisons in the final study.

Results of least squares analysis of the 59 continuous variables are shown in tables 5 and 6. Significant effects in the analysis are summarized as follows: ethnic group was significant for 30 of 59 variables; chain was significant for 28 variables; and ethnic area and day each were significant for 6 variables. Ethnic group was responsible alone or in an interaction for over one-half of the total significant effects (62 of 120). The conclusion was that ethnic group is a factor in meat buying practices.

Least squares means are shown in table 6. When a significant effect was shown in a main factor, Newman and Keuls' method was used to test the differences between means. Results are shown in table 6.

Ethnic area was a minor factor affecting meat buying practices, as the means for only 6 variables were significantly different for ethnic area. Means were significantly greater for the Mexican-American

area than for the Negro area for amount and cost of ready to eat meat and of cooked meat.

Supermarket chain was an important factor in the study. Means were significantly different for the two supermarket chains for 28 variables. Means were significantly greater in supermarket chain A than in chain B for total spent, amount of meat per person, total money spent per person, amount of meat per person per week, total spent per person per week, family income, total amount of beef, total cost of beef, amount and cost of ground beef, amount of less tender cuts of beef, amount and cost of ground beef with soy, amount of poultry, amount of white meat, amount of fresh meat, and amount and cost of canned meat. Means for chain A were significantly less than for chain B for cost of meat per pound, percent spent on meat, total amount of pork, amount and cost of fresh pork other than sausage, amount and cost of other meat, and amount of frozen meat.

A reason that amount and cost of other meat and amount of frozen meat was significantly greater in chain B than in chain A was that 5-lb. buckets of frozen chitterlings were sold in one of the chain B stores and were bought by a considerable number of shoppers. This finding has implications for retailing: if the other chain in this area of town had carried this item, considerable amounts of it would probably sell.

Day was not an important factor in this study. Means for only six variables were significantly different for the 2 days. Means were significantly greater on Wednesday than on Saturday for

total money spent and total money spent per person. Means were significantly greater on Saturday than on Wednesday for percent spent on meat, amount and cost of pork sausage, and amount of frozen meat. These findings might reflect that more general family shopping is done on Wednesday and more shopping for company and special weekend meals is done on Saturday.

Ethnic group was the most important factor in the study because it accounted for the largest number of significant effects. Means for variables usually were greater for Mexican-Americans than for Caucasians. Exceptions were for the following variables: education of head of household and of food shopper, family and per capita income, and amount and cost of pork sausage. While Mexican-Americans bought more kinds of meat, a greater amount of meat, and paid more for meat than did Caucasians, they also had more people in a family (5.2 versus 3.1). Means for amount and cost of groceries on a per person and per person per week basis were not significantly different for Mexican-Americans and Caucasians. The variables beginning with total amount of beef and continuing through cost of canned meat usually were greater for Mexican-Americans than for Caucasians. Family size was not considered for the analysis of these variables. Caucasians bought more tender cuts, pork sausage, fish, meat combination dishes and frozen meats and paid more for them than did Mexican-Americans, although these differences were not significant.

Few significant differences were found in means of variables for Negroes versus those for Caucasians and Mexican-Americans. The significant differences were: education of head of household and of

food shopper, which were greater for Negroes than for Mexican-Americans; and amount and cost of pork sausage, which were greater for Negroes than for either Caucasians or Mexican-Americans. Caucasians bought significantly less pork and less fresh pork other than sausage and paid less for them than did Mexican-Americans and Negroes.

In summary, of the four factors investigated (ethnic area, chain, day and ethnic group), ethnic group was significant for the greatest number of variables. Supermarket chain was significant for almost as many variables. Ethnic area and day were significant for the least number of variables.

TABLE 4. MEANS FOR CONTINUOUS VARIABLES BY ETHNIC GROUP

Variable	Ethnic group			Total n=600
	Caucasian n=364	Mexican- American n=162	Negro n=74	
Number of kinds of meat	3.34	4.24	3.93	3.66**
Amount of meat, lb.	5.17	7.10	7.94	6.03**
Cost of meat, \$	5.67	7.45	7.77	6.41**
Cost per pound of meat, \$	1.20	1.11	1.04	1.16**
Total money spent, \$	21.53	24.30	19.53	22.03
Percent of money spent on meat	30.39	33.37	43.13	32.77**
Number of people shopped for	3.09	4.91	4.18	3.71**
Amount of meat per person, lb.	1.88	1.76	2.08	1.87
Cost of meat per person, \$	2.11	1.89	1.99	2.03
Total money spent per person, \$	7.80	6.18	5.32	7.06**
Frequency of buying meat, per week	1.38	1.35	1.90	1.44**
Amount of meat per person per week, lb.	2.12	1.94	2.60	2.13*
Cost of meat per person per week, \$	2.36	2.09	2.55	2.31
Total money spent per person per week, \$	8.80	6.80	6.88	8.02**
Education of head of household, years	12.93	6.93	10.43	11.00**
Annual family income, \$	10979.98	5603.09	5631.38	8877.11**
Education of food shopper, years	12.69	7.70	11.15	11.15**
Age of food shopper, years	39.68	33.95	38.39	37.98**
Annual per capita income, \$	3984.46	1747.60	1706.34	3099.54**
Beef: Total, amount, lb.	2.02	2.64	2.21	2.21
Beef: Total, cost, \$	2.49	3.31	2.83	2.75*
Beef: Ground, amount, lb.	0.85	1.03	0.67	0.88
Beef: Ground, cost, \$	0.99	1.24	0.79	1.03
Beef: Tender cuts, amount, lb.	0.32	0.16	0.20	0.26
Beef: Tender cuts, cost, \$	0.48	0.23	0.33	0.40

TABLE 4-Continued

Variable	Ethnic group			Total n=600
	Caucasian n=364	Mexican- American n=162	Negro n=74	
Beef: Less tender cuts, amount, lb.	0.81	1.41	1.33	1.04**
Beef: Less tender cuts, cost, \$	1.01	1.79	1.71	1.31**
Beef: Ground with soy, amount, lb.	0.04	0.06	0.00	0.04
Beef: Ground with soy, cost, \$	0.03	0.05	0.00	0.03
Pork: Total, amount, lb.	0.99	1.56	2.31	1.31**
Pork: Total, cost, \$	1.29	1.99	2.76	1.66**
Pork: Sausage, amount, lb.	0.19	0.31	0.43	0.25**
Pork: Sausage, cost, \$	0.23	0.34	0.55	0.30**
Pork: Fresh other than sausage, amount, lb.	0.23	0.74	1.11	0.48**
Pork: Fresh other than sausage, cost, \$	0.31	0.95	1.24	0.60**
Pork: Cured other than sausage, amount, lb.	0.56	0.49	0.78	0.57
Pork: Cured other than sausage, cost, \$	0.73	0.68	0.98	0.75
Poultry: Amount, lb.	0.93	1.53	2.28	1.26**
Poultry: Cost, \$	0.52	0.79	1.15	0.67**
Fish: Amount, lb.	0.32	0.19	0.22	0.27
Fish: Cost, \$	0.43	0.23	0.24	0.35*
Ready to eat meat: Amount, lb.	0.37	0.53	0.34	0.41*
Ready to eat meat: Cost, \$	0.50	0.69	0.46	0.55*
Meat combination dishes: Amount, lb.	0.46	0.50	0.26	0.45
Meat combination dishes: Cost, \$	0.33	0.26	0.18	0.29
Other: Amount, lb.	0.07	0.12	0.34	0.12**
Other: Cost, \$	0.08	0.10	0.26	0.11**
Red meat: Amount, lb.	2.93	4.20	4.51	3.47**
Red meat: Cost, \$	3.69	5.25	5.58	4.34**
White meat: Amount, lb.	1.22	1.70	2.53	1.51**
White meat: Cost, \$	0.95	1.02	1.45	1.03*

TABLE 4-Continued

Variable	Ethnic group			Total n=600
	Caucasian n=364	Mexican- American n=162	Negro n=74	
Fresh meat: Amount, lb.	3.76	5.69	6.32	4.60**
Fresh meat: Cost, \$	3.97	5.84	6.12	4.74**
Frozen meat: Amount, lb.	0.53	0.24	0.84	0.49**
Frozen meat: Cost, \$	0.53	0.26	0.83	0.49**
Cooked meat: Amount, lb.	0.41	0.55	0.31	0.43*
Cooked meat: Cost, \$	0.62	0.78	0.46	0.64
Canned meat: Amount, lb.	0.49	0.64	0.45	0.52
Canned meat: Cost, \$	0.51	0.48	0.49	0.50

*P<.05, **P<.01.

TABLE 5. LEAST SQUARES ANALYSIS OF VARIANCE FOR CONTINUOUS DATA

Source of variation	df	Mean squares						
		Number of kinds of meat	Amount of meat, lb.	Cost of meat, \$	Cost of meat, \$/lb.	Total spent, \$	Percent spent on meat	People shopped for
Ethnic area	2	3.98	15.17	31.27	0.29	104.19	304.76	2.66
Chain	1	23.03	154.38*	40.40	1.15**	2999.56**	2073.20*	1.64
Day	1	0.00	21.28	19.93	0.10	2468.98**	3518.58**	3.57
Ethnic group	2	36.21**	229.02**	302.74**	0.04	1856.26**	239.55	92.86**
Area X Chain	2	34.97**	87.47*	83.20	0.41*	379.31	1354.61*	11.87*
Area X Day	2	1.42	9.84	17.63	0.25	720.72*	281.34	0.52
Area X Group	4	14.47	50.87	75.47*	0.09	341.41	197.56	3.22
Chain X Day	1	0.01	4.67	4.03	0.19	670.46	702.20	0.32
Chain X Group	2	0.62	7.14	1.52	0.61**	88.39	87.55	12.43*
Day X Group	2	4.43	46.19	98.24*	0.08	1338.14**	405.46	4.47
Remainder	580	6.44	24.96	27.73	0.13	226.49	333.06	3.63

TABLE 5-Continued

Mean squares							
Source of variation	df	Amount of meat per person, lb. person, \$	Cost of meat per person, \$	Total money spent per person, \$	Frequency of buying meat per week	Amount of meat per person per week, lb. week, \$	Total spent per person per week, \$
Ethnic area	2	0.09	1.65	24.26	0.20	3.02	16.61
Chain	1	14.04*	2.95	161.87*	1.03	18.86*	275.42**
Day	1	0.08	0.03	134.37*	0.00	1.44	111.97
Ethnic group	2	0.24	0.92	20.59	2.33	4.61	87.21
Area X Chain	2	5.30	6.82	8.36	1.29	1.23	11.93
Area X Day	2	0.74	2.94	50.50	1.39	1.48	0.48
Area X Group	4	1.45	1.65	17.36	0.63	1.54	8.64
Chain X Day	1	0.18	1.79	24.79	1.28	0.13	106.57
Chain X Group	2	0.89	3.37	45.02	0.62	2.73	71.75
Day X Group	2	1.58	4.66	60.66	4.12*	8.43	29.92
Remainder	580	2.57	3.29	28.81	0.96	2.97	33.82

TABLE 5-Continued

Source of variation	df	Mean squares				Per capita income, \$/yr.
		Education of head of household, years	Family income, \$/yr.	Education of food shopper, years	Age of food shopper, years	
Ethnic area	2	9.99	24607288.96	20.35	312.50	9360973.49
Chain	1	38.85	263452969.78*	23.60	1.11	1691995.60
Day	1	14.11	51975958.35	0.01	54.01	2504511.57
Ethnic group	2	592.68**	337788949.47**	367.16**	446.00	72050255.52**
Area X Chain	2	37.10	162971969.13**	18.96	410.24	7992346.91
Area X Day	2	27.92	15252689.03	24.50	515.30	7596905.54
Area X Group	4	13.61	40163408.21	15.18	450.78	6175882.51
Chain X Day	1	0.44	40387105.93	4.61	38.20	13231588.71
Chain X Group	2	13.31	69206977.62	0.93	634.85	9867912.48
Day X Group	2	5.00	46986361.31	7.22	14.81	345451.54
Remainder	580	14.36	46463378.17	9.34	213.04	8374180.92

TABLE 5-Continued

		Mean squares									
		Beef									
Source of variation	df	Total		Ground		Tender cuts		Less tender cuts			
		Amount, lb.	Cost, \$	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$
Ethnic area	2	3.10	0.70	0.06	0.11	0.07	0.17	3.91	0.17	3.91	1.19
Chain	1	125.63**	83.67**	14.46**	12.02*	2.56	2.15	21.83**	2.15	21.83**	13.98
Day	1	16.37	40.86	0.41	0.47	1.35	3.30	6.07	3.30	6.07	14.82
Ethnic group	2	39.14**	74.41**	7.34*	11.98**	0.31	0.43	18.40**	0.43	18.40**	33.50**
Area X Chain	2	15.57	24.73	2.72	3.08	2.06	3.13	0.97	3.13	0.97	3.34
Area X Day	2	7.55	13.20	1.09	1.66	1.44	2.93	3.66	2.93	3.66	6.78
Area X Group	4	7.51	9.74	1.32	2.06	0.20	0.46	5.48	0.46	5.48	5.36
Chain X Day	1	0.22	1.30	0.14	1.00	0.04	0.00	0.13	0.00	0.13	0.01
Chain X Group	2	1.70	2.25	1.10	1.95	0.05	0.16	0.02	0.16	0.02	0.35
Day X Group	2	25.66*	55.13**	1.29	0.76	1.20	2.56	13.93*	2.56	13.93*	32.66**
Remainder	580	6.71	10.75	1.64	2.20	0.72	1.64	3.12	1.64	3.12	4.82

TABLE 5-Continued

		Mean squares									
		Beef: Ground with soy					Pork				
Source of variation	df	Total		Sausage		Fresh other than sausage	Sausage		Fresh other than sausage		Cost, \$
		Amount, lb.	Cost, \$	Amount, lb.	Cost, \$		Amount, lb.	Cost, \$	Amount, lb.	Cost, \$	
Ethnic area	2	0.00	0.00	5.18	12.34	4.59**	10.16**	2.63	4.99		
Chain	1	0.73**	0.46**	26.22**	50.94**	1.35	0.84	12.31**	22.11**		
Day	1	0.00	0.00	2.93	5.77	2.56*	4.20**	1.99	2.63		
Ethnic group	2	0.01	0.01	28.97**	51.81**	1.30*	3.08**	19.30**	33.01**		
Area X Chain	2	0.13	0.08	0.78	1.78	0.24	0.26	0.06	0.19		
Area X Day	2	0.10	0.06	0.88	2.17	0.27	0.48	0.62	1.52		
Area X Group	4	0.06	0.04	10.00*	18.20**	1.78**	4.32**	3.74*	7.40**		
Chain X Day	1	0.00	0.00	2.80	9.02	0.00	0.09	0.02	0.33		
Chain X Group	2	0.07	0.05	5.68	10.52	0.66	0.74	2.31	4.16		
Day X Group	2	0.01	0.01	17.06**	28.67**	1.01	1.56	4.90*	5.95*		
Remainder	580	0.10	0.06	3.35	5.20	0.40	0.55	1.26	1.74		

TABLE 5-Continued

Source of variation	df	Mean squares									
		Meat combination dishes			Other		Red meat		White meat		
		Amount, lb.	Cost, \$	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$
Ethnic area	2	0.12	0.02	0.03	0.03	13.91	16.84	2.96	0.56		
Chain	1	3.29	0.89	7.59**	4.43**	34.45	5.79	39.81**	7.79		
Day	1	0.12	0.23	0.27	0.10	2.21	7.82	10.28	3.24		
Ethnic group	2	0.84	0.54	0.24	0.12	125.03**	223.17**	11.78	1.68		
Area X Chain	2	0.91	0.16	0.35	0.33	22.79	40.12	23.12*	7.63*		
Area X Day	2	6.09**	2.49**	0.93*	0.79*	8.13	19.84	1.72	0.35		
Area X Group	4	0.35	0.16	0.05	0.08	31.71*	43.87	2.19	0.85		
Chain X Day	1	0.33	0.09	0.42	0.21	4.01	20.12	2.41	0.00		
Chain X Group	2	0.11	0.07	2.10**	1.05**	0.30	5.86	9.53	2.12		
Day X Group	2	0.09	0.08	0.04	0.02	44.56*	93.34**	1.19	0.41		
Remainder	580	1.03	0.44	0.29	0.21	12.39	19.32	5.10	2.09		

TABLE 5-Continued

Source of variation	df	Mean squares							
		Fresh meat		Frozen meat		Cooked meat		Canned meat	
		Amount, lb.	Cost, \$	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$
Ethnic area	2	5.07	10.20	0.70	1.05	2.30**	7.07**	0.67	0.65
Chain	1	121.91*	11.92	5.15*	0.78	0.01	0.00	15.01**	14.16**
Day	1	34.67	27.77	4.76*	0.95	1.00	3.86	0.55	1.90
Ethnic group	2	216.02**	269.43**	2.69	2.23	2.32**	5.76**	1.64	1.29
Area X Chain	2	74.11*	69.46*	1.16	0.42	1.04	1.72	0.72	0.90
Area X Day	2	26.05	40.36	3.43*	1.12	0.02	0.17	2.32	2.43
Area X Group	4	37.43	43.67	0.31	0.41	1.38*	4.23**	0.62	0.82
Chain X Day	1	4.08	0.86	1.70	0.06	0.26	0.08	0.86	1.66
Chain X Group	2	4.75	0.34	6.72**	3.84*	0.08	0.20	1.45	1.50
Day X Group	2	38.00	77.12*	2.62	2.14	1.23	2.98	0.94	0.38
Remainder	580	19.76	21.35	1.05	1.08	0.46	1.08	1.35	1.27

*P<.05, **P<.01.

TABLE 6. LEAST SQUARES MEANS FOR CONTINUOUS MEAT BUYING VARIABLES

Source of variation	Number of subjects	Number of kinds of meat	Amount of meat, lb.	Cost of meat, \$	Cost of meat, \$/lb.	Total spent, \$	Percent spent on meat	People shopped for
Ethnic area								
1 Caucasian	200	3.55	6.23	7.55	1.30	26.39	28.01	3.53
2 Mexican-American	200	4.19	7.93	8.46	1.21	20.11	38.82	4.30
3 Negro	200	3.47	6.55	6.51	1.08	21.59	35.86	4.39
Chain								
1 A	300	4.00	7.59 ^a	7.85	1.14 ^a	25.70 ^a	31.74 ^a	4.14
2 B	300	3.47	6.22 ^b	7.16	1.26 ^b	19.70 ^b	36.73 ^b	4.00
Day								
1 Wednesday	300	3.73	7.15	7.75	1.22	25.39 ^a	31.02 ^a	4.18
2 Saturday	300	3.74	6.65	7.26	1.18	20.00 ^b	37.45 ^b	3.97
Ethnic group								
1 Caucasian	364	3.27 ^a	5.04 ^a	5.40 ^a	1.18	20.80 ^a	30.93	3.07 ^a
2 Mexican-American	162	4.57 ^b	8.27 ^b	9.12 ^b	1.15	29.98 ^b	31.42	5.15 ^b
3 Negro	74	3.37 ^{ab}	7.40 ^{ab}	7.99 ^{ab}	1.27	17.31 ^{ab}	40.35	4.00 ^{ab}
Ethnic area X Chain								
Area 1 X Chain 1	100	4.15	7.61	8.40	1.19	31.22	25.98	3.90
Area 1 X Chain 2	100	2.94	4.85	6.69	1.42	21.56	30.05	3.16
Area 2 X Chain 1	100	4.70	8.78	9.19	1.20	22.64	39.18	4.10
Area 2 X Chain 2	100	3.69	7.07	7.72	1.22	17.59	38.47	4.49
Area 3 X Chain 1	100	3.15	6.36	5.96	1.03	23.24	30.06	4.43
Area 3 X Chain 2	100	3.79	6.74	7.06	1.13	19.94	41.67	4.36
Ethnic area X Day								
Area 1 X Day 1	100	3.55	6.76	8.19	1.36	31.43	24.71	3.70
Area 1 X Day 2	100	3.54	5.71	6.90	1.25	21.34	31.31	3.36
Area 2 X Day 1	100	4.29	8.16	8.46	1.18	22.69	34.25	4.35
Area 2 X Day 2	100	4.10	7.70	8.45	1.24	17.53	43.40	4.25
Area 3 X Day 1	100	3.36	6.54	6.58	1.10	22.05	34.09	4.48
Area 3 X Day 2	100	3.57	6.56	6.44	1.06	21.13	37.63	4.30
Ethnic area X Ethnic group								
Area 1 X Group 1	192	3.54	5.45	6.27	1.27	23.40	28.92	3.19
Area 1 X Group 2	7	5.87	11.08	13.35	1.26	42.17	28.92	5.17
Area 1 X Group 3	1	1.23	2.17	3.02	1.39	13.59	26.19	2.23
Area 2 X Group 1	92	3.07	4.40	4.59	1.14	18.10	31.01	2.66
Area 2 X Group 2	106	4.58	7.31	7.55	1.09	23.23	34.39	4.67
Area 2 X Group 3	2	4.92	12.08	13.23	1.41	19.01	51.07	5.56
Area 3 X Group 1	80	3.18	5.28	5.34	1.13	20.91	32.85	3.35
Area 3 X Group 2	49	3.27	6.42	6.46	1.10	24.54	30.95	5.62
Area 3 X Group 3	71	3.95	7.96	7.73	1.01	19.33	43.78	4.21
Chain X Day								
Chain 1 X Day 1	150	4.00	7.93	8.01	1.14	29.47	27.41	4.27
Chain 1 X Day 2	150	4.00	7.24	7.69	1.14	21.93	36.06	4.02
Chain 2 X Day 1	150	3.47	6.38	7.48	1.29	21.31	34.62	4.08
Chain 2 X Day 2	150	3.48	6.06	6.83	1.22	18.08	38.84	3.93
Chain X Ethnic group								
Chain 1 X Group 1	193	3.45	5.70	5.82	1.07	22.87	29.11	3.11
Chain 1 X Group 2	65	4.84	9.25	9.35	1.02	32.90	28.12	5.62
Chain 1 X Group 3	42	3.71	7.80	8.39	1.32	21.33	37.98	3.70
Chain 2 X Group 1	171	3.08	4.38	4.98	1.28	18.73	32.75	3.02
Chain 2 X Group 2	97	4.31	7.29	8.89	1.27	27.06	34.72	4.69
Chain 2 X Group 3	32	3.03	7.00	7.59	1.22	13.30	42.72	4.30
Day X Ethnic group								
Day 1 X Group 1	180	3.15	4.96	5.24	1.17	20.50	29.71	2.98
Day 1 X Group 2	81	4.78	9.23	10.44	1.18	35.52	28.21	5.40
Day 1 X Group 3	39	3.27	7.27	7.56	1.30	20.15	35.13	4.14
Day 2 X Group 1	184	3.39	5.13	5.56	1.19	21.10	32.14	3.15
Day 2 X Group 2	81	4.36	7.31	7.80	1.12	24.43	34.63	4.91
Day 2 X Group 3	35	3.47	7.53	8.42	1.24	14.48	45.57	3.86
Residual variance	580 ^a	6.44	24.96	27.73	0.13	266.49	333.06	3.63

TABLE 6-Continued

Source of variation	Amount of meat per person, lb.	Cost of meat per person, \$	Total money spent per person, \$	Frequency of buying meat per week	Amount of meat per person per week, lb.	Cost of meat per person per week, \$	Total spent per person per week, \$
Ethnic area							
1 Caucasian	1.79	2.32	8.28	1.33	1.88	2.44	9.25
2 Mexican-American	1.82	1.97	5.41	1.50	2.70	2.89	7.03
3 Negro	1.72	1.72	5.76	1.56	2.10	2.10	7.11
Chain							
1 A	1.98 ^a	2.10	7.18 ^a	1.41	2.46 ^a	2.60	8.71 ^a
2 B	1.57 ^b	1.91	5.79 ^b	1.52	1.99 ^b	2.35	6.89 ^b
Day							
1 Wednesday	1.79	2.02	7.12 ^a	1.46	2.16	2.39	8.37
2 Saturday	1.76	2.00	5.86 ^b	1.46	2.29	2.57	7.22
Ethnic group							
1 Caucasian	1.82	1.99	7.48	1.42	2.14	2.33	8.71
2 Mexican-American	1.89	2.19	7.22	1.13	1.75	1.92	6.69
3 Negro	1.62	1.84	4.76	1.83	2.78	3.18	7.99
Ethnic area X Chain							
Area 1 X Chain 1	2.07	2.40	8.99	1.26	2.20	2.57	10.12
Area 1 X Chain 2	1.51	2.25	7.58	1.39	1.55	2.32	8.39
Area 2 X Chain 1	2.17	2.30	6.35	1.36	2.95	3.11	7.67
Area 2 X Chain 2	1.47	1.65	4.48	1.65	2.45	2.68	6.39
Area 3 X Chain 1	1.70	1.61	6.21	1.60	2.24	2.13	8.33
Area 3 X Chain 2	1.73	1.84	5.31	1.51	1.96	2.06	5.89
Ethnic area X Day							
Area 1 X Day 1	1.88	2.46	9.60	1.21	1.70	2.29	9.77
Area 1 X Day 2	1.70	2.19	6.96	1.44	2.05	2.60	8.74
Area 2 X Day 1	1.77	1.83	5.71	1.52	2.64	2.75	7.66
Area 2 X Day 2	1.87	2.12	5.12	1.48	2.75	3.04	6.40
Area 3 X Day 1	1.72	1.76	6.03	1.64	2.13	2.13	7.68
Area 3 X Day 2	1.71	1.69	5.50	1.47	2.06	2.06	6.53
Ethnic area X Ethnic group							
Area 1 X Group 1	1.97	2.30	8.37	1.33	2.07	2.41	8.99
Area 1 X Group 2	2.36	3.06	9.84	0.68	1.45	1.78	6.53
Area 1 X Group 3	1.06	1.62	6.63	1.97	2.11	3.14	12.24
Area 2 X Group 1	1.83	1.96	7.56	1.46	2.22	2.39	8.88
Area 2 X Group 2	1.92	2.02	6.22	1.43	2.17	2.34	7.03
Area 2 X Group 3	1.71	1.94	2.46	1.62	3.70	3.96	5.18
Area 3 X Group 1	1.67	1.72	6.50	1.48	2.14	2.21	8.27
Area 3 X Group 2	1.40	1.49	5.61	1.30	1.63	1.64	6.50
Area 3 X Group 3	2.08	1.97	5.19	1.88	2.53	2.44	6.55
Chain X Day							
Chain 1 X Day 1	1.98	2.06	8.02	1.36	2.41	2.49	9.71
Chain 1 X Day 2	1.98	2.15	6.35	1.46	2.51	2.71	7.70
Chain 2 X Day 1	1.60	1.98	6.21	1.56	1.91	2.29	7.03
Chain 2 X Day 2	1.54	1.85	5.37	1.47	2.07	2.42	6.74
Chain X Ethnic group							
Chain 1 X Group 1	2.00	2.07	7.97	1.30	2.22	2.27	8.93
Chain 1 X Group 2	2.00	2.08	7.23	1.13	1.95	1.88	7.13
Chain 1 X Group 3	1.95	2.15	6.35	1.80	3.22	3.66	10.06
Chain 2 X Group 1	1.64	1.92	6.99	1.55	2.06	2.40	8.50
Chain 2 X Group 2	1.79	2.30	7.21	1.14	1.55	1.96	6.25
Chain 2 X Group 3	1.29	1.53	3.17	1.86	2.34	2.71	5.92
Day X Ethnic group							
Day 1 X Group 1	1.82	1.96	7.44	1.53	2.37	2.52	9.65
Day 1 X Group 2	2.05	2.44	8.41	0.93	1.63	1.80	6.75
Day 1 X Group 3	1.50	1.66	5.50	1.92	2.49	2.85	8.72
Day 2 X Group 1	1.82	2.03	7.52	1.31	1.92	2.15	7.78
Day 2 X Group 2	1.74	1.94	6.04	1.34	1.88	2.03	6.63
Day 2 X Group 3	1.73	2.03	4.02	1.74	3.08	3.51	7.27
Residual variance	2.57	3.29	28.81	0.96	2.97	3.35	33.82

TABLE 6-Continued

Source of variation	Education of head of household, years	Family income, \$/yr.	Education of food shopper, years	Age of food shopper, years	Per capita income, \$
Ethnic area					
1 Caucasian	11.22	8898.16	11.66	34.87	3508.41
2 Mexican-American	10.61	6118.50	11.70	33.88	1800.52
3 Negro	9.87	6308.34	10.29	39.62	1908.83
Chain					
1 A	10.91	7998.06 ^a	11.48	36.07	2477.22
2 B	10.22	6218.61 ^b	10.95	36.18	2334.62
Day					
1 Wednesday	10.77	7499.31	11.22	36.52	2491.74
2 Saturday	10.36	6717.35	11.21	35.73	2320.09
Ethnic group					
1 Caucasian	12.63 ^a	9928.45 ^a	12.43 ^a	39.43	3551.39 ^a
2 Mexican-American	7.34 ^b	6203.30 ^b	8.29 ^b	35.19	1767.86 ^b
3 Negro	11.72 ^a	5193.24 ^b	12.93 ^a	33.75	1898.51 ^{a b}
Ethnic area X Chain					
Area 1 X Chain 1	11.03	10884.08	11.55	35.64	3432.61
Area 1 X Chain 2	11.41	6912.23	11.77	34.11	3584.20
Area 2 X Chain 1	10.97	6988.52	11.98	31.90	2139.41
Area 2 X Chain 2	10.25	5248.48	11.42	35.86	1461.63
Area 3 X Chain 1	10.72	6121.56	10.92	40.66	1859.65
Area 3 X Chain 2	9.02	6495.11	9.66	38.58	1958.02
Ethnic area X Day					
Area 1 X Day 1	11.01	9668.84	11.66	35.85	3839.75
Area 1 X Day 2	11.34	8127.47	11.66	33.90	3177.06
Area 2 X Day 1	10.62	6352.06	11.29	32.18	1678.40
Area 2 X Day 2	10.60	5834.93	12.10	35.58	1922.64
Area 3 X Day 1	10.59	6477.03	10.72	41.54	1957.08
Area 3 X Day 2	9.15	6139.65	9.87	37.70	1860.59
Ethnic area X Ethnic group					
Area 1 X Group 1	13.39	13682.54	13.05	41.08	4939.33
Area 1 X Group 2	7.70	7869.39	8.97	35.78	2067.43
Area 1 X Group 3	12.57	5142.54	12.96	27.75	3518.46
Area 2 X Group 1	12.67	7558.72	12.59	32.67	2931.53
Area 2 X Group 2	6.75	5860.04	7.66	33.90	1933.42
Area 2 X Group 3	12.41	4936.74	14.86	35.07	536.61
Area 3 X Group 1	11.84	8544.10	11.66	44.54	2783.31
Area 3 X Group 2	7.57	4880.46	8.25	35.88	1302.74
Area 3 X Group 3	10.19	5500.45	10.97	38.44	1640.45
Chain X Day					
Chain 1 X Day 1	11.14	8124.00	11.58	36.72	2411.35
Chain 1 X Day 2	10.68	7872.11	11.39	35.41	2543.10
Chain 2 X Day 1	10.40	6874.62	10.87	36.32	2572.14
Chain 2 X Day 2	10.05	5562.59	11.04	36.04	2097.09
Chain X Ethnic group					
Chain 1 X Group 1	13.13	10023.03	12.75	37.23	3602.78
Chain 1 X Group 2	7.30	6894.93	8.65	36.86	1493.07
Chain 1 X Group 3	12.29	7076.21	13.06	34.11	2335.81
Chain 2 X Group 1	12.13	9833.88	12.12	41.63	3499.99
Chain 2 X Group 2	7.38	5511.66	7.94	33.51	2042.66
Chain 2 X Group 3	11.15	3310.28	12.80	33.40	1461.20
Day X Ethnic group					
Day 1 X Group 1	12.91	10617.21	12.58	40.22	3578.61
Day 1 X Group 2	7.77	5856.45	8.53	35.50	1871.27
Day 1 X Group 3	11.63	6024.28	12.56	33.85	2025.35
Day 2 X Group 1	12.35	9239.70	12.29	38.65	3524.17
Day 2 X Group 2	6.91	6550.14	8.05	34.87	1664.45
Day 2 X Group 3	11.82	4362.21	13.30	33.66	1771.66
Residual variance	14.36	46463378.17	9.34	213.04	8374180.92

TABLE 6-Continued

Source of variation	Beef							
	Total		Ground		Tender cuts		Less tender cuts	
	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$
Ethnic area								
1 Caucasian	2.05	2.72	0.85	1.01	0.23	0.40	0.96	1.29
2 Mexican-American	2.74	2.98	0.76	0.90	0.08	0.15	1.89	1.92
3 Negro	2.11	2.68	0.73	0.85	0.15	0.23	1.22	1.59
Chain								
1 A	2.92 ^a	3.29 ^a	0.99 ^a	1.11 ^a	0.24	0.34	1.61 ^a	1.81
2 B	1.69 ^b	2.29 ^b	0.57 ^b	0.73 ^b	0.07	0.18	1.10 ^b	1.40
Day								
1 Wednesday	2.52	3.14	0.82	0.95	0.22	0.36	1.49	1.81
2 Saturday	2.08	2.44	0.75	0.88	0.09	0.16	1.22	1.39
Ethnic group								
1 Caucasian	1.88 ^a	2.28 ^a	0.79 ^a	0.90 ^a	0.27	0.38	0.80 ^a	0.99 ^a
2 Mexican-American	3.23 ^b	4.14 ^b	1.33 ^b	1.60 ^b	0.17	0.27	1.70 ^b	2.24 ^b
3 Negro	1.79 ^a	1.95 ^a	0.23 ^a	0.25 ^a	0.03	0.12	1.56 ^{ab}	1.58 ^{ab}
Ethnic area X Chain								
Area 1 X Chain 1	2.91	3.46	1.22	1.36	0.36	0.50	1.25	1.58
Area 1 X Chain 2	1.20	1.97	0.49	0.66	0.11	0.30	0.66	1.01
Area 2 X Chain 1	3.50	3.73	0.92	1.07	0.26	0.37	2.21	2.22
Area 2 X Chain 2	1.98	2.23	0.61	0.73	-0.10	-0.07	1.58	1.61
Area 3 X Chain 1	2.34	2.69	0.84	0.90	0.10	0.15	1.37	1.62
Area 3 X Chain 2	1.88	2.67	0.63	0.79	0.20	0.31	1.06	1.57
Ethnic area X Day								
Area 1 X Day 1	2.46	3.29	0.79	0.92	0.39	0.61	1.24	1.72
Area 1 X Day 2	1.64	2.14	0.92	1.10	0.08	0.19	0.67	0.87
Area 2 X Day 1	2.71	2.99	0.86	0.99	0.04	0.09	1.87	1.91
Area 2 X Day 2	2.77	2.97	0.67	0.81	0.12	0.21	1.92	1.92
Area 3 X Day 1	2.39	3.14	0.81	0.96	0.23	0.37	1.36	1.81
Area 3 X Day 2	1.83	2.22	0.65	0.74	0.08	0.09	1.08	1.38
Ethnic area X Ethnic group								
Area 1 X Group 1	2.23	2.81	1.00	1.18	0.41	0.63	0.78	0.99
Area 1 X Group 2	4.43	5.86	2.01	2.46	0.18	0.31	2.25	3.09
Area 1 X Group 3	-0.51	-0.52	-0.45	-0.62	0.11	0.26	-0.16	-0.19
Area 2 X Group 1	1.62	1.97	0.75	0.84	0.24	0.36	0.62	0.75
Area 2 X Group 2	2.84	3.37	1.05	1.25	0.22	0.30	1.49	1.74
Area 2 X Group 3	3.76	3.60	0.49	0.60	-0.21	-0.22	3.58	3.26
Area 3 X Group 1	1.78	2.08	0.62	0.68	0.14	0.16	1.00	1.22
Area 3 X Group 2	2.43	3.19	0.92	1.09	0.12	0.20	1.37	1.89
Area 3 X Group 3	2.12	2.77	0.65	0.76	0.20	0.33	1.27	1.67
Chain X Day								
Chain 1 X Day 1	3.15	3.59	1.01	1.10	0.32	0.44	1.76	2.01
Chain 1 X Day 2	2.68	2.99	0.97	1.11	0.17	0.24	1.46	1.60
Chain 2 X Day 1	1.89	2.68	0.62	0.81	0.12	0.28	1.22	1.61
Chain 2 X Day 2	1.49	1.90	0.52	0.65	0.01	0.08	0.98	1.18
Chain X Ethnic group								
Chain 1 X Group 1	2.36	2.70	0.89	0.97	0.35	0.49	1.07	1.21
Chain 1 X Group 2	3.89	4.52	1.54	1.73	0.23	0.32	1.97	2.38
Chain 1 X Group 3	2.50	2.66	0.54	0.62	0.15	0.21	1.80	1.83
Chain 2 X Group 1	1.39	1.87	0.69	0.84	0.18	0.27	0.53	0.76
Chain 2 X Group 2	2.58	3.77	1.11	1.47	0.11	0.22	1.44	2.10
Chain 2 X Group 3	1.09	1.23	-0.08	-0.12	-0.08	0.04	1.33	1.34
Day X Ethnic group								
Day 1 X Group 1	1.69	2.08	0.71	0.86	-0.22	0.32	0.74	0.89
Day 1 X Group 2	3.85	5.13	1.38	1.68	0.24	0.38	2.23	3.04
Day 1 X Group 3	2.02	2.20	0.36	0.33	0.19	0.38	1.51	1.50
Day 2 X Group 1	2.07	2.49	0.87	0.95	0.31	0.44	0.86	1.08
Day 2 X Group 2	2.61	3.15	1.27	1.52	0.10	0.16	1.18	1.44
Day 2 X Group 3	1.56	1.69	0.10	0.17	-0.13	-0.12	1.62	1.66
Residual variance	6.71	10.75	1.64	2.20	0.72	1.64	3.12	4.82

TABLE 6-Continued

Source of variation	Beef:		Total		Pork		Fresh other than sausage	
	Ground with soy				Sausage			
	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$
Ethnic area								
1 Caucasian	0.01	0.01	2.33	3.14	0.02 ^a	0.01 ^a	1.46	1.93
2 Mexican-American	0.03	0.02	2.15	2.82	1.00 ^b	1.43 ^b	0.92	1.06
3 Negro	0.01	0.01	1.50	1.84	0.26 ^a	0.31 ^a	0.66	0.79
Chain								
1 A	0.06 ^a	0.05 ^a	1.71 ^a	2.21 ^a	0.36	0.53	0.82 ^a	1.00 ^a
2 B	-0.03 ^b	-0.02 ^b	2.27 ^b	2.99 ^b	0.49	0.63	1.21 ^b	1.52 ^b
Day								
1 Wednesday	0.02	0.02	1.90	2.47	0.34 ^a	0.47 ^a	0.94	1.17
2 Saturday	0.01	0.01	2.09	2.73	0.51 ^b	0.69 ^b	1.09	1.35
Ethnic group								
1 Caucasian	0.03	0.02	0.98 ^a	1.26 ^a	0.20 ^a	0.24 ^a	0.24 ^a	0.31 ^a
2 Mexican-American	0.04	0.03	1.93 ^b	2.54 ^b	0.19 ^a	0.21 ^a	1.06 ^b	1.43 ^b
3 Negro	-0.02	-0.02	3.07 ^b	4.00 ^b	0.89 ^b	1.30 ^b	1.75 ^b	2.04 ^b
Ethnic area X Chain								
Area 1 X Chain 1	0.08	0.06	2.07	2.70	-0.04	-0.06	1.28	1.66
Area 1 X Chain 2	-0.05	-0.04	2.58	3.58	0.08	0.08	1.65	2.19
Area 2 X Chain 1	0.09	0.07	1.93	2.55	0.89	1.35	0.75	0.85
Area 2 X Chain 2	-0.04	-0.03	2.37	3.08	1.11	1.51	1.10	1.28
Area 3 X Chain 1	0.02	0.02	1.14	1.38	0.23	0.31	0.45	0.50
Area 3 X Chain 2	-0.00	-0.00	1.87	2.31	0.28	0.31	0.88	1.07
Ethnic area X Day								
Area 1 X Day 1	0.05	0.04	2.32	3.15	-0.05	-0.11	1.46	1.96
Area 1 X Day 2	-0.02	-0.01	2.33	3.13	0.09	0.12	1.46	1.89
Area 2 X Day 1	0.01	0.00	2.01	2.60	0.87	1.26	0.83	0.92
Area 2 X Day 2	0.04	0.03	2.28	3.03	1.14	1.60	1.02	1.21
Area 3 X Day 1	0.00	0.00	1.36	1.66	0.20	0.26	0.53	0.63
Area 3 X Day 2	0.02	0.01	1.65	2.03	0.31	0.36	0.80	0.94
Ethnic area X Ethnic group								
Area 1 X Group 1	0.05	0.04	1.06	1.39	0.14	0.18	0.25	0.33
Area 1 X Group 2	0.00	0.00	3.18	4.32	0.01	-0.00	1.97	2.77
Area 1 X Group 3	-0.00	-0.00	2.74	3.71	-0.09	-0.15	2.17	2.68
Area 2 X Group 1	0.02	0.02	0.72	0.94	0.26	0.30	0.12	0.15
Area 2 X Group 2	0.11	0.09	1.59	2.00	0.39	0.45	0.69	0.89
Area 2 X Group 3	-0.06	-0.04	4.13	5.52	2.35	3.55	1.95	2.15
Area 3 X Group 1	0.02	0.02	1.15	1.45	0.20	0.25	0.34	0.44
Area 3 X Group 2	0.01	0.01	1.01	1.30	0.16	0.18	0.51	0.64
Area 3 X Group 3	0.00	0.00	2.35	2.78	0.41	0.50	1.14	1.28
Chain X Day								
Chain 1 X Day 1	0.07	0.05	1.55	1.95	0.28	0.41	0.74	0.89
Chain 1 X Day 2	0.06	0.05	1.87	2.47	0.45	0.66	0.91	1.11
Chain 2 X Day 1	-0.03	-0.02	2.25	2.99	0.40	0.53	1.14	1.45
Chain 2 X Day 2	-0.03	-0.03	2.30	3.00	0.58	0.73	1.28	1.58
Chain X Ethnic group								
Chain 1 X Group 1	0.06	0.05	0.91	1.15	0.22	0.28	0.20	0.25
Chain 1 X Group 2	0.12	0.09	1.51	1.94	0.11	0.16	0.83	1.10
Chain 1 X Group 3	0.01	0.01	2.71	3.54	0.76	1.16	1.44	1.65
Chain 2 X Group 1	-0.00	-0.00	1.04	1.37	0.18	0.21	0.28	0.36
Chain 2 X Group 2	-0.03	-0.02	2.34	3.15	0.26	0.26	1.28	1.76
Chain 2 X Group 3	-0.06	-0.04	3.44	4.46	1.03	1.44	2.07	2.42
Day X Ethnic group								
Day 1 X Group 1	0.02	0.02	1.05	1.33	0.18	0.22	0.25	0.31
Day 1 X Group 2	0.05	0.04	2.23	2.93	0.18	0.18	1.19	1.58
Day 1 X Group 3	-0.01	-0.01	2.42	3.15	0.66	1.02	1.38	1.62
Day 2 X Group 1	0.04	0.03	0.91	1.19	0.22	0.26	0.22	0.30
Day 2 X Group 2	0.04	0.03	1.62	2.15	0.20	0.24	0.92	1.28
Day 2 X Group 3	-0.03	-0.02	3.73	4.86	1.12	1.58	2.13	2.45
Residual variance	0.10	0.06	3.35	5.20	0.40	0.55	1.26	1.74

TABLE 6-Continued

Source of variation	Pork, Cured		Poultry		Fish		Ready to eat meat	
	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$
Ethnic area								
1 Caucasian	0.85	1.21	0.86	0.44	0.28	0.40	0.43 ^{ab}	0.60 ^{ab}
2 Mexican-American	0.23	0.33	1.51	0.81	0.16	0.20	0.84 ^a	1.31 ^a
3 Negro	0.57	0.73	1.82	0.92	0.17	0.21	0.36 ^b	0.46 ^b
Chain								
1 A	0.52	0.67	1.71 ^a	0.83	0.25	0.31	0.58	0.86
2 B	0.58	0.85	1.09 ^b	0.62	0.16	0.23	0.51	0.72
Day								
1 Wednesday	0.62	0.83	1.60	0.82	0.21	0.28	0.55	0.81
2 Saturday	0.48	0.69	1.20	0.63	0.20	0.26	0.54	0.77
Ethnic group								
1 Caucasian	0.53	0.70	0.96 ^a	0.54	0.28	0.37	0.36 ^a	0.48 ^a
2 Mexican-American	0.67	0.89	1.76 ^b	0.87	0.27	0.34	0.63 ^b	0.84 ^b
3 Negro	0.44	0.68	1.48 ^{ab}	0.76	0.07	0.11	0.65 ^{ab}	1.06 ^{ab}
Ethnic area X Chain								
Area 1 X Chain 1	0.81	1.08	1.64	0.82	0.34	0.44	0.46	0.68
Area 1 X Chain 2	0.88	1.34	0.08	0.07	0.23	0.36	0.40	0.53
Area 2 X Chain 1	0.29	0.36	1.62	0.80	0.21	0.25	0.96	1.49
Area 2 X Chain 2	0.17	0.31	1.40	0.81	0.12	0.15	0.72	1.13
Area 3 X Chain 1	0.46	0.57	1.86	0.87	0.21	0.25	0.32	0.42
Area 3 X Chain 2	0.69	0.90	1.79	0.97	0.13	0.18	0.40	0.51
Ethnic area X Day								
Area 1 X Day 1	0.93	1.31	1.13	0.55	0.31	0.47	0.41	0.59
Area 1 X Day 2	0.77	1.11	0.60	0.33	0.25	0.33	0.46	0.62
Area 2 X Day 1	0.32	0.42	1.71	0.91	0.15	0.18	0.90	1.42
Area 2 X Day 2	0.14	0.24	1.32	0.71	0.17	0.21	0.78	1.21
Area 3 X Day 1	0.62	0.76	1.95	1.00	0.16	0.19	0.35	0.44
Area 3 X Day 2	0.53	0.71	1.70	0.84	0.18	0.24	0.37	0.48
Ethnic area X Ethnic group								
Area 1 X Group 1	0.65	0.85	0.92	0.52	0.39	0.57	0.42	0.57
Area 1 X Group 2	1.21	1.57	1.90	0.92	0.45	0.56	0.90	1.30
Area 1 X Group 3	0.68	1.21	-0.23	-0.12	-0.01	0.08	-0.03	-0.06
Area 2 X Group 1	0.34	0.49	0.77	0.46	0.28	0.33	0.29	0.37
Area 2 X Group 2	0.50	0.67	1.41	0.74	0.22	0.26	0.54	0.71
Area 2 X Group 3	-0.16	-0.16	2.35	1.22	-0.02	0.00	1.69	2.85
Area 3 X Group 1	0.61	0.76	1.20	0.62	0.16	0.21	0.36	0.48
Area 3 X Group 2	0.31	0.44	1.96	0.96	0.12	0.19	0.43	0.52
Area 3 X Group 3	0.80	1.01	2.31	1.17	0.24	0.25	0.29	0.38
Chain X Day								
Chain 1 X Day 1	0.53	0.65	1.99	0.95	0.25	0.32	0.59	0.88
Chain 1 X Day 2	0.51	0.69	1.42	0.71	0.25	0.31	0.57	0.85
Chain 2 X Day 1	0.72	1.01	1.20	0.69	0.16	0.25	0.51	0.75
Chain 2 X Day 2	0.44	0.69	0.99	0.55	0.15	0.21	0.50	0.69
Chain X Ethnic group								
Chain 1 X Group 1	0.49	0.60	1.06	0.56	0.32	0.42	0.36	0.50
Chain 1 X Group 2	0.57	0.68	2.40	1.13	0.33	0.42	0.63	0.87
Chain 1 X Group 3	0.51	0.73	1.66	0.79	0.10	0.10	0.75	1.22
Chain 2 X Group 1	0.58	0.80	0.87	0.51	0.23	0.32	0.35	0.46
Chain 2 X Group 2	0.78	1.11	1.11	0.62	0.20	0.25	0.62	0.82
Chain 2 X Group 3	0.37	0.64	1.30	0.72	0.04	0.12	0.55	0.89
Day X Ethnic group								
Day 1 X Group 1	0.61	0.79	1.06	0.60	0.26	0.35	0.31	0.43
Day 1 X Group 2	0.87	1.18	1.99	0.95	0.27	0.38	0.60	0.80
Day 1 X Group 3	0.39	0.52	1.74	0.90	0.07	0.12	0.75	1.22
Day 2 X Group 1	0.46	0.61	0.87	0.48	0.29	0.39	0.40	0.53
Day 2 X Group 2	0.48	0.61	1.53	0.79	0.25	0.29	0.65	0.89
Day 2 X Group 3	0.49	0.84	1.22	0.61	0.06	0.10	0.55	0.90
Residual variance	1.01	1.86	4.45	1.20	0.36	0.65	0.41	0.70

TABLE 6-Continued

Source of variation	Meat combination dishes		Other		Red meat		White meat	
	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$
Ethnic area								
1 Caucasian	0.18	0.15	0.20	0.19	4.30	5.77	1.12	0.80
2 Mexican-American	0.38	0.24	0.15	0.11	4.87	5.74	1.65	0.98
3 Negro	0.36	0.22	0.21	0.18	3.58	4.48	1.95	1.14
Chain								
1 A	0.41	0.25	0.04 ^a	0.05 ^a	4.58	5.46	1.92 ^a	1.12
2 B	0.21	0.15	0.34 ^b	0.28 ^b	3.93	5.20	1.22 ^b	0.82
Day								
1 Wednesday	0.29	0.17	0.16	0.14	4.33	5.48	1.74	1.07
2 Saturday	0.32	0.23	0.22	0.18	4.17	5.18	1.40	0.87
Ethnic group								
1 Caucasian	0.50	0.35	0.08	0.09	2.78 ^a	3.46 ^a	1.22	0.90
2 Mexican-American	0.39	0.23	0.11	0.12	5.14 ^b	6.64 ^b	1.97	1.18
3 Negro	0.02	0.03	0.37	0.28	4.83 ^{ab}	5.89 ^{ab}	1.52	0.83
Ethnic area X Chain								
Area 1 X Chain 1	0.21	0.17	0.07	0.10	4.86	6.07	1.92	1.22
Area 1 X Chain 2	0.15	0.13	0.33	0.28	3.74	5.47	0.31	0.39
Area 2 X Chain 1	0.56	0.32	0.03	0.03	5.43	6.31	1.83	1.05
Area 2 X Chain 2	0.19	0.16	0.26	0.20	4.32	5.17	1.47	0.91
Area 3 X Chain 1	0.44	0.27	0.01	0.01	3.43	4.01	2.00	1.11
Area 3 X Chain 2	0.28	0.16	0.42	0.35	3.73	4.95	1.89	1.16
Ethnic area X Day								
Area 1 X Day 1	0.05	0.05	0.25	0.25	4.59	6.23	1.38	0.95
Area 1 X Day 2	0.31	0.25	0.16	0.14	4.00	5.31	0.85	0.65
Area 2 X Day 1	0.59	0.36	0.13	0.11	4.70	5.48	1.86	1.07
Area 2 X Day 2	0.16	0.12	0.16	0.12	5.04	5.99	1.44	0.88
Area 3 X Day 1	0.22	0.11	0.10	0.08	3.69	4.73	1.99	1.19
Area 3 X Day 2	0.50	0.32	0.33	0.28	3.47	4.23	1.90	1.09
Ethnic area X Ethnic group								
Area 1 X Group 1	0.36	0.29	0.07	0.07	3.19	4.11	1.29	1.08
Area 1 X Group 2	0.25	0.21	0.15	0.21	7.53	10.08	2.34	1.46
Area 1 X Group 3	-0.06	-0.06	0.39	0.30	2.16	3.12	-0.28	-0.13
Area 2 X Group 1	0.74	0.49	0.04	0.04	2.27	2.82	1.04	0.78
Area 2 X Group 2	0.54	0.28	0.09	0.08	4.47	5.36	1.64	1.01
Area 2 X Group 3	-0.15	-0.05	0.32	0.23	7.87	9.03	2.26	1.15
Area 3 X Group 1	0.42	0.27	0.14	0.15	2.87	3.44	1.35	0.85
Area 3 X Group 2	0.39	0.18	0.09	0.07	3.41	4.47	1.92	1.07
Area 3 X Group 3	0.27	0.19	0.41	0.31	4.45	5.53	2.57	1.48
Chain X Day								
Chain 1 X Day 1	0.41	0.24	0.04	0.05	4.57	5.43	2.15	1.22
Chain 1 X Day 2	0.40	0.27	0.04	0.04	4.57	5.50	1.68	1.03
Chain 2 X Day 1	0.16	0.11	0.28	0.24	4.09	5.54	1.33	0.92
Chain 2 X Day 2	0.25	0.19	0.39	0.31	3.76	4.86	1.12	0.72
Chain X Ethnic group								
Chain 1 X Group 1	0.64	0.42	0.04	0.05	3.14	3.70	1.38	0.98
Chain 1 X Group 2	0.50	0.29	0.05	0.07	5.41	6.52	2.60	1.48
Chain 1 X Group 3	0.08	0.05	0.02	0.02	5.16	6.17	1.76	0.92
Chain 2 X Group 1	0.37	0.27	0.12	0.12	2.42	3.22	1.07	0.83
Chain 2 X Group 2	0.29	0.17	0.17	0.17	4.87	6.76	1.33	0.88
Chain 2 X Group 3	-0.04	0.01	0.73	0.54	4.50	5.61	1.27	0.75
Day X Ethnic group								
Day 1 X Group 1	0.48	0.33	0.07	0.08	2.63	3.29	1.29	0.94
Day 1 X Group 2	0.34	0.17	0.08	0.10	5.96	7.86	2.15	1.27
Day 1 X Group 3	0.04	0.02	0.33	0.25	4.40	5.30	1.79	1.00
Day 2 X Group 1	0.53	0.36	0.09	0.09	2.93	3.63	1.16	0.87
Day 2 X Group 2	0.44	0.28	0.15	0.14	4.32	5.42	1.79	1.09
Day 2 X Group 3	-0.00	0.03	0.41	0.31	5.26	6.49	1.24	0.67
Residual variance	1.03	0.44	0.29	0.21	12.39	19.32	5.10	2.09

TABLE 6-Continued

Source of variation	Fresh meat		Frozen meat		Cooked meat		Canned meat	
	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$	Amount, lb.	Cost, \$
Ethnic area								
1 Caucasian	5.20	6.16	0.27	0.25	0.59 ^{ab}	0.94 ^{ab}	0.19	0.19
2 Mexican-American	6.02	6.01	0.76	0.84	0.89 ^a	1.41 ^a	0.27	0.18
3 Negro	5.21	5.07	0.52	0.54	0.35 ^b	0.48 ^b	0.49	0.43
Chain								
1 A	6.08 ^a	5.93	0.39 ^a	0.49	0.60	0.94	0.53 ^a	0.47 ^a
2 B	4.87 ^b	5.55	0.64 ^b	0.59	0.61	0.95	0.10 ^b	0.06 ^b
Day								
1 Wednesday	5.79	6.03	0.40 ^a	0.49	0.66	1.05	0.27	0.19
2 Saturday	5.15	5.46	0.64 ^b	0.59	0.55	0.84	0.36	0.34
Ethnic group								
1 Caucasian	3.64 ^a	3.75 ^a	0.53	0.54	0.38 ^a	0.57 ^a	0.49	0.48
2 Mexican-American	6.78 ^b	7.26 ^b	0.20	0.24	0.70 ^b	1.06 ^b	0.62	0.52
3 Negro	6.00 ^{ab}	6.22 ^{ab}	0.83	0.85	0.74 ^{ab}	1.21 ^{ab}	-0.17	-0.20
Ethnic area X Chain								
Area 1 X Chain 1	6.54	6.92	0.07	0.18	0.53	0.87	0.46	0.46
Area 1 X Chain 2	3.85	5.39	0.48	0.31	0.64	1.02	-0.09	-0.08
Area 2 X Chain 1	6.61	6.42	0.73	0.85	0.98	1.54	0.49	0.41
Area 2 X Chain 2	5.43	5.60	0.79	0.83	0.80	1.29	0.04	-0.05
Area 3 X Chain 1	5.09	4.46	0.38	0.44	0.30	0.43	0.63	0.55
Area 3 X Chain 2	5.33	5.68	0.65	0.63	0.40	0.53	0.36	0.32
Ethnic area X Day								
Area 1 X Day 1	5.99	6.96	-0.01	0.10	0.64	1.06	0.10	0.07
Area 1 X Day 2	4.40	5.35	0.56	0.39	0.53	0.82	0.27	0.31
Area 2 X Day 1	5.99	5.76	0.78	0.87	0.95	1.55	0.37	0.25
Area 2 X Day 2	6.05	6.25	0.74	0.81	0.82	1.28	0.16	0.11
Area 3 X Day 1	5.40	5.37	0.43	0.49	0.39	0.55	0.36	0.26
Area 3 X Day 2	5.01	4.77	0.61	0.58	0.31	0.42	0.63	0.61
Ethnic area X Group								
Area 1 X Group 1	4.00	4.39	0.52	0.51	0.46	0.72	0.51	0.59
Area 1 X Group 2	9.23	10.68	0.13	0.18	1.08	1.79	0.62	0.66
Area 1 X Group 3	2.36	3.40	0.18	0.06	0.21	0.32	-0.57	-0.68
Area 2 X Group 1	2.89	3.00	0.63	0.62	0.34	0.50	0.48	0.46
Area 2 X Group 2	5.85	5.90	0.25	0.28	0.57	0.81	0.68	0.49
Area 2 X Group 3	9.32	9.13	1.40	1.61	1.74	2.94	-0.37	-0.40
Area 3 X Group 1	4.05	3.87	0.43	0.48	0.35	0.50	0.46	0.38
Area 3 X Group 2	5.25	5.21	0.21	0.25	0.43	0.57	0.57	0.43
Area 3 X Group 3	6.32	6.13	0.92	0.88	0.27	0.37	0.45	0.49
Chain X Day								
Chain 1 X Day 1	6.48	6.18	0.33	0.43	0.68	1.06	0.45	0.35
Chain 1 X Day 2	5.68	5.69	0.46	0.56	0.53	0.83	0.61	0.60
Chain 2 X Day 1	5.10	5.88	0.47	0.55	0.65	1.04	0.10	0.04
Chain 2 X Day 2	4.63	5.23	0.81	0.63	0.58	0.85	0.10	0.08
Chain X Ethnic group								
Chain 1 X Group 1	4.16	3.98	0.60	0.63	0.36	0.55	0.58	0.59
Chain 1 X Group 2	7.61	7.40	0.24	0.32	0.67	1.01	0.81	0.65
Chain 1 X Group 3	6.47	6.41	0.34	0.52	0.78	1.27	0.19	0.18
Chain 2 X Group 1	3.13	3.52	0.45	0.44	0.41	0.59	0.39	0.36
Chain 2 X Group 2	5.94	7.12	0.15	0.15	0.72	1.10	0.44	0.40
Chain 2 X Group 3	5.53	6.02	1.32	1.17	0.71	1.15	-0.52	-0.57
Day X Ethnic group								
Day 1 X Group 1	3.66	3.71	0.57	0.63	0.33	0.51	0.38	0.39
Day 1 X Group 2	7.74	8.51	0.08	0.17	0.74	1.16	0.67	0.52
Day 1 X Group 3	5.98	5.87	0.55	0.67	0.92	1.49	-0.23	-0.33
Day 2 X Group 1	3.63	3.80	0.48	0.44	0.44	0.64	0.59	0.57
Day 2 X Group 2	5.81	6.01	0.31	0.31	0.66	0.95	0.57	0.53
Day 2 X Group 3	6.02	6.57	1.12	1.03	0.56	0.93	-0.09	-0.07
Residual variance	19.76	21.35	1.05	1.08	0.46	1.08	1.35	1.27

^{a,b}Means with different superscripts within a category of ethnic area through ethnic group within a column differ significantly ($P < .05$). Means with same or no superscripts do not differ.

^cDegrees of freedom.

Correlation Analyses of Continuous Data

Results of the correlation analyses of continuous data are shown in tables 7 through 9. In correlation analyses 1 and 2, tables 7 and 8, the first 11 variables were significantly related to most of the meat buying variables (numbers 20 through 35). Fewer significant correlations were found of the education, age and income variables (variables 15 through 19) with the meat buying variables. Correlation analysis 1 showed the following number of significant correlations for amounts of meat variables with education, age and income variables: 21 with education of head of household, 7 with annual family income, 20 with education of food shopper, 11 with age of food shopper, and 23 with annual per capita income. Only per capita income was significantly related to the amount of meat per person.

Correlation analysis 2 showed the following number of significant correlations for cost of meat variables with education, age and income variables: 18 with education of head of household, 6 with annual family income, 19 with education of food shopper, 11 with age of food shopper, and 21 with annual per capita income. Only annual per capita income was significantly related to cost of meat per person. In both correlation analyses 1 and 2, annual per capita income had more significant correlations with amounts and costs of meat than did annual family income, education or age. Both analyses indicated that annual per capita income, education of head of household and education of food shopper were the age, education and income variables

which had more significant correlations with amounts and costs of meat. Number of people had the most significant correlations (27 in analysis 1 and 26 in analysis 2) with amounts and costs of meat.

Correlation analysis 3 showed similar correlation coefficients for most corresponding meat amounts and costs with the other variables. As was expected, significant and high correlations were found between almost all corresponding meat amounts and costs.

TABLE 7. CORRELATION ANALYSIS 1: SIMPLE CORRELATION COEFFICIENTS FOR SELECTED VARIABLES

Variable	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)	15)	16)	17)	18)	19)
1) Kinds of meat	1.00																		
2) Amount of meat	0.80**	1.00																	
3) Cost of meat, \$	0.82**	0.94**	1.00																
4) Cost of meat, \$/lb.	-.14**	-.27**	-.07	1.00															
5) Total money spent	0.71**	0.72**	0.74**	-.08*	1.00														
6) Percent of money spent for meat	0.13**	0.27**	0.28**	-.01	-.27**	1.00													
7) Number of people	0.15**	0.24**	0.19**	-.09*	0.18**	0.03	1.00												
8) Amount of meat per person	0.66**	0.73**	0.73**	-.20**	0.52**	0.27**	-.27**	1.00											
9) Cost of meat per person	0.63**	0.64**	0.73**	0.01	0.52**	0.26**	-.30**	0.94**	1.00										
10) Total spent per person	0.50**	0.41**	0.48**	0.02	0.70**	-.27**	-.37**	0.71**	0.75**	1.00									
11) Frequency of buying meat	-.32**	0.33**	-.32**	0.10*	-.40**	0.12**	0.11*	-.34**	-.32**	-.39**	1.00								
12) Amount of meat per person per week	0.43**	0.47**	0.45**	-.21**	0.23**	0.30**	-.25**	0.68**	0.61**	0.39**	0.14**	1.00							
13) Cost of meat per person per week	0.43**	0.42**	0.49**	0.03	0.25**	0.32**	-.29**	0.66**	0.70**	0.45**	0.17**	0.93**	1.00						
14) Total spent per person per week	0.27**	0.17**	0.22**	0.03	0.42**	-.28**	-.34**	0.41**	0.44**	0.66**	0.14**	0.66**	0.70**	1.00					
15) Education of head of household	-.14**	-.16**	-.12**	0.12**	-.02	-.21**	-.31**	0.01	0.04	0.17**	-.08	-.05	-.01	0.14**	1.00				
16) Annual family income	-.02	-.03	-.00	0.07	0.13**	-.17**	0.00	-.03	-.00	0.09*	-.04	-.03	0.02	0.10*	0.37**	1.00			
17) Education of food shopper	-.14**	-.15**	-.12**	0.10*	-.01	-.20**	-.31**	0.01	0.05	0.19**	-.05	-.02	0.01	0.17**	0.81**	0.36**	1.00		
18) Age of food shopper	-.13**	-.07	-.09*	-.04	-.14**	0.08	-.14**	0.01	-.01	-.07	0.08	0.10*	0.08	0.04	-.20**	0.00	-.19**	1.00	
19) Annual per capita income	-.10*	-.14**	-.10*	0.11*	-.03	-.11*	-.38**	0.12**	0.17**	0.25**	-.08*	0.10*	0.15**	0.23**	0.36**	0.69**	0.40**	0.06	1.00
20) Beef, Total, amount	0.54**	0.69**	0.76**	-.05	0.51**	0.26**	0.14**	0.55**	0.57**	0.34**	-.22**	0.34**	0.38**	0.17**	-.04	0.01	-.04	-.06	-.08
21) Beef, Ground, amount	0.38**	0.49**	0.50**	-.09*	0.37**	0.14**	0.15**	0.32**	0.31**	0.21**	-.15**	0.18**	0.20**	0.09*	-.00	0.03	-.01	-.13**	-.09*
22) Beef, Tender cuts, amount	0.24**	0.24**	0.32**	0.11*	0.22**	0.08	-.06	0.31**	0.38**	0.25**	-.11**	0.19**	0.27**	0.17**	0.07	-.07	0.03	0.02	0.08
23) Beef, Less tender cuts, amount	0.41**	0.56**	0.61**	-.04	0.39**	0.24**	0.11**	0.43**	0.44**	0.25**	-.17**	0.29**	0.31**	0.13**	-.10*	-.04	-.08	0.00	-.07
24) Pork, Total, amount	0.52**	0.61**	0.65**	-.04	0.48**	0.17**	0.15**	0.42**	0.43**	0.26**	-.19**	0.25**	0.27**	0.08	-.15**	-.06	-.14**	-.03	-.11*
25) Poultry, Amount	0.38**	0.66**	0.45**	-.40**	0.35**	0.15**	0.19**	0.43**	0.23**	0.11**	-.16**	0.36**	0.18**	0.06	-.17**	-.03	-.10*	-.00	-.10*
26) Fish, Amount	0.33**	0.25**	0.25**	-.03	0.30**	-.05	0.01	0.29**	0.28**	0.29**	-.18**	0.08*	0.09*	0.08	0.02	0.06	-.04	-.02	0.05
27) Ready to eat meat, Amount	0.40**	0.26**	0.29**	0.01	0.28**	0.05	0.16**	0.15**	0.16**	0.12**	-.12**	0.06	0.08	0.01	-.14**	-.02	-.14**	-.11*	-.10*
28) Meat combination dishes, Amount	0.40**	0.32**	0.23**	-.22**	0.30**	-.06	0.02	0.28**	0.19**	0.22**	-.17**	0.13**	0.07	0.07	0.01	-.05	-.02	-.12**	-.04
29) Other meat, Amount	0.04	0.09*	0.05	-.11**	-.02	0.19**	0.01	0.06	0.02	-.04	-.05	0.06	0.03	-.02	-.08	-.05	-.11*	0.02	-.07
30) Red meat, Amount	0.67**	0.83**	0.89**	-.06	0.62**	0.28**	0.18**	0.63**	0.64**	0.39**	-.26**	0.39**	0.43**	0.17**	-.11**	-.03	-.11*	-.06	-.11*
31) White meat, Amount	0.44**	0.68**	0.49**	-.38**	0.40**	0.13**	0.17**	0.48**	0.30**	0.18**	-.20**	0.36**	0.20**	0.08	-.15**	-.01	-.09*	-.01	-.08
32) Fresh meat, Amount	0.68**	0.94**	0.88**	-.26**	0.63**	0.29**	0.24**	0.67**	0.58**	0.33**	-.27**	0.47**	0.41**	0.15**	-.16**	-.03	-.14**	-.03	-.14**
33) Frozen meat, Amount	0.29**	0.26**	0.22**	-.08	0.18**	0.07	-.08	0.29**	0.23**	0.19**	-.13**	0.21**	0.18**	0.12**	0.06	0.00	0.03	-.02	0.05
34) Cooked meat, Amount	0.38**	0.29**	0.35**	0.07	0.30**	0.07	0.12**	0.18**	0.22**	0.16**	-.15**	0.05	0.09*	0.03	-.12**	0.02	-.10*	-.12**	-.06
35) Canned meat, Amount	0.42**	0.34**	0.28**	-.13**	0.36**	-.05	0.10*	0.26**	0.21**	0.23**	-.19**	0.05	0.02	0.02	-.09*	-.07	-.08	-.10*	-.10*

TABLE 7-Continued

Variable	20)	21)	22)	23)	24)	25)	26)	27)	28)	29)	30)	31)	32)	33)	34)	35)
20) Beef, Total, amount	1.00															
21) Beef, Ground, amount	0.64**	1.00														
22) Beef, Tender cuts, amount	0.42**	0.08	1.00													
23) Beef, Less tender cuts, amount	0.79**	0.19**	0.09*	1.00												
24) Pork, Total, amount	0.23**	0.15**	0.02	0.22**	1.00											
25) Poultry, Amount	0.21**	0.18**	0.02	0.18**	0.21**	1.00										
26) Fish, Amount	0.03	0.07	0.05	-0.03	0.09*	0.10*	1.00									
27) Ready to eat meat, Amount	0.10*	0.13**	-0.01	0.05	0.14**	0.03	0.07	1.00								
28) Meat combination dishes, Amount	0.01	0.03	0.00	-0.01	0.09*	0.12**	0.21**	0.12**	1.00							
29) Other meat, Amount	-0.06	-0.05	0.02	-0.07	0.02	0.08	-0.04	-0.04	-0.05	1.00						
30) Red meat, Amount	0.83**	0.52**	0.29**	0.71**	0.69**	0.29**	0.05	0.13**	0.05	-0.04	1.00					
31) White meat, Amount	0.21**	0.18**	0.03	0.17**	0.22**	0.96**	0.35**	0.04	0.17**	0.06	0.29**	1.00				
32) Fresh meat, Amount	0.76**	0.51**	0.27**	0.62**	0.57**	0.67**	0.08	0.11**	0.09*	0.07	0.86**	0.65**	1.00			
33) Frozen meat, Amount	0.01	0.02	-0.00	0.01	0.16**	0.10*	0.38**	0.03	0.36**	0.25**	0.09*	0.20**	0.05	1.00		
34) Cooked meat, Amount	0.16**	0.13**	-0.01	0.14**	0.21**	0.07	0.07	0.81**	0.04	-0.04	0.22**	0.08*	0.16**	0.01	1.00	
35) Canned meat, Amount	0.01	0.05	0.01	-0.02	0.21**	0.12**	0.41**	0.24**	0.68**	-0.06	0.11*	0.22**	0.10*	0.08	0.09*	1.00

*P<.05, **P<.01.

TABLE 8. CORRELATION ANALYSIS 2: SIMPLE CORRELATION COEFFICIENTS FOR SELECTED VARIABLES

Variable	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)	15)	16)	17)	18)	19)
1) Kinds of meat	1.00																		
2) Amount of meat	0.80**	1.00																	
3) Cost of meat, \$	0.82**	0.94**	1.00																
4) Cost of meat, 4/lb.	-.14**	-.27**	-.07	1.00															
5) Total money spent	0.71**	0.72**	0.74**	-.08*	1.00														
6) Percent of money spent for meat	0.13**	0.27**	0.28**	-.01	-.27**	1.00													
7) Number of people	0.15**	0.24**	0.19**	0.09*	0.18**	0.03	1.00												
8) Amount of meat per person	0.66**	0.73**	0.73**	-.20**	0.52**	0.27**	-.27**	1.00											
9) Cost of meat per person	0.63**	0.64**	0.73**	0.01	0.52**	0.26**	-.30**	0.94**	1.00										
10) Total spent per person	0.50**	0.41**	0.48**	0.02	0.70**	-.27**	-.37**	0.71**	0.75**	1.00									
11) Frequency of buying meat	-.32**	-.33**	-.32**	0.10*	-.40**	0.12**	0.11*	-.34**	-.32**	-.39**	1.00								
12) Amount of meat per person per week	0.43**	0.47**	0.45**	-.21**	0.23**	0.30**	-.25**	0.68**	0.61**	0.39**	0.41**	1.00							
13) Cost of meat per person per week	0.43**	0.42**	0.49**	0.03	0.25**	0.32**	-.29**	0.66**	0.70**	0.45**	0.17**	0.93**	1.00						
14) Total spent per person per week	0.27**	0.17**	0.22**	0.03	0.42**	-.28**	-.34**	0.41**	0.44**	0.66**	0.14**	0.66**	0.70**	1.00					
15) Education of head of household	-.14**	-.16**	-.12**	0.12**	-.02	-.21**	-.31**	0.01	0.04	0.17**	-.08	-.05	-.01	0.14**	1.00				
16) Annual family income	-.02	-.03	-.00	0.07	0.13**	-.17**	0.00	-.03	-.00	0.09*	-.04	-.03	0.02	0.10*	0.37	1.00			
17) Education of food shopper	-.14**	-.15**	-.12**	0.10*	-.01	-.20**	-.31**	0.01	0.05	0.19**	-.05	-.02	0.01	0.17**	0.81**	0.36**	1.00		
18) Age of food shopper	-.13**	-.07	-.09*	-.04	-.14**	0.08	-.14**	0.01	-.01	-.07	0.08	0.10*	0.08	0.04	-.20**	0.00	-.19**	1.00	
19) Annual per capita income	-.10*	-.14**	-.10*	0.11*	-.03	-.11*	-.38**	0.12**	0.17**	0.25**	-.08*	0.10*	0.15**	0.23**	0.36**	0.65**	0.40**	0.06	1.00
20) Beef; Cost	0.55**	0.68**	0.79**	0.02	0.53**	0.26**	0.12**	0.56**	0.61**	0.38**	-.22**	0.34**	0.42**	0.19**	-.04	0.02	-.05	-.06	-.05
21) Beef; Ground, cost	0.39**	0.47**	0.51**	-.05	0.39**	0.13**	0.13**	0.33**	0.34**	0.24**	-.14**	0.19**	0.22**	0.12**	0.01	0.04	-.01	-.14**	-.07
22) Beef; Tender cuts, cost	0.23**	0.23**	0.32**	0.13**	0.21**	0.10*	-.06	0.30**	0.39**	0.24**	-.11**	0.18**	0.28**	0.16**	0.06	0.06	0.04	0.03	0.08
23) Beef; Less tender cuts, cost	0.43**	0.57**	0.65**	-.00	0.42**	0.24**	0.11*	0.44**	0.46**	0.27**	-.17**	0.28**	0.32**	0.13**	-.10*	-.03	-.09*	-.01	-.06
24) Pork; Total, cost	0.53**	0.60**	0.67**	0.03	0.48**	0.18**	0.13**	0.43**	0.46**	0.28**	-.19**	0.25**	0.29**	0.10*	-.14**	-.05	-.13**	-.05	-.09*
25) Poultry; Cost	0.39**	0.63**	0.46**	-.36**	0.33**	0.16**	0.18**	0.41**	0.24**	0.11*	-.15**	0.36**	0.21**	0.07	-.15**	-.02	-.10*	0.02	-.10*
26) Fish; Cost	0.34**	0.24**	0.27**	0.04	0.33**	-.05	-.01	0.30**	0.32**	0.32**	-.18**	0.08	0.11*	0.10*	0.05	0.08	0.06	-.03	0.06
27) Ready to eat meat; Cost	0.42**	0.28**	0.31**	0.03	0.30**	0.04	0.16**	0.17**	0.18**	0.14**	-.13**	0.07	0.09*	0.02	-.12**	-.01	-.11**	-.12**	-.10*
28) Meat combination dishes; Cost	0.39**	0.29**	0.23**	-.17**	0.27**	-.03	-.02	0.29**	0.23**	0.23**	-.14**	0.18**	0.13**	0.12**	0.05	-.03	0.02	-.13**	0.01
29) Other meat; Cost	0.04	0.09*	0.05	-.10*	-.00	0.16**	0.00	0.06	0.02	-.02	-.05	0.07	0.04	-.00	-.07	-.03	-.10*	0.02	-.06
30) Red meat; Cost	0.68**	0.81**	0.92**	0.02	0.63**	0.28**	0.15**	0.64**	0.69**	0.42**	-.27**	0.37**	0.45**	0.19**	-.10*	-.02	-.10*	-.07	-.08*
31) White meat; Cost	0.49**	0.62**	0.50**	-.25**	0.43**	0.11**	0.12**	0.49**	0.37**	0.26**	-.22**	0.33**	0.23**	0.11**	-.10*	-.02	-.05	-.00	-.03
32) Fresh meat; Cost	0.69**	0.88**	0.93**	-.10*	0.64**	0.30**	0.19**	0.67**	0.67**	0.40**	-.26**	0.44**	0.47**	0.19**	-.13**	-.01	-.13**	-.05	-.10*
33) Frozen meat; Cost	0.34**	0.30**	0.28**	-.06	0.24**	0.07	-.06	0.32**	0.28**	0.23**	-.14**	0.23**	0.21**	0.15**	0.07	0.00	0.05	-.04	0.04
34) Cooked meat; Cost	0.38**	0.29**	0.37**	0.13**	0.33**	0.05	0.12**	0.19**	0.24**	0.19**	-.15**	0.03	0.08	0.04	-.08	0.05	-.06	-.13**	-.04
35) Canned meat; Cost	0.40**	0.29**	0.28**	-.02	0.33**	-.03	0.07	0.25**	0.24**	0.25**	-.18**	0.07	0.06	0.04	-.05	-.03	-.03	-.07	-.06

TABLE 8-Continued

Variable	20)	21)	22)	23)	24)	25)	26)	27)	28)	29)	30)	31)	32)	33)	34)	35)
20) Beef; Total, cost	1.00															
21) Beef; Ground, cost	0.62**	1.00														
22) Beef; Tender cuts, cost	0.48**	0.08	1.00													
23) Beef; Less tender cuts, cost	0.80**	0.22**	0.09*	1.00												
24) Pork; Total, cost	0.24**	0.14**	0.03	0.26**	1.00											
25) Poultry; Cost	0.21**	0.17**	0.02	0.18**	0.19**	1.00										
26) Fish; Cost	0.05	0.08	0.06	-.01	0.10*	0.08	1.00									
27) Ready to eat meat; cost	0.11*	0.14**	-.01	0.07	0.16**	0.04	0.10*	1.00								
28) Meat combination dishes; Cost	0.03	0.03	0.03	0.01	0.07	0.09*	0.19**	0.11*	1.00							
29) Other meat; Cost	-.06	-.06	0.02	-.06	0.02	0.08	-.05	-.04	-.05	1.00						
30) Red meat; Cost	0.84**	0.51**	0.35**	0.71**	0.70**	0.26**	0.09*	0.15**	0.06	-.04	1.00					
31) White meat; Cost	0.18**	0.17**	0.04	0.13**	0.21**	0.82**	0.62**	0.09*	0.17**	0.03	0.25**	1.00				
32) Fresh meat; Cost	0.84**	0.54**	0.36**	0.69**	0.60**	0.46**	0.08	0.14**	0.07	0.04	0.92**	0.40**	1.00			
33) Frozen meat; Cost	0.04	0.04	-.00	0.04	0.23**	0.13**	0.43**	0.05	0.42**	0.18**	0.15**	0.35**	0.08	1.00		
34) Cooked meat; Cost	0.18**	0.13**	-.01	0.17**	0.28**	0.08	0.10*	0.70**	0.04	-.05	0.28**	0.12**	0.18**	0.04	1.00	
35) Canned meat; Cost	-.00	0.04	0.01	-.03	0.25**	0.08	0.50**	0.25**	0.39**	-.04	0.13**	0.34**	0.05	0.10*	0.08	1.00

*P<.05, **P<.01.

TABLE 9. CORRELATION ANALYSIS 3: SIMPLE CORRELATION COEFFICIENTS FOR SELECTED VARIABLES

Variable	1)	2)	3)	4)	5)	6)	7)	8)	9)	10)	11)	12)	13)	14)	15)	16)	17)	18)	19)
1) Beef: Total, amount	1.00																		
2) Beef: Total, cost	0.96**	1.00																	
3) Beef: Ground, amount	0.64**	0.60**	1.00																
4) Beef: Ground, cost	0.62**	0.62**	0.97**	1.00															
5) Beef: Tender cuts, amount	0.42**	0.47**	0.08	0.08	1.00														
6) Beef: Tender cuts, cost	0.41**	0.48**	0.07	0.08	0.98**	1.00													
7) Beef: Less tender cuts, amount	0.79**	0.77**	0.19**	0.19**	0.09*	0.09*	1.00												
8) Beef: Less tender cuts, cost	0.78**	0.80**	0.21**	0.22**	0.09*	0.09*	0.98**	1.00											
9) Pork: Total, amount	0.23**	0.23**	0.15**	0.14**	0.02	0.02	0.22**	0.25**	1.00										
10) Pork: Total, cost	0.23**	0.24**	0.14**	0.14**	0.03	0.03	0.22**	0.26**	0.98**	1.00									
11) Poultry: Amount	0.21**	0.21**	0.18**	0.17**	0.02	0.03	0.18**	0.18**	0.21**	0.20**	1.00								
12) Poultry: Cost	0.20**	0.21**	0.18**	0.17**	0.02	0.02	0.17**	0.18**	0.20**	0.19**	0.96**	1.00							
13) Fish: Amount	0.03	0.04	0.07	0.08	0.05	0.04	-0.03	-0.02	0.09*	0.09*	0.10*	0.10*	1.00						
14) Fish: Cost	0.03	0.05	0.06	0.08	0.07	0.06	-0.02	-0.01	0.09*	0.10*	0.08*	0.08	0.94**	1.00					
15) Ready to eat meat Amount	0.10*	0.09*	0.13**	0.13**	-0.01	-0.01	0.05	0.05	0.14**	0.15**	0.03	0.03	0.07	0.08	1.00				
16) Ready to eat meat: Cost	0.12**	0.11*	0.14**	0.14**	-0.01	-0.01	0.07	0.07	0.15**	0.16**	0.04	0.04	0.08	0.10*	0.97**	1.00			
17) Meat combination dishes: Amount	0.01	0.00	0.03	0.03	0.00	-0.01	-0.01	0.00	0.09*	0.09*	0.12**	0.11**	0.21**	0.20**	0.12**	0.13**	1.00		
18) Meat combination dishes: Cost	0.03	0.03	0.03	0.03	0.03	0.03	0.01	0.01	0.06	0.07	0.10*	0.09*	0.19**	0.19**	0.10*	0.11**	0.92**	1.00	
19) Other meat: Amount	-0.07	-0.05	-0.05	-0.05	0.02	0.03	-0.07	-0.06	0.02	0.01	0.08	0.08	-0.04	-0.05	-0.04	-0.05	-0.05	1.00	
20) Other meat: Cost	-0.08	-0.06	-0.06	-0.06	0.02	0.02	-0.07	-0.06	0.02	0.02	0.08	0.08	-0.05	-0.05	-0.04	-0.04	-0.05	0.97**	
21) Red meat: Amount	0.83**	0.82**	0.52**	0.50**	0.29**	0.28**	0.71**	0.72**	0.69**	0.68**	0.29**	0.27**	0.05	0.06	0.13**	0.15**	0.05	-0.04	
22) Red meat: Cost	0.81**	0.84**	0.50**	0.51**	0.34**	0.35**	0.67**	0.71**	0.68**	0.70**	0.27**	0.26**	0.07	0.09*	0.14**	0.15**	0.05	0.06	
23) White meat: Amount	0.21**	0.21**	0.18**	0.17**	0.03	0.03	0.17**	0.17**	0.22**	0.21**	0.96**	0.92**	0.35**	0.32**	0.04	0.06	0.17**	0.14**	
24) White meat: Cost	0.17**	0.18**	0.16**	0.17**	0.04	0.04	0.12**	0.13**	0.21**	0.21**	0.79**	0.82**	0.59**	0.62**	0.07	0.09*	0.20**	0.17**	
25) Fresh meat: Amount	0.76**	0.74**	0.51**	0.50**	0.27**	0.26**	0.62**	0.62**	0.57**	0.54**	0.67**	0.64**	0.08	0.08	0.11**	0.13**	0.09*	0.09*	
26) Fresh meat: Cost	0.81**	0.84**	0.53**	0.54**	0.36**	0.36**	0.65**	0.69**	0.59**	0.60**	0.46**	0.46**	0.07	0.08	0.12**	0.14**	0.09*	0.07	
27) Frozen meat: Amount	0.01	0.02	0.02	0.02	-0.00	0.01	0.01	0.02	0.16**	0.15**	0.11*	0.10*	0.38**	0.32**	0.03	0.05	0.33**	0.42**	
28) Frozen meat: Cost	0.04	0.04	0.04	0.04	-0.00	-0.00	0.03	0.04	0.23**	0.23**	0.14**	0.13**	0.44**	0.43**	0.03	0.05	0.33**	0.42**	
29) Cooked meat: Amount	0.16**	0.16**	0.13**	0.14**	-0.01	-0.01	0.14**	0.14**	0.21**	0.24**	0.07	0.06	0.07	0.09*	0.81**	0.81**	0.04	0.04	
30) Cooked meat: Cost	0.18**	0.18**	0.12**	0.13**	-0.01	-0.01	0.17**	0.17**	0.25**	0.28**	0.08	0.08	0.09*	0.10*	0.68**	0.70**	0.03	0.04	
31) Canned meat: Amount	0.01	0.00	0.05	0.04	0.01	0.01	-0.02	-0.01	0.21**	0.23**	0.12**	0.11**	0.41**	0.41**	0.24**	0.24**	0.68**	0.51**	
32) Canned meat: Cost	0.01	-0.00	0.05	0.04	0.03	0.01	-0.03	-0.03	0.21**	0.25**	0.08	0.08	0.47**	0.50**	0.25**	0.25**	0.47**	0.39**	
33) Pork: Sausage, amount	0.07	0.06	0.03	0.04	-0.06	-0.05	0.10*	0.10*	0.49**	0.44**	0.04	0.03	0.10*	0.10*	0.10*	0.10*	0.03	-0.01	
34) Pork: Sausage, cost	0.08	0.07	0.04	0.04	-0.04	-0.04	0.18**	0.10*	0.48**	0.46**	0.06	0.04	0.11*	0.11*	0.10*	0.12**	0.04	0.04	

TABLE 9-Continued

Variable	20)	21)	22)	23)	24)	25)	26)	27)	28)	29)	30)	31)	32)	33)	34)
20) Other meat; Cost	1.00														
21) Red meat; Amount	-.05	1.00													
22) Red meat; Cost	-.04	0.96**	1.00												
23) White meat; Amount	0.06	0.29**	0.27**	1.00											
24) White meat; Cost	0.03	0.24**	0.25**	0.90**	1.00										
25) Fresh meat; Amount	0.06	0.86**	0.83**	0.65**	0.54**	1.00									
26) Fresh meat; Cost	0.04	0.91**	0.92**	0.45**	0.40**	0.94**	1.00								
27) Frozen meat; Amount	0.23**	0.09*	0.09*	0.20**	0.26**	0.05	0.03	1.00							
28) Frozen meat; Cost	0.18**	0.14**	0.15**	0.25**	0.35**	0.11*	0.08	0.89**	1.00						
29) Cooked meat; Amount	-.04	0.22**	0.24**	0.08*	0.11*	0.16**	0.17**	0.01	0.02	1.00					
30) Cooked meat; Cost	-.05	0.26**	0.28**	0.10*	0.12**	0.17**	0.18**	0.02	0.04	0.95**	1.00				
31) Canned meat; Amount	-.06	0.11*	0.12**	0.22**	0.32**	0.10*	0.07	0.08	0.10*	0.09*	0.07	1.00			
32) Canned meat; Cost	-.04	0.11*	0.13**	0.20**	0.34**	0.06	0.05	0.08	0.10*	0.10*	0.08	0.89**	1.00		
33) Pork; Sausage, amount	-.02	0.29**	0.27**	0.07	0.08	0.20**	0.18**	0.28**	0.38**	0.08	0.07	0.08*	0.09*	1.00	
34) Pork; Sausage, cost	-.02	0.30**	0.29**	0.09*	0.11*	0.20**	0.19**	0.31**	0.44**	0.10*	0.09*	0.09*	0.10*	0.96**	1.00

*P<.05, **P<.01.

Card Questionnaire Scores

Card questionnaires were returned by 132 subjects (22%) of the total 600. Caucasians returned 112 cards (85%), Mexican-Americans 13 (10%), and Negroes 7 (5%). The chi-square analysis, table 1, showed that the return was not independent of ethnic group ($P < .01$). Even though a very short questionnaire in a convenient card form with postage prepaid was handed to shoppers, the proportion of questionnaires returned was low. Since most of the questionnaires returned were from Caucasians, questionnaires returned in the mail might not adequately represent other ethnic groups.

Least squares analysis of scores on the card questionnaires for accuracy in kind, amount and cost of meat showed no significant effect on ethnic group. Therefore, the hypothesis that there are no significant differences among mean scores for accuracy in kind, amount and cost of meat recorded on the card questionnaires of the Caucasians, Mexican-Americans and Negroes (page 18) was accepted. Mean percent scores were 76.1 for Caucasians, 78.5 for Mexican-Americans, and 88.0 for Negroes. The overall mean was 80.9%. Therefore, the commonly used method of questionnaires completed by consumers was approximately 81% accurate in supplying the food buying data obtained by the method of observation and recording used in this study.

Multiple Regression Analysis of Continuous Data

Multiple regression analysis was used to obtain a quantitative measure of the relationships among certain meat buying

variables and socioeconomic variables. Ethnic group was included as a discrete main factor. The seven continuous independent variables (socioeconomic variables), along with their means, were listed in table 10.

TABLE 10. MEANS FOR SOCIOECONOMIC VARIABLES IN REGRESSION ANALYSIS

Symbol	Variable	Mean
X ₁	Number of people shopped for (family size)	3.71
X ₂	Frequency of buying meat per week	1.44
X ₃	Education of head of household, years	11.00
X ₄	Annual family income, \$	8877.11
X ₅	Education of food shopper, years	11.15
X ₆	Age of food shopper, years	37.98
X ₇	Annual per capita income, \$	3099.54

The seven continuous dependent variables (meat buying variables) selected for analysis were:

Y₁ = Amount of meat, lb.

Y₂ = Cost of meat, \$

Y₃ = Total money spent at the grocery store, \$

Y₄ = Percent of money spent on meat

Y₅ = Amount of meat per person per week, lb.

Y₆ = Cost of meat per person per week, \$

Y₇ = Total money spent at the grocery store per person per week, \$.

Multiple regression analysis using the seven socioeconomic variables showed the following numbers of meat buying variables were significantly affected by the socioeconomic variables: 6, number of

people; 6, frequency of buying meat; 4, ethnic group; 2, education of head of household; 2, family income; 2, per capita income; 1, education of food shopper; and 1, age of food shopper. Therefore, number of people, frequency of buying meat and ethnic group were the socioeconomic variables with the most significant effects on meat buying variables. Only percent of money spent on meat was not significantly affected by the number of people and frequency of buying meat. Ethnic group significantly affected amount of meat, cost of meat, percent spent on meat, and amount of meat per person per week.

The seven socioeconomic variables accounted for only 11 to 24% of the variation in the meat buying variables. For example, 14% of the total variation in the cost of meat per person per week was accounted for. This finding is similar to that of Stubbs, et al. (1972), who reported that the 12 socioeconomic factors studied accounted for only 10% of the total variation in value of dairy products (\$/person/week) used by southern urban families.

Four additional multiple regression analyses were made in order to simplify the regression equations to contain fewer variables. Mean squares and significant effects in the final analysis are shown in table 11. Number of people and frequency of buying meat significantly affected the greatest number (6) of meat buying variables. Ethnic group and education of head of household significantly affected four meat buying variables. Per capita income significantly affected the least number (2) of meat buying variables.

TABLE 11. ANALYSIS OF VARIANCE FOR FINAL REGRESSION EQUATIONS

Source of variation	df	Mean Squares					Total spent per person per week, \$
		Amount of meat, lb.	Cost of meat, \$	Total spent, \$	Percent of money spent on meat	Amount of meat per person per week, lb.	Cost of meat per person per week, \$
Ethnic group	2	245.30**	162.31**	7.03	3679.97**	9.44*	2.95
People linear	1	632.57**	502.42**	6813.00**	501.97	124.13**	157.66**
Frequency linear	1	2405.62**	2345.81**	24524.81**	939.53	38.82**	71.89**
Education HH linear	1	122.97*	68.45	6.77	7854.84**	27.70**	15.88*
Per capita income linear	1	3.86	0.15	52.33	75.92	8.42	14.63*
Remainder	593	21.13	24.44	195.46	329.77	2.66	2.92
							232.36**
							29.86

*P<.05, **P<.01.

The relationships among the meat buying variables with the socioeconomic variables were expressed in final multiple linear regression equations, table 12. $\bar{Y}$ is the average value for the meat buying variables and the X 's in the equations are the independent (socioeconomic) variables listed on page 69. G refers to the constants for ethnic group (G_1 for Caucasian, G_2 for Mexican-American and G_3 for Negro). Total variation in the meat buying variable accounted for by the equation was indicated by the coefficient of determination, R^2 .

Final multiple regression equations, table 12, showed that the amount and cost of meat and the total money spent at the grocery store ($\hat{Y}_1, \hat{Y}_2, \hat{Y}_3$) increased as the number of people increased. However, when these variables were treated on a per person per week basis ($\hat{Y}_5, \hat{Y}_6, \hat{Y}_7$) they increased as number of people decreased. The meat buying variables of major concern in this study were amount and cost of meat per person per week ($\hat{Y}_5, \hat{Y}_6$). The equations for $\hat{Y}_5$ and $\hat{Y}_6$ were similar. $\hat{Y}_5$ and $\hat{Y}_6$ increased as frequency of shopping increased. Thus, people who shopped more frequently bought more meat and paid more for it. Increased per capita income increased cost of meat ($\hat{Y}_6$) although not amount of meat ($\hat{Y}_5$). $\hat{Y}_5$ and $\hat{Y}_6$ also increased as number of people and education of head of household decreased. The former result was expected. The latter result is unexplained. People with more education may eat out more and therefore buy less meat for use at home. Percent of money spent on meat ($\hat{Y}_4$) was significantly affected by ethnic group and education of head of household.

Negroes spent the largest percent on meat and Mexican-Americans spent the least. Percent spent on meat decreased as education of head of household increased. Ethnic group significantly affected amount and cost of meat, percent spent on meat, and amount of meat per person per week. Negroes bought the most meat and paid the most for it and Caucasians bought the least meat and paid the least for it. Negroes spent the greatest percent on meat and Mexican-Americans the least. Negroes bought the most meat per person per week and Caucasians bought the least. Possible explanations for the results that Caucasians bought the least meat, paid the least for meat, and bought the least meat per person per week were that Caucasians bought meat at places other than supermarkets (i.e., at a meat market and stored the meat in a freezer) and ate away from home more frequently. The variations in the meat buying variables accounted for by the final equations (R^2) were 10 to 24%, similar to the variations accounted for by the total seven socioeconomic variables. The conclusion was that socioeconomic variables accounted for some of the variation in meat buying variables but that they failed to account for most of the variation.

TABLE 12. FINAL MULTIPLE REGRESSION EQUATIONS

Equation	R^2	s_e
$\hat{Y}_1 = 6.630 + G + 0.562 X_1 - 2.048 X_2 - 0.123 X_3 - 0.000029 X_7$ (0.237) ^a (0.103) (0.192) (0.051) (0.000067) ($G_1 = -0.959, G_2 = -0.921, G_3 = 1.880$)	0.239	4.597
$\hat{Y}_2 = 6.927 + G + 0.501 X_1 - 2.023 X_2 - 0.092 X_3 + 0.000006 X_7$ (0.255) (0.110) (0.206) (0.055) (0.000073) ($G_1 = -0.876, G_2 = -0.206, G_3 = 1.497$)	0.190	4.944
$\hat{Y}_3 = 21.936 + G + 1.845 X_1 - 6.540 X_2 + 0.029 X_3 + 0.000106 X_7$ (0.720) (0.312) (0.584) (0.155) (0.000205) ($G_1 = 0.249, G_2 = -0.159, G_3 = -0.090$)	0.210	13.981
$\hat{Y}_4 = 34.702 + G - 0.501 X_1 + 1.280 X_2 - 0.980 X_3 - 0.000128 X_7$ (0.936) (0.406) (0.758) (0.201) (0.000267) ($G_1 = -2.547, G_2 = -4.786, G_3 = 7.334$)	0.103	18.160
$\hat{Y}_5 = 2.251 + G - 0.249 X_1 + 0.260 X_2 - 0.058 X_3 + 0.000043 X_7$ (0.084) (0.036) (0.068) (0.018) (0.000024) ($G_1 = -0.196, G_2 = -0.170, G_3 = 0.366$)	0.128	1.631
$\hat{Y}_6 = 2.386 + G - 0.281 X_1 + 0.354 X_2 - 0.044 X_3 + 0.000056 X_7$ (0.088) (0.038) (0.071) (0.019) (0.000025) ($G_1 = -0.145, G_2 = -0.035, G_3 = 0.180$)	0.141	1.709
$\hat{Y}_7 = 7.842 + G - 0.893 X_1 + 1.143 X_2 + 0.027 X_3 + 0.000224 X_7$ (0.282) (0.122) (0.228) (0.060) (0.000080) ($G_1 = 0.204, G_2 = 0.541, G_3 = -0.745$)	0.165	5.464

^aNumber in parenthesis is the standard error of the regression coefficient, s_b .

Comparison of Findings with Results of Other Studies

Stubbs et al. (1972) studied food purchasing practices of 4,656 southern urban families in seven states. Usually the homemaker was interviewed. Whites made up 80% of the sample, and other subjects were classified as nonwhites. Dairy products were used as "tool" foods for relating buying practices to behavioral and socioeconomic factors. In multiple regression analysis, variables selected to determine the value (\$/person/week) of dairy products accounted for only 10% of the variation. Weekly grocery expenditures were predicted more accurately, with per capita income and family life cycle accounting for 60% of the variability of grocery expenditures, and with per capita income being the main predictive factor. The average weekly per capita grocery expenditure (\$7.94) amounted to 16.5% of the average weekly per capita income (\$48.01).

In the present study, Caucasians made up a smaller percent of the total sample (60.7). Therefore, nonwhites were represented to a greater degree. Although table 11 shows that on a per person per week basis the cost of meat and the total spent at the grocery store were not significantly affected by ethnic group, the means for these variables were different for the three ethnic groups, table 12. The variation accounted for in cost of meat per person per week was slightly greater in the present study (14%) than was the variation in value (\$/person/week) of dairy products (10%) accounted for in the study by Stubbs et al. (1972). However, the present study accounted for much less variation in total money spent at the grocery store (17%)

than the 60% in the study by Stubbs et al. (1972). Stubbs and workers (1972) included many more socioeconomic variables in their study than was possible to use in the present study because their study used the homemaker interview method while the present study was conducted at the grocery store check out counter. The average weekly per capita grocery expenditures for both studies were similar: \$7.94 in the study by Stubbs et al. (1972) and \$7.88 in the present study.

The Bureau of Labor Statistics showed how much it cost for a family of four persons to live (U. S. Department of Labor, 1967; Brackett, 1969). The family of four persons included a husband employed full time, a wife who did not work outside the home, and two children, a girl of 8 and a boy of 13 years. Budgets for three levels of living were given. The most recent estimates of cost of the three budget levels available were for autumn 1973 (Brackett, 1974). The costs were \$8,181, \$12,626 and \$18,201 for lower, moderate and higher budgets, respectively. Comparison of these U. S. urban average budget figures with the distribution of subjects in various income groups in the current study, table 1, and with the mean income of \$8,877, table 4, indicated that many incomes in the study were below the U. S. budget figures. This was an expected result, since the budget levels for the south and for the three Texas cities used in the U. S. figures (Austin, Dallas and Houston) were lower than the U. S. figures.

Food-at-home costs in the budgets were based on quantities in the low-, moderate- and liberal-cost food plans developed by the U. S. D. A. in accordance with the nutritional standards formulated by the

National Research Council of the National Academy of Sciences. The food total also included an allowance for a specified number of meals away from home at each budget level. Annual food costs per household in the budgets were \$2,440, \$3,183 and \$4,020, respectively. Total food costs and at home costs for the three Texas cities included were 90 to 95% of the average U. S. urban figures.

The food costs in the present study cannot be compared directly with the U. S. Bureau of Labor Statistics food costs because the latter included some school lunches, snacks and other meals away from home. The cost of food at home estimated for food plans at three cost levels by the U. S. D. A. for a family of four with two school children for February 1974 (U. S. D. A., 1974b) was \$43.10, \$54.80 and \$66.60 for low-, moderate- and liberal-plans, respectively. Corresponding figures for March were \$43.70, \$55.10 and \$66.90. The appropriate figure for comparison in the present study would be the total money spent per person per week X four, table 4. The results were \$36.76 in the preliminary study in February and \$32.08 in the final study in March. Thus considerably less money was spent for food in Lubbock than the U. S. D. A. estimated figures. To some extent, this was an expected result because the index of budget levels and food costs in the budget levels was less in the south and in Texas cities than for the U. S.

Results of the current study may be compared with an earlier study of food buying in Texas (Stubbs, 1965). Recall interviews were used with 1,225 families, 136 of which were Negro. The homemaker in each family was asked the kinds and amounts of foods used by her

family for the week preceding the interview. Data was gathered in the spring of 1958. Both low and high income groups showed high percentage use of chicken, ground beef and bacon. As income increased the total use of meat in amount and variety increased. Negro families tended to use more pork than white families. Less meat was purchased in the present study than was used in the study by Stubbs (1965), slightly less than 2 lb. per person per week (table 4) compared with 3.57 lb. for white urban persons and 2.98 for Negroes. Negroes purchased slightly more meat than Caucasians in the present study, while the reverse occurred in Stubbs' study. Stubbs showed little difference in the frequency of using chicken by Negroes and whites, 63 and 60%. However, in the current study, significantly more Negroes (31%) than Caucasians (15%) bought whole chicken, table 3, while similar percents of Caucasians and Negroes bought cut up chicken. Ground beef was used frequently in the Stubbs' study by 57% of urban whites and 71% of the Negroes. Ground beef was bought frequently in the current study, with no significant difference in the proportion of Caucasians and Negroes who bought either type of ground beef, table 3. In the current study bacon was bought by 30% of the people with no significant difference for Caucasians and Negroes. In the Stubbs' study, bacon was used by 71% of the urban whites and 63% of the Negroes. In summary, the main differences in results of the current study and the Stubbs' study was that in the current study less meat per person per week was purchased and Negroes purchased significantly more whole chicken than did Caucasians.

In the last household food consumption study in the United States (U. S. D. A., 1965a), approximately 15,000 households were interviewed. Data were collected by personal interview, usually with the homemaker. The homemaker recalled the kinds, quantities and costs of foods used at home during the seven days preceding the interview. The United States was divided into four regions: Texas was included in the South (U. S. D. A., 1965b). Average family size was 3.3 persons for the United States and the South. Costs of food bought per person per week for the United States and South, respectively, were \$8.19 and \$7.13. The average consumption of meat, poultry and fish at home per person per day was 10 1/2 and 10 1/4 oz., respectively. Of the food dollar, 36% was spent for meat, poultry, fish and eggs. Results for the current study showed larger families (average 3.7 persons), similar cost of food bought per person per week (\$8.02), and a smaller percent of money spent on meat (33), table 4. However, eggs were not included in the current study, which would explain part of the difference in percents spent on meat. The amount of meat per person per week was 2.13 lb., or 0.30 lb. per day, which was considerably less than in the 1965 study. Possible explanations for lower meat consumption in the current study were larger families and decreased meat consumption in the U. S. in 1973 and 1974. Furthermore, only meat bought in the grocery store (not bought in the meat market or home produced) was included in the current study, while all meat consumed at home was included in the 1965 study.

Type of meat used was similar for the U. S. and the South in the 1965 study and for the current study. For all U. S. households the following pounds of meat were used per week: beef 5.35, pork 3.45, poultry 2.82 and fish 1.16. For the South the corresponding amounts were: beef 4.85, pork 3.61, poultry 2.86 and fish 1.45. In the current study, the pounds of meat bought per person per week were: beef 2.02, pork 0.99, poultry 0.93 and fish 0.32, table 4. These results of the current study were similar to the 1965 results when the size of household was considered.

The 10 meat cuts served in a week by the greatest percent of households for the U. S. in 1965 were, in order: chicken, bacon, ground beef, frankfurters, ham, round steak, pork chops, canned tuna, fresh pork sausage and chuck roast. Results for the South were similar. The order of meat cuts purchased in the current study, table 3, was similar: bacon, whole chicken, bologna, lean ground beef, canned tuna, extra lean ground beef, regular pork chops, wieners, regular ground beef, ground sausage (pork), round steak and cut up fryer. Therefore, the most frequently bought meat cuts were similar in the two studies.

CHAPTER IV

SUMMARY AND CONCLUSIONS

The primary purpose of this research was to determine meat buying practices of Caucasians, Mexican-Americans and Negroes. Additional purposes were to investigate relationships between socioeconomic factors and meat buying practices, to determine the accuracy of questionnaires completed by consumers as sources of food buying information, and to investigate a new approach to obtaining food buying information.

Data were obtained by recording kinds, weight, and cost of meat purchased by shoppers in six supermarkets. Socioeconomic data were obtained by questioning the shoppers as they left the stores. Card questionnaires were given to shoppers as they left the stores and the returned questionnaires were scored for accuracy of meat purchase information. Two chain stores in each of the three ethnic areas of Lubbock, Texas, were used. Wednesday and Saturday were the test days. A preliminary study made in early February, 1974, included 60 subjects and a final study in early March, 1974, included 600 subjects. The statistical design was factorial: 3 ethnic areas X 2 retail chains in each X 2 days of the week X 3 ethnic groups. Data were analyzed by chi-square, least squares and multiple regression analyses.

Results of chi-square analysis of the socioeconomic data by ethnic group showed that socioeconomic factors, except day and sex,

were not independent of ethnic group. More Mexican-Americans shopped in chain store B. More Caucasians returned the card questionnaires. Education of the head of the household and of the food shopper was highest for Caucasians and least for the Mexican-Americans. Caucasians had the highest mean income. The age of food shopper was least for Mexican-Americans.

Of 198 meat cuts bought, only 12 were bought by 10% or more of the shoppers. Since one-half of the 12 meat cuts bought by the most people and 19% of all meat cuts bought were not independent of ethnic group, ethnic group should be an important consideration in marketing of meat and in food and nutrition education. More Negroes bought pork cuts and more Mexican-Americans bought beef cuts. Caucasians bought less whole chicken than the other two groups. Negroes bought meat cuts which were less expensive per pound than cuts bought by Caucasians.

Means for continuous data were similar for the preliminary and final studies. Least squares analysis of continuous data with four main factors (ethnic area, chain, day and ethnic group) showed that ethnic group accounted for most of the significant effects (62 of 120), followed closely by chain, while area and day accounted for fewer significant effects. Shoppers in stores of chain A spent more money, bought more meat, paid less per pound for meat, and bought less pork and frozen meat than shoppers in stores of chain B. Amount and cost of meat and money spent was significantly greater for Mexican-Americans than for Caucasians, but when family size was considered, differences were not significant. Few significant differences were

found between Negroes and the other groups. Negroes had more education than Mexican-Americans and bought more pork sausage than the other two groups. Correlation analyses showed few significant correlations of the education, age and income variables with the meat buying variables. Annual per capita income had the most significant correlations with meat purchase variables, followed by education of head of household and of food shopper. The age of food shopper and annual family income had fewer significant correlations with the meat buying variables. Number of people shopped for had more significant correlations with meat variables than did annual per capita income.

Card questionnaires were returned by 22% of the subjects. Significantly more cards were returned by Caucasians. Least squares analysis of scores on the card questionnaires for accuracy of meat purchase information showed no significant effect of ethnic group. Mean accuracy of questionnaires was 81%. Therefore, the commonly used method of questionnaires completed by consumers supplied approximately 81% of the food buying data obtained by the method of observation of actual purchase used in this study. It is likely that the questionnaires returned in the mail do not adequately represent Mexican-Americans and Negroes.

Multiple regression analysis of the relationships between the socioeconomic variables and selected meat buying variables, using ethnic group as the main effect, showed that the most meat buying variables were significantly affected by the number of people and the frequency of buying meat, followed closely by ethnic group. The resulting multiple regression equations accounted for only 11 to 24% of the

variation in meat buying. Therefore, socioeconomic factors considered accounted for some of the variation in amount and cost of meat and other meat buying variables, although most of the variation remained unexplained. Amount and cost of meat per person per week increased as frequency of shopping increased and as number of people and education of head of household decreased. Cost of meat per person per week but not amount of meat per person per week increased as per capita income increased. Caucasians and Mexican-Americans bought less meat, paid less for it, spent a smaller percent of money on meat, and bought less meat per person per week than did Negroes.

Conclusions were that there are differences in meat buying practices of Caucasians, Mexican-Americans and Negroes; the socioeconomic factors investigated accounted for some of the variation in meat buying practices; questionnaires completed by consumers were 81% accurate concerning food buying information; and observation of purchases was a practical method of obtaining food buying information.

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APPENDIX

- A. Meat Buying Practices Data Form
- B. Card Questionnaire
- C. Ethnic Percent Distribution by Census Tract in Lubbock, Texas,
in 1970
- D. Map of Census Tracts of Lubbock, Texas, 1970, with Store
Locations and Ethnic Areas
- E. Meat Classification Form
- F. Meat Prices Advertised in Newspaper During Study

APPENDIX A: MEAT BUYING PRACTICES DATA FORM

Subject no. _____ No. of people who bought food and no meat C ___ M ___ N ___

I. Worker records (as customer checks groceries at checkout counter):

1. Ethnic group: A. Caucasian ___ B. Mexican-American ___ C. Negro ___

2. Sex: A. Female ___ B. Male ___

3. Meat bought:

Kind of Meat	Weight	Total Cost	Cost/lb.
i.e. Ground beef, regular	1 lb.	\$.98	\$.98
1) Bacon, sliced			
2) Bologna			
3) Chicken, cut up fryer			
4) Chicken, whole fryer			
5) Ground beef, regular			
6) Ground beef, lean			
7) Ground beef, extra lean			
8) Pork chops, regular loin			
9) Pork chops, wafer thin			
10) Sausage, ground			
11) Tuna, canned			
12) Wieners			
13)			
14)			
15)			
16)			

4. Total amount of money spent at grocery store: _____

5. Use food stamps? Yes ___ No ___

II. Worker says (after customer puts money away and steps away from the counter), "Please help us with our meat buying research at Texas Tech University by answering a few questions."

1. How many people did you buy meat for? 1 ___ 2 ___ 3 ___ 4 ___ 5 ___ or ___

2. How often do you buy meat? Once a week ___ Twice a week ___ or ___

3. Your age? _____ years

4. Your education? _____ years of school completed

5. Education of head of household? _____ years of school

6. Write your family income in this blank: \$ _____
Weekly ___ Twice/mo. ___ Monthly ___ Yearly ___

III. Worker hands the following card to customer and says: "Please complete this card and mail it today. Thank you."

APPENDIX B: CARD QUESTIONNAIRE

<p>Postage Will be Paid by Addressee</p>		<p>No Postage Stamp Necessary If Mailed in the United States</p>
<p>BUSINESS REPLY MAIL FIRST CLASS PERMIT NO. 28, LUBBOCK, TEXAS 79409</p>		
<p>Helen Brittin Department of Food and Nutrition Texas Tech University Lubbock, Texas 79409</p> <p>Account No. 191-8383</p>		

[illegible]

APPENDIX C: ETHNIC PERCENT DISTRIBUTION BY CENSUS TRACT
IN LUBBOCK, TEXAS, IN 1970

Census tract	Ethnic group			
	White	Black	Spanish	Other ^a
1	72		27	1
2.01	46	1.7	52.3	
2.02	46.5	0.1	50.5	2.9
3	40.6	0.4	58	1
4.01	97.7	2.3		
4.02	99	0.1		0.9
4.03	99	0.6		0.4
5	99	0.4		0.6
6.01	98	0.6		1.4
6.02	76	0.3	23	0.7
7	84	14.1		1.9
8	5	13.8	79.2	2
9	29.5	43.7	25.8	1
10	4.8	59.2	35.8	0.2
11	22.6	45.4	31	1
12.01	8	90.2		1.8
12.02	0.3	99.7		
13	74		25	1
14	99	0.2		0.8
15	99.4	0.3		0.3
16.01	99.4	0.4		0.2
16.02	99.6			0.4
17.01	99.2			0.8
17.02	99.6	0.2		0.2
17.03	99.5	0.2		0.3
18.01	99.6			0.4
18.02	98.4			1.6
19.01	99.6	0.2		0.2
19.02	99			1
20	99.6	0.2		0.2
21	99			1
22	99.5	0.1		0.4
23	99.7			0.3
24	73	0.3	26.1	0.6
25	57	4.2	38.8	
101	68	4.4	27	0.6
102	67	6.7	26	0.3
103	74	3.7	22	0.3
104	72	6.1	20	1.9
105	65	15.7	19	0.3
106	60	11.9	28	0.1
107	98.3	1.7		

^aPersons of Spanish language or surname may be included.

APPENDIX D: MAP OF CENSUS TRACTS OF LUBBOCK, TEXAS, 1970, WITH STORE LOCATIONS AND ETHNIC AREAS

APPENDIX E: MEAT CLASSIFICATION FORM

Subject Number _____

Kind of Meat	Amount	Cost
1. Beef: Total		
a. Ground		
b. Tender cuts (rib or loin)		
c. Less tender cuts (not ground, rib or loin)		
d. Ground beef with vegetable protein (Patty mix)		
2. Pork: Total		
a. Sausage		
b. Fresh other than sausage		
c. Cured other than sausage (includes bacon, ham)		
3. Poultry		
4. Fish		
5. Ready to eat meat (lunch meats, wieners, bologna)		
6. Meat combination dinners or dishes (i.e. TV dinner)		
7. Other (non-muscle, i.e. liver, tripe)		
8. Red meat (1+2)		
9. White meat (3+4)		
10. Fresh meat		
11. Frozen meat		
12. Cooked meat		
13. Canned meat		

APPENDIX F: MEAT PRICES ADVERTISED IN NEWSPAPER DURING WEEK OF STUDY

Meat	Cost, \$	Weight
Chain A		
Sirloin steak	1.19	1b.
Round steak	1.19	1b.
T-bone steak	1.49	1b.
Club steak	1.39	1b.
Rib steak	1.19	1b.
Prime rib roast	1.19	1b.
Short ribs	0.69	1b.
Stew meat	1.14	1b.
Boneless cutlets	1.59	1b.
Ranch style steak	1.09	1b.
Halibut squares, frozen	1.39	1b.
Pork sausage	1.17	1b.
Turkey hens, 10-12 lb. average	0.65	1b.
14-16 lb. average	0.59	1b.
Perch fish	0.99	1b.
Pre-cooked perch	0.89	1b.
Canned hams	4.69	3 lb.
Chain B ^a		
Chuck steak	0.98	1b.
Hot-dogs with vegetable protein added	0.69	12 oz.
Ground beef, 3 lb. chub pack, fresh	0.89	1b.
Cod-fish sticks	0.79	1b.
Bacon	0.99	12 oz.
Chuck boneless roast	1.39	1b.
Lunchmeat (bologna; salami; pickle and pimiento, olive, and liver loaf)	0.45	6 oz.
Hot link sausage	0.89	1b.
Franks	0.79	12 oz.

^aCoupons worth 100 trading stamps were given with each of these meats in chain B: Ground beef, 3-lb. package
Pork loin, full quarter, sliced,
3-4 lb.
Sliced bacon, 2-lb. package.