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To the Graduate Council:

I am submitting herewith a thesis written by Robert E. Adcock, Jr. entitled "The Impact of Working Wives' Income on Household Food Consumption and Expenditures." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Economics.

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THE IMPACT OF WORKING WIVES' INCOME ON HOUSEHOLD FOOD CONSUMPTION AND EXPENDITURES

A Thesis

Presented to

the Graduate Council of

The University of Tennessee

In Partial Fulfillment

of the Requirements for the Degree

Master of Science

---

by

Robert E. Adcock, Jr.

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CHAPTER I

INTRODUCTION

Economic theory has utilized price and income elasticities of demand in measuring and explaining household food purchase behavior. While these elasticity coefficients have explained quantity change measurements with respect to different income and price levels, a more accurate explanation of the resultant elasticity coefficient may be obtained if causes of variations between households of given income levels can be established. To obtain this added information, a more detailed analysis, with the inclusion of variables in addition to price and income constituents, would be required.

An important source of additional income for households in the United States has been that earned by wives in the labor force. The 1960 Census of Population indicated that about 24 percent of all households in metropolitan Knoxville, Tennessee, had both the husband and wife gainfully employed.[1] Results of this study indicate that approximately 26 percent of those households surveyed in Knoxville, Tennessee, had both the husband and wife in the labor force. The effect of the wives' household income upon household food purchases with respect to poundage and expenditure per capita is the primary concern of this study.

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[1] Census of Population: 1960, Vol. I, Part 44 (Washington: Government Printing Office, 1963), p. 359.

I. PROBLEM

The problem consisted of constructing a procedure by which sufficient information with regard to food purchase and expenditure patterns could be obtained from households located in metropolitan Knoxville, Tennessee. No secondary data with regard to per capita food purchase and expenditure patterns was available. A simple random sample of two hundred households was taken in Knoxville, Tennessee, so that statistical measurements could be made of differences between households where only the male head worked and households where both heads worked with respect to:

1. The number of pounds of food purchased weekly per capita, and
2. The amount of money spent weekly per capita for household food purchases.

If no statistically significant difference between one and two head households could be established for per capita food poundage and expenditure data (total yearly household income being held constant) then it could be stated that some portion of the wives' income was used for household food purchases. Evidence to further substantiate this assumption would be manifest if any significant differences existed between one and two head households for per capita food poundage and expenditure data with the average wives' income of all households sampled being removed from the analysis. If a significant difference existed with that income removed, one could conclude that the wives' income was an important factor in household food purchases.

II. HYPOTHESES

Stated in the null form, the hypotheses are as follows:

1. There are no statistically significant differences with regard to the average pounds of food purchased weekly per capita between one and two head households (total yearly household income held constant).

2. There are no statistically significant differences with regard to the average per capita weekly expenditure for food purchases between one and two head households (total yearly income held constant).

III. PROCEDURES OF THE STUDY

In order to test the stated hypotheses, the following procedures were formulated:

1. To determine if statistically significant differences existed between one and two head households for the per capita pounds of food purchased weekly and the weekly per capita expenditure for food purchased (total yearly household income held constant).

2. To determine if incomes earned by multiple heads of households were spent together or separately for weekly food purchases.

3. To determine whether a household would spend more, less or the same amount for weekly food purchases with a ten dollar per week increase in aggregate household income.

4. To estimate the average number of pounds purchased weekly per capita of selected food items contained in meat, vegetables, fruit, fruit juices, and grain categories, and to explain differences in the

amounts of these items purchased for one and two head households at different income levels.

5. To determine the form (fresh, frozen or other) in which green beans, green peas, strawberries, and orange juice were most frequently purchased, and whether or not purchases were affected by the wives' employment status.

Since it cost very little to obtain additional information from households surveyed, secondary procedures were formulated as follows:

1. To determine food purchasing habits of households with regard to the store most frequently shopped; the number of times per week purchases were made; what member did most of the household food shopping, and the day of the week most household food purchases were made.

2. To obtain information pertinent to members within households which included employment status, race, age, education and household size.

3. To arrive at an estimate of the gross yearly income of households by delineating gross yearly income for heads of households and other contributing members.

4. To estimate the average number of pounds purchased weekly per capita of food groups including dairy, egg, meat, vegetable, fruit, fruit juice, grain, and specialty items.

IV. DEFINITION OF TERMS

The following terms were defined to clarify their use in the present study:

Head of Household. "That member which is reported as the head by the household respondent and considered to be the head by the household members."[2]

Household. "A household consists of all the persons who occupy a housing unit."[3]

Household Food Purchases. Those food purchases made by a member of the household for consumption by the members of that household on the physical housing unit premises. This does not include food bought in restaurants or like establishments for immediate consumption on those premises.

Housing Unit.

> . . . A house, an apartment or other group of rooms, or a single room, is regarded as a housing unit when it is occupied or intended for occupancy as separate living quarters which have either direct access from the outside or through a common hall, or a kitchen or cooking equipment for the exclusive use of the occupants.[4]

One Head Household. A household in which the husband is the only member gainfully employed.

Two Head Household. A household in which both the husband and wife are the only members gainfully employed.

V. REVIEW OF RELATED LITERATURE

Wold and Jureen found a positive correlation between income and average food expenditure.[5] This finding was also supported by Waite

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[2] Ibid., p. xxvii. [3] Ibid., p. xxviii. [4] Ibid., p. xxvi.

[5] Herman Wold and Lars Jureen, Demand Analysis (New York: John Wiley and Sons, 1953), p. 5.

and Cassidy in that

> . . . When the expenditures of families of essentially similar composition and location, but with different incomes are examined, it will be found usually that the higher income families spend more on each of the principal expenditure groups than do those with lower incomes.[6]

Food was considered by them to be a principal expenditure group.

Cochrane and Bell noted that average family size increased as yearly household income increased.[7]

It is generally considered that a positive correlation exists between income and high-quality item purchases, as Cochrane and Bell stated, "spending at higher income levels consists in buying better-quality items rather than more in quantity."[8] This statement considered items in a general sense and was not made for food items per se.

Waite and Cassidy found an R^2 value of 0.178 when regressing income on food expenditure for households located in Columbus, Ohio.[9]

VI. SUMMARY

A review of the related literature suggests the following observations:

1. A positive correlation has been found to exist between income and average household food expenditure.

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[6]Warren C. Waite and Ralph Cassidy, Jr., The Consumer and the Economic Order (New York: McGraw-Hill Book Company, Inc., 1949), p. 201.

[7]Willard W. Cochrane and Carolyn Shaw Bell, The Economics of Consumption (New York: McGraw-Hill Book Company, Inc., 1956), p. 198.

[8]Ibid., p. 231.

[9]Waite and Cassidy, op. cit., p. 204.

2. A positive correlation has been found to exist between income and average family size.
3. A positive correlation has been found to exist between income and high-quality item purchases.
4. That R^2 values for the regression of income upon food expenditure have in some cases been low.
5. Information was limited concerning the interrelationship(s) between income, average food expenditure, and average family size. No information was available concerning the effect of the wives' income component on household food purchases.

CHAPTER II

SAMPLE SELECTION

A two-stage sampling plan of two hundred households was taken in metropolitan Knoxville, Tennessee. Surveys were initiated March 23, 1967, and terminated May 27, 1967, representing a time period of approximately two months.

The most recent map delineating city blocks within the city boundaries was obtained from the Metropolitan Planning Commission and all blocks located within city boundaries were enumerated in serpentine fashion. There were 2,807 city blocks in total.

City blocks were selected at random by use of a random number table.[1] Households within each city block were chosen at random with the total number of households chosen from any one block not exceeding ten. This was arbitrarily decided because survey time and cost factors were limited. No *a priori* information was available concerning the number of households in each city block. However, since over half of the eligible households in every block were selected, the precision of the variance estimates obtained was not seriously affected.[2] Emphasis was made to keep the primary sampling units small so that the relative differences

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[1] Ernest Kurnow and Gerald T. Glasset, *Statistics for Business Decisions* (Homewood, Illinois: Richard D. Irwin, Inc., 1959), p. 503.

[2] William E. Deming, *Some Theory of Sampling* (New York: John Wiley and Sons, Inc., 1950), p. 82.

between socioeconomic strata in the sample would be accurately represented.

Households were interviewed on a door-to-door basis and questions contained on a survey form pertaining to the objectives of the study were asked of the household member (see Appendix A). At least two additional attempts were made to interview the adult occupant of a household if they could not be interviewed the first time.

A sample city block consisted on the average of nine households. The range was from five to seventeen households. Only nine of the households interviewed refused to cooperate with the interview. This represented approximately 5 percent of all households surveyed.

I. ANALYSIS OF THE DATA

Where possible, all household food purchase quantities were converted to poundage equivalents as established by the U. S. Department of Agriculture.[3] For those food items where no poundage equivalent was available (e.g., converted rice and canned orange juice) the net weight corresponding to size of container for food items sold in local Knoxville food stores was used. This was derived by inspecting sizes of food containers on food store shelves, noting the net weight printed on the container and its size (large, medium or small) and using the net weight corresponding to the size of container purchased by the household. In

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[3]United States Department of Agriculture, Agricultural Statistics: 1966 (Washington: Government Printing Office, 1966), pp. v-vii.

cases where the household respondent did not know the size of container, an average for all container sizes of that commodity sold was used. Because all food items were placed on a poundage basis, standard arithmetical procedures were used.

The total weekly purchase per household of any one food group in pounds (e.g., Dairy Group or Meat Group) was divided by the number of members in the household, yielding a per capita poundage figure for that food group. The per capita poundage for any one food item (e.g., Breakfast Cereal or Sandwich Meat) was derived in a similar manner.

Per capita poundage figures were further classified by income levels to derive the average per capita poundage figure for that income level. This was effected by summing all per capita poundage figures for one commodity or item found in a particular income level and dividing this sum by the number of figures.

A Chi Square Test for goodness of fit was employed to determine if the percentage frequency of households classified by income obtained in the sample data differed significantly from the percentage frequency of households classified by income obtained by the 1960 Census of Population.[4]

Both weekly per capita expenditure for food and average pounds per capita of food purchased weekly were subjected to an analysis of the variance to determine if the observed variances between and within

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[4]Census of Population: 1960, Vol. I, Part 44, p. 192.

classes could be regarded as independent estimates of the same population variance. If the value of F is not unity, partitioning of the Total Sum of Squares is designed to show the different forces.[5]

Statistical "t" tests for the means of nonpaired observations were used to ascertain if significant differences existed in average pounds per capita of food purchased weekly and weekly per capita expenditure for food between one and two head households. These tests were employed in the following manner:

1. Comparing the average per capita weekly expenditure for food between one and two head households, total yearly household income held constant.
2. Comparing the average pounds per capita of food purchased weekly between one and two head households, total yearly household income held constant.
3. Comparing the average per capita weekly expenditure for food (classified according to a discrete income level) between one and two head households with the figure for two head households adjusted by subtracting out the average wives' income for all households. The average gross income earned by all working wives in the sample was $3,000.00 per annum.
4. Comparing the average pounds per capita of food purchased weekly between one and two head households. This figure

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[5]Frederick C. Mills, Statistical Methods (New York: Henry Holt and Company, 1955), p. 555.

for households where both heads worked corresponded to the new income figure obtained in (3) above.

Data for households surveyed pertaining to education, sex, shopping habits, head of household arrangements, race, yearly household income, and response to a hypothetical ten dollar per week increase in income as concerns household food purchases were analyzed and are presented in the following chapter in tabular form.

Some relationship(s) between average per capita weekly expenditure for food; yearly household income; household size, and average pounds of food purchased weekly were shown graphically. A second degree quadratic equation provided the best "fit" in describing the originally plotted data for these relationships, although several types of equations were attempted (e.g., rectangular hyperbola, straight line, and parabola).

Purchasing habits by households with regard to the form of strawberries, orange juice, green beans, and green peas purchased weekly are presented in tabular form to note differences between one and two head households, and to particularly note, if the wives' working has any effect on the form in which these items are purchased.

CHAPTER III

RESULTS AND DISCUSSION FOR THE COMPARISON OF HOUSEHOLDS BY HEAD OF HOUSEHOLD ARRANGEMENT

I. GENERAL DATA

Head of household arrangement by household size. Table I shows the mean and modal number of members per household classified by income and head of household arrangement. The average household size was larger where two heads worked than households where only one head worked for incomes inclusive of $4,000.00 to $10,000.00 per annum. Differences in average household size were larger for households where two heads worked than for households where one head worked having a yearly income of $8,000.00 to $9,999.00 and $4,000.00 to $5,999.00 per annum. These differences were 1.84 persons and 1.36 persons, respectively.

Figure 1 shows the average household size according to yearly income and head of household arrangement. The distribution of households where two heads work, according to average household size, is bi-modal. The distribution of households where one head works is somewhat "U" shaped in configuration. In considering both curves for a household income range of $4,000.00 to $10,000.00 per annum, the curve representing the average number of members per household where two heads work lies above the average for all households.

Table I. Mean and modal number of members per household classified by income and head of household arrangement, survey of two hundred households, Knoxville, Tennessee, 1967.

Yearly Household Income in Dollars	Members Per Household			
	One Head		Two Heads	
	Mean Number	Modal Number	Mean Number	Modal Number
2,000 - 3,999	4.09	3	3.00	2
4,000 - 5,999	3.14	3	4.50	5
6,000 - 7,999	3.28	4	3.70	2 and 3
8,000 - 9,999	3.31	2	5.25	2,3,4,5,6
10,000 - 11,999	4.23	2 and 3	4.00	3,4,6
12,000 and above	4.11	4	3.38	4
All	3.65	3	3.86	2

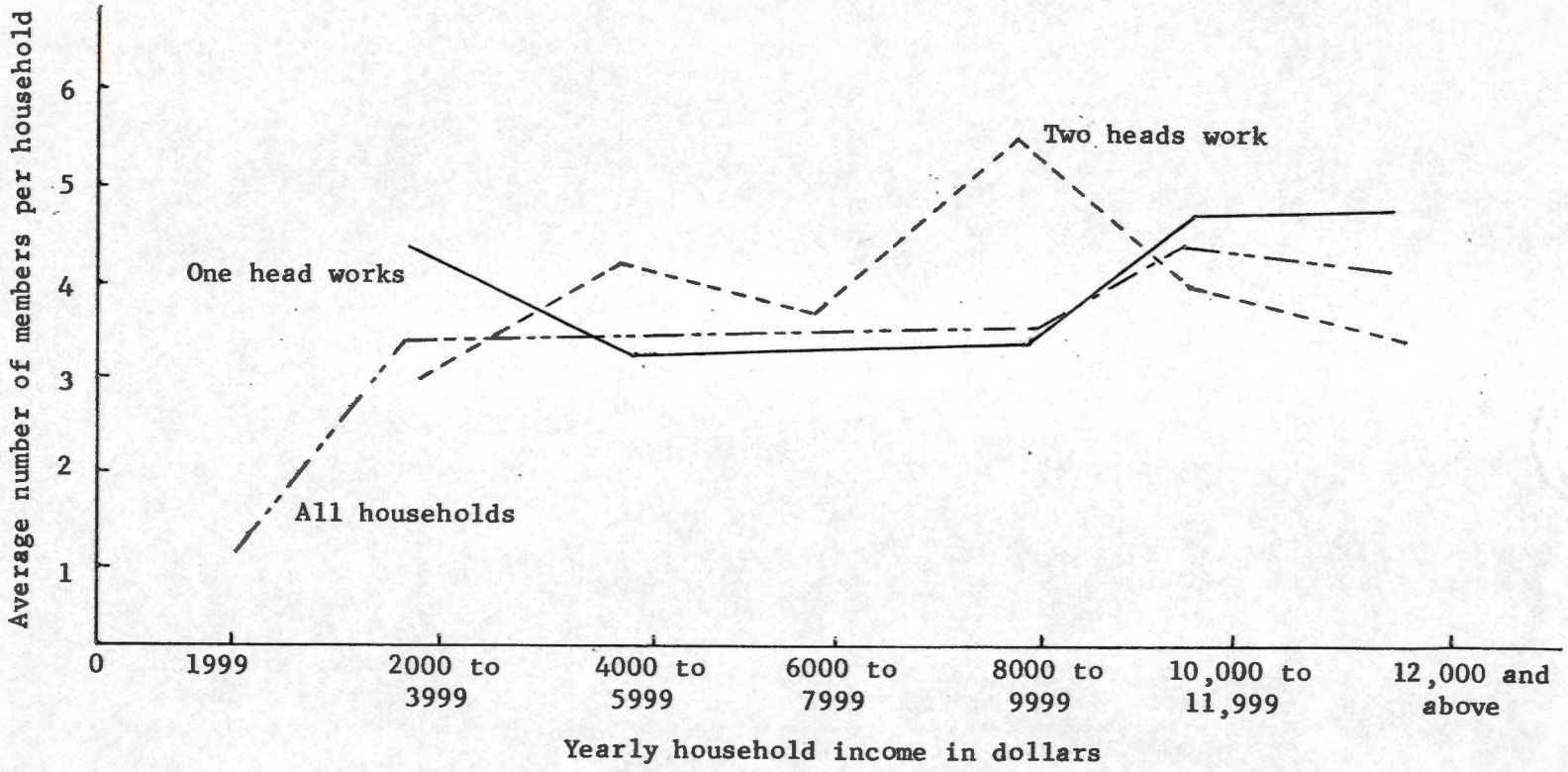


Figure 1. Average number of members per household, classified by yearly household income and head of household arrangement, survey of two hundred households, Knoxville, Tennessee, 1967.

Expenditure for food with a hypothetical increase in income. Responses of households, classified according to participation in the labor force and head of household arrangement, indicating more, same or a less amount for food expenditure with a hypothetical ten dollar weekly increase in income is shown in Table II. Almost twice as many households where one head worked indicated they would spend more for food than households where two heads worked. Households not participating in the labor force were about equally divided with respect to spending more or the same amount for food. However, a greater number of both one and two head households indicated they would spend less for food with a ten dollar per week increase in income. This response is suspect because it places food in the category of an inferior good; i.e., a good which has a negative income elasticity. This means that as income increases the quantity of food bought decreases. Since empirical evidence exists to support the fact that food is a superior good (has a positive income elasticity), the evidence presented in Table II supporting a negative income elasticity must be considered invalid.[1] One must conclude that asking if a person would spend more, less or the same amount for food purchases with a hypothetical increase in income does not accurately predict national economic behavior, nor provide substantial empirical evidence for such.

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[1]Herman Wold and Lars Jureen, Demand Analysis (New York: John Wiley and Sons, 1953), p. 5.

Table II. Number of households classified according to labor force participation and head of household arrangement that would spend more, same or a less amount for food expenditure with a hypothetical ten dollar per week increase in income, survey of two hundred households, Knoxville, Tennessee, 1967.

Households	Number of households			
	More	Less	Same	All
Participating in labor force:				
One head	24	67	0	91
Two heads	**13	37	*1	51
Not participating in labor force:	28	30	0	58
Total	65	134	1	200

*Represents only one household.

**Average household size was 4.7 persons with a mode of five persons.

II. RESULTS OF STATISTICAL "t" TESTS

Per capita expenditure for food. Table III shows the results of statistical "t" tests at the 0.01 level of significance comparing households where only one head worked and households where two heads worked with regard to average per capita expenditure for food at different income levels.

No significant differences were found at the 0.01 level. Since husbands'and wives' income for two head households was equal to the husband's income for one head households, with no significant difference between one and two head households for per capita food expenditure, it can be deduced that some portion of the wives' yearly income was used for household food expenditures.

A highly significant difference was found between two head households (adjusted by subtracting out the average wives' income for all households) and one head households for the weekly average per capita expenditure for food. Since husbands'and wives' income for two head households (average wives' income for all households subtracted out) was equal to the husband's income for one head households, with a significant difference between one and two head households for weekly per capita food expenditure, it can be further deduced that some portion of the wives' yearly income was used for household food expenditures. However, this was only applicable to all households taken in the aggregate.

Table III. Results of "t" tests at the 0.01 level of significance between one and two head households for the average per capita expenditure for food at different income levels, survey of two hundred households, Knoxville, Tennessee, 1967.

Yearly household income in dollars	"t" for per capita weekly expenditure	"t" for per capita weekly expenditure: less income of wife**
2,000 - 3,999	1.34	2.68
4,000 - 5,999	2.06	0.23
6,000 - 7,999	0.83	0.10
8,000 - 9,999	0.24	2.22
10,000 - 11,999	0.38	0.15
12,000 and above	1.73	1.58
All households	1.34	*3.14

*Calculated "t" of 3.14 greater than tabular "t" of 1.98 at 0.05 level; 2.63 at 0.01 level of significance, df 121.

**Comparisons of average made with household income where two heads worked, adjusted by subtracting out average wives' income for all households.

Pounds of food purchased. The results of "t" tests at the 0.01 level for differences between one and two head households as regards the average per capita pounds of food purchased weekly are shown in Table IV.

No significant differences at the 0.01 level were found. This indicates that although some portion of the wives' income is spent for food, the amount spent is not reflected in an increase in weekly per capita pounds of food purchased. Differences in average per capita food quantities purchased between one and two head households (adjusted by subtracting out the average wives' income for all households) were not significant at the 0.01 level. This indicates that the average per capita purchase of food poundage remains about the same without or with additional household income for the aggregate of all levels. However, a highly significant difference was found between one and two head households at the $4,000.00 to $5,999.00 yearly income level (two head households adjusted by subtracting out the average wives' income for all households) with respect to average per capita purchase of food in pounds. This finding is in accord with the large household size for this income level where two heads work (see Table I, page 14).

III. THE DIFFERENCE IN PURCHASING HABITS FOR TWO HEAD HOUSEHOLDS WHEN COMPARED WITH ONE HEAD HOUSEHOLDS

The $6,000 to $7,999.00 yearly household income level was chosen in comparing head of household arrangements because this level had more

Table IV. Results of "t" tests as the 0.01 level of significance for differences between one and two head households for the average per capita pounds of food purchased weekly at different income levels, survey of two hundred households, Knoxville, Tennessee, 1967.

Yearly household income in dollars	"t" for per capita average pounds of food purchased weekly	"t" for per capita average pounds of food purchased: adjusted for wives' income**
2,000 - 3,999	0.10	1.94
4,000 - 5,999	2.42	*4.18
6,000 - 7,999	0.25	0.90
8,000 - 9,999	2.06	0.20
10,000 - 11,999	2.31	0.34
12,000 and above	0.66	0.68
All households	1.26	1.16

*Calculated "t" of 4.18 greater than tabular "t" of 2.12 at the 0.05 level; 2.98 at the 0.01 level of significance, df 16.

**Comparison of means made with household income where two heads worked, adjusted by subtracting out average wives' income for all households.

two head households of varying household sizes. A total of forty households were used in this comparison. In some cases the number of households in household size groupings were small so that general trends in differences were noted.

Meats. Table V shows the change in average pounds per capita of selected meats purchased weekly by two head households at a yearly income level of $6,000.00 to $7,999.00, as compared with one head households. This table is taken from Appendix B.

The amount of pork chops purchased increased as household size increased for households where two heads worked as compared to those where only one head worked. There was a corresponding decrease in the purchase of Chuck Roast, Steaks and Fryers.

As household size increased the purchase of Pork Chops tended to increase. The purchase of other types of meats varied considerably with household size.

Vegetables. The change in average pounds per capita of selected vegetables purchased weekly for two head households as compared to one head, having a yearly income of $6,000.00 to $7,999.00 is shown in Table VI.

The purchase of green beans was greater for all households where two heads worked. However, there was a decrease in the purchase of white potatoes.

Table V. Differences in average pounds per capita per week of selected meats purchased weekly by two head households as compared with one head households, yearly household income held at $6,000.00 to $7,999.00, forty of two hundred households surveyed, Knoxville, Tennessee, 1967.

Meats	Number of members per household			
	Two	Three	Four	All
Pork Chops	+0.08	+0.37	+0.44	+0.89
Chuck Roast	-0.08	-0.05	0	-0.13
Steaks	+0.16	-0.99	+0.37	-0.46
Hamburger	0	-0.20	+0.48	+0.28
Fryer	-2.12	+0.91	-0.12	-1.33
Sandwich	+0.25	-0.19	+0.21	+0.27

Table VI. Differences in average pounds per capita per week of selected vegetables purchased weekly for two head households as compared with one head households, yearly household income held at $6,000.00 to $7,999.00, forty of two hundred households surveyed, Knoxville, Tennessee, 1967.

Vegetables	Number of members per household			
	Two	Three	Four	All
Green Beans	+1.00	+0.61	+0.06	+1.67
Green Peas	+1.06	+0.23	-0.44	+0.85
White Potatoes	0	+0.83	-1.25	-0.42
Carrots	0	+0.05	-0.05	0
Lettuce	-0.09	+0.17	+0.45	+0.53
Onions	-0.17	+0.13	+0.07	+0.03

Fruits. Table VII shows the differences in average pounds per capita for selected fruits purchased weekly by two head households as compared with one head households, yearly household income held at the $6,000.00 to $7,999.00 level.

The purchase of apples, oranges, grapefruit and bananas are less for all households where two heads worked. Strawberries seemed to be the most consistent item with purchases increasing as household size increased.

Fruit juices. The change in average pounds per capita of selected fruit juices purchased weekly by two head households as compared with one head households, yearly household income held constant at the $6,000 to $7,999.00 level, is shown in Table VIII.

There was an overall decrease in the purchase of fruit juices (excepting tomato juice) by all households where two heads worked. Exceptions were noted for households of three member size in the purchase of orange juice and tomato juice.

A large increase in the purchase of "other" types of juices for four member households was noted.

Grain and specialty items. Table IX shows the change in average pounds per capita of selected grain and specialty items purchased weekly by two head households as compared with one head households, yearly household income held constant at the $6,000.00 to $7,999.00 level.

Table VII. Differences in average pounds per capita per week of selected fruits purchased weekly by two head households as compared with one head households, yearly income held constant at the $6,000.00 to $7,999.00 level, forty of two hundred households surveyed, Knoxville, Tennessee, 1967.

Fruits	Number of members per household			
	Two	Three	Four	All
Apples	-2.25	-0.07	-0.16	-2.48
Oranges	0	-0.30	+0.17	-0.13
Grapefruit	-3.00	0	-1.25	-4.25
Bananas	-0.33	+0.17	-0.10	-0.26
Strawberries	+0.32	+2.00	+1.72	+3.40
Peaches	+0.90	-0.19	+0.58	+1.29
Pears	+0.50	0	+0.25	+0.75

Table VIII. Differences in average pounds per capita per week of selected fruit juices purchased weekly by two head households as compared with one head households, yearly household income held constant at the $6,000.00 to $7,999.00 level, forty of two hundred households surveyed, Knoxville, Tennessee, 1967.

Fruit Juices	Number of members per household			
	Two	Three	Four	All
Apple	0	0	0	0
Orange	-0.27	+0.03	-0.41	-0.65
Tomato	-0.22	+0.29	0	+0.07
Grapefruit	0	-0.29	-0.07	-0.36
Other	-0.44	-0.29	+0.65	-0.08

Table IX. Differences in average pounds per capita per week of selected grain and specialty items purchased weekly by two head households as compared with one head households, yearly income held constant at the $6,000.00 to $7,999.00 level, forty of two hundred households surveyed, Knoxville, Tennessee, 1967.

Grains and specialty items	Number of members per household			
	Two	Three	Four	All
Rice	+0.41	-0.41	-0.38	-0.39
Bread	-0.63	-0.38	-0.21	-1.22
Breakfast Cereal	+0.45	+0.01	+0.13	+0.59
Cakes	0	-0.25	-0.12	-0.37
Cookies	-0.17	0	+0.25	+0.08
Cake Mix	-0.05	0	-0.43	-0.48

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Purchase of rice, bread, cakes and cake mix decreased for all households where two heads worked. However, the purchase of breakfast cereal and cookies increased.

Orange juice. The number of households purchasing orange juice weekly, according to form, classified by income and head of household arrangement is shown in Table X.

An almost equal number of two head households purchased the canned and frozen forms. However, over twice as many one head households purchased frozen orange juice as compared with two head households.

Strawberries. Table XI shows the number of households purchasing strawberries weekly, according to form, classified by income and head of household arrangement.

Almost twice as many two head households purchased fresh strawberries as purchased frozen. However, twice as many one head households purchased frozen strawberries as purchased fresh.

IV. PURCHASES OF GREEN BEANS ACCORDING TO FORM

Green beans. The number of households purchasing green beans weekly, according to form, classified by income and head of household arrangement, is shown in Table XII.

Almost twice as many one and two head households purchased canned green beans than purchased fresh green beans. Very few households purchased frozen green beans.

Table X. Number of households purchasing orange juice weekly, according to form, classified by income and head of household arrangement, survey of two hundred households, Knoxville, Tennessee, 1967.

Form of orange juice purchased	Number of households with yearly incomes of							
	0 to 1,999	2,000 to 3,999	4,000 to 5,999	6,000 to 7,999	8,000 to 9,999	10,000 to 11,999	12,000 up	Total**
CANNED								
One head	2	5	2	4	3	2	0	18
Two heads	0	0	4	1	1	4	4	14
Other households*	6	3	1	2	1	0	0	13
All households	8	8	7	7	5	6	4	45
JAR								
One head	0	3	2	4	1	1	1	12
Two heads	0	0	1	5	0	0	0	6
Other households*	2	5	2	1	0	1	0	11
All households	2	8	5	10	1	2	1	29
FROZEN								
One head	0	3	7	7	6	2	7	32
Two heads	0	3	2	2	1	1	4	13
Other households*	1	4	4	3	1	0	1	14
All households	1	10	13	12	8	3	12	59

*This figure includes households with no head gainfully employed and with more than two heads gainfully employed.

**A total of 67 households did not purchase orange juice.

Table XI. Number of households purchasing strawberries weekly, according to form, classified by income and head of household arrangement, survey of two hundred households, Knoxville, Tennessee, 1967.

Form of strawberries purchased	Number of households with yearly incomes of							
	0 to 1,999	2,000 to 3,999	4,000 to 5,999	6,000 to 7,999	8,000 to 9,999	10,000 to 11,999	12,000 up	Total**
FRESH								
One head	0	1	0	1	2	2	1	7
Two heads	0	0	0	3	2	4	1	10
Other households*	1	1	1	1	1	1	0	6
All households	1	2	1	5	5	7	2	23
FROZEN								
One head	0	1	6	3	2	0	3	15
Two heads	0	0	1	1	0	1	3	6
Other households*	0	1	0	1	0	0	0	2
All households	0	2	7	5	2	1	6	23

*This figure includes households with no head gainfully employed and with more than two heads gainfully employed.

**A total of 154 households did not purchase strawberries.

Table XII. Number of households purchasing green beans weekly, according to form, classified by income and head of household arrangement, survey of two hundred households, Knoxville, Tennessee, 1967.

Form of green beans purchased	Number of households with yearly incomes of							
	0 to 1,999	2,000 to 3,999	4,000 to 5,999	6,000 to 7,999	8,000 to 9,999	10,000 to 11,999	12,000 up	Total**
CANNED								
One head	0	7	4	7	2	5	0	25
Two heads	0	1	4	4	6	5	4	24
Other households*	10	6	4	0	0	1	1	22
All households	10	14	12	11	8	11	5	71
FRESH								
One head	0	4	1	3	2	3	5	18
Two heads	0	1	3	4	2	2	1	13
Other households*	8	4	2	5	2	1	0	22
All households	8	9	6	12	6	6	6	53
FROZEN								
One head	0	0	1	0	0	0	1	2
Two heads	0	0	1	0	0	1	0	2
Other households*	0	0	0	0	0	0	0	0
All households	0	0	2	0	0	1	1	4

*This figure includes households with no head gainfully employed and with more than two heads gainfully employed.

**A total of 72 households did not purchase green beans.

Green peas. Table XIII shows the number of households purchasing green peas weekly, according to form, classified by income and head of household arrangement.

A majority of households purchased canned green peas while very few households purchased frozen green peas.

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Table XIII. Number of households purchasing green peas weekly, according to form, classified by income and head of household arrangement, survey of two hundred households, Knoxville, Tennessee, 1967.

Form of green peas purchased	Number of households with yearly incomes of							
	0 to 1,999	2,000 to 3,999	4,000 to 5,999	6,000 to 7,999	8,000 to 9,999	10,000 to 11,999	12,000 up	Total**
CANNED								
One head	0	15	6	13	5	5	4	48
Two heads	0	3	4	5	2	3	3	20
Other households*	7	8	4	7	2	1	1	30
All households	7	26	14	25	9	9	8	98
FROZEN								
One head	0	0	0	1	2	1	3	7
Two heads	0	0	0	0	1	1	0	2
Other households*	3	1	0	0	0	0	0	4
All households	3	1	0	1	3	2	3	13

*This figure includes households with no head gainfully employed and with more than two heads gainfully employed.

**A total of 89 households did not purchase green peas.

CHAPTER IV

RESULTS AND DISCUSSION OF DATA FOR ALL HOUSEHOLDS

I. GENERAL INFORMATION

Racial composition. Approximately 6 percent of all households surveyed were nonwhite and 94 percent were white. However, the average size of nonwhite households (3.67 persons) was slightly larger than that of white (3.31 persons) households. On a population basis, the distribution of the survey was 93 percent white and 7 percent nonwhite. The 1960 Census of Population estimated that almost 19 percent of the Metropolitan Knoxville population was nonwhite. This represented a decided departure from the distribution found in the sample survey. Because of this differential, it was decided not to classify any data on the basis of race.

Distribution of households by income and size. Distribution of households surveyed by income and size is shown in Table XIV. One to two member households decreased in number as household income increased. There were more three to four member households in the upper income groups.

A frequency distribution for household size is shown in Figure 2. Two member households were the most frequent with the total distribution for all households being skewed to the right.

Table XIV. Number of households classified by income and household size, survey of two hundred households, Knoxville, Tennessee, 1967.

Yearly household income in dollars	Number of members per household			
	1 or 2	3 or 4	5 or more	All households
0 - 1,999	23	1	0	24
2,000 - 3,999	17	19	9	45
4,000 - 5,999	11	12	9	32
6,000 - 7,999	9	24	7	40
8,000 - 9,999	6	11	6	23
10,000 - 11,999	3	8	6	17
12,000 and above	3	12	4	19
Total	72	87	41	200

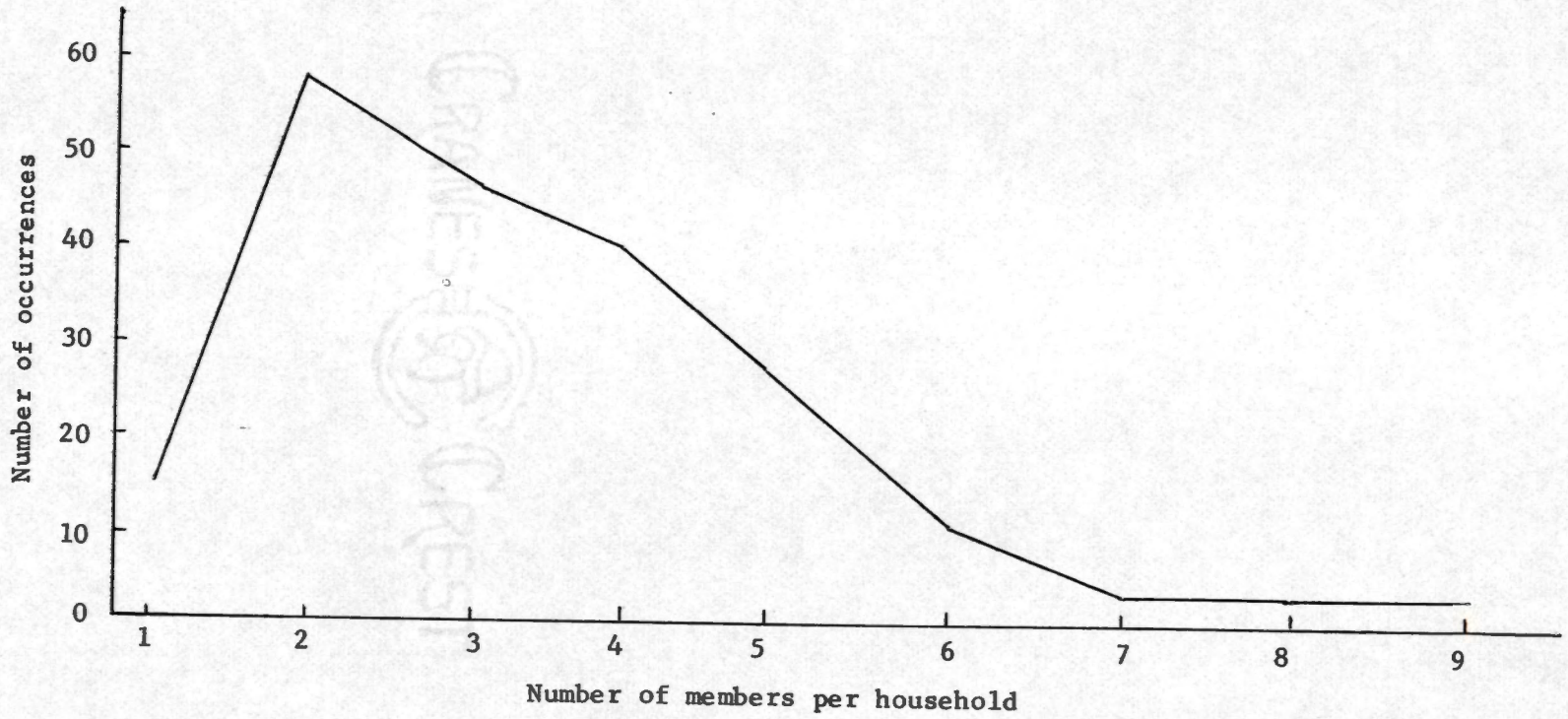


Figure 2. Frequency of occurrence for number of members per household, survey of two hundred households, Knoxville, Tennessee, 1967.

The mean and modal size of households surveyed is shown in Table XV. Both the mean and modal number of members per household increased as yearly household income increased. This relationship was positive.

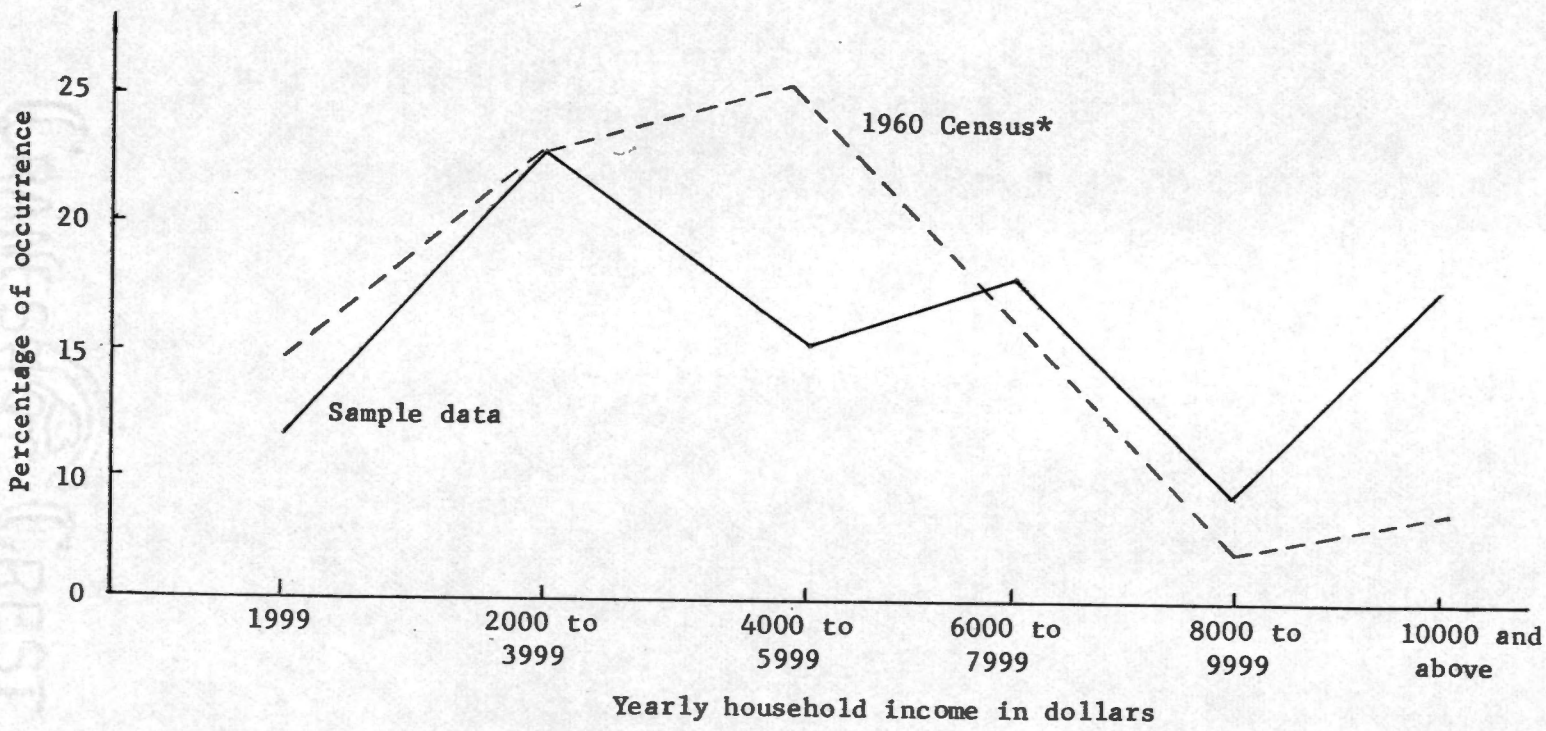
Households distributed according to income levels for all households surveyed and the 1960 Census of Population are shown in Figure 3. The sample data was closely aligned with that obtained by the census excepting the $4,000.00 to $5,999.00 income group. A Chi Square test for goodness of fit for the sample data and data obtained in the 1960 Census of Population indicated no significant difference between both sets of data at the 0.01 level. The 1 percent level was chosen because of the relatively small number of observations used in estimating the universe.

Household labor force participation. A frequency distribution for household labor force participation is shown in Figure 4. Only one household surveyed, that was participating in the labor force, had a yearly income of less than two thousand dollars. A few nonparticipating households had sizable yearly incomes. The overall distribution is one exhibiting skewness to the right.

Figure 5 shows the occurrence of women participating in the labor force according to household size. The number of wives participating in the labor force closely paralleled that for all female heads of households.

Table XV. Mean and modal number of members per household by income level, survey of two hundred households, Knoxville, Tennessee, 1967.

Yearly household income in dollars	Mean number of members per household	Modal number of members per household
0 - 1,999	1.61	1 and 2
2,000 - 3,999	3.24	2
4,000 - 5,999	3.44	2
6,000 - 7,999	3.53	3
8,000 - 9,999	3.68	3
10,000 - 11,000	4.38	4
12,000 and above	3.74	4



*1960 Census of Population, Part 44, Tennessee, p. 192.

Figure 3. Percentage distribution of yearly household income for sample data and data from 1960 Census of Population, survey of two hundred households, Knoxville, Tennessee, 1967.

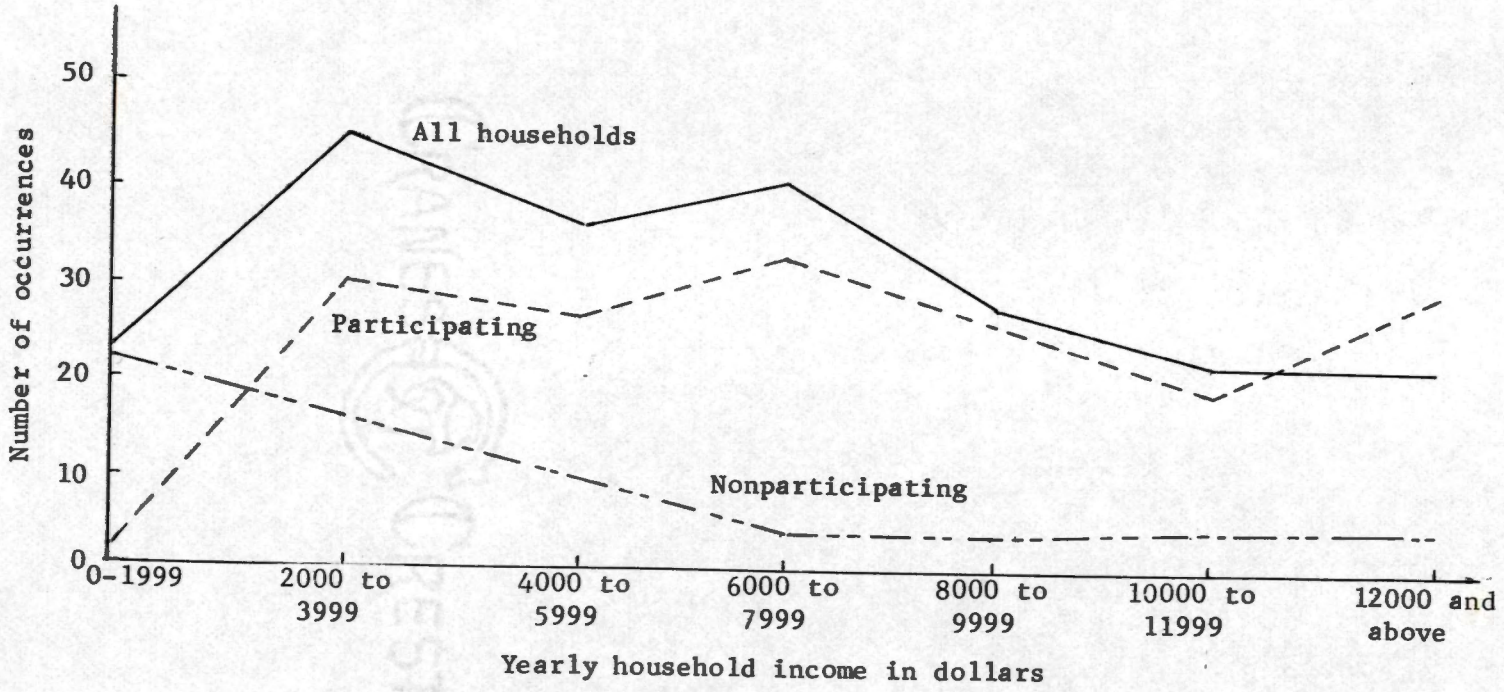


Figure 4. Frequency of occurrence for household labor force participation, classified according to income, survey of two hundred households, Knoxville, Tennessee, 1967.

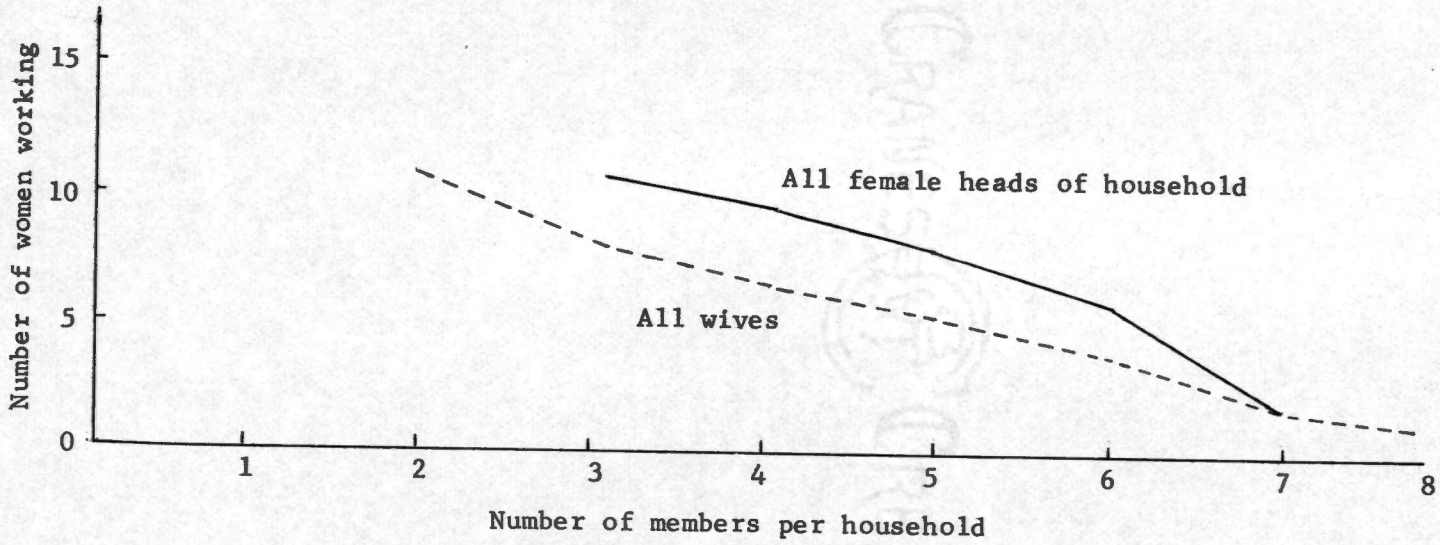


Figure 5. Number of women working in labor force, according to number of members per household, survey of two hundred households, Knoxville, Tennessee, 1967.

Head of household by age and education. The classification of male heads of households by age and education is seen in Table XVI. Approximately 40 percent of all male heads of households surveyed had twelve years of secondary school education. About one-fourth had one year of college or more, with half of these ranging from 31 to 45 years of age. Fifteen percent of those surveyed having one year or more of college were under 30 years of age.

Table XVII shows female heads of households classified according to age and level of education. About 35 percent of all female heads of households surveyed had twelve years of secondary school education, 5 percent less than the corresponding figure for male heads of household.

II. SHOPPING HABITS

Household member who did most of the food shopping. Table XVIII shows the household member who did a majority of the household food shopping classified by income. Female heads of households, including wives, represented approximately two-thirds of all members who shopped. Their importance increased in the upper income groupings.

Male heads of households had their greatest importance as the major food shopper in the $2,000.00 to $3,999.00 income group. However, in only 8 percent of the households were they the member doing a majority of the household food shopping.

Store most frequently shopped. The store most frequently shopped for food is shown in Table XIX. Over 50 percent of all households

Table XVI. Male heads of households classified according to age and education, survey of two hundred households, Knoxville, Tennessee, 1967.*

Age in Years	Percent to complete education level				
	Eighth grade or less	Ninth to eleventh	Twelfth to high school	One year of college or more	All male heads
Under 30	1	4	7	4	16
31 - 45	3	9	15	16	43
46 - 60	3	9	13	5	30
61 and over	3	1	5	2	11
Total	10	23	40	27	100

*Thirty-one of the two hundred households sampled had no male head.

Table XVII. Female heads of households classified according to age and education, survey of two hundred households, Knoxville, Tennessee, 1967.*

Age in years	Percent to complete education level				
	Eighth grade or less	Ninth to eleventh	Twelfth to high school	One year of college or more	All female heads
Under 30	2	4	7	4	17
31 - 45	5	8	16	7	36
46 - 60	6	11	9	5	31
61 and over	6	6	3	1	16
Total	19	29	35	17	100

*Three of the two hundred households sampled had no female head.

Table XVIII. Household member who did a majority of the household food shopping, classified by income, survey of two hundred households, Knoxville, Tennessee, 1967.

Yearly household income in dollars	Percentage of			
	Male head	Female head	Both heads	Other members
0 - 1,999	1	8	1	3
2,000 - 3,999	4	12	5	2
4,000 - 5,999	1	9	5	1
6,000 - 7,999	1	12	5	1
8,000 - 9,999	1	9	1	1
10,000 - 11,999	0	6	2	0
12,000 or more	0	8	0	1
Total	8	64	19	9

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Table XIX. Store most frequently shopped for food on a weekly basis, survey of two hundred households, Knoxville, Tennessee, 1967.

Store shopped	Percentage of households
White Store	37
Kroger	20
Cas Walker	14
A & P	12
IGA	4
Winn Dixie	3
Other	10
Total	100

surveyed shopped the local chain stores most frequently for food. A local chain store was defined as one having its origin in Knoxville. These included the White Store and Cas Walker.

Approximately 35 percent of those households surveyed shopped the national chain stores which included Kroger, A & P, and Winn-Dixie.

The number of households classified by store most frequently shopped and yearly household income is shown in Table XX.

National chain stores were shopped by more households in upper income levels ($10,000 and above), while household food purchases by lower income levels ($0 to $5,999) were about equally divided between local and national food chains.

Frequency of household food purchases. Table XXXI shows the frequency of household food purchases on a weekly basis. Over one-half of all households surveyed shopped for food two or three times per week. Almost 25 percent shopped for food once a week.

Day of the week food purchases were made. The day of the week on which a majority of household food purchases were made is shown in Table XXII. Almost one-third of all households surveyed made a majority of their food purchases on Friday. Approximately 62 percent made a majority of their food purchases on Thursday, Friday or Saturday.

Per capita expenditure for food classified by income. Table XXIII shows the average per capita weekly expenditure for food purchases according to household income. Per capita expenditure dropped below the average

Table XX. Number of households classified by store most frequently shopped and yearly household income, survey of two hundred households, Knoxville, Tennessee, 1967.

Yearly household income in dollars	Store most frequently shopped by number of households for food purchases						
	IGA	Cas Walker	White Store	A & P	Kroger	Winn Dixie	Other
0 - 1,999	0	4	7	1	4	0	8
2,000 - 3,999	5	11	12	5	7	1	5
4,000 - 5,999	1	5	13	3	6	2	2
6,000 - 7,999	1	4	15	8	9	0	4
8,000 - 9,999	0	4	12	2	4	1	0
10,000 - 11,999	0	1	7	2	4	1	1
12,000 and above	0	0	10	4	4	0	0
Total	7	29	76	25	38	5	20

Table XXI. Frequency of household food purchases by weekly time periods, survey of two hundred households, Knoxville, Tennessee, 1967.

Frequency of purchase	Percentage of households
Every other week	3
Once a week	22
Twice a week	27
Three times a week	24
Four times a week	13
Five times a week	7
Six times a week	4
Total	100

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Table XXII. Day of week on which a majority of household food purchases were made, survey of two hundred households, Knoxville, Tennessee, 1967.

Day of week	Percentage of households
Monday	2
Tuesday	6
Wednesday	3
Thursday	17
Friday	31
Saturday	14
Sunday	2
No special day	25
Total	100

Table XXIII. Average per capita weekly expenditure for food classified by income, survey of two hundred households, Knoxville, Tennessee, 1967.

Yearly household income in dollars	Average per capita expenditure in dollars
0 - 1,999	7.69
2,000 - 3,999	6.54
4,000 - 5,999	6.53
6,000 - 7,999	7.94
8,000 - 9,999	7.22
10,000 - 11,999	8.10
12,000 or more	7.37
Average of all households	7.25

of all households for two of the lower income groups while the $6,000.00 to $7,999.00 income level was above the average for all households.

A second degree quadratic equation for the average per capita expenditure for food and household income is plotted in Figure 6. This overall relationship is positive with the rate of increase being small.

Per capita expenditure for food classified by household size. The average per capita weekly expenditure for food by household size is shown in Table XXIV. Per capita expenditure decreased as the number of members in the household increased. The difference was greatest for those households having three members ($1.80).

Figure 7 shows a second degree quadratic equation plotted for the average per capita expenditure for food and household size. The overall relationship is negative. The index of correlation for the equation in fitting the original data was 0.91.

Pounds of food purchased classified by income. Table XXV shows the average pounds of food purchased per capita per week according to yearly household income. The average pounds of food purchased weekly per capita tended to decline as income increased.

A second degree quadratic for the average pounds of food purchased weekly per capita according to yearly household income is plotted in Figure 8. Pounds of food purchased per capita increased for the two lower income groupings but then decreased as income increased. The overall relationship is negative.

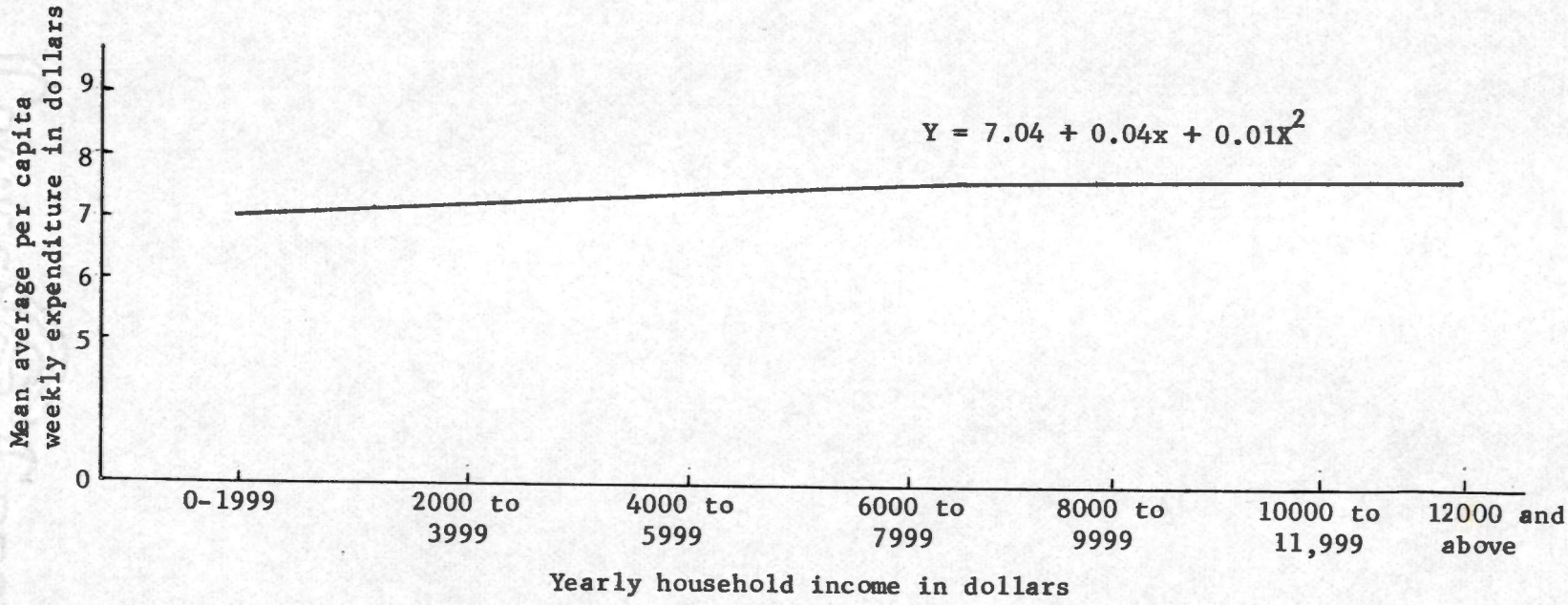


Figure 6. Average per capita weekly expenditure for food in dollars, classified by household income, survey of two hundred households, Knoxville, Tennessee, 1967.

Table XXIV. Average per capita weekly expenditure for food, classified by household size, survey of two hundred households, Knoxville, Tennessee, 1967.

Number of members in household	Average per capita expenditure in dollars
1	9.96
2	8.84
3	7.04
4	6.37
5 or more	6.37

CRANES CREST

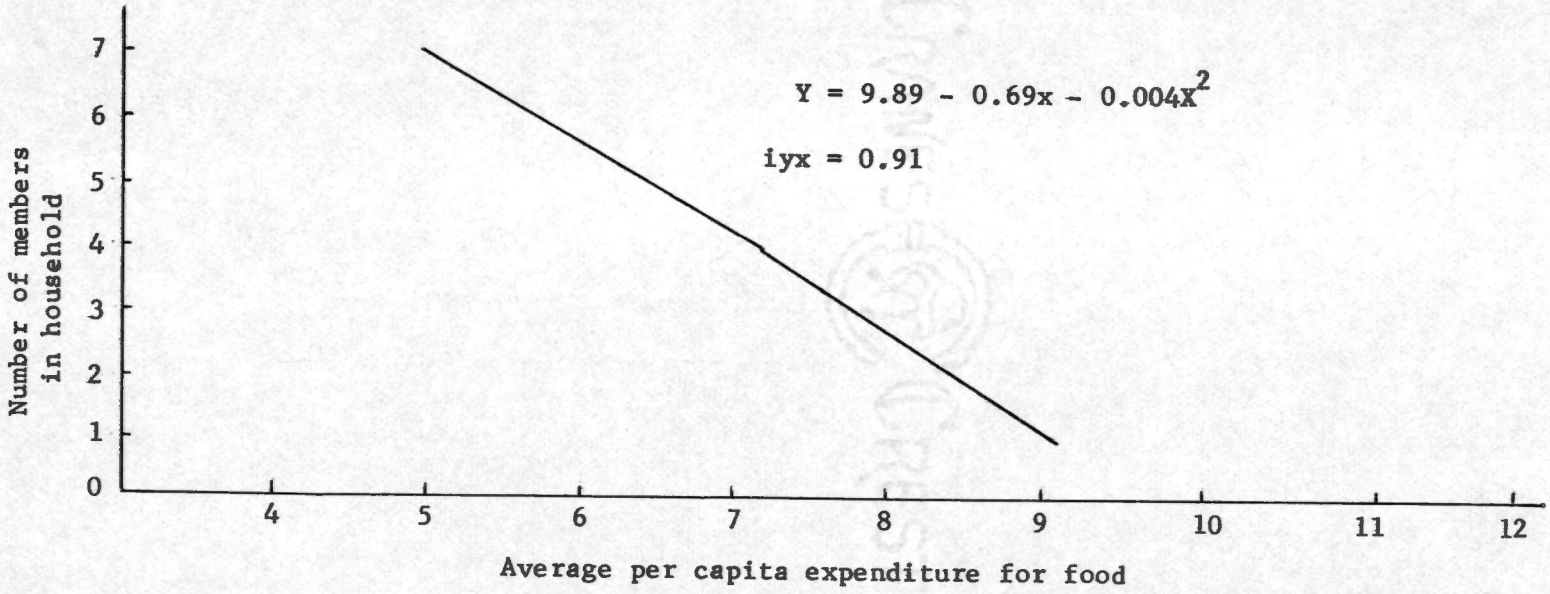


Figure 7. Average weekly per capita expenditure for food, classified by household size, survey of two hundred households, Knoxville, Tennessee, 1967.

Table XXV. Average pounds of food purchased weekly per capita, classified by income, survey of two hundred households, Knoxville, Tennessee, 1967.

Yearly household income in dollars	Average pounds of food purchased weekly per capita
0 - 1,999	24.55
2,000 - 3,999	21.73
4,000 - 5,999	22.12
6,000 - 7,999	23.43
8,000 - 9,999	21.77
10,000 - 11,999	19.90
12,000 and above	22.18
Average for all households	22.36

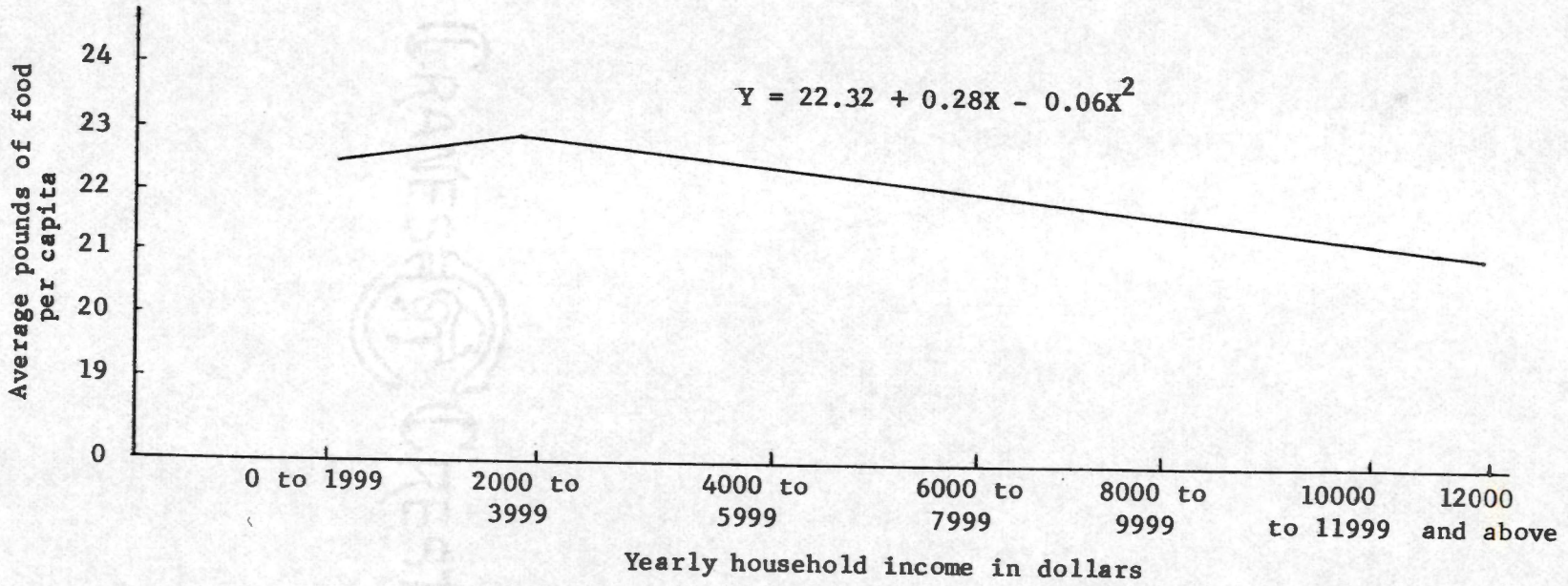


Figure 8. Average pounds of food purchased weekly per capita, classified by income, survey of two hundred households, Knoxville, Tennessee, 1967.

Pounds of food purchased classified by household size. The average pounds of food purchased weekly per capita according to household size is shown in Table XXVI. The greatest difference in average pounds purchased was from one to two member households. This represented a decrement of 6.70 pounds per capita. The next largest decrement (4.80 pounds) was from two to three member households. This can be partially explained by the lumpy quantities in which food items were purchased.

Figure 9 shows a second degree quadratic equation plotted for the average pounds of food purchased weekly per capita according to household size. The overall relationship is negative, with pounds of food purchased per capita decreasing as household size increased. The index of correlation for the equation in fitting the original data is 0.73.

III. ANALYSIS OF VARIANCE

Household income and size on weekly per capita expenditure. An analysis of the variance for linear regression of yearly household income and household size on weekly per capita expenditure for food is shown in Table XXVII.

The null hypothesis of no linear regression for yearly household income and household size on weekly per capita expenditure for food was rejected at the 0.01 level of significance (computed value of F or 16.31 larger than tabular F or 4.71 for df 2/197 at the 0.01 level of significance).

Table XXVI. Average pounds of food purchased weekly per capita, classified by household size, survey of two hundred households, Knoxville, Tennessee, 1967.

Number of members in household	Average pounds of food purchased weekly per capita
1	33.05
2	26.35
3	21.55
4	21.41
5 or more	17.44
Total of all households	24.01

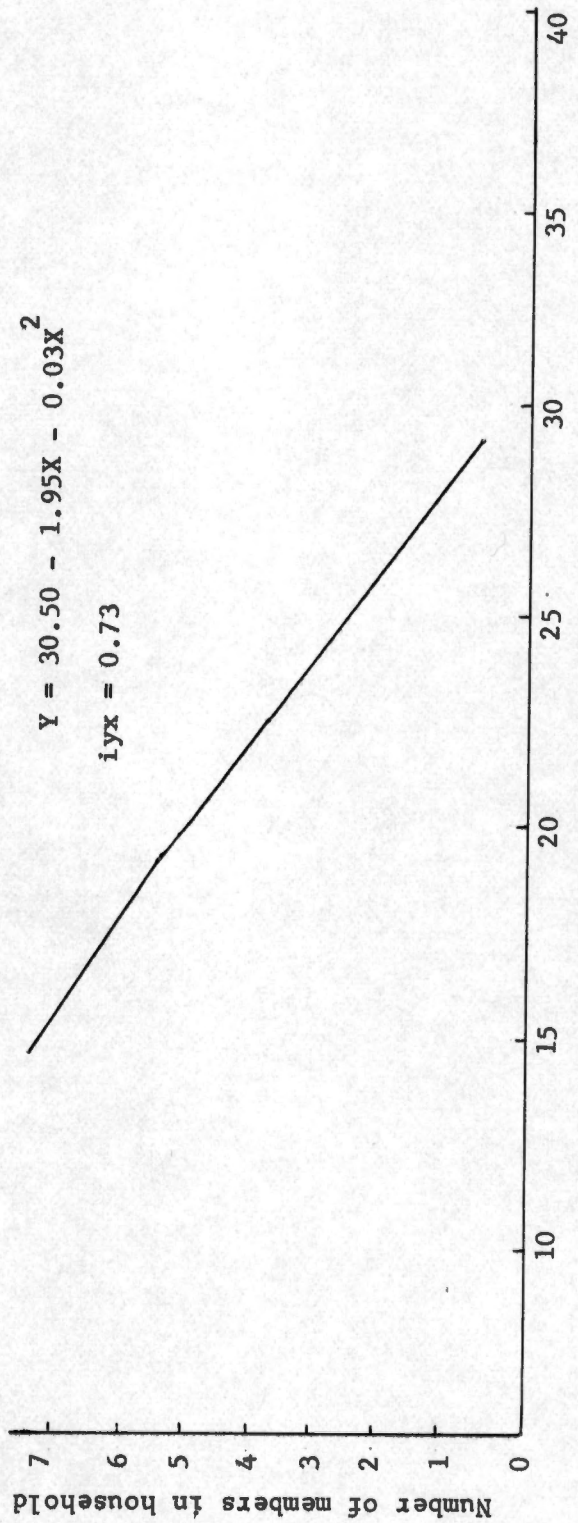


Figure 9. Average pounds of food purchased weekly per capita, classified by household size, survey of two hundred households, Knoxville, Tennessee, 1967.

Table XXVII. Analysis of variance for linear regression of income and household size on per capita weekly expenditure for food, survey of two hundred households, Knoxville, Tennessee, 1967.

Source of variation	Sum of square	df	Mean square	F ratios
Due to regression on two independent variables	339.64	2	169.82	*16.31
Due to number of household members	320.06	1		
Due to yearly household income	19.58	1		
Residual	2,050.26	197	s^2 = 10.41	
Total	2,389.90	199		

*F larger than 3.04 (df 2/197) required for significance at the .05 level; 4.71 at the 0.01 level.

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An additional null hypothesis, that household income contributes nothing to the predictability of weekly per capita expenditure for food that is not already measured by household size was accepted at the 0.05 and 0.01 levels of significance (computed value for F of 1.87 from the ANOVA table less than a tabular F of 3.89 at the 0.05 level of significance and 6.76 at the 0.01 level of significance for df 1/197).

Economic theory would lead us to believe that household income would be a better predictor of per capita food consumption than would household size. Since income and family size have been shown to be correlated to some degree, multicollinearity is present in the regression equation and the separate effects of income and household size cannot be measured accurately. Therefore, the fact that household size appeared to contribute more than household income in explaining per capita expenditure and per capita pounds purchases can be attributed to the formulation of the regression equation per se.

An R^2 value of 0.142 was obtained for the data.

Household income and size on weekly per capita purchase in pounds. Table XXVIII shows an analysis of the variance for linear regression of yearly household income and household size on weekly per capita purchase of food in pounds.

IV. FOOD PURCHASING DATA

Purchases of selected food groups. Table XXIX shows the average pounds of food purchased weekly per capita for different food groups.

Table XXVIII. Analysis of variance for linear regression of income and household size on per capita weekly purchase of food in pounds, survey of two hundred households, Knoxville, Tennessee, 1967.

Source of variation	Sum of square	df	Mean square	F ratios
Due to regression on two independent variables	46.10	2	23.05	*30.33
Due to number of household members	45.71	1		
Due to yearly household income	0.40	1		
Residual	150.26	197	$s^2 = 0.76$	
Total	196.37	199		

*F larger than 3.04 (df 2/197) required for significance at the .05 level; 4.71 at the .01 level.

Table XXIX. Average pounds of food purchased weekly per capita for different food groups, classified according to income, survey of two hundred households, Knoxville, Tennessee, 1967.

Yearly household income in dollars	Average pounds of food purchased							
	Meat	Vegetable	Fruit	Juice	Grain	Specialty	Dairy	Eggs
0 - 1,999	3.92	4.10	1.97	0.52	1.53	0.56	8.10	1.39
2,000 - 3,999	3.02	3.59	1.52	0.38	1.21	0.48	7.11	1.26
4,000 - 5,999	3.50	3.82	2.18	0.50	1.20	0.39	7.03	1.14
6,000 - 7,999	3.48	3.60	2.34	0.62	1.22	0.49	8.28	1.39
8,000 - 9,999	2.78	3.48	1.74	0.42	1.15	0.39	6.84	0.99
10,000 - 11,999	3.24	3.47	1.99	0.49	0.91	0.51	6.91	1.03
12,000 and over	3.33	3.05	3.19	0.80	0.98	0.33	10.31	0.99
All households	3.30	3.61	2.10	0.53	1.17	0.47	7.79	1.20

The purchase of meats and grains tended to decline as income increased, although a definite trend was difficult to establish because of variations for different income levels.

Purchases of vegetables tended to decrease as incomes increased, although variations for different income groups made establishment of a trend difficult.

Trends for the purchase of fruits, fruit juices, specialty items, and dairy products were not definitely assignable.

Meats. The average pounds purchased weekly per capita of selected meat items is shown in Table XXX. Purchases of pork chops, chuck roast, hamburger and, with some exceptions, fryers tended to decrease as income increased.

Purchases of steak in average pounds per capita was equal for households having incomes below $2,000.00 and from $4,000.00 to $5,999.00 per annum.

An irregular increase in the purchase of sandwich meats was established as incomes increased to the $10,000.00 per annum level.

Vegetables. Table XXXI shows the average pounds per capita purchase of selected vegetables. The purchase of all items tended to decrease as yearly household income increased. An exception was noted in that the purchase of white potatoes, carrots, lettuce and onions increased for the $8,000.00 to $9,999.00 yearly household income level.

Table XXX. Average pounds of selected meats purchased weekly per capita, classified by income, survey of two hundred households, Knoxville, Tennessee, 1967.

Yearly household income in dollars	Average pounds of selected meats					
	Pork chops	Chuck roast	Steak	Hamburger	Fryer	Sandwich
0 - 1,999	0.83	1.80	1.03	1.05	1.68	0.37
2,000 - 3,999	0.60	1.16	0.76	0.98	1.10	0.37
4,000 - 5,999	0.55	1.07	1.03	0.98	0.96	0.38
6,000 - 7,999	0.61	0.98	0.84	0.76	1.08	0.47
8,000 - 9,999	0.58	0.92	0.76	0.55	1.06	0.54
10,000 - 11,999	0.38	0.82	0.74	0.55	0.77	0.39
12,000 and above	0.53	1.21	0.74	0.74	0.79	0.45
All households	0.57	1.12	0.84	0.80	1.06	0.42

Table XXXI. Average pounds of selected vegetables purchased weekly per capita, classified by income, survey of two hundred households, Knoxville, Tennessee, 1967.

Yearly household income in dollars	Average pounds of selected vegetables					
	Green beans	Green peas	White potatoes	Carrots	Lettuce	Onions
0 - 1,999	1.23	0.81	3.03	0.68	0.68	1.25
2,000 - 3,999	0.79	0.70	2.80	0.38	0.57	0.70
4,000 - 5,999	0.71	0.69	2.30	0.43	0.42	0.68
6,000 - 7,999	0.64	0.61	2.08	0.37	0.49	0.59
8,000 - 9,999	0.62	0.61	2.76	0.46	0.60	0.64
10,000 - 11,999	0.66	0.48	2.13	0.35	0.47	0.59
12,000 and above	0.72	0.44	2.02	0.39	0.44	0.60
All households	0.77	0.63	2.46	0.42	0.52	0.69

Fruits. The average pounds per capita purchase of selected fruit items is shown in Table XXXII. Per capita purchases of apples, grapefruit, bananas, and strawberries tended to decrease as household income increased. There was a sharp increase in the per capita purchase of fruits at the $6,000.00 to $7,999.00 income level. The purchase of oranges tended to increase as incomes increased.

Fruit juices. Table XXXIII shows the average pounds per capita purchase of selected fruit juices. The purchase of all juices, with the exception of apple juice and the classification "other", tended to decrease as income increased. Purchases of apple juice and "other" tended to increase as income increased. There was a departure from the trend in the poundage purchase of fruit juices at the $6,000.00 to $7,999.00 yearly income level.

Grains and specialty foods. The average pounds per capita of selected grains and specialty items is shown in Table XXXIV. Purchases of rice, bread, and cookies tended to decrease as incomes increased. Increases in the purchase of bread, breakfast cereal, cakes and cookies for the $6,000.00 to $7,999.00 yearly household income level was considered a departure from the overall trend.

Table XXXII. Average pounds of selected fruits purchased weekly per capita, classified by income, survey of two hundred households, Knoxville, Tennessee, 1967.

Yearly household income in dollars	Average pounds of selected fruits						
	Apples	Oranges	Grapefruit	Bananas	Strawberries	Peaches	Pears
0 - 1,999	8.25	0.50	2.41	1.42	*1.66	0.93	*0.50
2,000 - 3,999	1.24	1.06	1.18	0.93	1.20	0.63	0.67
4,000 - 5,999	1.00	1.27	1.53	0.81	0.33	0.45	0.40
6,000 - 7,999	1.10	1.49	2.10	0.74	0.76	0.63	0.42
8,000 - 9,999	1.07	1.28	1.54	0.62	0.78	0.49	0.48
10,000 - 11,999	0.73	1.31	1.60	0.56	0.56	0.53	0.38
12,000 and above	1.02	1.08	1.26	0.69	0.47	0.60	0.43
All households	1.22	1.25	1.63	0.83	0.66	0.59	0.46

*One household.

Table XXXIII. Average pounds of fruit juices purchased weekly per capita, classified by income, survey of two hundred households, Knoxville, Tennessee, 1967.

Yearly household income in dollars	Average pounds of fruit juices					
	Apple	Orange	Tomato	Grapefruit	Grape	Other
0 - 1,999	0	0.93	*0.88	0	0	0.59
2,000 - 3,999	0.36	0.66	0.41	0.44	0.34	0.40
4,000 - 5,999	*0.17	0.55	0.38	0.36	0	0.28
6,000 - 7,999	0.19	0.70	0.43	0.29	0.36	0.48
8,000 - 9,999	0.33	0.56	0.31	*0.50	*0.13	0.21
10,000 - 11,999	0.24	0.32	0.31	*0.29	0.19	0.39
12,000 and above	0.56	0.45	0.32	0.21	0.10	0.43
All households	0.32	0.60	0.38	0.35	0.26	0.41

*One household.

Table XXXIV. Average pounds of grains and specialty foods purchased weekly per capita, classified by income, survey of two hundred households, Knoxville, Tennessee, 1967.

Yearly household income in dollars	Average pounds of grains and specialty foods						
	Rice	Bread	Breakfast cereal	Cakes	Cookies	Cake mix	Instant potato
0 - 1,999	0.81	0.51	0.38	0.38	0.71	0.79	0
2,000 - 3,999	0.57	1.06	0.33	0.26	0.59	0.45	*0.62
4,000 - 5,999	0.56	1.01	0.33	0.25	0.54	0.32	0
6,000 - 7,999	0.43	1.08	0.35	0.33	0.59	0.43	0.17
8,000 - 9,999	0.47	0.98	0.34	0.25	0.56	0.53	0.19
10,000 - 11,999	0.31	0.74	0.24	0.25	0.50	0.38	*0.15
12,000 and above	0.45	0.85	0.28	0.40	0.49	0.32	*0.06
All households	0.50	1.01	0.34	0.29	0.57	0.45	0.20

*One household.

CHAPTER V

SUMMARY AND CONCLUSIONS

I. SUMMARY

The main objective of this study was to determine if any statistically significant differences in quantity and value of food purchases existed between one and two head households.

A random sample of two hundred households was taken in metropolitan Knoxville, Tennessee. Data concerning food purchases and food expenditures for households surveyed were converted to per capita weekly equivalents and classified according to yearly household income.

Statistical "t" tests were carried out at different income levels and at the aggregate income level for all households to determine if in the average weekly per capita food expenditure between one and two head households were significant. No statistically significant differences were found at the 0.01 level for the average weekly per capita expenditure for food. Because income for one and two head households was equated at the same level, this indicated that some portion of the wives' yearly income was used for food purchases.

A highly significant difference was found at the 0.01 level between one and two head households (two head households adjusted by subtracting out the average wives' income for all households) for the average weekly per capita expenditure for food. This gave further

evidence that some portion of the wives' income was used for household food purchases.

Statistical "t" tests were carried out at the 0.01 level between one and two head households for the average weekly per capita purchase of food in pounds. No statistically significant differences at the 0.01 level were found for the average weekly per capita purchase of food in pounds. This indicated that the wives' income component was not reflected in the purchase of increased food poundage.

No statistically significant difference at the 0.01 level was found for the aggregate of all income levels with regard to the average per capita purchase of food in pounds between one and two head households (adjusted by subtracting out the average wives' income for all households). However, a highly significant difference was found between one and two head households having a yearly income of $4,000.00 to $5,999.00 (adjusted by subtracting out the average wives' income for all households) for the average per capita purchase of food in pounds.

II. CONCLUSIONS

The following conclusions were formulated, having as their basis the results obtained from the present study and within the limitations of this study:

Some portion of the wives' yearly income was used for household food purchases, where both heads worked, as established by statistical "t" tests. This additional income component

resulted in higher per capita food expenditures for households where both heads work, at all income levels, when compared with households where only the male head worked.

The wives' income component did not effect a change, as established by statistical "t" tests, in the average pounds of food purchased weekly per capita for all income groups taken in the aggregate. This is consistent with the hypothesis that people consume about the same quantity of food regardless of income. However, at one income level, where household size was large, there was a significant difference in the average pounds per capita of food purchased (i.e., greater for households where both heads worked). Therefore, no definite conclusion can be stated with regard to the effect of the wives' income on per capita pounds of food purchased since this varies with discrete household size and income.

The wives' income influenced the quality, as determined by price, of food bought at the $6,000.00 to $7,999.00 yearly household income level. Holding household income constant at the $6,000.00 to $7,999.00 level and increasing household size from two to four members resulted in increases in the purchases of more expensive food items where one and two heads worked.

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Frozen food items did not represent a "service" for households where both heads worked and were not purchased as frequently as the same food items in other forms.

Households where both heads worked were larger in size. The average number of members per household was greater for households where both heads worked (3.86 members) than for households where only the male head worked (3.65 members).

Both the mean and modal number of members per household increased as household income increased. The overall relationship was negative.

The average weekly pounds of food purchased per capita decreased as income increased. The overall relationship was negative.

The average weekly pounds of food purchased per capita decreased as household size increased. The overall relationship was negative. This was in part due to the lumpy quantities in which food purchases were made.

Household size contributed more than household income in explaining the predictability of per capita expenditure for food. An R^2 value of 0.142 was obtained in the regression of household size and yearly household income on per capita expenditure for food.

Household size contributed more than household income in explaining the predictability of per capita purchase of food in pounds. An R^2 value of 0.235 was obtained in the regression of household size and yearly household income on per capita purchase of food in pounds.

Limitations of the present study. Although the results of this study are based on observations for two hundred households for the per capita purchase of food in pounds and the per capita expenditure for food in dollars, the lack of observations for two, three and four member households classified by head of household arrangement, at all income levels, limits the study.

III. IMPLICATIONS FOR FURTHER STUDY

The following topics are suggested for further research:

A replication of the present study which would employ a larger sample size and/or employ a random sampling procedure weighted according to the distribution of household income. Such a study might include questions pertaining to food purchases outside of the household, use of consumer credit, and fundamental criteria relating to the decision making process for choices involving alternative food group items.

A study of food purchases by households which would include a systematic classification for variables such as religion, intensity levels of household member participation in association with other

households per unit space and time, and household transfer relationships with regard to origin and frequency of transfer per parental generation longevity.

A study of the relationship between household food purchases per unit time and different ways in which food items are prepared in the home.

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APPENDIXES

APPENDIX A

CRANESTON CREST

SURVEY QUESTIONNAIRE NO. _____

DATE _____ ENUMERATOR _____

NAME _____ CAUCASIAN _____
NEGRO _____

ADDRESS _____ OTHER _____

_____

NUMBER OF MEMBERS IN HOUSEHOLD:

	MALE	FEMALE
Under 30	_____	_____
31-45	_____	_____
46-60	_____	_____
61 and over	_____	_____

EDUCATION:

8 years or less	_____	_____
9-11 years	_____	_____
12 or high school	_____	_____
College	_____	_____

EMPLOYMENT:

(40 hrs./wk.)	Full time	_____	_____
	Part time	_____	_____
(Plan to quit	Temporary	_____	_____
this year?)	Permanent	_____	_____

(If Both Heads Work) Do you spend your incomes together or separately for food purchases? _____

At what grocery store do you do most of your food shopping?

_____

How many times did you shop for food last week? _____

What day of the week do you usually make your food purchases? _____

No special day _____

Which member of your household does most of the food shopping? _____

Approximately how much money did you spend last week for food? $_____

Paper products $_____ Total $_____

If you had a ten dollar a week increase in income would you spend more, less, or the same amount for food purchases? _____

FOOD GROUP PURCHASES:

DAIRY:	PURCHASED	NOT PURCH.	NR	QUANTITY
Sweet milk				
Buttermilk				
Dry milk				
Skim milk				
Evap. milk				
Yellow cheese				
Cottage cheese				
Ice cream				
Eggs				
MEAT:				
Bacon				
Sausage				
Pork chops				
Chuck roast				
Pork shoulder				
Beef stew				
Steaks				
Hamburger				
Broilers				
Fryers				
Sandwich meats				
Fish				

VEGETABLES	C-CANNED	FR-FRESH	FZ-FROZEN		
Green beans					
Peas					
White potatoes					
Sweet potatoes					
Carrots					
Lettuce					
Onions					
Rice					

FRUITS	PURCHASED		NOT PURCH.	NR	QUANTITY
	C-CANNED	FR-FRESH FZ-FROZEN			
Apples					
Oranges					
Grapefruit					
Bananas					
Strawberries					
Peaches					
Pears					

JUICES	C-CANNED	FZ-FROZEN		
Apple				
Orange				
Tomato				
Grapefruit				
Grape				
Other (Ping, Pong, V-8)				

GRAINS:				
Rice				
Bread				
Breakfast cereal				

SPECIALTY:				
Cakes				
Cookies				
Whipped potatoes				
Cake mixes				
Other				

Does your household have an investment program? Yes ____ No ____

TYPE OF PROGRAM:

Life insurance	
Mutual fund	
Stocks	
Real estate	
Other	

Would you please tell me which number on the card you are holding is opposite your yearly income?

NUMBER:	HUSBAND	WIFE	OTHER MEMBER
1			
2			
3			
4			
5			
6			
7			
8			
9			

CRANE'S CREST

APPENDIX B

Table XXXV. Average pounds per capita of selected meats purchased weekly by households having a $6,000.00 to $7,999.00 yearly income, classified according to number of members per household and head of household arrangement, survey of two hundred households, Knoxville, Tennessee, 1967.

Meats	Number of members per household		
	Two	Three	Four
Pork Chops			
One head	0.75	0.29	0.44
Two heads	0.83	*0.66	0.88
Chuck Roast			
One head	1.25	1.05	0
Two heads	1.17	*1.00	0
Steaks			
One head	1.25	0.99	0.56
Two heads	1.41	0	0.93
Hamburger			
One head	1.00	0.75	0.52
Two heads	1.00	0.55	1.00
Fryers			
One head	3.00	0.92	0.75
Two heads	0.88	1.83	0.63
Sandwich			
One head	0.75	0.44	0.29
Two heads	1.00	0.25	*0.50

*One household.

Table XXXVI. Average pounds per capita of selected vegetables purchased weekly by households having a $6,000.00 to $7,999.00 yearly income, classified according to number of members per household and head of household arrangement, survey of two hundred households, Knoxville, Tennessee, 1967.

Vegetables	Number of members per household		
	Two	Three	Four
Green Beans			
One head	0	0.33	0.44
Two heads	1.00	0.94	*0.50
Green Peas			
One head	0	0.49	0.44
Two heads	1.06	0.72	0
White Potatoes			
One head	*2.50	1.66	2.50
Two heads	2.50	2.49	1.25
Carrots			
One head	*0.50	0.44	0.30
Two heads	*0.50	0.49	*0.25
Lettuce			
One head	0.75	0.49	0.30
Two heads	0.66	0.66	*0.75
Onions			
One head	*1.00	0.45	0.56
Two heads	0.83	0.58	0.63

*One household.

Table XXXVII. Average pounds per capita of selected grains and specialty items purchased weekly by households having a $6,000.00 to $7,999.00 yearly household income, classified according to number of members per household and head of household arrangement, survey of two hundred households, Knoxville, Tennessee, 1967.

Grains	Number of members per household		
	Two	Three	Four
Rice			
One head	0.16	0.42	0.38
Two heads	0.57	0	0
Bread			
One head	2.13	1.26	0.96
Two heads	1.50	0.88	0.75
Breakfast Cereal			
One head	0.28	0.31	0.17
Two heads	0.73	0.32	0.30
Cakes			
One head	*0.50	0.25	*0.37
Two heads	*0.50	0	*0.25
Cookies			
One head	*1.00	*0.66	*0.25
Two heads	0.83	0.66	*0.50

*One household.

CRANES CREST

Table XXXVIII. Average pounds per capita of selected fruits purchased weekly by households having a $6,000.00 to $7,999.00 yearly income, classified according to number of members per household and head of household arrangement, survey of two hundred households, Knoxville, Tennessee, 1967.

Fruits	Number of members per household		
	Two	Three	Four
Apples			
One head	2.25	0.90	0.66
Two heads	0	0.83	*0.50
Oranges			
One head	*2.50	1.30	1.08
Two heads	*2.50	*1.00	*1.25
Grapefruit			
One head	*5.00	1.66	*2.50
Two heads	2.00	*1.66	*1.25
Bananas			
One head	*1.50	0.66	0.60
Two heads	1.17	0.83	*0.50
Strawberries			
One head	0	*0.21	0.35
Two heads	*0.32	*2.21	*2.07
Peaches			
One head	0	0.65	*0.45
Two heads	0.90	0.46	1.03
Pears			
One head	0	*0.33	0
Two heads	*0.50	*0.33	*0.25

*One household.

Table XXXIX. Average pounds per capita of selected fruit juices purchased weekly by households having a $6,000.00 to $7,999.00 yearly income, classified according to number of members per household and head of household arrangement, survey of two hundred households, Knoxville, Tennessee, 1967.

Fruit Juices	Number of members per household		
	Two	Three	Four
Apple			
One head	0	0	*0.22
Two heads	0	0	*0.22
Orange			
One head	0.71	0.44	0.70
Two heads	0.44	0.47	0.29
Tomato			
One head	*0.44	0	0.22
Two heads	*0.22	*0.29	*0.22
Grapefruit			
One head	0	0.29	*0.44
Two heads	0	0	*0.37
Grape			
One head	0	0	0
Two heads	0	*0.29	0
Other			
One head	*0.44	*0.29	*0.66
Two heads	0	0	*1.31

*One household.