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NUTRIENT INTAKE OF EXTENSION HOMEMAKERS

BY

BERNADINE L. ENEVOLDSEN

A thesis submitted
in partial fulfillment of the requirements for the
degree of Master of Science, Major in
Home Economics, South Dakota State University

1986

NUTRIENT INTAKE OF EXTENSION HOMEMAKERS

This thesis is approved as a creditable and independent investigation by a candidate for the degree, Master of Science, and is acceptable for meeting the thesis requirements for this degree. Acceptance of this thesis does not imply that the conclusions reached by the candidate are necessarily the conclusions by the major department.

Edna Page Anderson Date
Major and Thesis Advisor

Michael G. Crews Date
Department Representative,
Nutrition and Food Science

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Chapter I

Introduction

In all parts of the world today, as in the past, food is more than intake of a combination of nutrients. Food in an underdeveloped country gets rid of the gnawing feeling of hunger. In a country where food is more readily available food represents much more than sustenance. Perhaps it needs to be recognized first that human beings are social creatures. Human beings are the only animal who invite others of their species to share food with them in their own home (Lowenberg, 1974).

Every culture has its own special foods and food taboos. Food patterns are reported in Biblical writings, books about Medieval times, and in more recent history. According to Grivetti and Pangborn (1974), health and sanitation have not been the only reasons for food prescriptions.

Most family milestones and most religious ceremonies are part of a celebration containing food. All of the patterns are a definite part of human culture. People have been making food selections since their very beginning.

Some food selections have perhaps been based on hunger but other reasons for choices are preconceived ideas, preferences for familiar foods, or lack of knowledge about additional foods. Even today in the United States, the Chinese practice the yin and yang concept of food in relation to health (Ludman & Newman, 1984).

Health professionals working with Native Americans found that the diabetics would not comply with the diabetic diet because it did not contain any of their favorite foods (Broussard, Bass & Jackson, 1982). Mexican-American families in California did not serve lowfat or skim milk to their children because they were not familiar with the products (Dewey et al., 1984).

A closer look at food patterns and food habits reveals that some new foods are readily used and enjoyed by people totally unfamiliar with them. To be aware of changing food patterns and tastes one can simply compare cookbooks produced twenty years ago by community groups in South Dakota with recent cookbooks. In the newer cookbooks it is possible to find a number of Mexican-American recipes, indicating an influence that must come from outside the community since there are few Mexican-Americans in South Dakota. Salad bars abound today in restaurants across the country; even pizza and fast food restaurants offer salad bars. Native American women in a WIC program readily used the foods they received with the WIC vouchers. The foods were so readily accepted that they served them to other members of the family not on the program (Slonim, Kolasa & Bass, 1981). At other times when food is readily available and important for adequate dietary intake, participants in certain food programs such as WIC may choose not to consume the foods (Endres, Sawicki & Casper, 1981).

A review of information about food patterns presents tremendously opposing views. One view shows that people are

reluctant to change their food patterns. The other view shows that people will readily change to totally new food patterns when foods and information about them are readily available. The two views present a complex problem of understanding for the nutrition educator.

When that problem is localized to a small community in South Dakota the picture becomes even more confusing. Since 1978 the Brookings County Extension Service has done DIETCHECKS on the AGNET Computer System for participants in the WON (Weight Off Nutritionally) Program, the general public by individual request, and 4-H members who are planning menus for projects. In the process of completing DIETCHECKS the home economics staff began to notice that many of the diets did not meet the RDA's for the nutrients listed. In other DIETCHECKS the nutrient intake percentage was extremely high for some nutrients and extremely low for other nutrients. A few DIETCHECKS were exceptionally good. Since the original DIETCHECKS had no demographic data other than age, there was no way to determine linkages between characteristics of people and various levels of dietary intake.

For clarification, most of the DIETCHECKS were for the WON participants - people who registered for a weight-loss program. However, the fact that they registered for that program was not an indicator of serious obesity. Overweight of participants ranged from a few pounds to over 100 pounds. Some of the participants came because they wanted to gain knowledge about nutrition in order to help someone else in their family.

Some of the WON participants had been involved in previous Extension Service education programs but others had no previous contact with Extension Service nutrition education. The assumption on the part of the home economics staff was that all the participants came to learn how to control weight by gaining knowledge about nutrition. That assumption was quickly shattered when the DIETCHECKS revealed diabetics, heart patients, and hypertension patients in non-compliance with their existing prescribed diets. Observations revealed that individuals with nutrition knowledge necessary for their own health were choosing not to use that knowledge.

From this early work evolved the idea of doing DIETCHECKS for participants in ongoing nutrition adult education programs, Extension Homemakers, in Brookings County. The DIETCHECKS would give the home economics staff in the Brookings County Extension Service baseline data about current habits in order to plan for future nutrition education programs.

The only characteristic Extension Homemakers in Brookings County have in common is an apparent interest in ongoing adult education. In other characteristics such as age, income, employment outside the home, educational level, and place of residence there is a definite variety. This variety has been noted by observation of the Brookings County Extension Service. No formal study has been completed to determine the exact demographic composition. Past observations have indicated that the severely low income and those

with very low educational level do not regularly participate in community groups and are reached more effectively by individual consultations. A quick scan of enrollments also reveals very few single parent homemakers. These limitations indicate that they are not totally representative of the general population.

Extension Homemakers, through an ongoing adult education program, receive training in home economics from the Cooperative Extension Service. The Smith-Lever Act of 1914 established the Cooperative Extension Service to disseminate the current research information from the land grant university system to every county in every state in the nation (USDA-NASULGC, 1968). The concept was to make practical information available to local people in their own communities to raise the level of living of the people. The Smith-Lever Act specified that programs of the Cooperative Extension Service were to relate primarily to Agriculture, Horticulture, Home Economics, Family Living, 4-H and Youth Development, and Community Resource Development.

Although the programs offered have changed over the years the concept remains the same. Local people assess their own program needs and receive research information to address those needs from the land grant university system through the Cooperative Extension Service.

The local group system was developed to reach large numbers of people in the local community. Local leaders receive training from the Cooperative Extension Service staff and disseminate the information to others in their own community.

The very earliest local groups in Brookings County were poultry clubs where farm women learned to care for poultry. Within a short time the groups became Home Demonstation Clubs where women could learn a variety of skills that would help them to manage resources for the optimum health and function of their family units. Later groups included not only rural women but women in small towns and cities as well as men. A name change established the groups as Extension Homemakers' Clubs.

Today the Cooperative Extension Service still utilizes the local group system to reach people through Extension Homemakers' Project Leader Training. Leaders are trained to disseminate new research information to the local community. Additional people are reached through a variety of other ways including mass media and community meetings. Special efforts have been utilized in recent years to reach single parents and severely low income individuals through other methods. Some Extension Homemakers do not currently belong to clubs but are independent members.

Brookings County, the site of this research project, lies in gently rolling farmland in eastern South Dakota where agribusiness is the major industry. It also has a number of small manufacturing industries mostly located in the county seat, Brookings. The ethnic backgrounds of the people in the county are generally of western European origin. A large portion are German, Scandinavian, or Dutch in country of origin.

Brookings County has some unique characteristics which make

it different from other communities in South Dakota. It was designated by the US Department of Transportation as one of 91 communities in the nation who are "economic growth centers" (Jensen, 1976). Currently, six of the local manufacturing and processing businesses are involved in international trade relations. It is the home of South Dakota State University, a land grant institution, and the largest center of higher education in South Dakota.

Opportunities for nutrition and health education are readily available in Brookings. In addition to programs which have been available through the Cooperative Extension Service since the early 1920's, there are many programs and conferences provided by the Nutrition and Food Science Department at SDSU which are available to everyone in the community. Students from SDSU regularly do their adult education public programs in the Brookings community. These students include those enrolled in nutrition, home economics education, and nursing programs. Several dietitians do informational meetings as well as individual consultations. With the amount of nutrition education available in the community it would be difficult to believe there is a lack of knowledge.

Brookings County is also a highly educated community. Of the 5,902 females over 25 years of age in 1980, 42.6 percent had one or more years of college (US Department of Commerce, General Social and Economic Characteristics, 1983). In the same age category of females 77.2 percent were high school graduates. For all persons over 25 years of age the median educational level in 1980 was 12.8 years of

school (US Department of Commerce, General Social and Economic Characteristics, 1983).

Purpose of the Study

The purpose of the study was to determine the relationship of certain demographic factors to dietary intake of participants in the Brookings County Extension Homemakers' program. Specific questions to be addressed were:

1. With the availability of knowledge, what are the actual food practices or food habits of women involved in nutrition adult education programs on a regular basis?

2. When their diets are analyzed for selected essential nutrients, will their nutrient intake meet the RDA?

3. What, if any, is the relationship between selected demographic factors and the percent of the RDA for nutrients in their diets?

4. Will existing problems within the family be related to their dietary intake?

5. Will contact with mass media and other printed material be related to their dietary intake?

6. Will the actual information programs they have attended within the last year make a difference in their food selection?

7. With motivation known as a key ingredient in helping people to improve their dietary status, will interest in nutrition and interest in new food preparation ideas be the central factor in

the quality of the diet?

At this time no formal study exists to determine the nutrition education needs of a group like Extension Homemakers who are interested in long-term home economics education. Before those needs can be determined home economists working in Extension Service should have a realistic picture of the current dietary practices and how demographic factors relate to those practices.

This study will provide baseline data that can be used for determining future Cooperative Extension Service programs in nutrition in Brookings County. Because of the particular group targeted for the study and their location, care must be taken in projecting the results of this study to other communities. However, the format of this study can serve as a model for other communities in South Dakota. Every Extension Agent/Home Economics has access to the AGNET Computer System and could conduct a similar study in the local community.

Definition of Terms

The following definitions will be used throughout the study.

AGNET: "A pilot project funded by the Old West Regional Commission to extend the AGricultural Computer NETwork developed in Nebraska to South Dakota, North Dakota, Montana, and Wyoming. The states of Washington and Wisconsin joined AGNET in 1980. Pooling the resources of the seven states makes programs from the states available to South Dakota" (Cooperative Extension Service, 1981).

AGNET can be used by anyone in the United States and some foreign countries. Access requires a telephone and a computer terminal or a microcomputer or word processor modified to be a terminal.

Dietary Intake: The food and beverage one consumes.

DIETCHECK: A dietary analysis program located on the AGNET Computer System, Lincoln, Nebraska. It is written in Fortran for an IBM/VM system. One to 14 days dietary intake for a single individual can be analyzed. DIETCHECK analyzes dietary intake for calories and nine nutrients - protein, calcium, phosphorus, iron, vitamin A, thiamin, riboflavin, niacin, and ascorbic acid - as a percent of RDA. It also indicates consumption of grams of total fat, saturated fat, monounsaturated fat, polyunsaturated fat, carbohydrate, and fiber. Cholesterol, sodium, and potassium are indicated in milligrams. It also indicates percent of calories from total fat, carbohydrate, protein, and alcohol. Analysis includes a breakdown of percentage of different fatty acids. It can also summarize groups of diets (Kohn & Thompson, 1983).

Eating Habits: Practices or behaviors involving food consumption, such as kinds of food chosen or time of day food is eaten.

Extension Homemakers: Persons registered in the Brookings County Extension Office as an ongoing member of the Adult Education Program in Home Economics. They may be members of organized Extension Homemakers' Clubs or individual members called members-at-large.

Harvard Study: This study was undertaken by a task force of physicians, health experts, academic leaders, and religious leaders to determine the status of hunger in the United States in 1984. Ten months were spent observing and interviewing in all regions of the United States.

Health and Nutrition Examination Survey (HANES): A surveillance system designed to periodically measure the nutritional status of the United States population throughout the years. The first study, HANES I, was conducted from 1971-74. HANES II focused on clinical findings and biochemical analysis and was conducted in 1977-78 as a follow-up. HANES was conducted by the National Center for Health Statistics. It is called NHANES with the N indicating National.

Nationwide Food Consumption Surveys (NFCS): Nationwide studies periodically done by USDA to assess the nutritional status of the general population. The most recent studies were done in 1955, 1965-66, and 1977-78. They are also called the Household Food Consumption Surveys.

Nutrients: The chemical components of food that the body uses to promote growth and repair of body tissue, to supply energy, and to regulate body processes.

Nutrition: "The science of food, the nutrients and other substances therein, their action, interaction, and balance in relation to health and disease and the processes by which the organism ingests, digests, absorbs, transports, utilizes, and excretes

food substances" (Guthrie, 1986, p. 4).

RDA (Recommended Dietary Allowance): Amount of daily intake of essential nutrients considered to be adequate for maintenance of good nutrition of most healthy persons in the United States, recommended by the Food and Nutrition Board of the National Research Council (National Academy of Sciences).

Program Years: The Extension Homemakers' program year runs from September through May, so persons considered having one program year could actually have less than one year in Extension Homemakers.

Ten State Nutrition Survey (TSNS): The first comprehensive study developed to assess the magnitude of serious hunger and malnutrition in the United States. Developed by the Department of Health, Education and Welfare, the study was specifically designed to over-represent groups suspected of being at high nutritional risk. It is also called the National Nutrition Survey.

Chapter II

Review of Literature

History

From a historical prospective nutrition is a relatively new field. It was first recognized as a distinct discipline in 1934 at the time of the organization of the American Institute of Nutrition. As a science it is closely related to chemistry, microbiology, physiology, medicine, and cellular biology (Guthrie, 1986). Nutrition education draws from the fields of psychology, sociology, and anthropology to better understand the selection of foods and beverages for dietary intake.

Until the 1960's there was not much interest in nutrition by policy makers or the general public. Today it is a major topic of interest in the United States. Mass media, educational programs offered by public agencies, and private business are constantly alerting Americans to the need for adequate dietary intake. With all of the nutrition education available and the level of interest in health today in the United States, one might assume that all Americans would have an adequate dietary intake. In reality that assumption cannot be made. In all of the national nutrition studies, evidence indicates specific nutrient intake below recommended amounts. Americans consume excess alsohol, fat, sugar, salt, and calories. They also tend to be overweight (Wenck, Baren & Dewan, 1983).

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National Studies

The Ten State Nutrition Survey was considered the first major comprehensive assessment of hunger and malnutrition across the United States (Kart & Metress, 1984). The study was specifically designed to over-represent groups considered to be at risk, such as the poor, migrant groups, Hispanics of the Southwest, inner city, and industrial areas that had experienced an influx of workers from southern states in preceding years. The ten states selected were Texas, Louisiana, Kentucky, Michigan, New York, Massachusetts, Washington, California, West Virginia, and South Carolina. New York specifically included a separate study of New York City. The study included about 24,000 families for a total of 86,352 persons. The states identified as the low income states were South Carolina, Louisiana, Texas, Kentucky, and West Virginia. The high income states were Michigan, California, Washington, Massachusetts, and New York. The family characteristics of income, place of residence, size, composition, and sex of head of household were used to identify the low and high income states.

The major result of the Ten State Survey was the identification of nutritional iron deficiency as a national public health problem. Low hemoglobin levels were frequent in all subgroups of the population studied (Kart & Metress, 1984). More than 70 percent of the 15-16 year old females in the low income states had dietary intakes below two-thirds the RDA. The high income states presented a similar picture with about 60 percent below two-thirds of the RDA. For pregnant women in both high and low income states 60 to 70 percent

were below two-thirds the RDA for iron. Over 80 percent of the one to three year old children were two-thirds below the RDA in the low income states. The high income states showed a similar pattern. In the 12-16 year old range, 60 percent of the females were below two-thirds the RDA for both the low income and high income states. For boys the percent with intakes below two-thirds the RDA was smaller. For the elderly the intake of iron was definitely below the RDA, similar in percentage to the other age groups.

In general, consumption of iron in the diet was lowest for blacks in the low income states. Consumption of iron for whites was also lower in the low income states. For Hispanics consumption of iron was low in both high and low income states. With the exception of pregnant women, the general results of the study indicate the low iron consumption was somewhat related to race and income but the relationships were not dramatic.

Hispanics had a very low intake of vitamin A for all age ranges in the low income states but adequate intakes in the high income states. For the other ages and areas overall the children seemed to have the lowest intake. The groups with the lowest intake of vitamin C were black males and white males over 17 years of age and Hispanic males over 60 in the low income states. Riboflavin intake was lowest for blacks and Hispanics in the low income states. It was also low for white youth in the low income states and for all blacks in the high income states. Vitamin C and thiamin intake were low for some subgroups of the population. Protein appeared as a problem for

some subgroups of blacks and Hispanics in low income states. In general, race and/or income appeared to have some relationship to dietary intakes (Guthrie, 1979).

National Health and Nutrition Examination Survey

The National Health Survey Act of 1956 established the authority for the HANES or NHANES undertaken by the National Center for Health Statistics. The standards for evaluating dietary intake developed by an adhoc advisory group were different from the Ten State Nutrition Survey (Kart & Metress, 1984). The dietary standards for the Ten State survey used 30 mg of ascorbic acid while for HANES the standard for different age groups ranged from 40-65 mg. The standard for vitamin A for pregnant women was an additional 1000 IU in HANES (Guthrie, 1979).

In general, for vitamin A and C, 50 percent were below the evaluation standards for dietary intake. Thirty percent of all subject groups except children were below the evaluation standard for calcium. Intake of iron was low for females and for children under 17. Biochemical assessment revealed low hemoglobin, hematocrit values, serum iron, and transferrin levels for some portions of the population (Guthrie, 1986).

When the elderly were treated as a subgroup, low income blacks had lower vitamin A and C intake than blacks above the poverty level. Low income whites had a lower intake of iron and vitamin C than higher income whites (Kart & Metress, 1984).

As in the Ten State Survey, both race and income were related to dietary intake when comparing intake for different nutrients. It is important to keep in mind the differences in dietary standards between Ten State and HANES when comparing the two studies.

Nationwide Food Consumption Survey

Over the years the United States Department of Agriculture has been conducting food consumption surveys. The most recent surveys were done in 1955, 1965-66, and 1977-78. They are referred to in the literature as Household Food Consumption Surveys. The 1977-78 survey is usually referred to most often as the Nationwide Food Consumption Survey. The methods and categories in the surveys have changed over the years showing definite differences between 1965 and 1977-78. The 1965 survey used a one day food record while the 1977-78 used a three day food record for each of the four quarters of the year. The 1977-78 survey included households of one person or more. The categories of place of residence changed between the two surveys. The food groupings between the two surveys also changed (USDA, Nutrient Intake: Individuals in 48 States, 1980).

From 1965-1977 (Pao & Cronin, 1980) there was a 10 percent decline in food energy but an increase in vitamins and iron indicating more nutrient dense diets which could partially be attributed to enrichment or fortification. The average intake of iron for females 12-50 years of age remained at 35 to 40 percent below the RDA.

Ascorbic acid and thiamin were the nutrients which increased the most. There was a decrease in the amount of calcium consumed by infants, children, and teenagers. Females 12 years and older were 25 percent below the RDA for calcium in 1977. With the exception of men and women over 65, protein consumption decreased for all sex-age groups. Fat consumption decreased for all sex-age groups.

From 1965 to 1977 diets in the lowest income group improved the most. There was more similarity between income groups in 1977 than there had been in 1965. Quality of diet still tended to follow income to some degree but the highest level of intake for some nutrients was indicated at the lowest income levels (Pao & Cronin, 1980).

When looking at race there is a somewhat different picture. Blacks had lower intakes than whites in food energy with the exception of girls 15 to 18. Blacks had lower average intakes of fat and carbohydrates than whites with the exception of females 15 to 50 years of age. Blacks had higher protein intakes for children 3 to 8, 65 to 74, and females 12 years and over. Whites had higher intakes of calcium, magnesium, and phosphorus. Whites had higher iron intake except for children 3 to 8 and females 9-50 and 65-74 years. For vitamins, some were lower, some were higher, and some were nearly identical for whites and blacks. There may be specific race or cultural factors that were responsible for some of the specific exceptions or overall intake for a race. Females in the white middle class or upper middle class families are very weight conscious, which

may account for white females 15 to 18 years of age consuming few calories. Blacks have a higher incidence of lactose intolerance, which may account for blacks in general having a lower intake of calcium.

When 1977 is compared to 1965, it must be remembered that the RDA for selected nutrients had changed. Essentially the nutritional standards were different for all of the four most recent major studies - Ten State Nutrition Survey, NHANES, 1965 Household Food Consumption Survey, and Nationwide Food Consumption Survey 1977-78.

The cited studies tended to show lower calorie intakes than the recommended amounts. The reported increases in weight from the Health and Examination Survey of 1960-1962 to the HANES I of 1971-74 contradicts the decrease in calorie consumption (Mertz & Kelsay, 1984). To determine the reason for that discrepancy a study was undertaken at the Beltsville Human Nutrition Research Center. Mertz and Kelsay (1984) indicated that subjects may not report all of their food intake as earlier studies have shown that subjects on a controlled diet require more calories than subjects on a self selected diet in order to maintain weight. As part of the one year Beltsville study researchers (Kim, Kelsay, Judd, Marshall, Mertz & Prather, 1984) found that all the adults in their study met or exceeded the RDA with the exception of calcium and iron for females. These results were similar to HANES II and NFCS. However the calorie content was higher than NFCS and HANES II. The overall results of their study found very little difference in diet records evaluated by four methods. The one

day food intake record or 24-hour recall may not be suitable for evaluating one individual but it can be used to measure group trends.

Relationship of Dietary Intake to Location of Residence

The most recent study conducted with subjects in Brookings County was completed in 1976 by Jan Jensen. Her study involved 5th grade students at the three elementary schools in Brookings. Although the results of her study cannot be projected without bias to adults in the Brookings area because children may select different foods, it is worth noting that the children had higher quality diets on week days than during the weekend when they were home with their families. The children had lower intakes of calcium, vitamin A, thiamin, riboflavin, and ascorbic acid on weekends. The seven day mean intake placed 85 percent of the children below the RDA in calories, 73 percent in thiamin, and 62 percent in niacin. For the other nutrients, the mean intake was above the RDA; a number of children were still below in certain nutrients. Twenty-five percent were below the RDA in ascorbic acid, 60 percent in vitamin A, 45 percent in iron, and 20 percent in calcium. The diets were relatively high in fat with 39 percent of the calories coming from fat.

Thiamin was considered to be the most important nutritional deficiency uncovered by Jensen (1976); nearly half of the students failed to consume at least 1 milligram of thiamin. The failure to consume the RDA for niacin may not be a serious problem because the children had a high protein intake so there was potential for

conversion of trytophan to niacin. According to Jensen (1976) the overall results were different than expected in a predominantly middle class Caucasian community. The quality of the diets were poorer than expected.

Auch (1985) in her study in a neighboring county to Brookings found Extension Homemakers had the lowest level of nutrition knowledge of the four groups of adult subjects. They had the best nutrition practices as defined by that study since they practiced few food fads. Other subjects in the Auch study included residents of Brookings County; those subjects included American Association of University Women Members, Business and Professional Women, and food cooperative shoppers. The results of the total study by Auch (1985) found no significant relationship between food faddism and income without the influence of critical thinking ability. Age and educational level were not significantly correlated with food faddism.

Sims (1976), in a study in a university community, indicated that the lack of correlation between income and nutrition knowledge could be due to the fact that many of those subjects were university affiliated. Although they ranked somewhat lower on the income scale they ranked high on the occupation-education scale. Those subjects with a high occupation-education rank had a higher level of nutrition knowledge.

Brown and Pestle (1981) found that farm women had higher dietary intake scores when they entered the EFNEP program than urban or nonfarm women. They attributed this finding to the fact that the

data was collected during the growing season and the farm women utilized home produced food.

Relationship of Dietary Intake to Level of Employment of Homemaker

Walker and Woods (1976) found that homemakers who were employed outside the home spent less time per day on meal preparation and after meal cleanup than homemakers who worked at home full time. Kruel (Cited in More People Eating Out, 1986) reported that 42 percent of every food dollar in the US is now spent on eating out. Fifty percent of adult females work outside the home and the average working woman will eat out 26 more times per year than the full time homemaker.

According to Kruel (Cited in More People Eating Out, 1986) it may be economically wise for single people to eat out but for a family of 4 or more, it is more economical to eat at home. The employed homemaker with several children may have a problem with adequate time for meal preparation. She is caught in a dilemma of choice between time for home meal preparation and the cost of eating out. She may look at other alternatives such as convenience food or eating in fast-food restaurants which may be higher in sodium and fat content.

The homemaker with older children may find that she cannot organize her children's lives around her time. Conran (1978) found that as her children became teenagers they required her undivided attention. She said her children needed her ability to listen and be a mother when they had specific problems. Older children do not need

the advice of an adult when it is convenient for the adult. They must have adult help in solving the major problems in life when the problems occur.

For mothers with older children there may be even more limited time for meal preparation because of the requirements for parenting time. Teenagers may also make a contribution to the meal preparation time. According to Walker and Woods (1976) teenagers' meal preparation time increased by six minutes a day when the mother was employed outside the home.

Relationship of Dietary Intake to Age

Krondl, Lau, Yurkiw, and Coleman (1984), University of Toronto, found that the elderly they studied ate a substantial variety of foods. Fifty or more different foods were eaten by 81 percent of the participants per year. Those in the 65-70 age range showed a tendency to select fewer foods than those in the 71-77 year age range. Those with great variety in food selection had a high level of education, high health rating, and a strong desire to maintain health. In general, the educational and income level of the participants in this study was relatively high.

The food consumption patterns of the University of Toronto study were consistant with other studies. Fluid milk was an "either or" food, meaning it was either consumed frequently or not at all. Whole wheat bread ranked high in the bread and cereal group with eggs being the main source of animal protein. Fewer fruits and vegetables

were among the frequently used foods.

One of the factors in the food habits of the elderly that should be investigated is snacking pattern. The elderly may carry lifelong patterns of snacking and have extra time in retirement years, so snacking needs to be considered as part of their overall food plan. Also, snack foods are readily available today on both the supermarket shelves and in vending machines. Snack foods may require little preparation and may form a definite part of the social system of the elderly.

Singleton, Kirby, and Overstreet (1982) found that half of the elderly participants in their study consumed one or more snacks per day (range 1 to 7). More snacks were consumed in the evening with the second highest in the afternoon and the least in the morning. More than 60 percent of the snacks consumed were from the four food groups. The other snacks were high sugar items, coffee or tea with small amounts of candy, and carbonated beverages.

The snacks did make a contribution to the nutrient intake because 5 to 10 percent of the mean nutrient intake for protein, vitamin A, B12, and iron were provided as well as 10 to 15 percent of the mean nutrient intake for thiamin, riboflavin, niacin, B6, ascorbic acid, and calcium. Eighteen percent of the carbohydrate content and 30.8 percent of the sucrose came from snacks.

The findings in the Singleton, Kirby, and Overstreet study (1982) were similar to the USDA Nationwide Food Consumption Survey (1977-78). In the 1977-78 study, 46.9 percent of the females 65-74

years of age and 40.2 percent of those 75 years or older reported snacks. In the 1982 study, 44 percent of the participants over 60 years of age reported snacks. In both studies, there was a similar intake of calories and vitamin B6. In comparing the other nutrients, the mean intakes were less in 1982 than in 1977. Hamberlin (1980) found that college females consumed one-fourth of their total calories in snacks. In the Singleton, Kirby, and Overstreet (1982) study, elderly females consumed 15 percent of their calories as snacks. This may indicate that the snacks selected by the elderly are lower in calories.

Frequency of food shopping may also be a factor in the dietary intake of the elderly. With limited transportation they may make fewer trips to the food market. Infrequent shopping, every two weeks or even once a month, will limit the consumption of fresh fluid milk, fresh fruits, and fresh vegetables.

Relationship of Dietary Intake to Level of Education

When relating education to diet Jensen (1976) found that children with mothers in the lowest educational level (0-8 years) had the highest fat intake of the four educational level groupings. Children of mothers with the lowest educational level consumed the lowest amounts of vitamin A and ascorbic acid but the differences were not significant.

Sims (1976) found socioeconomic status and level of occupation-education were more strongly related to nutrition knowledge

than income as a separate variable. In the same study those mothers with the most nutrition knowledge tended to spend less on groceries for the family. In their study of the elderly, Singleton, Kirby, and Overstreet (1982) found that education and age were better correlated with nutrient intake than income for nutrients other than calcium. O'Hanlon, Kohrs, Hilderbrand, and Nordstrom (1983) also found a significant relationship between nutrient intake and education for four nutrients in their study of the elderly. Schafer, Reger, Gillespie, and Roderuck (1980) found a correlation between dietary scores and educational level in only two of the states they studied. Earlier studies (Hafstron & Dunsing, 1972; Hendel, Burke & Lund, 1965; Murphy & Wertz, 1954) found significant correlations between diet quality and education.

Relationship of Dietary Intake to Income

Hunger has never been a popular word in the history of the United States. In fact there was very little focus on the word or the reality of its meaning until the 1960's. Americans generally assumed that they were a nation of plenty where everyone was well fed and where hunger did not exist. In the 1960's the political system began to focus on evidence that there were indeed hungry people in the United States and that perhaps as many as fifteen million Americans were malnourished (Kotz, 1969).

One look at the reality of hunger in the United States can begin with the visit of Robert Kennedy to the Mississippi Delta

region in the 1960's. During his tour he visited inside the homes of families. In the course of those visits he found poverty at its worst. One situation he encountered was a young child under 2 years old who was so dull and lifeless that all his attempts to get her to respond to his presence failed. The mother of the child explained to him that because she was unable to purchase Food Stamps, she was feeding her family rice and biscuits made from leftover surplus commodities (Kotz, 1969). In 1967 a team of doctors examined numbers of Mississippi children and found children living such primitive lives, in extreme poverty, that they could not believe they were children of 20th Century America (Kotz, 1969). In 1955 reports indicated 25 percent of Americans in poverty with diets lacking essential nutrients. By 1965 the percentage had increased to 36 percent. Those with incomes less than $3,000 showed 63 percent had less than adequate diets. The dietary levels of ascorbic acid, calcium, vitamin A, and iron were often low.

Between 1961 and 1969 several doctors reported cases of malnutrition on the Navajo reservation of the Southwest. By 1969 an infant born to poor parents in the United States was twice as likely to die before his/her first birthday than a middle class child. Other reports identified hunger in Hispanic communities, Boston, New York City, and Appalachia (Kotz, 1969).

Since the 1960's the United States has seen the addition of supplemental feeding programs for pregnant women, young children, the elderly, and better availability of Food Stamps. Those programs have

helped to control hunger but have not totally eliminated the problem. The realities still exist.

The 1977-78 USDA Nationwide Food Consumption Survey indicated some variations in food consumption patterns across the United States, particularly among the blacks and Hispanics. However, the overall results of the survey did not indicate a significant variation between income groups. The food programs available to the low income groups by 1977-78 may have made the positive contribution to the low income diets. Earlier studies did show a difference in the number of calories consumed by low income as compared to higher income males. The low income diets were just as nutrient dense per calorie, meaning that for the calories consumed the diets were high quality (Windham, Wyse, Hansen & Hurst, 1983).

In another study (Peterkin, Kerr & Hama, 1982) researchers found that as the amount of money spent for food increased the RDA for the eleven selected nutrients improved. However 12 percent of the households with food expenditures close to the Food Stamp allotment did meet the RDA.

The most recent diet information, published in 1985-86, referred to as the Harvard Study (Harvard University School of Public Health, 1985 and Harvard University School of Public Health, 1986) indicated that although there was improvement in diet from the 1960's through the late 1970's, there may be deterioration of dietary quality in the 1980's. In Hunger Counties (Harvard University School of Public Health, 1986) 150 counties in the United States were

identified as being high risk areas. Twenty-eight South Dakota counties were included in that identification. Of those 28 counties, 21 ranked in the top one-third of the list. In 1980 South Dakota had a per capita income for all counties ranging from $2,642 in Buffalo County to $6,625 in Pennington County. For the identified hunger counties in eastern South Dakota the range was from $3,658 in Aurora County to $5,436 in Spink County. Brookings County with a per capita income of $5,500 was not identified as a hunger county. However 437 households had incomes less than $2,500. A total of 225 households had public assistance income (mean $1,821) (Department of Rural Sociology, South Dakota Poverty Trends, 1983).

According to the recent reports from the Harvard Study the number of hungry Americans is increasing. Although the exact number of hungry Americans is not known the problem may be so serious that up to 20,000,000 people may be hungry at least part of the time (Harvard University School of Public Health, 1985).

Because of the realities of poverty the poor may actually be paying more for the basic essentials of life than the remainder of the American population. The poor have much less flexibility and freedom in purchasing. They have definite limitations of time, place, quality, quantity, and mode of purchase.

Time of purchase can be extremely important. The thrifty consumer knows that the time to buy is when items are on sale. Being poor is having no extra money to take advantage of seasonal sales. Being poor is buying the item when you absolutely need it rather than

when it is on sale. In one particular instance nutrition workers suspected that stores located in the low income areas raised their prices when welfare checks were distributed in their areas. The nutrition workers encouraged families to postpone purchases for a few days after checks were distributed. They completely failed in their attempts, not because the families were apathetic but simply because they had already been waiting for the checks and could not wait any longer to purchase the basic essentials of human life (Meyers, 1970).

Being poor is being able to buy only the quantity that can be afforded in any given week or month. The poor do not have the extra cash to buy in bulk regularly needed items when a good price is available.

The poor also may not own freezers or refrigerators that work nor have adequate rodent free storage for staple items even if they have money to stock extra supplies. While gardening, home canning and freezing could significantly increase their food supply they may not have money for the initial equipment investment.

The poor may also be limited in their consumer knowledge and sophistication. They may not have ready access to educational opportunities to increase their consumer knowledge. More affluent consumers may not have complete consumer knowledge but are less likely to suffer as much because of their limitations.

Meyers (1970) reported the following:

> "Unfortunately, the people who are likely to be hurt most by a lack of knowledge are the very ones who are

> least likely to be able to acquire such knowledge. Because of their history of limited buying power, lack of consumer mobility, and inflexible finances they have little opportunity to acquire the purchasing sophistication of more affluent consumers. And since poverty has in many cases become institutionalized, poor people are not likely to learn these skills from their families."

To help show what it is like to live on Food Stamps, the next section will focus on the diary of a person on Food Stamps. The diary was kept by Jeannette Lynch, Consumer Marketing Specialist, at Colorado State University in 1965. Mrs. Lynch and her 18-year old son lived on the Food Stamp equivalent from October 25 to November 25, 1965. Because she couldn't actually receive food stamps and did not use actual Food Stamps in purchases the situation was not totally real. She also had some definite advantages. Lynch was a highly skilled food buyer with a well equipped kitchen. There were no outstanding food bills and installment payments or need to borrow from the food money to pay the rent. Both Lynch and her son were healthy so could eat any kind of food. She was a skilled cook, had plenty of recipes and knowledge of proper nutrition.

In the diary Lynch explains how it took three hours for planning menus and another one and one-half hours to shop because on a limited budget a person could not afford a newspaper to check

specials ahead of time. Even with careful planning and shopping there was a tendency to overspend.

There were problems encountered in storing food because Food Stamps cannot be used for wax paper, aluminum foil, or plastic. Salvaging bread wrappers and other storage containers was a regular chore.

Lynch reported a complete attitude change about meals. No longer was meal preparation time and eating approached with enthusiasm. The extra hours and human energy needed for food preparation created a tense situation.

In the 30 day experiment there were moments of absolute despair when the situation seemed hopeless. Turning down invitations for coffee, lunch, and social gatherings because of lack of money was depressing. The experiment taught Lynch that it is difficult for a mother on a low food budget to give the family both proper nutrition and interesting meals. At the end of the 30 day experiment Lynch reported the sober realization that if the next check was a day late, there would have been no food for her family.

One population group that may be particularly vulnerable to a poor diet because of lack of income are the elderly. The NHANES II indicated a prevalence of anemia among the elderly (Dallman, Yip & Johnson, 1984). Batcher and Caliendo (1980) found that older Americans who had a higher quality of diet also had more to spend on food. In one study of non-institutionalized elderly females, calcium intake was related to income. For other nutrients it was found that

income was not related to nutrient intake as much as age and education (Singleton, Overstreet & Schilling, 1980). In a study of snacking patterns, nutrient intake was found not to be related to income nor age (Singleton, Kirby & Overstreet, 1982). Another study revealed a food supply so limited that the Title III-C meal program was the source of the only meal of the day for some of the elderly (Caliendo & Smith, 1981).

The overall characteristics of the elderly related to income may influence their dietary quality. They may not have money to fix the stove or get transportation to the food market. When they do buy, it may be at the corner store where prices may be higher (Fernandes, 1982).

In the seven state nutrition survey of women, it was found that family income had a significant correlation with dietary scores in Illinois and Iowa. The study included six states from the North Central region - Illinois, Iowa, Michigan, Minnesota, Nebraska, Wisconsin - and one southern state, Georgia (Schafer, Reger, Gillespie & Roderuck, 1980).

Haider and Wheeler (1979) identified poor education, low socioeconomic status, and poor food choices as having the strongest relationship to substandard dietary intake. In their study they also found that blacks had a poorer diet than Hispanic women. They attributed the difference to ethnic background rather than income because the difference in income between the two groups was very small. Haider and Wheeler found that the subjects in their study consumed

about two-thirds the recommended calories while showing signs of obesity. Explanations could include failure of the subjects to report high calorie snacks, consumption of alcohol, and/or sedentary lifestyle.

Koh and Caples (1979) found low income blacks in Mississippi low in calorie intake, calcium, iron, and niacin. Although protein in the subjects' diets was high, biochemical findings indicated a niacin deficiency. With the low calorie diets it was possible that the tryptophan in the protein was not converted to niacin. The adolescents in the family had an improved dietary intake when they participated in school lunch although calorie intake, calcium, and iron were still below the RDA. When relating income to diet Jensen (1976) found that children from families with the highest amount of income had the highest mean fat intake. Jensen also found that children consumed a higher quality diet while participating in school lunch.

Mexican-Americans in California more than 10 years tended to increase the quality of their diet. They reported eating more canned foods, frozen foods, fruits, and vegetables in the US. Many of the families indicated they had more money with which to buy food (Dewey et al., 1984).

Relationship of Dietary Intake to Household Type and Number of Children

Walker and Woods (1976) found that as the number of children in the family increased the amount of time spent in food preparation

increased. However, even if the number of children increased, food preparation time was less when the homemaker was employed outside the home. As more women enter the labor force meal preparation time will be limited for many families where women assume the major proportion of meal preparation responsibility. By 1990 it is expected that 60 percent of the adult females will work outside the home (Kruel cited in More People Eating Out, 1986). When meal preparation time is limited homemakers may not take the extra time to prepare fresh fruits and vegetables. They may also use more convenience foods.

According to Walker and Woods (1976) time spent on meal preparation tended to increase in larger and more complex families. However, homemakers' employment outside the home was more consistently related to food preparation time than family composition.

Much has been written about how parental attitudes directly influence children (Burt & Hertzler, 1978; Yperman & Vermeersch, 1979). Some studies such as the work of Birch (1980) show little positive correlation between childrens' food preferences and that of their parents. Other studies (McCarthy, 1935; Birch cited in Birch, 1980; Galst & White, 1976) found that peers, siblings, and television influence children's food patterns. Perhaps as children are influenced from other outside elements they may influence parents' food choices.

The most recent research on dietary intake with individuals in Brookings County was done on the dietary intake of Brookings 5th grade school children by Jensen (1976). Her findings indicated that

the children in that study had overall low intakes of thiamin and niacin. A number of children also had intakes lower than the RDA for ascorbic acid, vitamin A, iron, and calcium. Whether the children's diets were similar to adults in their household or whether the children influenced the adult eating pattern was not determined. However, Jensen's findings did indicate that the children had poorer diets on weekends when they were home with their families.

In relation to number of children in the household, Sims (1976) found that families with more persons in the home tended to have a lower level of nutrition knowledge than smaller families. In the same study it was found that families in the later stages of the family life cycle had less knowledge of nutrition.

Relationship of Dietary Intake to Health Problems

In studies with individuals on restricted diets the evidence does not always suggest that individuals were motivated to follow the prescribed diet for health reasons. In a study of Cherokee Indian diabetics dietary non-compliance was a problem when the diet did not include familiar, favorite foods (Broussard, Bass & Jackson, 1982). In another study of diabetics the subjects were allowed selection of carbohydrates in a high carbohydrate diet. Findings from that study demonstrated that the subjects in the experiment tended to select more familiar carbohydrate rich food rather than the more complex high fiber foods. They tended to prefer white rice to brown rice, refined cereals to whole grain cereals, and juice to whole fruit indicating

that even for subjects who are highly motivated it may be difficult to include unfamiliar or less familiar foods in the diet (Hollenbeck, Leklem, Riddle & Conner, 1983).

Positive or negative support from family members, co-workers, and/or support groups may make a difference in how effectively individuals follow a prescribed diet. One study suggested that dieters on a weight control program with correct information may not be successful without either positive or negative support from family members and other influential groups. The total influence of the culture may also have been a factor because in some cultures overweight among women may not be considered totally undesirable (Hertzler & Schulman, 1983). Food characteristics may also enhance the success of weight loss programs (Jordan, Levitz, Utgoff & Lee, 1981). Therefore support from other significant individuals, the overall cultural patterns, and the willingness to change the characteristics of the food intake may also play a role in successful change of dietary pattern (Rauen & Tseng, 1979).

Cancer patients, because of the nature of the disease and/or the treatment, may have difficulty maintaining a normal eating pattern. Cancer patients may have food aversions which include high protein foods, sweet foods, and cereal products. Vegetables, fruits, and cultured dairy products are less likely to be aversive. Food aversions may not be related to chemotherapy (Vickers, Nielsen & Theologides, 1981). The anorexia of cancer patients may be an extremely individual thing with no clear concrete evidence of the reasons for inadequate

food intake (Trant, Serin & Douglass, 1982).

Hypertension is one of the current major health problems in the United States today, indicating that low sodium diets may be commonplace. The sensory pleasure derived from salt may limit the ability of the individual to reduce salt intake. The number of processed foods containing high amounts of salt also increase the difficulty of reducing salt consumption. Salt may be one of the strongest taste sensations. It may also increase salivation, thus making chewing and swallowing easier. Salt may also mask the bitterness in some foods. Although the salt taste is strong, a long term change in dietary sodium intake can make the highly concentrated salt taste less pleasant (Beauchamp, Bertino & Moran, 1982).

The need for salt taste is a very individual desire. The same person will consistently add the same amount of salt over a span of time regardless of dietary variation. As amount of food consumed is increased, salt will be added at the same rate per number of calories (Kumanyika & Jones, 1983). Because salt taste is so individual it is difficult to measure and make any concrete conclusions (Pangborn & Pecore, 1982).

The present knowledge about taste perceptions, cultural practices, and family support presents a collage of individual dietary variation. This variation indicates that there will probably be a wide range of compliance with restricted dietary standards.

Relationship of Dietary Intake to Nutrition Education

Many studies have been done on nutrition education related to young children, teenagers, and college students. There is less concrete information on the effectiveness of nutrition education with adults.

In work with school age children, grades kindergarten through 6th grade, nutrition knowledge increased following nutrition education programs if there was enough time to teach the material in the classroom, and if the teacher was interested and willing to teach it (Graves, Shannon, Sims & Johnson, 1982). In a companion study, there was a mixed effect on the children's food behavior. Most parents of the children reported that their children were more likely to ask for high density nutrient foods than low density nutrient foods following the nutrition education program. Although the overall effect of the program was positive, the results were not considered dramatic (Shannon, Graves & Hart, 1982).

Nutrition education in one selected food area such as milk can achieve a change of behavior. In one study 16 percent of the students reported that their selection of milk in the school lunchroom was influenced by the posters indicating fat and calorie count (Martilotta & Guthrie, 1980).

Education in nutrition with school age children should include more than an explanation of basic nutrients. Effective education should also include factors affecting choice, food production, food supply, food trends, and the overall role of nutrients in health

(Moody, 1982).

Nutrition education may not always be effective especially when prior habits become firmly established or when there is intense peer pressure, as in the case of college students. Pond (1985) in her study of students taking a nutrition education course, found the diets of the students actually deteriorating during the semester rather than improving. One of the particular dramatic changes was that milk consumption decreased while alcohol consumption increased. In the summary of her research she concluded that there needs to be emphasis on why people have certain food habits so that better methods can be developed for motivating people to change to more positive eating habits. She found that nutrition knowledge alone did not bring a positive change in behavior (Pond, 1985).

Although adults are not daily education participants in a classroom setting, they do receive and can utilize education through other means (Fortmann, Williams, Hulley, Haskell & Farguhar, 1981). The Stanford Three Community Study demonstrated that adults can benefit from an effective mass media education program. Baseline data was taken from a sample of three communities in northern California. For two years, two of the communities were involved in a nutrition campaign which included television, radio, newspaper, and billboards. Information pamphlets, cookbooks, and other nutrition information was distributed directly to the baseline participants in the two communities. The third community, the control group, did not receive the educational campaign. In the third year the educational effort to

the experimental group communities was reduced to half of the previous effort.

Dietary cholesterol was reduced 23 percent to 34 percent and saturated fat 25 percent to 30 percent in the treatment towns. The sample in the two treatment towns maintained a more stable weight and less increase in plasma cholesterol. Even in the third year the differences between those in the treatment towns and the control town were maintained or increased indicating the effectiveness of the nutrition education program in achieving lasting changes in diet, obesity, and plasma cholesterol (Farguhar, Fortmann, Haskell, Hulley, & Williams, 1981).

Mass media and group meetings have been typical teaching methods for working with adults. One-to-one intensive teaching may be the more effective way for reaching some adults as has been demonstrated by the Cooperative Extension Service EFNEP program (Brown & Pestle, 1981). The EFNEP program was specifically designed to reach young families living in or near the poverty level. In a Georgia EFNEP study an entrance score, graduation score, and follow-up score was taken for each of the participants in the program. The follow-up score was taken twelve months after graduation from the program. The graduation score was taken at the time the homemaker's diet met what was considered the minimum daily requirement for consumption of foods from the four food groups. There was no significant difference between the graduation and follow-up scores indicating the long-term effectiveness of the program (Brown & Pestle, 1981).

The Stanford Three Community Study and the Georgia EFNEP study showed positive results after intense concentrated education programs. The results may not be so dramatic where the nutrition education program is not in depth or continous.

In Cooperative Extension Services programs other than EFNEP, nutrition education is only one of many home economics program offerings. Sometimes it may not be regularly offered because of limited audience interest. These sporadic attempts at nutrition education may not make that much difference in the knowledge, attitudes, and behaviors of participants in ongoing adult education programs.

One study in the Brookings, South Dakota area found that Extension Homemakers (participants in Cooperative Extension Service ongoing adult education programs) had the lowest nutrition knowledge scores of five select groups of people. They also had the lowest score in critical thinking ability. In actual food behavior they practiced the fewest food fads of all the groups studied. This research indicates that actual food practice was better than level of knowledge (Auch, 1985).

Another group found to have better behavior than knowledge were buyers at food cooperatives across the nation. They tended to buy more nutrient dense food than their nutrition knowledge would indicate (Fjeld, Sommer, Becker & Warholic, 1983).

Nutrition education can be in formal organized groups, one-to-one, or mass media. Some individuals such as senior citizens

and single parents may be difficult to reach through the group method. Others may need one-to-one education but because of time involved that method should probably be restricted to use with individuals who do not have the ability to benefit from other methods. Direct mail to select audiences may be a way of reaching large numbers of people. Shannon and Pelican (1984) studied the feasibility of mailing information to senior citizens via pension check envelopes. These results indicated that this educational system had a positive influence on the pensioners attitude toward the importance of the relationship between nutrition and good health. In their sample they found the men almost as interested in nutrition education as the women.

Mass media may have a negative effect on the nutrient intake of families due to the food related behavior of prime time television characters. Way (1983) found that 53.3 percent of the food related behavior on television was defined as less nutritious. Rarely do the characters have health problems associated with eating and drinking while the foods they consume on the shows have a high ratio of calories to nutrients. Way also found that the networks that aired the greatest number of situation comedies showed the greatest percentage of less nutritious food. The television viewer gets two messages. One message from the nutrition education program says to be aware of nutrient intake. The other message from prime time says it doesn't matter what you eat because you can still be slim, beautiful, and healthy regardless of your food intake.

Nutrition education is conducted to increase knowledge which should logically result in change of food behavior. In actual practice the logical does not always result.

Food habits are part of the culture and may be so permanent that they will only change through concentrated in-depth effort. As creatures of habit, people will tend to select the same assortment with very little change due to outside forces such as season, outdoor temperature, and day of week. However, in one study people tended to reduce calorie consumption in the late spring and summer (Zifferblatt, Wilbur & Pinsky, 1980).

Relationship of Dietary Intake to Attitudes

Attitudes may be stronger in motivating actual food practices than nutrition knowledge. Because of the continual emphasis on nutrition in the media today, respondents in a survey may answer the way they feel they should answer but their actual nutrition practices may differ.

One study of young college student families has supported the claim that knowledge is not enough to make a food change. Underlying attitudes which were not verbalized may have been the determining factor. The families in that study were not representative of the general population because of a combination of high educational level and low income. They reported that cost, family preferences, and nutritive value were the most important factors that influenced their food choices. In actual practice in food shopping behavior or food

use, cost and nutritive value did not appear to be important (Bassler & Newell, 1982).

Social desirability and need to have the approval of investigators may definitely influence how respondents report dietary intake. Fruits and vegetables may be considered socially desirable while sweets are not. A respondent wanting to have socially desirable characteristics would report eating many fruits and vegetables and few sweets. If that individual carried the desire for social approval to the point of actual practice, it would be possible that she/he actually consumed the desirable foods (Worsley, Baghurst & Leitch, 1984). This concept adds more doubt to the accuracy of self-reported dietary intakes particularly when the individuals are well educated.

Certain combinations of value characteristics may be combined in such a way that they will predict a relationship between that combination and food or beverage consumption. Granzin and Bahn (1982) found that consumers with a religious, security-oriented value structure consumed milk, health drinks, regular soft drinks, and milk shakes. Consumers with the opposite value structure, those who were risk takers and competition oriented, preferred high calorie content beverages including beer and wine.

The Q-methodology typically used in social-psychological research can also be adapted to use in identifying individual characteristics related to food preferences. Fetzer, Solt, and McKinney (1985) used a Q-sort instrument to identify different food value orientations or food habit types. "Finicky eaters" liked only

a few foods and disliked many. "Health-conscious dieters" liked low calorie foods. The "high-calorie traditionalist" liked high calorie foods and what could be considered to be "all-American" favorites. Those who were adventuresome in their choices and liked a wide variety of foods could be considered "diverse diners". In another study of health foods, cooperative members could be classified by relationship of nutrition attitudes to member status and type of diet (Ehlers & Fox, 1982).

Individuals may choose to include or exclude certain foods for a variety of reasons including perceived health, ecological, safety, ethical, philosophical, religious, political, aesthetic, and/or metaphysical reasons. The choices they make would not be related to actual medical or health reasons (Williams & Penfield, 1985).

In addition to knowledge and attitude, a person's selection of certain foods may also be precipitated by a physiological factor not yet determined. Evidence has been observed in both animals and humans that one food related behavior, overeating of carbohydrate rich foods, may be regulated by the release of the brain neurotransmitter serotonin (Wurtman, 1984).

There is a positive relationship between knowledge and attitudes toward nutrition as indicated in a number of studies (Sims, 1976; Schwartz, 1975; Bremer & Weatherholtz, 1975; Eppright, Fox, Fryer, Lamkin & Vivian, 1970; Werblow, Fox & Henneman, 1978). In a study in South Dakota, Davis (1979) found a positive relationship between elementary teachers' attitudes toward nutrition education and

their nutrition knowledge.

Attitude toward and interest in food preparation may be an additional important ingredient in quality of the diet. Eppright, Fox, Fryer, Lamkin, and Vivian (1970) found that attitudes toward meal planning and food preparation were as significantly related to dietary quality as knowledge of nutrition. They also found that mothers with a good attitude toward nutrition did not do a better job of food selection but gave more vitamin supplements. Schwartz (1975) found that knowledge and attitudes were correlated, attitudes and practices were correlated, but knowledge and practices were not correlated.

In summary, it appears that the best combination for nutrition education would include attitudes and knowledge of nutrition combined with information on how to utilize the knowledge in meal planning and preparation.

Chapter III

Methods and Procedures

The purpose of the study was to determine possible relationships between nutrient intake and thirteen selected homemaker characteristics. The characteristics were place of residence, level of employment, age, education, income, household type, number of children in selected age ranges, number of years in Extension Homemakers, sources of nutrition information, sources of nutrition instruction, health problems in the family, interest in nutrition, and interest in new food preparation ideas, including new foods.

Population and Sample

The original population for the study was 600 Extension Homemakers involved in adult education programs offered by the Brookings County Extension Service. From this population a random sample of one-third, 200 people, was drawn. In order to draw the sample the entire membership list was numbered. The computer was used to select subjects by random number generation.

Instrumentation

The instrument used to collect the data for the study consisted of two parts: 1) a questionnaire; and 2) a 24-hour recall of dietary intake. The questionnaire contained 14 different items related to demographic characteristics, sources of nutrition information, sources of nutrition instruction, health problems of the family, interest in nutrition and interest in new food preparation ideas, including new

foods. The fourteenth characteristic, race/ethnic group or country of ancestral origin, was not used in this study and is only referred to here in describing the instrument. After the data was collected it became evident that the answers to this question were complicated and required the development of a separate coding system. The decision was made to omit this characteristic in the analysis. The instrument can be found in Appendix A.

To obtain the 24-hour dietary recall, a one page form was used in which the day was shown divided into time blocks for the 24-hour period. The time block method was specifically chosen over a meal pattern listing to obtain accurate information on the intermittent eating pattern that may be characteristic of today's lifestyles. On the form, participants also indicated if they were pregnant or lactating, their height, weight, and age. Those characteristics were required for the dietary analysis by the AGNET System. The participants listed all food and beverages consumed and the amounts consumed in the appropriate time blocks on the form (Appendix A).

The dietary intake analysis program used had capacity for one to fourteen days of dietary intake. The method for obtaining the data could be dietary history, written food records, weighed food records, food frequency questionnaire, or 24-hour recall. Before deciding on the method to be used the advantages and disadvantages of each method were evaluated.

In the dietary history method, qualitative data is gathered on past dietary habits, such as number and type of meals, food groups

use this technique.

The 24-hour recall method is limited to one day and may not reflect usual dietary intake. It also relies on a good memory. In this study the dietary recall was not totally unannounced as the subjects received a letter ahead of time asking them to participate. The letter did not suggest that a food record be kept and did not explain what a 24-hour recall was (Appendix B). The 24-hour recall method has usually required a face-to-face interview with a standardized procedure for entering data. This method does reduce opportunity for participants to modify their food behavior. The 24-hour recall method requires much researcher time in collecting data but less time is involved in coding data.

Posner, Borman, Morgan, Borden, and Ohls (1982) report that the 24-hour recall method provides reasonably accurate results for mean intake of groups of individuals. A newer method of doing 24-hour recall is by telephone. In that method a food portion visual is mailed to the respondents' homes prior to the call. It has been found to provide similar results to the personal interview method (Posner, Borman, Morgan, Borden, and Ohls, 1982).

For this study the face-to-face interview method was used in order to provide direct, individual help in completing the form.

Data Collection and Analysis

A letter was sent to each of the 200 selected homemakers requesting their participation in a dietary intake study. In the

letter, subjects were asked to come to the Brookings County Extension Building at specific times in May and June of 1984. Participants who did not respond to the first letter were sent a second letter identifying additional times for participation (Appendix B). Those who did not respond to the second scheduled series of data intake times were contacted by telephone. If it was difficult for them to leave their homes to come to the central location, the researcher went to the individual homes to collect the data.

In order to obtain a high percentage of participation, at least three telephone calls were made to those who did not respond after the first and second letters of invitation. Some could not be reached by telephone, perhaps due to summer vacations. Some of those who could not be reached by telephone were associated with South Dakota State University and were out of Brookings for the summer.

Others in the selected sample were unable to participate due to illness or other major family complications. Some were no longer involved in Extension Homemakers or had moved away from the Brookings area. Of the original sample, 160 persons completed both parts of the instrument.

Subjects coming to the Brookings County Extension Building were given an overview of the project and asked to complete the two parts of the instrument. In addition to receiving the instrument, participants received a card with their name and number. The card could be used later to obtain one's individual dietary analysis. To assure complete confidentiality no combined list of names and numbers was kept by the

researcher.

Each participant completed the homemaker characteristics form privately and placed it in a receptacle separate from the dietary intake form. The researcher gave additional instructions on how to complete the dietary intake form. The instructions included how to determine portion size and the sequence for entering the foods on the form. Individual help was given as needed. Each dietary intake form was checked by the researcher or trained assistants for accuracy and completion. For persons completing the instrument in their homes, confidentiality was assured by asking them to place the completed forms in an envelope and seal it before giving them to the researcher.

At the completion of the project participants were invited to a research summary meeting. At the meeting each received the individual dietary analysis and a report of the research findings.

The dietary intake and homemaker characteristics forms were coded by the researcher and three assistants. Each form was checked for accuracy of coding a second time. Each individual dietary intake computer printout was also checked with the original intake form. As a result of that accuracy check, eighteen individual forms were corrected and data was re-entered into the computer.

The method for determining individual dietary intake on the AGNET computer is titled "DIETCHECK". The codes for the foods in the 24-hour recall were obtained from "Nutritive Value of Foods in Common Units," Agricultural Handbook No. 456 (Adams, 1975), the DIETCHECK Foods and Codes (Nebraska Cooperative Extension Services, 1981), and

other code updates (Kohn & Thompson, 1983; Composition of Foods, 1983).

In the DIETCHECK analysis the total day's nutrient intake for each participant is compared to the RDA for eleven nutrients and calories. The proportion of fats, carbohydrates, and protein in the diet is also shown. Specific quantities are listed for saturated fat, monounsaturated fat, polyunsaturated fat, and cholesterol.

Figure 1 shows a sample DIETCHECK which illustrates the format for the printout that was used for this study. Longer formats of printouts are available showing index of nutrient density, complete meal listing, and a bar graph illustration of percent of RDA intake. The longer formats provide no additional information in relation to dietary intake for total quantity and percent of RDA so the shorter format was selected for transferring the information.

After all the individual dietary intakes were entered into the AGNET computer at Lincoln, Nebraska and analyzed for nutrient content, they were transferred to South Dakota State University. Homemaker characteristics were combined with the individual dietary analysis for statistical analysis. Analysis of variance, multiple analysis of variance, and the Waller-Duncan t test were used to test the relationships between the independent variables, demographic characteristics, and the dependent variable nutrient intake. Group means were also examined to determine if any fell below 90 percent of the RDA. Ninety percent was chosen because that would indicate a diet relatively high in nutrient intake. The group means for intake of fat and carbohydrate

DIETCHECK for 253

Number of Days - 1

Female - 46 Yr. Height: 66 Inches Weight: 232 Pounds

Recommended Dietary Allowances

Nutrient	Total Quantity	Percent of RDA	Morning Meal	Morning Snack	Mid Day Meal	Mid Day Snack	Evening Meal	Evening Snack
Calories	1739.8	87.	281.6	0.0	922.0	92.5	443.7	0.0
Protein.g	62.1	141.	3.7	0.0	31.8	7.5	19.2	0.0
Fat, Total g	82.4	*	8.3	0.0	55.9	3.2	15.0	0.0
Saturated g	29.4	*	2.0	0.0	19.5	1.4	6.6	0.0
Monounsat g	27.4	*	3.9	0.0	17.1	1.2	5.2	0.0
Polyunsat g	15.8	*	1.7	0.0	12.8	0.3	1.0	0.0
Cholesterol mg	281.6	*	25.2	0.0	114.5	9.3	132.5	0.0
Carbohydrate g	192.6	*	47.4	0.0	76.8	8.1	60.3	0.0
Fiber g	3.8	*	0.3	0.0	1.5	0.0	1.9	0.0
Calcium mg	937.8	117.	55.6	0.0	687.4	48.0	146.8	0.0
Phosphorus g	1305.8	163.	145.0	0.0	815.4	82.9	262.5	0.0
Iron mg	9.2	51.	1.7	0.0	4.5	0.6	2.4	0.0
Sodium mg	2675.2	*	218.7	0.0	1792.9	215.3	448.3	0.0
Potassium mg	2263.9	*	741.2	0.0	988.4	52.9	481.4	0.0
Vitamin A IU	2206.0	55.	529.6	0.0	824.7	83.3	768.3	0.0
Thiamin mg	0.9	92.	0.3	0.0	0.4	0.1	0.1	0.0
Riboflavin mg	1.6	137.	0.2	0.0	0.9	0.2	0.4	0.0
Niacin mg	10.4	80.	3.4	0.0	4.4	0.5	2.0	0.0
Vitamin C mg	137.7	299.	124.0	0.0	4.3	0.0	9.3	0.0

* Indicates no specific RDA for this category.

Calorie Breakdown

Percent of Calories (Approximate) from Nutrients

Protein	14.1%
Carbohydrate	43.8%
Total Fat	42.1%

Figure 1. Sample DIETCHECK

were also examined to determine the proportion of the diet from those nutrients. The criteria for significance was $P \leq .05$. Prior to 1986 there was an RDA for calories so the results show calories in relation to RDA.

Limitations of the Study

The population was limited to Extension Homemakers in Brookings County and is probably not representive of all Extension Homemakers in other locations. This population cannot be considered representive of all women. Any generalizations from this study should be limited to similar populations.

The 24-hour recall method has limitations due to the selection of the particular day. Some women who completed the instrument on Monday reported that their dietary intake from the preceding day was not a normal pattern. In a recall method participants may forget what they have eaten in the past 24 hours. Another potential source of error is the inability of the participants to judge portion size. The researcher's direct involvement in helping participants complete the dietary form helped to eliminate some of the problems with memory and portion size. At the same time, the direct involvement may have encouraged participants to try to please the researcher in listing their food intake. Even with consistent diligence in coding accuracy and rechecking, there was potential chance of error.

Hypotheses

The following null hypotheses were developed to be tested and evaluated.

1. There is no significant relationship between nutrient intake and place of residence of homemaker.
2. There is no significant relationship between nutrient intake and homemaker level of employment outside the home.
3. There is no significant relationship between nutrient intake and age of homemaker.
4. There is no significant relationship between nutrient intake and educational level of homemaker.
5. There is no significant relationship between nutrient intake and income level of homemaker.
6. There is no significant relationship between nutrient intake and type of household.
7. There is no significant relationship between nutrient intake and number and ages of children in the household.
8. There is no significant relationship between nutrient intake and number of years involved in Extension Homemakers' programs.
9. There is no significant relationship between nutrient intake and sources of nutrition information utilized in the year preceding the research study.
10. There is no significant relationship between nutrient intake and nutrition education received within the year preceding the research study.

11. There is no significant relationship between nutrient intake and health problems in the family.
12. There is no significant relationship between nutrient intake and interest in nutrition.
13. There is no significant relationship between nutrient intake and interest in new food preparation ideas including use of new foods.

Chapter IV

Results and Discussion

The major purpose of the study was to determine the relationship between selected demographic characteristics of the subjects, Extension Homemakers, and their nutrient intake. In this chapter demographic information on the subjects is summarized. Findings from the statistical testing of the hypotheses on the relationships between nutrient intake and demographic factors are also presented.

Demographic Characteristics of the Subjects

Table 1 contains a summary of the demographic characteristics of the Extension Homemakers who participated in the study. All the Extension Homemakers in this study were female. That characteristic was typical of Extension Homemakers in Brookings County at the time the sample was taken. Occasionally there have been males involved in the program but not at the time of this study.

Extension Homemakers are often presumed to be farm women. That was not true of the sample. Only 33.7 percent were farm women. Almost 40 percent lived in the City of Brookings with the remainder living in small towns or in the country in a non-farm setting.

Prior to the study it was estimated that about 50 percent of the subjects would be participants in the recognized labor force. The actual results showed that 51.3 percent either worked outside the home or had a business in their home. Almost 25 percent worked outside the

Table 1

Demographic Characteristics of Sample

Characteristics	Subjects	
	Number[a]	Percent[b]
Place of residence		
Rural farm	54	33.7
Rural non-farm	21	13.1
Small town	22	13.7
City of Brookings	63	39.4
Total	160	99.9
Level of employment		
Full time homemaker	78	48.7
Employed outside the home less than 20 hours a week	19	11.9
Employed outside the home more than 20 hours a week	39	24.4
Employed at home	24	15.0
Total	160	100.0

Table 1 (continued)

Characteristics	Subjects	
	Number[a]	Percent[b]
Age		
Under 25	2	1.2
25-34	28	17.5
35-44	22	13.7
45-54	30	18.8
55-64	35	21.9
65-74	30	18.8
75-84	6	3.7
Over 85	7	4.4
Total	160	100.0

Table 1 (continued)

Characteristics	Subjects	
	Number[a]	Percent[b]
Education (last grade completed)		
8th grade	5	3.1
Some high school	7	4.4
12th grade	44	27.5
2 years of college or less	46	28.7
Vocational/technical training	18	11.2
Bachelor's degree	32	10.0
Master's degree	8	5.0
Total	160	99.9
Annual income		
Less than $10,000	22	13.9
$10,000-$19,999	46	29.1
$20,000-$29,999	45	28.5
$30,000-$39,999	34	21.5
Over $40,000	11	7.0
Total	158	100.0

Table 1 (continued)

Characteristics	Subjects	
	Number[a]	Percent[b]
Families with number of children in each age category		
Preschool children		
None	125	79.1
One child	21	13.3
Two children	10	6.3
Three children	1	.6
Four children	1	.6
Total	158	99.9
Elementary age children		
None	117	74.5
One child	21	13.4
Two children	15	9.6
Three children	3	1.9
Five children	1	.6
Total	157	100.0

Table 1 (continued)

Characteristics	Subjects	
	Number[a]	Percent[b]
Families with number of children in each age category		
High school age children		
None	140	88.6
One child	16	10.1
Two children	2	1.3
Total	158	100.0
Number of children above high school age living in the home		
None	127	79.9
One	23	14.5
Two children	6	3.8
Three children	2	1.3
Four children	1	.6
Total	159	100.1

Table 1 (continued)

Characteristics	Subjects	
	Number[a]	Percent[b]
Number of years in Extension Homemakers		
Less than one	4	2.5
2-4	23	14.5
5-14	52	32.7
15-24	29	18.2
25-34	28	17.6
More than 35	23	14.5
Total	159	100.0
Type of household		
Single living alone	16	10.0
Single parent family	2	1.2
Two parent family	80	50.0
Multigenerational family	3	1.9
Married couple - no children present	56	35.0
Other	3	1.9
Total	160	100.0

Table 1 (continued)

Characteristics	Subjects	
	Number[a]	Percent[b]
Level of interest in nutrition		
1 Lowest level of interest	0	0
2	2	1.3
3	11	7.1
4	5	3.2
5	22	14.1
6	17	10.9
7	26	16.7
8	24	15.4
9 Highest level of interest	49	31.4
Total	155	100.1

Table 1 (continued)

Characteristics	Subjects	
	Number[a]	Percent[b]
Interest in new foods and food preparation ideas		
1 Lowest level of interest	4	2.6
2	2	1.3
3	10	6.4
4	7	4.5
5	26	16.7
6	17	10.9
7	23	14.7
8	15	9.6
9 Highest level of interest	52	33.3
Total	156	100.0

[a]The N for each demographic characteristic does not always equal the total N, 160, because some subjects did not complete all the demographic items on the survey.

[b]Total percentages do not always equal 100 because of rounding.

Table 1 (continued)

Characteristics	Subjects	
	Number[c]	Percent
Sources of nutrition information[b]		
Radio	75	48.1
Television	98	62.8
Newspaper	116	74.4
Magazine	139	89.1
Books	67	42.9
Other	35	22.7
Sources of nutrition instruction[b]		
Extension Homemakers' Meeting	120	76.9
Extension Homemaker's Leader Training	45	28.8
Special Interest Program	18	11.8
Education from private business	20	13.1
Education from other community groups	27	17.5

Table 1 (continued)

Characteristics	Subjects	
	Number[c]	Percent
Health problems in the family		
Heart and circulatory diseases	21	13.5
Hypertension	40	25.6
Stomach and intestinal diseases	16	10.3
Liver, kidney, gallbladder and pancreas disease	7	4.5
Metabolic disorders	5	3.2
Malabsorption disorders	2	1.3
Neurologic disorders	1	.6
Diabetes	12	7.7
Food allergies	12	7.7
Other (overweight was often listed as the health problem in this category	23	14.7

[c]The N for this demographic characteristic may equal more than the total N, 160, because multiple responses were allowed.

home more than 20 hours a week with nearly 12 percent being employed less than 20 hours per week. The remainder were employed at home, including day care, custom dressmaking, cake decorating, and bookkeeping. Some women who were regularly and actively involved in the farming operation would have checked this category. In the 1980 census (US Department of Commerce, County and City Data Book, 1983) South Dakota had an overall average of 41.3 percent females in the labor force. Brookings County had 42.6 percent females in the labor force in 1980. In this study of Extension Homemakers, a higher percentage, 51.3 percent, were in the labor force. Three factors may help to explain this difference: 1) more women in Extension Homemakers may be in the labor force than in the population as a whole; 2) by 1984 more females may have been in the labor force than in 1980; and, 3) this study included women who did work for pay in the home as one of the categories of employment.

Prior to the study it was assumed that the subjects would evenly represent all age categories. Slightly less than 19 percent were under 35. The percentage of those between the ages of 35 and 44 was 13.7. From age 45 to 54 the percentage increased to 18.8 percent and from 55 to 64 the percentage was 21.9 percent, the latter being the highest number in a single age category. The total percentage involved after age 75 was 8.1 percent. This data verifies what has been happening in recent years with the combination of women in the labor force and children reaching the stage where they are active in the community. Many women had been observed leaving the program

between the ages of 35 and 40 because of combined job responsibilities and children's activities not allowing time for activities of their own. Many women had entered the labor force at this time because of the growing financial burden of children in the teenage years and the anticipation of providing a post secondary education for children. These observations were supported by Walker (1970) who found that women with children who worked outside the home more than 15 hours per week consistently spent more hours per week in total workload than full time homemakers. Conran (1978) indicated that teenagers require a lot of time from the homemaker. She emphasized that during the teenage years needs are more complicated, requiring undivided attention and needing the parent, not just her services.

The educational level was not surprising considering that Brookings is a university community. Twenty-five percent had at least one college degree, including 5 percent with a master's degree. Another 28.7 percent had some college and 11.2 percent had some formal training beyond high school. The total percentage of those educated beyond high school was 64.9 percent or almost two-thirds of the sample. Of the remaining numbers 3.1 percent had an 8th grade education, 4.4 percent had some high school, and 27.5 percent had graduated from high school. In general, these subjects could be considered a well educated group. According to the 1980 census 77.2 percent of the females in Brookings County were high school graduates (US Department of Commerce, General Social and Economic Characteristics, 1983).

The income level was higher than anticipated with 28.5 percent in the over $30,000 category. Low income families, under $10,000, comprised 13.9 percent of the sample. The remainder were almost evenly divided, with 29.1 percent having incomes between $10,000 and $19,999, and 28.5 percent between $20,000 and $29,999. These percentages indicate that in relation to income, Extension Homemakers are fairly representative of the general population of Brookings County in the $10,000 to $29,999 income categories. In the 1980 census data (US Department of Commerce, County and City Data Book, 1983) for Brookings County, South Dakota, 36.6 percent of the population were under $10,000, 33.7 had incomes of $10,000 to $19,999, 18.2 percent had incomes of $20,000 to $29,999, and 7.2 percent had incomes over $40,000. The difference in the percentages in income categories between Extension Homemakers and the general population of Brookings County indicated that among Extension Homemakers there were less low income families and more high income families than the general population. The difference in percentage in income categories could be partially attributed to inflation between 1980 census data and 1984 when the demographic data for this study was collected.

Findings on type of household indicated that exactly 50 percent were two parent families with only 1.2 percent being single parent families. The percentage with high school age children present in the home was 11.4. This provided evidence that single parents and mothers of teenage children chose not to be involved in an out-of-school education program like Extension Homemakers. Time

may be the single most important factor. The remainder of the households were single individuals, couples, multigenerational, or "other".

The demographic data gives support for the Extension Service to use methods other than meetings to reach single parent families and mothers of teenage children. A more concentrated effort must be made to reach young women under 25 with preschool children and less than a high school education.

Level of interest in nutrition was relatively high with almost 75 percent indicating interest at 5 or above on a 9 point scale. Over 85 percent indicated an interest in new foods and new food preparation ideas at 5 or above on a 9 point scale. Generally speaking, Extension Homemakers had an inquisitive nature regarding food.

Nutrition information was received from a variety of sources with magazines being the most popular and newspapers being second. The level of education may partly explain the wide use of printed material.

The Extension Homemakers' meeting was the most common source of nutrition instruction with 76.9 percent stating that they had received instruction by that method. Additionally, more than 40 percent had either been a club project leader in nutrition or had attended a public meeting on nutrition offered by the Extension Service. Club project leaders receive special training to take the material back to their community to present at a local club meeting. About 30 percent had also received nutrition instruction through private business and other

community groups.

Hypertension, one of the major risk factors associated with cardiovascular disease (Kannel, 1975), was the most prevalent health problem in the family unit followed by "other" and heart or circulatory diseases. Overweight was most often indicated as the health problem most common in the category of "other". Heart disease was the leading cause of death among Caucasians in South Dakota in 1984 (State Health Planning and Development Agency, 1984). While obesity is not listed as a cause of death it is closely associated with heart disease (Robinson & Lawler, 1977).

The frequency of relationship among the independent variables also provides some information which is important to consider in nutrition education programs (see Table 2). Fifty-seven percent of those over 85 had incomes less than $10,000 and 50 percent of those ages 75-84 had incomes less than $10,000. Economy of food selection would be an important educational consideration of those 75 and over. In the 65-74 age range the majority were in the $10,000-$30,000 income range with 3.5 percent in the over $40,000 income category. In the other age categories the majority were between $10,000 and $40,000.

In the relationship between place of residence and income level, 45 percent of those under $10,000 were farm families and 45 percent of those over $40,000 were farm families indicating a wide range of income for farm families. In the $10,000 and under category 27 percent were from the City of Brookings and in the $40,000 and over category 27 percent were from the City of Brookings. In general, there

Table 2. Frequency Distribution

Place of Residence by Income

	Under $10,000	$10,000 to $19,999	$20,000 to $29,999	$30,000 to $39,999	Over $40,000	Total
Rural Farm	10	14	17	8	5	54
Rural Non Farm	5	5	4	5	2	21
Small Town	1	12	4	3	1	21
City of Brookings	6	15	20	18	3	62
Total	22	46	45	34	11	158[a]

Age by Income

	Under $10,000	$10,000 to $19,999	$20,000 to $29,999	$30,000 to $39,999	Over $40.000	Total
Age Under 25	0	0	2	0	0	2
Age 25-34	3	13	5	7	0	28
Age 35-44	3	4	7	4	4	22
Age 45-54	4	9	7	6	4	30
Age 55-64	0	8	13	11	2	34
Age 65-74	5	9	10	4	1	29
Age 75-84	3	2	0	1	0	6
Age 85 and Over	4	1	1	1	0	7
Total	22	46	45	34	11	158[a]

Table 2. Frequency Distribution (Continued)

	Age by Interest in Nutrition Level of Interest Scale 1-9									
	1	2	3	4	5	6	7	8	9	Total
Age Under 25	0	0	0	0	1	0	0	1	0	2
Age 25-34	0	1	1	0	6	7	4	5	4	28
Age 35-44	0	0	1	1	4	3	4	6	3	22
Age 45-54	0	1	0	0	5	1	5	3	14	29
Age 55-64	0	0	2	3	3	2	7	5	12	34
Age 65-74	0	0	5	0	1	3	5	3	11	25
Age 75-84	0	0	1	1	0	0	1	0	3	6
Age 85 and Over	0	0	1	0	2	1	0	1	2	7
Total	0	2	11	5	22	17	26	24	49	156[b]

[a]Frequency missing = 2

[b]Frequency missing = 4

was not a definite pattern or relationship between place of residence and income.

Relationship of Nutrient Intake to Demographic Characteristics of the Subjects

Data on food consumption was obtained through a 24-hour recall of food intake. Each subject was asked to record the total food intake for the previous 24 hours. The form for recording food intake was divided by time slots to insure that all snacks would be included. The dietary record information was coded for analysis with nutrient intake. The nutrient analysis for each subject was combined with the demographic characteristics. Analysis of variance for nutrient intake in relation to subjects demographic characteristics was computed. To further analyze significant differences in group means the Waller-Duncan t test was used ($P < 0.05$).

Hypothesis Testing

Hypothesis One. There is no significant relationship between nutrient intake and place of residence of the homemaker.

In Table 3 the results of the analysis of variance procedure are shown for relationship of nutrient intake and place of residence of the homemaker. For each category of place of residence the RDA was met at 90 percent or above. Residents of the City of Brookings met the RDA for iron at a significantly higher level ($P < .0037$). Niacin approached significance ($P < .0578$) with the 63 subjects from Brookings having higher intakes of niacin.

Table 3

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Place of Residence.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	198087.343	510289.370	0.39	0.7617
Calories RDA Percent	508.730	1410.763	0.36	0.7815
Protein Grams	420.994	1134.777	0.37	0.7740
Protein RDA Percent	3688.804	5780.903	0.64	0.5916
Fat Grams	2932.561	3008.394	0.97	0.4063
Saturated Fat Grams	430.466	331.322	1.30	0.2767
Monounsaturated Fat Grams	611.330	563.204	1.09	0.3571
Polyunsaturated Fat Grams	111.060	176.274	0.63	0.5967
Cholesterol Milligrams	47066.303	39943.250	1.18	0.3199
Carbohydrate Grams	4069.960	5023.513	0.81	0.4900
Fiber Grams	4.603	4.170	1.10	0.3494
Calcium Milligrams	35230.039	513113.618	0.07	0.9765
Calcium RDA Percent	667.884	7925.800	0.08	0.9685
Phosphorus Milligrams	50084.454	459358.221	0.11	0.9547
Phosphorus RDA Percent	1265.094	7067.152	0.18	0.9105
Iron Milligrams	48.050	27.450	1.75	0.1590
Iron RDA Percent	12454.707	2659.065	4.68	0.0037
Sodium Milligrams	14272.651	1550781.358	0.01	0.9988
Potassium Milligrams	1239354.474	935298.400	1.33	0.2682
Vitamin A IU	544376.737	21970032.984	0.02	0.9947
Vitamin A RDA Percent	1565.311	14206.090	0.11	0.9540
Thiamin Milligrams	0.077	0.399	0.19	0.9005
Thiamin RDA Percent	1390.666	3983.205	0.35	0.7898
Riboflavin Milligrams	0.295	0.713	0.41	0.7428
Riboflavin RDA Percent	2224.467	4883.816	0.46	0.7138
Niacin Total Milligrams	130.979	55.341	2.37	0.0730
Niacin RDA Percent	8347.946	3275.170	2.55	0.0578
Vitamin C Milligrams	8387.774	6728.448	1.25	0.2948
Vitamin C RDA Percent	15611.762	13835.948	1.13	0.3395
Protein Percent	40.586	21.415	1.90	0.1312
Carbohydrate Percent	166.614	107.270	1.55	0.2030
Fat Percent	153.660	105.104	1.46	0.2271

[1] Numerator DF = 3

[2] Denominator (Error) DF = 156

Part of the reason that the subjects in Brookings met the RDA at a higher level was that many of those subjects were past the childbearing years and had lower RDAs. In general, studies of nutrient intake have focused on urban areas or on rural areas where diets had previously been identified as being poor, such as in the South and among the Native Americans. In 1986 a major study on poverty (Harvard University School of Public Health, Hunger Counties, 1986) focused attention on the rural Midwest and identified South Dakota as being one of the states with a large number of high risk counties. All of the identified counties in South Dakota would be considered rural. In the past it has been assumed that rural people would have their own food supply including a wide variety of meat, milk, eggs, and home garden produce. As agriculture has become more specialized, not every farm family may have ready access to a wide variety of food. Hypothesis one was rejected based on the finding for iron.

Hypothesis Two. There is no significant relationship between nutrient intake and homemaker level of employment outside the home.

Table 4 shows the results of the analysis of variance procedure for relationship of nutrient intake and level of employment of the homemaker. As in hypothesis one, the means for each category of level of employment were at 90 percent of the RDA or above. Homemakers who were employed outside the home 20 hours a week or less and full time homemakers had a significantly higher intake of thiamin ($P < .0417$) than homemakers in the other two levels of employment. There were 78 full time homemakers in the study while 19 were employed outside the

Table 4

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Employment Level of Homemaker.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	189915.744	510446.516	0.37	0.7733
Calories RDA Percent	304.983	1414.681	0.22	0.8855
Protein Grams	1095.842	1121.799	0.98	0.4053
Protein RDA Percent	5740.126	5741.455	1.00	0.3947
Fat Grams	1349.825	3038.831	0.44	0.7217
Saturated Fat Grams	11.039	339.388	0.03	0.9921
Monounsaturated Fat Grams	348.033	568.267	0.61	0.6079
Polyunsaturated Fat Grams	148.922	175.546	0.85	0.4694
Cholesterol Milligrams	15375.406	40552.690	0.38	0.7682
Carbohydrate Grams	2686.731	5050.114	0.53	0.6610
Fiber Grams	0.598	4.247	0.14	0.9354
Calcium Milligrams	334582.390	507356.842	0.66	0.5782
Calcium RDA Percent	4660.498	7849.019	0.59	0.6200
Phosphorus Milligrams	318187.136	454202.400	0.70	0.5531
Phosphorus RDA Percent	4621.935	7002.598	0.66	0.5778
Iron Milligrams	15.963	28.067	0.57	0.6364
Iron RDA Percent	4995.416	2802.513	1.78	0.1528
Sodium Milligrams	1992643.425	1512735.766	1.32	0.2708
Potassium Milligrams	312279.846	953126.759	0.33	0.8054
Vitamin A IU	29327129.583	21416518.506	1.37	0.2542
Vitamin A RDA Percent	18809.033	13874.479	1.36	0.2585
Thiamin Milligrams	1.095	0.379	2.89	0.0375
Thiamin RDA Percent	10667.983	3804.795	2.80	0.0417
Riboflavin Milligrams	0.788	0.704	1.12	0.3429
Riboflavin RDA Percent	4807.477	4834.143	0.99	0.3971
Niacin Total Milligrams	89.986	56.129	1.60	0.1909
Niacin RDA Percent	5069.203	3338.223	1.52	0.2119
Vitamin C Milligrams	8163.599	6732.759	1.21	0.3071
Vitamin C RDA Percent	11148.996	13922.324	0.80	0.4952
Protein Percent	10.300	21.898	0.47	0.7034
Carbohydrate Percent	73.858	109.054	0.68	0.5672
Fat Percent	92.070	106.288	0.87	0.4600

[1]Numerator DF = 3

[2]Denominator (Error) DF = 156

home 20 hours a week or less, 39 were employed outside the home for more than 20 hours per week, and 24 were employed at home. The difference for the intake of thiamin was not of practical significance since the means for all groups were at 112 percent of the RDA or above. These results are not in agreement with those of Jensen (1976) who found that a number of school children in Brookings were consuming very low quantities of thiamin.

The results for this hypothesis were surprising because the expectation had been that as level of employment increased the quality of the diet would be reduced because of time constraints in meal preparation. In the Walker and Woods (1976) study women who are employed outside the home spent less time in meal preparation. Hypothesis two was rejected based on the finding for thiamin intake.

Hypothesis Three. There is no significant relationship between nutrient intake and age of homemaker.

There was a significant difference for consumption of calcium, iron, and vitamin C among the different age groups (see Table 5). Iron could be identified as the nutrient least likely to be consumed in sufficient quantity since the 52 subjects in the age range under 44 consumed iron at a level less than 75 percent of the RDA. The age group with the most problems in meeting the RDA was identified as those under 25.

The means for each of the age categories show that the two subjects under 25 did not meet the RDA at 90 percent or above for calories, calcium, iron, vitamin A, thiamin, niacin, and vitamin C.

Table 5

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Age of Homemaker.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	532890.136	503086.663	1.06	0.3926
Calories RDA Percent	1201.475	1402.598	0.86	0.5424
Protein Grams	1102.445	1122.178	0.98	0.4462
Protein RDA Percent	5986.767	5730.131	1.04	0.4024
Fat Grams	3301.949	2993.378	1.10	0.3640
Saturated Fat Grams	471.410	326.828	1.44	0.1923
Monounsaturated Fat Grams	597.749	562.563	1.06	0.3904
Polyunsaturated Fat Grams	110.194	178.030	0.62	0.7397
Cholesterol Milligrams	41475.981	40013.250	1.04	0.4080
Carbohydrate Grams	4351.713	5035.631	0.86	0.5364
Fiber Grams	4.381	4.169	1.05	0.3983
Calcium Milligrams	1030880.768	479837.166	2.15	0.0419
Calcium RDA Percent	15260.856	7444.753	2.05	0.0524
Phosphorus Milligrams	603132.750	444659.253	1.36	0.2278
Phosphorus RDA Percent	9245.232	6852.332	1.35	0.2310
Iron Milligrams	24.448	27.994	0.87	0.5291
Iron RDA Percent	16008.059	2237.644	7.15	0.0001
Sodium Milligrams	1323606.411	1530917.532	0.86	0.5361
Potassium Milligrams	785316.589	948206.564	0.83	0.5654
Vitamin A IU	17474291.769	21754198.903	0.80	0.5858
Vitamin A RDA Percent	12275.359	14045.516	0.87	0.5286
Thiamin Milligrams	0.193	0.402	0.48	0.8467
Thiamin RDA Percent	2245.438	4012.065	0.56	0.7877
Riboflavin Milligrams	1.170	0.684	1.71	0.1104
Riboflavin RDA Percent	7926.081	4691.225	1.69	0.1154
Niacin Total Milligrams	91.633	55.163	1.66	0.1226
Niacin RDA Percent	6015.237	3249.103	1.85	0.0814
Vitamin C Milligrams	13558.778	6446.643	2.10	0.0464
Vitamin C RDA Percent	9554.462	14010.686	0.68	0.6378
Protein Percent	19.151	21.795	0.88	0.5249
Carbohydrate Percent	214.572	103.500	2.07	0.0497
Fat Percent	178.594	102.678	1.74	0.1038

[1]Numerator DF = 7

[2]Denominator (Error) DF = 152

For iron they consumed 58 percent of the RDA, for vitamin A, 53 percent of the RDA, and for vitamin C, 22 percent of the RDA. The 30 subjects in the 45-54 years age range did not consume 90 percent of the RDA or above for calories. This may have been due to cutting down on calories to control weight. Those subjects in the 65-74 year age range, 30 persons, did not meet the RDA for calcium at 90 percent or above.

There was also a significant difference ($P < .0497$) among age groups in percent of the diet from carbohydrates. The over 85 age group, 7 subjects, consumed 53.77 of their diet as carbohydrates while the under 25 age group, 2 subjects, consumed 36.85 percent of their diet as carbohydrates. The under 25 age group consumed 51.60 percent of their diet as fat while the over 85 age group consumed 30.11 percent of their diet as fat.

According to the American Heart Association total fat consumption should be less than 35 percent of the total calories. The only group in the study consuming fat at less than 35 percent of the total calories were those over 85. As a result of this information the consumption level of fat in the diet could be identified as being a problem area. Caution must be taken in interpretation of the values in the under 25 age range and the over 85 age range because of the small number of subjects in those age categories. Table 5 contains the complete summary for hypothesis three. Hypothesis three was rejected.

In this study the elderly, those over 75, had high quality

diets. These results are similar to those of Krondl, Lau, Yurkiw, and Coleman (1984). In their study, the elderly, ages 71-77, tended to select a greater variety of food than individuals in the 65-70 age range. They found that those with the greatest variety of food selection had a high educational level, high health rating, and a strong desire to maintain health. According to Welsh and Marston (1982), the carbohydrate consumption of the American diet in 1909-13 was at 56 percent. In 1984, the elderly in this study consumed 53.77 percent of their calories as carbohydrate, indicating a dietary pattern for carbohydrate similar to the United States pattern in the early 1900's. Fat consumption in 1909-13 (Welsh & Marston, 1982) was at 32 percent, similar to the 1984 fat consumption for the over 85 age group in this study at 30.11 percent. In 1980, the overall average fat consumption of the American diet was 42 percent while carbohydrate was 46 percent (Welsh & Marston, 1982). The under 25 age group in this study consumed 51.60 percent of their calories as fat and 35.85 percent of their calories as carbohydrate, indicating diets more closely related to the current national averages than the diets of the elderly in this study.

Hypothesis Four. There is no significant relationship between nutrient intake and educational level of homemaker.

The eight subjects with master's degrees failed to meet the RDA for calories and iron at the 90 percent level or above. The RDA level for iron was 70.5 percent for that educational level. The seven subjects with some high school failed to meet the RDA for calcium. In

the analysis of variance procedure no significant difference was found between nutrient intake and educational level of homemaker. A complete summary is shown in Table 6. Hypothesis four was not rejected.

Although there was not a significant relationship between educational level and nutrient intake it is important to note that two educational levels did not meet the RDA at 90 percent or above for one or more nutrients. In practical application of these results, the lower iron and calcium intake indicated a need to address these deficiencies in nutrition education programs.

The results of this study were in agreement with the findings of Schafer, Reger, Gillespie, and Roderuck (1980) who found no significant correlation between educational level and dietary quality among women in five of the seven states they studied. In earlier studies (Hafstrom & Dunsing, 1972; Hendel, Burke & Lund, 1965; Murphy & Wertz, 1954), significant correlations were found between educational level and dietary quality.

Hypothesis Five. There is no significant relationship between nutrient intake and income level of homemaker.

No significant relationship was found. All income levels had RDA means at 90 percent or above. There was almost no difference in the percentage range of carbohydrate and fat consumption. Hypothesis five was not rejected. Table 7 contains the results from the analysis of variance procedure.

As noted in the literature review, income was not consistently related to nutrient intake. The 1984 poverty guideline was $10,608

Table 6

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Educational Level of Homemaker.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	214980.293	515748.510	0.42	0.8670
Calories RDA Percent	796.304	1417.172	0.56	0.7601
Protein Grams	193.064	1157.711	0.17	0.9852
Protein RDA Percent	1570.343	5905.002	0.27	0.9520
Fat Grams	1612.724	3061.639	0.53	0.7874
Saturated Fat Grams	89.488	342.750	0.26	0.9541
Monounsaturated Fat Grams	424.180	569.599	0.74	0.6145
Polyunsaturated Fat Grams	94.000	178.222	0.53	0.7868
Cholesterol Milligrams	35113.067	40272.337	0.87	0.5171
Carbohydrate Grams	6189.832	4959.078	1.25	0.2849
Fiber Grams	5.450	4.128	1.32	0.2514
Calcium Milligrams	232107.86	514763.186	0.45	0.8435
Calcium RDA Percent	3405.298	7960.762	0.43	0.8596
Phosphorus Milligrams	42245.349	467690.612	0.09	0.9972
Phosphorus RDA Percent	632.980	7205.707	0.09	0.9974
Iron Milligrams	7.527	28.635	0.26	0.9533
Iron RDA Percent	3933.308	2801.166	1.40	0.2164
Sodium Milligrams	687380.276	1554512.602	0.44	0.8496
Potassium Milligrams	841343.243	944944.800	0.89	0.5036
Vitamin A IU	13906953.595	21866121.269	0.64	0.7013
Vitamin A RDA Percent	6794.916	14248.865	0.48	0.8248
Thiamin Milligrams	0.480	0.389	1.23	0.2926
Thiamin RDA Percent	4956.458	3894.204	1.27	0.2731
Riboflavin Milligrams	0.392	0.718	0.55	0.7727
Riboflavin RDA Percent	2214.287	4936.359	0.45	0.8451
Niacin Total Milligrams	71.676	56.184	1.28	0.2717
Niacin RDA Percent	4488.151	3327.068	1.35	0.2389
Vitamin C Milligrams	6738.937	6760.572	1.00	0.4296
Vitamin C RDA Percent	8844.393	14068.032	0.63	0.7071
Protein Percent	17.042	21.861	0.78	0.5872
Carbohydrate Percent	76.128	109.655	0.69	0.6546
Fat Percent	78.075	107.116	0.73	0.6270

[1] Numerator DF = 6

[2] Denominator (Error) DF = 153

Table 7

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Income Level.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	520377.477	509762.914	1.02	0.3985
Calories RDA Percent	1185.692	1415.620	0.84	0.5033
Protein Grams	803.764	1140.459	0.70	0.5898
Protein RDA Percent	4954.000	5818.587	0.85	0.4948
Fat Grams	2942.401	3043.238	0.97	0.4275
Saturated Fat Grams	68.970	342.385	0.20	0.9373
Monounsaturated Fat Grams	725.970	566.370	1.28	0.2796
Polyunsaturated Fat Grams	303.650	173.840	1.75	0.1426
Cholesterol Milligrams	8037.495	41086.079	0.20	0.9404
Carbohydrate Grams	5715.220	5019.802	1.14	0.3406
Fiber Grams	5.162	4.183	1.23	0.2987
Calcium Milligrams	302263.536	514799.723	0.59	0.6724
Calcium RDA Percent	5494.132	7933.032	0.69	0.5982
Phosphorus Milligrams	316090.605	459711.120	0.69	0.6016
Phosphorus RDA Percent	5834.646	7057.782	0.83	0.5101
Iron Milligrams	16.133	28.413	0.57	0.6864
Iron RDA Percent	978.514	2908.659	0.34	0.8531
Sodium Milligrams	425140.828	1546574.667	0.27	0.8438
Potassium Milligrams	833128.949	955125.191	0.87	0.4821
Vitamin A IU	40742700.885	21267967.076	1.92	0.1106
Vitamin A RDA Percent	25512.015	13798.978	1.85	0.1223
Thiamin Milligrams	0.351	0.397	0.88	0.4748
Thiamin RDA Percent	3538.703	3981.203	0.89	0.4722
Riboflavin Milligrams	0.189	0.725	0.26	0.9023
Riboflavin RDA Percent	1601.555	4956.711	0.32	0.8622
Niacin Total Milligrams	74.252	56.655	1.31	0.2685
Niacin RDA Percent	4480.806	3362.356	1.33	0.2603
Vitamin C Milligrams	3548.795	6910.984	0.51	0.7259
Vitamin C RDA Percent	15722.769	13953.021	1.13	0.3460
Protein Percent	35.436	21.542	1.64	0.1658
Carbohydrate Percent	81.095	108.876	0.74	0.5629
Fat Percent	70.618	107.585	0.66	0.6232

[1] Numerator DF = 4

[2] Denominator (Error) DF = 153

for a family of four (Harvard University School of Public Health, 1985). In this study 13.9 percent of the families had incomes less than $10,000. More than 50 percent of the subjects with $10,000 or less income were persons over 65 years old. Possibly many of them were single person households. Over 45 percent with incomes under $10,000 were farm families who may have had their own home produced food. The availability of the federal Food Stamp program and meals for senior citizens may have influenced the relationship of income to nutrient intake. The Harvard Study (Harvard University School of Public Health, 1986) designated 28 counties in South Dakota as hunger counties. Texas was the only state having more hunger counties with 29 designated counties. Hunger counties were selected by two criteria. The first criterion was that 20 percent of the population must be below the poverty guideline and the second criterion was that less than one-third of the families received federal Food Stamp assistance. Brookings County was not indicated as one of the 28 hunger counties in South Dakota. Although 36.6 percent of the households were below $10,000 income in 1980 (US Department of Commerce, County and City Data Book, 1983) 17.4 percent of the persons in this study were below the poverty guideline.

Studying the two percentages together, 36.6 percent of the households below $10,000 and 17.4 percent of the persons below that poverty guideline indicated that many of the households were single or two person households. It could not be assumed that only the single elderly were low income because 13.6 percent of the children in

Brookings lived in families with incomes below the poverty guidelines (US Department of Commerce, County and City Data Book, 1983).

Hypothesis Six. There is no significant relationship between nutrient intake and type of household.

As shown in Table 8, analysis of variance results showed a difference ($P < .0052$) for percent of RDA for iron. Because of unequal sample sizes a significant difference could not be detected using the Waller-Duncan t test. A difference in means of 59.65 would be needed between group three and group four for a significant difference. Group three, multigenerational families, consumed the RDA for iron at 87 percent while group four consumed the RDA for iron at 127.09 percent. Group four was designated as the married couples with no children present. Group three had three subjects while group four had 56 subjects.

In addition, the two single parent subjects failed to meet the RDA for calories and calcium at 90 percent or above. The three subjects described as living in the family type termed "other" did not meet the RDA for calcium at 90 percent or above and consumed over 53 percent of their calories as fat. Hypothesis six was not rejected.

Hypothesis Seven. There is no significant relationship between nutrient intake and number and ages of children in the household.

There was a significant difference in nutrient intake for total quantity of calcium ($P < .0099$), percent of RDA for calcium ($P < .0144$), quantity of phosphorus ($P < .0310$), percent of RDA for phosphorus ($P < .0378$), percent of RDA for iron ($P < .0026$), percent of

Table 8

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Type of Household.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	523654.122	503773.592	1.04	0.3965
Calories RDA Percent	330.523	1428.263	0.23	0.9483
Protein Grams	1060.790	1123.274	0.94	0.4541
Protein RDA Percent	4711.471	5774.870	0.82	0.5401
Fat Grams	2833.214	3012.604	0.94	0.4566
Saturated Fat Grams	342.819	332.880	1.03	0.4021
Monounsaturated Fat Grams	475.422	566.991	0.84	0.5243
Polyunsaturated Fat Grams	114.375	177.013	0.65	0.6648
Cholesterol Milligrams	61829.359	39371.423	1.57	0.1716
Carbohydrate Grams	5211.479	4998.835	1.04	0.3948
Fiber Grams	2.949	4.218	0.70	0.6248
Calcium Milligrams	484897.594	504720.303	0.96	0.4438
Calcium RDA Percent	6672.429	7825.106	0.85	0.5145
Phosphorus Milligrams	402391.177	453234.934	0.89	0.4908
Phosphorus RDA Percent	5334.015	7010.396	0.76	0.5794
Iron Milligrams	11.989	28.353	0.42	0.8323
Iron RDA Percent	9190.021	2637.846	3.48	0.0052
Sodium Milligrams	1374496.729	1526572.897	0.90	0.4825
Potassium Milligrams	258582.124	963192.878	0.27	0.9298
Vitamin A IU	10625906.466	21920965.866	0.48	0.7873
Vitamin A RDA Percent	6524.935	14209.229	0.46	0.8061
Thiamin Milligrams	0.034	0.404	0.08	0.9946
Thiamin RDA Percent	343.522	4050.872	0.08	0.9945
Riboflavin Milligrams	1.078	0.693	1.55	0.1763
Riboflavin RDA Percent	6884.906	4767.040	1.44	0.2115
Niacin Total Milligrams	57.283	56.752	1.01	0.4142
Niacin RDA Percent	3552.560	3364.984	1.06	0.3872
Vitamin C Milligrams	4319.901	6838.972	0.63	0.6759
Vitamin C RDA Percent	9554.462	14010.686	0.68	0.6378
Protein Percent	9.561	22.072	0.43	0.8249
Carbohydrate Percent	203.695	105.295	1.93	0.0917
Fat Percent	195.099	103.128	1.89	0.0988

[1] Numerator DF = 5

[2] Denominator (Error) DF = 154

RDA for vitamin C ($P < .0232$), when subjects were compared for number of preschool children. The subjects with one preschool child consumed more calcium and phosphorus than either the 125 subjects with no preschool children or the 12 subjects with more than one preschool child. The 125 subjects with no preschool children met the RDA for vitamin C at a higher percent than the 33 subjects with preschool children. The results for calcium, phosphorus, and vitamin C were not of practical significance since all subjects met the RDA for those nutrients at 100 percent or above. The 33 subjects with one or more preschool children failed to meet the RDA at 90 percent or above for iron.

A significant difference was not found in nutrient intake for those subjects with children above high school age. However, the nine subjects with two or more children above high school age did not meet the RDA at 90 percent or above for calcium and iron. They also consumed over 40 percent of their diet as fat.

For further statistical evaluation the preschool categories were combined with the elementary age categories. After the categories were combined there was a significant difference for intake of quantity of carbohydrate ($P < .0017$), quantity of iron ($P < .0243$), quantity of potassium ($P < .0248$), quantity of riboflavin ($P < .0010$), and percent of riboflavin ($P < .0011$). Subjects ($n=106$) with no preschool or elementary age children consumed a mean of 200 grams of carbohydrate while the other categories consumed more or less without an apparent pattern of relationship of number of children to intake of carbohydrate. In comparing percent of RDA for calcium, the four subjects with one

preschool child and the four subjects with a combination of two preschool children and one elementary age child did not meet the RDA at 90 percent or above. Of the 50 subjects having either preschool or elementary age children or a combination of both, only 13 subjects met the RDA for iron at 90 percent or above. The 12 subjects with two or more preschool children consumed over 40 percent of their calories as fat.

For subjects with elementary age children there was a significant difference for quantity of calcium ($P < .0393$), percent of RDA for calcium ($P < .0354$), and percent of RDA for iron ($P < .0036$). The 40 subjects with elementary age children consumed more calcium and met the RDA at a higher percentage than the 11 subjects who did not have elementary age children. That finding was not of practical significance since all subjects consumed more than 100 percent of the RDA. The 21 subjects with one elementary age child met the RDA for iron at 91 percent while the 19 subjects with two or more children met the RDA at 76 percent. Subjects with three or more elementary age children consumed over 40 percent of their calories as fat. There were four subjects in that category.

For subjects with high school age children, there was no significant difference in nutrient intake. In practical application the two subjects with two high school age children consumed 74 percent of the RDA for calcium and 55 percent of the RDA for iron. Subjects with two or more high school age children consumed just under 40 percent (39.55) of their caloric intake as fat. The four subjects

with one preschool child and the one subject with a combination of two preschool children and two elementary age children consumed much less potassium (950 mg). All the other groups consumed over 2500 milligrams. All subjects met the RDA for riboflavin at 90 percent or above so the differences were not of practical significance.

When the preschool categories were combined with the high school categories there was a significant difference for quantity of calories ($P < .0151$), percent of RDA for calories ($P < .0259$), quantity of carbohydrate ($P < .0029$), quantity of sodium ($P < .0065$), and percent of protein ($P < .0021$). The four subjects with one preschool child and one high school age child consumed 70 percent of the RDA for calories while all the other categories consumed over 90 percent. Those same subjects also consumed the least amount of carbohydrate and sodium of the five categories. The individuals having preschool children only, failed to meet the RDA at 90 percent or above for iron while all the other categories had 90 percent or above of the RDA. The four subjects with one preschool child combined with one high school age child did not meet the RDA at 90 percent or above for calcium. Those same individuals consumed the highest percentage of their calories as protein, 23 percent. The subjects with two or more preschool children consumed more fat, over 40 percent, than any of the other age categories.

When the categories for subjects with elementary age and high school age children were merged, fiber ($P < .0127$), quantity of riboflavin ($P < .0171$), and percent of RDA for riboflavin ($P < .0151$)

of the RDA for vitamin A. The highest percentage of fat was consumed by the eight subjects with two or more children above high school combined with no elementary children and the one subject with two or more children above high school combined with one elementary child. The first group consumed 42 percent of their calories as fat and the latter subject consumed 45.5 percent of the calories as fat.

When subjects with high school age children were combined with those subjects who had children above high school, there were significant differences for percent of RDA for thiamin ($P < .0412$), quantity of thiamin ($P < .0463$), and percent of RDA for riboflavin ($P < .0475$). The differences for thiamin and riboflavin were not of practical significance since all groups consumed 90 percent or more of the RDA. The three subjects with two children above high school age combined with one high school child did not meet the RDA for iron and vitamin A at 90 percent or above. All the subjects who had children above high school age but no high school children consumed more than 40 percent of their calories as fat.

When the three age categories of children present in the household, preschool, elementary, and high school were combined with all subjects under 54 years of age there were a number of significant differences. The differences were for quantity of calories, percent of RDA for calories, quantity of protein, percent of RDA for protein, quantity of fat, quantity of saturated fat, quantity of monounsaturated fat, quantity of polyunsaturated fat, quantity of calcium, percent of RDA for calcium, quantity of phosphorus, percent of RDA for phosphorus,

quantity of sodium, quantity of riboflavin, percent of RDA for riboflavin, percent of carbohydrate, and percent of fat.

When comparing age with preschool children categories, it was found that all subjects ages 25-34 did not meet the RDA for iron at 90 percent or above regardless of whether they did or did not have children. The 27 subjects in the 45-54 age range without preschool children met the RDA at 90 percent or above for iron while the two with children did not. In the 35-44 age range the five subjects with one preschool child met the RDA at 90 percent or above for iron while the 14 subjects in that age range who had no preschool children and the one subject that had two or more preschool children did not meet the RDA for iron at 90 percent or above.

The two subjects 45-54 years of age with one preschool child consumed 80 percent of the RDA for calcium and 76 percent of the RDA for riboflavin. The highest fat diet was consumed by those individuals in the 45-54 age range with no preschool children.

When age was combined with subject categories for elementary children, the only group that met the RDA for iron was the 45-54 age range with no children (n=25). The four subjects in that same age range with one elementary child consumed 86 percent of the RDA for calcium. Five of the eight categories had fat consumption of over 40 percent of calories.

When age was combined with subject categories for high school children the results were similar with the only group meeting the RDA being the 45-54 age range with no children (n=25). There were six

categories in this pattern combination and four of them had a fat consumption over 40 percent of calories.

The other differences for consumption were not of practical significance. Hypothesis seven was rejected. Tables 9-13 contain the summary from the analysis of variance procedure.

Hypothesis Eight. There is no significant relationship between nutrient intake and number of years involved in Extension Homemakers' program.

There was a significant difference in consumption of iron in relationship to the RDA ($P < .0141$). The 27 subjects with less than five years in Extension Homemakers did not meet the RDA for iron at 90 percent or above. Further examination revealed that the 28 subjects with 25-34 years of membership were significantly different from those with less than five years of membership. The 25 subjects with more than 35 years of membership were significantly different from those with less than one year of membership. Subjects with 25-34 years of membership had an iron intake at 132.71 percent of the RDA while those with 35 or more years of membership met the RDA for iron at 122 percent. There may have been another independent variable that is related to years of membership. The majority of those with 25 or more years of membership were past the child bearing years so the RDA for iron was smaller, making it easier to consume adequate iron. The group with less than five years of membership included a majority of young women who had a higher RDA.

On the basis of the significant difference in iron intake,

Table 9

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Presence of Preschool Children in the Family

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	493502.019	508311.498	0.97	0.3810
Calories RDA Percent	649.286	1411.543	0.46	0.6322
Protein Grams	2495.951	1100.716	2.27	0.1070
Protein RDA Percent	12275.616	5640.178	2.18	0.1169
Fat Grams	611.888	3074.705	0.20	0.8198
Saturated Fat Grams	594.734	333.117	1.79	0.1712
Monounsaturated Fat Grams	28.522	577.620	0.05	0.9518
Polyunsaturated Fat Grams	41.483	176.757	0.23	0.7932
Cholesterol Milligrams	254.044	40684.244	0.01	0.9938
Carbohydrate Grams	5855.769	4893.231	1.20	0.3050
Fiber Grams	6.457	4.199	1.54	0.2181
Calcium Milligrams	2267355.401	476816.883	4.76	0.0099
Calcium RDA Percent	32228.610	7400.317	4.36	0.0144
Phosphorus Milligrams	1562664.891	439674.993	3.55	0.0310
Phosphorus RDA Percent	22709.926	6788.105	3.35	0.0378
Iron Milligrams	37.808	28.056	1.35	0.2629
Iron RDA Percent	16651.544	2692.567	6.18	0.0026
Sodium Milligrams	581680.513	521510.518	0.38	0.6829
Potassium Milligrams	51348.057	951220.603	0.05	0.9475
Vitamin A IU	200084.462	22050180.243	0.01	0.9910
Vitamin A RDA Percent	1802.660	14259.831	0.13	0.8813
Thiamin Milligrams	0.018	0.402	0.05	0.9543
Thiamin RDA Percent	1532.889	4008.397	0.38	0.6829
Riboflavin Milligrams	2.008	0.679	2.96	0.0549
Riboflavin RDA Percent	10464.742	4697.934	2.23	0.1112
Niacin Total Milligrams	23.476	52.519	0.45	0.6404
Niacin RDA Percent	2894.762	3098.970	0.93	0.3951
Vitamin C Milligrams	19759.313	6673.664	2.96	0.0547
Vitamin C RDA Percent	52209.790	13533.026	3.86	0.0232
Protein Percent	4.632	20.656	0.22	0.7994
Carbonydrate Percent	36.757	108.753	0.34	0.7137
Fat Percent	39.141	107.907	0.36	0.6964

[1]Numerator DF = 4

[2]Denominator (Error) DF = 155

Table 10

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Presence of Elementary School Age Children in the Family.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	596810.668	510169.121	1.17	0.3132
Calories RDA Percent	578.858	1420.619	0.41	0.6660
Protein Grams	614.309	1132.159	0.54	0.5823
Protein RDA Percent	2910.477	5797.490	0.50	0.6063
Fat Grams	1309.367	3085.406	0.42	0.6549
Saturated Fat Grams	491.033	336.549	1.46	0.2357
Monounsaturated Fat Grams	193.187	579.063	0.33	0.7168
Polyunsaturated Fat Grams	123.673	178.782	0.69	0.5022
Cholesterol Milligrams	6997.971	40650.008	0.17	0.8420
Carbohydrate Grams	7205.186	4886.203	1.47	0.2321
Fiber Grams	7.265	4.174	1.74	0.1789
Calcium Milligrams	1605225.456	485450.696	3.31	0.0393
Calcium RDA Percent	25567.251	7488.375	3.41	0.0354
Phosphorus Milligrams	762973.656	452121.816	1.69	0.1884
Phosphorus RDA Percent	11657.497	6963.968	1.67	0.1909
Iron Milligrams	2.821	28.682	0.10	0.9064
Iron RDA Percent	15783.965	2710.293	5.82	0.0036
Sodium Milligrams	52343.595	1531674.273	0.03	0.9664
Potassium Milligrams	1812210.951	926745.936	1.96	0.1450
Vitamin A IU	37792889.520	21632143.253	1.75	0.1777
Vitamin A RDA Percent	18504.114	14090.741	1.31	0.2719
Thiamin Milligrams	0.142	0.403	0.35	0.7034
Thiamin RDA Percent	1382.064	4036.254	0.34	0.7106
Riboflavin Milligrams	1.892	0.682	2.77	0.0656
Riboflavin RDA Percent	13398.049	4670.532	2.87	0.0598
Niacin Total Milligrams	57.244	51.890	1.10	0.3344
Niacin RDA Percent	3200.183	3083.210	1.04	0.3566
Vitamin C Milligrams	10666.759	6763.611	1.58	0.2099
Vitamin C RDA Percent	22662.312	13824.381	1.64	0.1975
Protein Percent	7.946	20.717	0.38	0.6823
Carbohydrate Percent	0.459	109.256	0.00	0.9958
Fat Percent	0.777	108.658	0.01	0.9929

[1]Numerator DF = 2

[2]Denominator (Error) DF = 154

Table 11

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Presence of High School Age Children in the Family.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	320265.667	510528.500	0.63	0.5354
Calories RDA Percent	637.137	1412.012	0.45	0.6377
Protein Grams	1794.422	1125.934	1.59	0.2065
Protein RDA Percent	9986.013	5754.300	1.74	0.1797
Fat Grams	268.887	3079.616	0.09	0.9164
Saturated Fat Grams	28.972	340.925	0.08	0.9186
Monounsaturated Fat Grams	97.269	576.439	0.17	0.8449
Polyunsaturated Fat Grams	2.566	179.301	0.01	0.9858
Cholesterol Milligrams	5683.625	40961.837	0.14	0.8705
Carbohydrate Grams	4327.509	4958.366	0.87	0.4198
Fiber Grams	4.306	4.220	1.02	0.3629
Calcium Milligrams	109056.217	505162.756	0.22	0.8061
Calcium RDA Percent	1537.844	7804.236	0.20	0.8214
Phosphorus Milligrams	107919.173	458806.469	0.24	0.7907
Phosphorus RDA Percent	1770.269	7064.280	0.25	0.7787
Iron Milligrams	61.877	27.752	2.23	0.1110
Iron RDA Percent	2799.732	2872.374	0.97	0.3796
Sodium Milligrams	8668.669	1529643.953	0.01	0.9943
Potassium Milligrams	494571.065	949929.655	0.52	0.5952
Vitamin A IU	1152063.960	22030121.403	0.05	0.9491
Vitamin A RDA Percent	768.608	14268.710	0.05	0.9476
Thiamin Milligrams	0.042	0.401	0.11	0.9000
Thiamin RDA Percent	585.617	4019.057	0.15	0.8645
Riboflavin Milligrams	0.543	0.699	0.78	0.4614
Riboflavin RDA Percent	4430.139	4780.758	0.93	0.3981
Niacin Total Milligrams	133.379	56.019	2.38	0.0958
Niacin RDA Percent	8112.020	3323.726	2.44	0.0904
Vitamin C Milligrams	5596.756	6828.977	0.82	0.4425
Vitamin C RDA Percent	11316.997	14002.779	0.81	0.4475
Protein Percent	61.217	21.389	2.86	0.0602
Carbohydrate Percent	3.563	110.463	0.03	0.9683
Fat Percent	38.280	107.869	0.35	0.7018

[1] Numerator DF = 2

[2] Denominator (Error) DF = 155

Table 12

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Presence of Children Above High School Age in the Family.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	81789.921	518177.792	0.16	0.9592
Calories RDA Percent	210.043	1433.178	0.15	0.9643
Protein Grams	265.682	1150.797	0.23	0.9207
Protein RDA Percent	1607.844	5885.910	0.27	0.8949
Fat Grams	699.939	3084.977	0.23	0.9230
Saturated Fat Grams	12.408	343.671	0.04	0.9975
Monounsaturated Fat Grams	147.532	577.614	0.26	0.9060
Polyunsaturated Fat Grams	62.788	179.073	0.35	0.8433
Cholesterol Milligrams	28897.068	40625.609	0.71	0.5854
Carbohydrate Grams	3679.892	5070.356	0.73	0.5756
Fiber Grams	2.263	4.246	0.56	0.6945
Calcium Milligrams	179898.812	515354.889	0.35	0.8444
Calcium RDA Percent	2669.037	7966.115	0.34	0.8540
Phosphorus Milligrams	132204.953	462865.344	0.29	0.8870
Phosphorus RDA Percent	2018.782	7131.137	0.28	0.8886
Iron Milligrams	5.870	28.590	0.21	0.9351
Iron RDA Percent	1372.925	2893.273	0.47	0.7544
Sodium Milligrams	849332.290	1545179.390	0.55	0.6995
Potassium Milligrams	1089583.286	943259.097	1.16	0.3329
Vitamin A IU	13741281.876	21886551.264	0.63	0.6433
Vitamin A RDA Percent	8915.880	14175.359	0.63	0.6425
Thiamin Milligrams	0.363	0.396	0.92	0.4553
Thiamin RDA Percent	3343.794	3973.643	0.84	0.5009
Riboflavin Milligrams	0.470	0.716	0.66	0.6228
Riboflavin RDA Percent	3252.172	4904.279	0.66	0.6185
Niacin Total Milligrams	28.400	57.574	0.49	0.7407
Niacin RDA Percent	1708.196	3417.763	0.50	0.7359
Vitamin C Milligrams	5848.080	6794.861	0.86	0.4891
Vitamin C RDA Percent	14220.606	13871.238	1.03	0.3962
Protein Percent	11.499	22.057	0.52	0.7202
Carbohydrate Percent	102.242	109.193	0.94	0.4446
Fat Percent	71.742	107.546	0.67	0.6158

[1] Numerator DF = 4

[2] Denominator (Error) DF = 154

Table 13

General Linear Models Procedure, Significant Values for Interrelationships.

Nutrient	Relationship	DF	F Value	PR > F
Calories	Elementary Children and Age	3	2.96	0.0389
Calories RDA Percent	Preschool Children and Age	3	2.98	0.0381
Calories RDA Percent	Elementary Children and Age	3	2.94	0.0399
Protein Grams	Elementary Children and Age	3	4.31	0.0079
Protein RDA Percent	Elementary Children and Age	3	4.51	0.0063
Fat Grams	Preschool Children and Age	3	4.38	0.0210
Fat Grams	Elementary Children and Age	3	4.46	0.0066
Fat Grams	High School Children and Age	2	4.03	0.0226
Saturated Fat Grams	Elementary Children and Age	3	4.00	0.0113
Saturated Fat Grams	High School Children and Age	2	4.66	0.0129
Monounsaturated Fat Grams	Preschool Children and Age	3	3.89	0.0128
Monounsaturated Fat Grams	Elementary Children and Age	3	4.24	0.0086
Monounsaturated Fat Grams	High School Children and Age	2	3.70	0.0302
Polyunsaturated Fat Grams	Preschool Children and Age	3	3.11	0.0324
Polyunsaturated Fat Grams	Elementary Children and Age	3	4.46	0.0067
Cholesterol	Elementary Children and Age	3	2.82	0.0462
Cholesterol	High School Children and Age	2	3.74	0.0293
Calcium Milligrams	Elementary Children and Age	3	4.65	0.0053
Calcium RDA Percent	Elementary Children and Age	3	4.74	0.0048
Phosphorus Milligrams	Elementary Children and Age	3	5.50	0.0020
Phosphorus RDA Percent	Elementary Children and Age	3	5.70	0.0016
Sodium Milligrams	Elementary Children and Age	3	2.79	0.0478
Riboflavin Milligrams	Elementary Children and Age	3	4.27	0.0083
Riboflavin RDA Percent	Elementary Children and Age	3	4.49	0.0064
Carbohydrate Percent	Elementary Children and Age	3	3.14	0.0313
Carbohydrate Percent	High School Children and Age	2	4.10	0.0212
Fat Percent	High School Children and Age	2	3.96	0.0239
Calories	Preschool and High School Children	1	6.06	0.0151
Calories RDA Percent	Preschool and High School Children	1	5.07	0.0259
Carbohydrate Gram	Preschool and Elementary School Children	4	4.56	0.0017
Carbohydrate Gram	Preschool and High School Children	1	9.21	0.0029
Fiber Grams	Elementary and High School Children	2	4.51	0.0127

Table 13 (Continued)

Nutrient	Relationship	DF	F Value	PR > F
Iron Grams	Preschool and Elementary School Children	4	2.90	0.0243
Sodium Milligrams	Preschool and High School Children	1	7.64	0.0065
Potassium Milligrams	Preschool and Elementary School Children	4	2.89	0.0248
Thiamin Milligrams	High School and Past High School Children	2	3.14	0.0463
Thiamin RDA Percent	High School and Post High School Children		3.26	0.0412
Riboflavin Milligrams	Preschool and Elementary Children	4	4.93	0.0010
Riboflavin Milligrams	Elementary and High School Children	2	4.19	0.0171
Riboflavin RDA Percent	Preschool and Elementary Children	4	4.82	0.0011
Riboflavin RDA Percent	Elementary and High School Children	2	4.32	0.0151
Riboflavin RDA Percent	High School and Post High School Children	2	3.12	0.0475
Protein Percent	Elementary and High School Children	2	9.82	0.0021

hypothesis eight was rejected. Table 14 contains the results from the analysis of variance procedure.

Hypothesis Nine. There is no significant relationship between nutrient intake and sources of nutrition information utilized in the year preceding the study.

There was no significant difference between the 75 subjects who used radio as a source of nutrition education and those who did not. Both groups met the RDA for all nutrients at 99 percent and above. They consumed almost identical proportions of their calories from protein, fat, and carbohydrate.

There was a significant difference for those who used television as a source of nutrition information for the quantity of niacin ($P < .0096$) and percentage of niacin RDA ($P < .0073$). The 75 subjects who used television consumed less niacin than the 58 subjects who did not use television. This difference was not of practical significance since both groups met the RDA for niacin at 131 percent or above. For all nutrients, the television users and the non-users met the RDA at 95 percent or above. There was also very little difference in proportion of the calories from protein, carbohydrates, and fat between the two groups.

There was a significant difference in quantity of thiamin ($P < .0329$) and percentage of thiamin RDA ($P < .0273$) for the 116 subjects who said they used newspapers as a source of nutrition information and the 40 subjects who did not use newspapers. The subjects using newspapers consumed less thiamin. Again this difference

Table 14

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Number of Years in Extension Homemakers.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	399430.711	510316.390	0.78	0.5636
Calories RDA Percent	505.758	1430.278	0.35	0.8793
Protein Grams	726.109	1137.748	0.64	0.6709
Protein RDA Percent	2497.635	5866.530	0.43	0.8302
Fat Grams	2048.943	3055.554	0.67	0.6464
Saturated Fat Grams	581.636	326.602	1.78	0.1199
Monounsaturated Fat Grams	290.104	576.379	0.50	0.7734
Polyunsaturated Fat Grams	82.303	179.217	0.46	0.8061
Cholesterol Milligrams	63351.287	39259.876	1.61	0.1596
Carbohydrate Grams	1695.424	5144.561	0.33	0.8945
Fiber Grams	2.235	4.248	0.53	0.7562
Calcium Milligrams	801518.017	496534.110	1.61	0.1595
Calcium RDA Percent	10071.605	7748.021	1.30	0.2668
Phosphorus Milligrams	493285.969	451860.658	1.09	0.3673
Phosphorus RDA Percent	5826.983	7020.096	0.83	0.5302
Iron Milligrams	20.212	28.239	0.72	0.6125
Iron RDA Percent	1965.650	2695.013	2.96	0.0141
Sodium Milligrams	1027278.449	1545261.116	0.66	0.6507
Potassium Milligrams	335558.559	966898.965	0.35	0.8835
Vitamin A IU	8530563.052	22056.723	0.39	0.8573
Vitamin A RDA Percent	6389.689	14258.425	0.45	0.8141
Thiamin Milligrams	0.487	0.391	1.25	0.2901
Thiamin RDA Percent	4850.289	3917.734	1.24	0.2940
Riboflavin Milligrams	1.219	0.690	1.77	0.1232
Riboflavin RDA Percent	7275.801	4764.269	1.53	0.1845
Niacin Total Milligrams	26.625	57.861	0.46	0.8054
Niacin RDA Percent	1862.623	3426.904	0.54	0.7430
Vitamin C Milligrams	8477.759	6726.804	1.26	0.2840
Vitamin C RDA Percent	25332.309	13533.488	1.87	0.1024
Protein Percent	2.985	22.371	0.13	0.9845
Carbohydrate Percent	96.783	109.373	0.88	0.4928
Fat Percent	111.746	106.523	1.05	0.3911

[1]Numerator DF = 5

[2]Denominator (Error) DF = 153

was not of practical significance since both groups met the RDA for all nutrients at 99 percent or above. There was very little difference between the two groups in the proportion of calories from protein, carbohydrate, and fat.

There was no significant difference in nutrient intake between those who did and did not use magazines as a source of nutrition information. Both groups met the RDA for all nutrients at 94 percent or above. There was also very little difference in proportion of calories from protein, carbohydrates, and fat. There were 139 subjects who said they used magazines and 17 subjects who did not use magazines.

There was no significant difference between the 67 subjects who used books as a source of nutrition information and the 89 subjects who did not. Both groups met the RDA for all nutrients at 98 percent or above.

Hypothesis nine was rejected because differences were found in nutrient intake and sources of nutrition information. However, these differences were of no practical significance because the overall nutrient intake was at 90 percent of the RDA or more. Tables 15-19 contain the results from the analysis of variance procedure.

Hypothesis Ten. There is no significant relationship between nutrient intake and nutrition instruction received within the year preceding the research study.

Both the 120 subjects who did and the 36 subjects who did not receive nutrition instruction at an Extension Homemakers' meeting met

Table 15

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Radio as a Source of Nutrition Education.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	91435.912	514249.633	0.18	0.6739
Calories RDA Percent	203.052	1421.524	0.14	0.7060
Protein Grams	111.896	1138.984	0.10	0.7544
Protein RDA Percent	172.099	5837.389	0.03	0.8639
Fat Grams	2234.774	3054.680	0.73	0.3937
Saturated Fat Grams	25.083	338.845	0.07	0.7859
Monounsaturated Fat Grams	196.112	575.719	0.34	0.5603
Polyunsaturated Fat Grams	598.342	175.948	3.40	0.0671
Cholesterol Milligrams	5134.739	40336.320	0.13	0.7217
Carbohydrate Grams	1780.220	5108.158	0.35	0.5558
Fiber Grams	0.500	4.244	0.12	0.7319
Calcium Milligrams	25927.412	519131.843	0.05	0.8235
Calcium RDA Percent	188.227	8023.535	0.02	0.8785
Phosphorus Milligrams	3131.556	463248.454	0.01	0.9346
Phosphorus RDA Percent	2.935	7138.178	0.00	0.9838
Iron Milligrams	10.092	26.599	0.38	0.5388
Iron RDA Percent	162.219	2645.108	0.06	0.8047
Sodium Milligrams	258006.692	1561511.748	0.17	0.6850
Potassium Milligrams	17520.826	921678.220	0.02	0.8905
Vitamin A IU	6641394.261	20970862.712	0.32	0.5744
Vitamin A RDA Percent	5568.070	13607.613	0.41	0.5233
Thiamin Milligrams	0.150	0.363	0.41	0.5210
Thiamin RDA Percent	2526.888	3634.498	0.70	0.4057
Riboflavin Milligrams	0.003	0.709	0.00	0.9470
Riboflavin RDA Percent	55.892	4848.186	0.01	0.9146
Niacin Total Milligrams	86.957	54.217	1.60	0.2073
Niacin RDA Percent	4709.481	3222.842	1.46	0.2286
Vitamin C Milligrams	2442.528	5098.917	0.48	0.4899
Vitamin C RDA Percent	9692.410	13914.348	0.70	0.4052
Protein Percent	5.465	22.135	0.25	0.6200
Carbohydrate Percent	78.785	106.386	0.74	0.3908
Fat Percent	34.859	105.819	0.33	0.5668

[1] Numerator DF = 1

[2] Denominator (Error) DF = 154

Table 16

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Television as a Source of Nutrition Education.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	754974.380	509940.941	1.48	0.2256
Calories RDA Percent	769.898	1417.844	0.54	0.4623
Protein Grams	782.110	1134.632	0.69	0.4077
Protein RDA Percent	2491.036	5822.331	0.43	0.5140
Fat Grams	2351.219	3053.924	0.77	0.3816
Saturated Fat Grams	1137.982	331.618	3.43	0.0659
Monounsaturated Fat Grams	362.877	574.636	0.63	0.4280
Polyunsaturated Fat Grams	62.950	179.424	0.35	0.5545
Cholesterol Milligrams	33434.886	40152.552	0.83	0.3629
Carbohydrate Grams	4911.473	5087.825	0.97	0.3274
Fiber Grams	4.022	4.221	0.95	0.3305
Calcium Milligrams	2297158.092	504383.592	4.55	0.0344
Calcium RDA Percent	32355.311	7814.658	4.14	0.0436
Phosphorus Milligrams	1074676.525	456290.370	2.36	0.1269
Phosphorus RDA Percent	13643.064	7049.605	1.94	0.1662
Iron Milligrams	9.275	26.604	0.35	0.5558
Iron RDA Percent	7815.343	2595.413	3.01	0.0847
Sodium Milligrams	840011.039	1557732.499	0.54	0.4639
Potassium Milligrams	589183.926	917966.122	0.64	0.4243
Vitamin A IU	2759110.050	20996072.350	0.13	0.7175
Vitamin A RDA Percent	5976.354	13604.962	0.44	0.5085
Thiamin Milligrams	0.025	0.364	0.07	0.7931
Thiamin RDA Percent	639.244	3646.756	0.18	0.6760
Riboflavin Milligrams	1.344	0.700	1.92	0.1679
Riboflavin RDA Percent	7698.990	4798.555	1.60	0.2072
Niacin Total Milligrams	360.978	52.438	6.88	0.0096
Niacin RDA Percent	22952.920	3104.378	7.39	0.0073
Vitamin C Milligrams	2.430	5114.762	0.00	0.9826
Vitamin C RDA Percent	265.036	13975.564	0.02	0.8906
Protein Percent	45.188	21.877	2.07	0.1527
Carbohydrate Percent	61.887	106.496	0.58	0.4470
Fat Percent	180.862	104.871	1.72	0.1911

[1]Numerator DF = 1

[2]Denominator (Error) DF = 154

Table 17

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Newspaper as a Source of Nutrition Education.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	40470.222	514580.579	0.08	0.7795
Calories RDA Percent	1005.935	1416.311	0.71	0.4007
Protein Grams	0.118	1139.710	0.00	0.9919
Protein RDA Percent	85.871	5837.949	0.01	0.9036
Fat Grams	1631.454	3058.598	0.53	0.4663
Saturated Fat Grams	5.812	338.970	0.02	0.8960
Monounsaturated Fat Grams	305.806	575.007	0.53	0.4669
Polyunsaturated Fat Grams	550.113	176.261	3.12	0.0793
Cholesterol Milligrams	12258.493	40290.062	0.30	0.5820
Carbohydrate Grams	1088.596	5112.649	0.21	0.6451
Fiber Grams	2.655	4.230	0.63	0.4294
Calcium Milligrams	273748.800	517522.613	0.53	0.4681
Calcium RDA Percent	3345.795	8003.032	0.42	0.5189
Phosphorus Milligrams	29955.561	463074.272	0.06	0.7996
Phosphorus RDA Percent	133.006	7137.333	0.02	0.8916
Iron Milligrams	5.114	26.631	0.19	0.6618
Iron RDA Percent	5238.859	2612.143	2.01	0.1587
Sodium Milligrams	399.729	1563184.520	0.00	0.9873
Potassium Milligrams	88724.448	921215.859	0.10	0.7567
Vitamin A IU	37976987.890	20767384.831	1.83	0.1783
Vitamin A RDA Percent	38472.037	13393.951	2.87	0.0921
Thiamin Milligrams	1.640	0.354	4.63	0.0329
Thiamin RDA Percent	17563.292	3536.859	4.97	0.0273
Riboflavin Milligrams	0.065	0.708	0.09	0.7609
Riboflavin RDA Percent	606.237	4844.612	0.13	0.7240
Niacin Total Milligrams	185.256	53.579	3.46	0.0649
Niacin RDA Percent	11743.068	3177.170	3.70	0.0564
Vitamin C Milligrams	1869.040	5102.641	0.37	0.5439
Vitamin C RDA Percent	6822.162	13932.986	0.49	0.4851
Protein Percent	2.690	22.153	0.12	0.7279
Carbohydrate Percent	40.650	106.634	0.38	0.5379
Fat Percent	18.184	105.927	0.17	0.6792

[1]Numerator DF = 1

[2]Denominator (Error) DF = 154

Table 18

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Magazines as a Source of Nutrition Education.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	263375.828	513133.140	0.51	0.4748
Calories RDA Percent	161.341	1421.795	0.11	0.7367
Protein Grams	2603.904	1122.802	2.32	0.1298
Protein RDA Percent	12014.196	5760.492	2.09	0.1507
Fat Grams	2917.252	3050.248	0.96	0.3296
Saturated Fat Grams	449.640	336.088	1.34	0.2492
Monounsaturated Fat Grams	602.155	573.083	1.05	0.3069
Polyunsaturated Fat Grams	11.570	179.758	0.06	0.8001
Cholesterol Milligrams	120995.345	39583.978	3.06	0.0824
Carbohydrate Grams	1992.500	5106.779	0.39	0.5331
Fiber Grams	7.427	4.199	1.77	0.1855
Calcium Milligrams	57604.361	518926.149	0.11	0.7395
Calcium RDA Percent	658.147	8020.484	0.08	0.7749
Phosphorus Milligrams	105171.760	462585.855	0.23	0.6342
Phosphorus RDA Percent	1189.956	7130.470	0.17	0.6835
Iron Milligrams	60.244	26.273	2.29	0.1320
Iron RDA Percent	2696.696	2628.651	1.03	0.3127
Sodium Milligrams	511174.335	1559867.802	0.33	0.5678
Potassium Milligrams	5956.945	921753.311	0.01	0.9360
Vitamin A IU	52279.421	21013649.172	0.00	0.9603
Vitamin A RDA Percent	14.275	13643.677	0.00	0.9742
Thiamin Milligrams	0.001	0.364	0.00	0.9538
Thiamin RDA Percent	5.256	3650.872	0.00	0.9698
Riboflavin Milligrams	0.120	0.708	0.17	0.6809
Riboflavin RDA Percent	751.677	4843.668	0.16	0.6942
Niacin Total Milligrams	37.953	54.536	0.70	0.4054
Niacin RDA Percent	2016.021	3240.332	0.62	0.4315
Vitamin C Milligrams	2089.327	5101.211	0.41	0.5231
Vitamin C RDA Percent	4880.806	13945.592	0.35	0.5550
Protein Percent	55.388	21.81	2.54	0.1131
Carbohydrate Percent	308.006	104.898	2.94	0.0886
Fat Percent	150.625	105.067	1.43	0.2330

[1]Numerator DF = 1

[2]Denominator (Error) DF = 154

Table 19

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Books as a Source of Nutrition Education.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	82151.501	514309.921	0.16	0.6900
Calories RDA Percent	563.152	1419.186	0.40	0.5297
Protein Grams	144.518	1138.772	0.13	0.7221
Protein RDA Percent	260.708	5836.813	0.04	0.8329
Fat Grams	286.130	3067.334	0.09	0.7605
Saturated Fat Grams	269.180	337.260	0.80	0.3730
Monounsaturated Fat Grams	172.768	575.871	0.30	0.5847
Polyunsaturated Fat Grams	392.386	177.285	2.21	0.1389
Cholesterol Milligrams	11289.536	40296.353	0.28	0.5974
Carbohydrate Grams	1269.361	5111.475	0.25	0.6190
Fiber Grams	0.006	4.247	0.00	0.9677
Calcium Milligrams	872771.132	513632.858	1.70	0.1943
Calcium RDA Percent	11676.501	7948.936	1.47	0.2274
Phosphorus Milligrams	408730.126	460614.697	0.89	0.3477
Phosphorus RDA Percent	4767.104	7107.241	0.67	0.4141
Iron Milligrams	59.254	26.280	2.25	0.1353
Iron RDA Percent	3551.146	2623.102	1.35	0.2464
Sodium Milligrams	2066539.148	1549768.031	1.33	0.2500
Potassium Milligrams	69939.942	921337.837	0.08	0.7833
Vitamin A IU	3586.451	21013965.360	0.00	0.9896
Vitamin A RDA Percent	248.173	13642.158	0.02	0.8929
Thiamin Milligrams	0.071	0.364	0.20	0.6579
Thiamin RDA Percent	1306.367	3642.424	0.36	0.5501
Riboflavin Milligrams	0.450	0.706	0.64	0.4258
Riboflavin RDA Percent	2175.918	4834.419	0.45	0.5033
Niacin Total Milligrams	86.010	54.224	1.59	0.2098
Niacin RDA Percent	5445.848	3218.061	1.69	0.1952
Vitamin C Milligrams	108.418	5114.074	0.02	0.8844
Vitamin C RDA Percent	320.437	13975.205	0.02	0.8798
Protein Percent	3.425	22.148	0.15	0.6947
Carbohydrate Percent	20.709	106.763	0.19	0.6602
Fat Percent	19.647	105.918	0.19	0.6673

[1]Numerator DF = 1

[2]Denominator (Error) DF = 154

the RDA at 97 percent or above for all nutrients. There was very little difference in the proportion of calories from protein, carbohydrate, and fat.

There was no significant difference in nutrient intake for the 45 subjects who had attended a project leader training in the last year and the 111 subjects who had not. For calories, both groups met the RDA at 96 percent or above and for all other nutrients at 105 percent or above. There was also very little difference in the proportion of calories from protein, carbohydrate, and fat.

There was no significant difference in nutrient intake for those subjects who had attended a special interest program offered by Extension Service in the last year and those who had not. The special interest programs offered were weight control programs so the conjecture was that the 18 subjects who had attended the training would consume fewer calories. This group did consume fewer calories but the difference was not significant. For all other nutrients, both groups met the RDA at 97 percent or above. There was very little difference in proportion of calories from protein, fat, and carbohydrate.

There was a significant difference for those attending private business educational programs and those who did not. The significant difference was in the percentage of calories from protein. The 20 subjects who attended the private business programs received significantly ($P < .0241$) more calories from protein. Private business instruction included commercial weight control groups and meat

promotion agencies. Both of those groups tended to place a high emphasis on protein consumption, possibly providing some explanation for this finding. Both the 20 subjects that received the nutrition instruction from private business and the 133 that did not, met the RDA at 102 percent or above for all nutrients except calories. Those subjects receiving the nutrition instruction from private business met the RDA at 92 percent for calories while those that did not met the RDA at 100 percent.

Subjects receiving instruction from other community groups had a significantly higher fiber consumption ($P < .0434$) than those subjects who did not. Since fiber was a popular nutrition topic during the time of the study, it is possible that it was included in the other educational programs those 35 subjects attended. It is important to note that both groups received almost identical proportions of their calories from carbohydrates indicating that those who consumed more fiber simply consumed more complex carbohydrates without consuming more total carboyhydrates. Both groups met the RDA for calories at 99 percent or above. For all other nutrients both groups met the RDA at 104 percent or above. On the basis of these findings, hypothesis ten was rejected. Tables 20-24 contain the results from the analysis of variance procedure.

Each year the Brookings County Extension Service has offered a major emphasis program planned by local clientele. This major area of concentration was usually in a different area of home economics each year. In addition to the major emphasis, programs in other areas of

Table 20

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Extension Homemakers' Meeting as a Source of Nutrition Instruction.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	417159.270	512134.546	0.81	0.3682
Calories RDA Percent	727.355	1418.120	0.51	0.4750
Protein Grams	279.400	1137.896	0.25	0.6209
Protein RDA Percent	808.338	5833.257	0.14	0.7102
Fat Grams	1225.953	3061.231	0.40	0.5278
Saturated Fat Grams	458.282	336.032	1.36	0.2447
Monounsaturated Fat Grams	163.146	575.933	0.28	0.5953
Polyunsaturated Fat Grams	0.816	179.828	0.00	0.9464
Cholesterol Milligrams	582.506	40365.880	0.01	0.9045
Carbohydrate Grams	4146.912	5092.790	0.81	0.3683
Fiber Grams	0.818	4.242	0.19	0.6611
Calcium Milligrams	912118.481	513377.356	1.78	0.1845
Calcium RDA Percent	12639.205	7942.685	1.59	0.2090
Phosphorus Milligrams	500805.588	460016.805	1.09	0.2984
Phosphorus RDA Percent	6288.595	7097.362	0.89	0.3480
Iron Milligrams	2.141	26.651	0.08	0.7772
Iron RDA Percent	553.179	2642.570	0.21	0.6479
Sodium Milligrams	1968164.247	1550406.829	1.27	0.2616
Potassium Milligrams	183704.836	920599.104	0.20	0.6557
Vitamin A IU	553846.409	21010392.244	0.03	0.8712
Vitamin A RDA Percent	218.834	13642.349	0.02	0.8994
Thiamin Milligrams	0.076	0.364	0.21	0.6478
Thiamin RDA Percent	262.795	3649.200	0.07	0.7888
Riboflavin Milligrams	0.667	0.705	0.95	0.3320
Riboflavin RDA Percent	3881.334	4823.345	0.80	0.3711
Niacin Total Milligrams	11.840	54.705	0.22	0.6424
Niacin RDA Percent	912.925	3247.495	0.28	0.5967
Vitamin C Milligrams	191.585	5113.534	0.04	0.8468
Vitamin C RDA Percent	178.894	13976.124	0.01	0.9101
Protein Percent	8.191	22.117	0.37	0.5437
Carbohydrate Percent	11.421	106.824	0.11	0.7441
Fat Percent	1.785	106.034	0.02	0.8969

[1] Numerator DF = 1

[2] Denominator (Error) DF = 154

Table 21

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Extension Homemakers' Project Leader Training as a Source of Nutrition Instruction.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	457834.336	511870.422	0.89	0.3458
Calories RDA Percent	1513.706	1413.014	1.07	0.3023
Protein Grams	193.568	1138.453	0.17	0.6807
Protein RDA Percent	745.682	5833.664	0.13	0.7212
Fat Grams	306.358	3067.202	0.10	0.7524
Saturated Fat Grams	1.577	338.998	0.00	0.9457
Monounsaturated Fat Grams	5.519	576.957	0.01	0.9222
Polyunsaturated Fat Grams	60.210	179.442	0.34	0.5633
Cholesterol Milligrams	34.756	40369.436	0.00	0.9766
Carbohydrate Grams	11963.541	5042.032	2.37	0.1255
Fiber Grams	0.157	4.246	0.04	0.8474
Calcium Milligrams	246363.644	517700.439	0.48	0.4913
Calcium RDA Percent	4166.043	7997.706	0.52	0.4716
Phosphorus Milligrams	114705.690	462523.947	0.25	0.6192
Phosphorus RDA Percent	1993.006	7125.255	0.28	0.5977
Iron Milligrams	0.836	26.659	0.03	0.8596
Iron RDA Percent	5.046	2646.129	0.00	0.9652
Sodium Milligrams	1754529.535	1551794.067	1.13	0.2893
Potassium Milligrams	1021646.288	915157.925	1.12	0.2924
Vitamin A IU	13793402.885	20924421.098	0.66	0.4181
Vitamin A RDA Percent	10225.231	13577.372	0.75	0.3868
Thiamin Milligrams	0.003	0.364	0.01	0.9226
Thiamin RDA Percent	110.995	3650.186	0.03	0.8618
Riboflavin Milligrams	0.118	0.708	0.17	0.6828
Riboflavin RDA Percent	761.918	4843.601	0.16	0.6922
Niacin Total Milligrams	6.134	54.742	0.11	0.7383
Niacin RDA Percent	342.686	3251.198	0.11	0.7459
Vitamin C Milligrams	11542.286	5039.828	2.29	0.1322
Vitamin C RDA Percent	35691.117	13745.525	2.60	0.1091
Protein Percent	1.791	22.189	0.08	0.7766
Carbohydrate Percent	72.876	106.425	0.68	0.4092
Fat Percent	114.364	105.303	1.09	0.2990

[1]Numerator DF = 1

[2]Denominator (Error) DF = 154

Table 22

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Extension Homemakers' Special Interest Program as a Source of Nutrition Instruction.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	360979.744	473825.221	0.76	0.3841
Calories RDA Percent	1139.513	1324.311	0.86	0.3551
Protein Grams	23.168	888.000	0.03	0.8719
Protein RDA Percent	308.518	4524.485	0.07	0.7943
Fat Grams	671.335	2946.786	0.23	0.6338
Saturated Fat Grams	168.561	306.635	0.55	0.4596
Monounsaturated Fat Grams	79.638	567.815	0.14	0.7086
Polyunsaturated Fat Grams	0.735	178.850	0.00	0.9490
Cholesterol Milligrams	249.760	37094.793	0.01	0.9347
Carbohydrate Grams	10459.317	5051.893	2.07	0.1523
Fiber Grams	0.122	4.141	0.03	0.8637
Calcium Milligrams	147363.934	425829.501	0.35	0.5572
Calcium RDA Percent	1872.902	6559.345	0.29	0.5939
Phosphorus Milligrams	151969.699	323903.965	0.47	0.4944
Phosphorus RDA Percent	1820.889	4950.605	0.37	0.5451
Iron Milligrams	2.411	26.273	0.09	0.7624
Iron RDA Percent	1323.796	2644.631	0.50	0.4803
Sodium Milligrams	204643.172	1488866.277	0.14	0.7113
Potassium Milligrams	304410.015	830892.060	0.37	0.5459
Vitamin A IU	1787232.215	19891608.760	0.09	0.7648
Vitamin A RDA Percent	1314.147	12954.781	0.10	0.7505
Thiamin Milligrams	0.039	0.360	0.11	0.7422
Thiamin RDA Percent	545.255	3602.876	0.15	0.6978
Riboflavin Milligrams	0.375	0.627	0.60	0.4407
Riboflavin RDA Percent	2472.801	4281.411	0.58	0.4485
Niacin Total Milligrams	20.440	53.534	0.38	0.5376
Niacin RDA Percent	1045.856	3180.554	0.33	0.5672
Vitamin C Milligrams	817.591	5117.749	0.16	0.6899
Vitamin C RDA Percent	2968.078	13972.858	0.21	0.6455
Protein Percent	34.788	21.954	1.58	0.2100
Carbohydrate Percent	170.213	105.120	1.62	0.2052
Fat Percent	56.866	106.202	0.54	0.4655

[1]Numerator DF = 1

[2]Denominator (Error) DF = 151

Table 23

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Private Business as a Source of Nutrition Instruction.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	288163.201	474307.450	0.61	0.4369
Calories RDA Percent	1080.085	1324.705	0.82	0.3680
Protein Grams	356.377	885.793	0.40	0.5269
Protein RDA Percent	2467.269	4510.188	0.55	0.4607
Fat Grams	2037.724	2937.737	0.69	0.4062
Saturated Fat Grams	578.915	303.918	1.90	0.1696
Monounsaturated Fat Grams	103.267	567.658	0.18	0.6703
Polyunsaturated Fat Grams	86.678	178.280	0.49	0.4867
Cholesterol Milligrams	15897.780	36991.164	0.43	0.5131
Carbohydrate Grams	1973.702	5108.089	0.39	0.5351
Fiber Grams	1.077	4.134	0.26	0.6104
Calcium Milligrams	24603.775	426642.483	0.06	0.8105
Calcium RDA Percent	212.242	6570.343	0.03	0.8576
Phosphorus Milligrams	234.601	324908.834	0.00	0.9786
Phosphorus RDA Percent	24.675	4962.500	0.00	0.9439
Iron Milligrams	0.316	26.287	0.01	0.9127
Iron RDA Percent	181.813	2652.194	0.07	0.7938
Sodium Milligrams	1288443.594	1481688.791	0.87	0.3526
Potassium Milligrams	85185.150	832343.880	0.10	0.7495
Vitamin A IU	1971459.076	19890388.715	0.10	0.7533
Vitamin A RDA Percent	1486.227	12953.641	0.11	0.7353
Thiamin Milligrams	0.141	0.359	0.39	0.5313
Thiamin RDA Percent	1064.583	3599.437	0.30	0.5874
Riboflavin Milligrams	0.038	0.630	0.06	0.8044
Riboflavin RDA Percent	411.493	4295.063	0.10	0.7573
Niacin Total Milligrams	10.660	53.598	0.20	0.6563
Niacin RDA Percent	766.837	3182.402	0.24	0.6242
Vitamin C Milligrams	1.570	5123.153	0.00	0.9861
Vitamin C RDA Percent	76.478	13992.007	0.01	0.9412
Protein Percent	111.389	21.447	5.19	0.0241
Carbohydrate Percent	4.606	106.217	0.04	0.8353
Fat Percent	48.103	106.260	0.45	0.5021

[1] Numerator DF = 1

[2] Denominator (Error) DF = 151

Table 24

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Other Community Groups as a Source of Nutrition Instruction.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	10329.736	474113.952	0.02	0.8828
Calories RDA Percent	23.610	1327.793	0.02	0.8941
Protein Grams	515.960	881.431	0.59	0.4454
Protein RDA Percent	2355.447	4494.816	0.52	0.4702
Fat Grams	113.450	2931.983	0.04	0.8443
Saturated Fat Grams	24.275	305.893	0.08	0.7785
Monounsaturated Fat Grams	7.250	564.583	0.01	0.9099
Polyunsaturated Fat Grams	108.716	176.985	0.61	0.4344
Cholesterol Milligrams	35425.529	37924.196	0.93	0.3353
Carbohydrate Grams	848.009	5099.203	0.17	0.6840
Fiber Grams	16.651	4.014	4.15	0.0434
Calcium Milligrams	19373.358	423887.892	0.05	0.8310
Calcium RDA Percent	245.372	6527.303	0.04	0.8465
Phosphorus Milligrams	232317.788	321614.687	0.72	0.3967
Phosphorus RDA Percent	3247.612	4915.087	0.66	0.4176
Iron Milligrams	1.469	26.168	0.06	0.8130
Iron RDA Percent	441.965	2653.450	0.17	0.6838
Sodium Milligrams	322600.565	1478573.464	0.22	0.6411
Potassium Milligrams	1076741.921	824713.035	1.31	0.2550
Vitamin A IU	50246.456	19807665.466	0.00	0.9599
Vitamin A RDA Percent	1028.601	12894.289	0.08	0.7780
Thiamin Milligrams	0.107	0.360	0.30	0.5866
Thiamin RDA Percent	1548.323	3604.553	0.43	0.5132
Riboflavin Milligrams	0.127	0.627	0.20	0.6525
Riboflavin RDA Percent	807.673	4278.259	0.19	0.6645
Niacin Total Milligrams	5.861	53.608	0.11	0.7414
Niacin RDA Percent	489.586	3182.82	0.15	0.6955
Vitamin C Milligrams	95.233	5099.493	0.02	0.8915
Vitamin C RDA Percent	7.431	13931.234	0.00	0.9816
Protein Percent	33.263	21.820	1.52	0.2189
Carbohydrate Percent	8.213	105.498	0.08	0.7806
Fat Percent	78.316	105.365	0.74	0.3900

[1] Numerator DF = 1

[2] Denominator (Error) DF = 152

home economics have also been included. The program emphasis for Brookings County Extension Service during the year preceding the research study was not in the area of nutrition. Although some nutrition programs were offered, nutrition education was not an area of concentration. In this context the finding that the current years' program did not make a difference is consistent with previous research. Where educational programs have been concentrated, researchers have found a difference in nutrient intake (Fortmann, Williams, Hulley, Haskell & Farguhar, 1981; Brown & Pestle, 1981). Other researchers (Pond, 1985 & Alexander, 1977) have found that nutrition education may not make a difference in dietary intake, indicating confounding variables. When nutrition education was not concentrated, the level of knowledge of those receiving nutrition education was not better than other groups (Auch, 1985). In some cases the level of application of knowledge to eating patterns was better than the knowledge would indicate (Fjeld, Sommer, Becker & Warholic, 1983; Auch, 1985).

This study did not include a test for nutrition knowledge, but the results of this study did show relatively good application of nutrition knowledge when the percent of RDA was used as a measure of dietary quality. The nutrient intake of the subjects involved in the Extension Homemakers' program was much better than the quality of the diets of 5th grade students in Brookings studied by Jensen (1976).

Hypothesis Eleven. There is no significant relationship between nutrient intake and health problems in the family.

Tables 25-33 contain the results from the analysis of variance

Table 25

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Presence of Heart or Circulatory Disease in the Family.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	56.279	514843.007	0.00	0.9917
Calories RDA Percent	47.761	1422.533	0.03	0.8549
Protein Grams	1640.814	1129.056	1.45	0.2299
Protein RDA Percent	9778.800	5775.007	1.69	0.1951
Fat Grams	1515.817	3059.349	0.50	0.4826
Saturated Fat Grams	210.316	337.642	0.62	0.4312
Monounsaturated Fat Grams	299.838	575.046	0.52	0.4713
Polyunsaturated Fat Grams	40.641	179.569	0.23	0.6349
Cholesterol Milligrams	1188.724	40361.943	0.03	0.8640
Carbohydrate Grams	1977.337	5106.878	0.39	0.5347
Fiber Grams	1.637	4.237	0.39	0.5350
Calcium Milligrams	180396.688	518128.796	0.35	0.5560
Calcium RDA Percent	3338.316	8003.080	0.42	0.5193
Phosphorus Milligrams	786300.00	458162.945	1.72	0.1921
Phosphorus RDA Percent	13710.092	7049.170	1.94	0.1651
Iron Milligrams	2.378	26.649	0.09	0.7655
Iron RDA Percent	126.070	2645.343	0.05	0.8275
Sodium Milligrams	4847905.752	1531707.209	3.17	0.0772
Potassium Milligrams	2752042.233	903921.588	3.04	0.0830
Vitamin A IU	4463873.014	20985002.460	0.21	0.6453
Vitamin A RDA Percent	3154.304	13623.287	0.23	0.6311
Thiamin Milligrams	0.124	0.363	0.34	0.5601
Thiamin RDA Percent	1482.769	3641.278	0.41	0.5243
Riboflavin Milligrams	0.085	0.708	0.12	0.7281
Riboflavin RDA Percent	879.476	4842.83	0.18	0.6706
Niacin Total Milligrams	38.777	54.530	0.71	0.4004
Niacin RDA Percent	2549.516	3236.868	0.79	0.3762
Vitamin C Milligrams	16094.436	5010.269	3.21	0.0751
Vitamin C RDA Percent	47791.382	13666.952	3.50	0.0634
Protein Percent	33.081	21.956	1.51	0.2215
Carbohydrate Percent	75.809	106.405	0.71	0.3999
Fat Percent	202.346	104.721	1.93	0.1665

[1]Numerator DF = 1

[2]Denominator (Error) DF = 154

Table 26

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Presence of Hypertension in the Family.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	232629.854	513332.789	0.45	0.5018
Calories RDA Percent	1904.000	1410.479	1.35	0.2471
Protein Grams	99.055	1139.067	0.09	0.7685
Protein RDA Percent	144.071	5837.571	0.02	0.8754
Fat Grams	2275.987	3054.412	0.75	0.3894
Saturated Fat Grams	113.300	338.272	0.33	0.5636
Monounsaturated Fat Grams	659.641	572.709	1.15	0.2849
Polyunsaturated Fat Grams	80.444	179.311	0.45	0.5040
Cholesterol Milligrams	35.882	40369.429	0.00	0.9763
Carbohydrate Grams	1686.333	5108.767	0.33	0.5664
Fiber Grams	6.862	4.203	1.63	0.2032
Calcium Milligrams	87737.387	518730.480	0.17	0.6815
Calcium RDA Percent	1945.251	8012.126	0.24	0.6229
Phosphorus Milligrams	97447.430	462636.013	0.21	0.6469
Phosphorus RDA Percent	2380.700	7122.738	0.33	0.5640
Iron Milligrams	11.095	26.592	0.42	0.5193
Iron RDA Percent	2250.846	2631.546	0.86	0.3565
Sodium Milligrams	46398.726	1562885.826	0.03	0.8634
Potassium Milligrams	2009970.726	908740.234	2.21	0.1390
Vitamin A IU	23776503.276	20859595.770	1.14	0.2874
Vitamin A RDA Percent	13801.948	13554.147	1.02	0.3145
Thiamin Milligrams	0.067	0.364	0.18	0.6678
Thiamin RDA Percent	267.692	3649.168	0.07	0.7869
Riboflavin Milligrams	0.003	0.709	0.00	0.9480
Riboflavin RDA Percent	0.099	4848.548	0.00	0.9964
Niacin Total Milligrams	50.013	54.457	0.92	0.3394
Niacin RDA Percent	2561.089	3236.793	0.79	0.3751
Vitamin C Milligrams	9319.004	5054.265	1.84	0.1765
Vitamin C RDA Percent	29295.402	13787.055	2.12	0.1470
Protein Percent	30.367	21.973	1.38	0.2416
Carbohydrate Percent	14.030	106.807	0.13	0.7175
Fat Percent	15.191	105.947	0.14	0.7055

[1] Numerator DF = 1

[2] Denominator (Error) DF = 154

Table 27

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Presence of Stomach or Intestinal Disease in the Family.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	91421.336	514249.727	0.18	0.6739
Calories RDA Percent	821.209	1417.510	0.58	0.4477
Protein Grams	721.325	1135.026	0.64	0.4266
Protein RDA Percent	3053.276	5818.680	0.52	0.4699
Fat Grams	1929.586	3056.662	0.63	0.4281
Saturated Fat Grams	0.002	339.008	0.00	0.9980
Monounsaturated Fat Grams	769.989	571.993	1.35	0.2477
Polyunsaturated Fat Grams	301.951	177.872	1.70	0.1946
Cholesterol Milligrams	419.289	40366.93	0.01	0.9190
Carbohydrate Grams	3.553	5119.695	0.00	0.9790
Fiber Grams	0.277	4.246	0.07	0.7987
Calcium Milligrams	410444.736	516634.977	0.79	0.3741
Calcium RDA Percent	5791.896	7987.148	0.73	0.3958
Phosphorus Milligrams	229628.662	461777.694	0.50	0.4818
Phosphorus RDA Percent	2965.673	7118.939	0.42	0.5196
Iron Milligrams	17.977	26.548	0.68	0.4118
Iron RDA Percent	70.857	2645.702	0.03	0.8702
Sodium Milligrams	356017.867	1560875.312	0.23	0.6336
Potassium Milligrams	51426.189	921458.056	0.06	0.8136
Vitamin A IU	2444758.688	20998113.592	0.12	0.7334
Vitamin A RDA Percent	1335.659	13635.096	0.10	0.7547
Thiamin Milligrams	0.168	0.363	0.46	0.4976
Thiamin RDA Percent	2043.761	3637.635	0.56	0.4547
Riboflavin Milligrams	0.470	0.706	0.67	0.4155
Riboflavin RDA Percent	3448.154	4826.158	0.71	0.3993
Niacin Total Milligrams	33.073	54.567	0.61	0.4375
Niacin RDA Percent	2181.84	3239.255	0.67	0.4131
Vitamin C Milligrams	9501.759	5053.078	1.88	0.1723
Vitamin C RDA Percent	28470.883	13792.409	2.06	0.1528
Protein Percent	8.939	22.112	0.41	0.5247
Carbohydrate Percent	2.067	106.884	0.02	0.8896
Fat Percent	18.737	105.924	0.18	0.6746

[1] Numerator DF = 1

[2] Denominator (Error) DF = 154

Table 28

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Presence of Liver, Kidney, Gall Bladder or Pancreas Disease in the Family.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	22834.265	518034.564	0.04	0.8340
Calories RDA Percent	191.958	1430.470	0.13	0.7146
Protein Grams	1731.342	1135.409	1.52	0.2188
Protein RDA Percent	8210.338	5821.055	1.41	0.2368
Fat Grams	1292.126	3070.473	0.42	0.5175
Saturated Fat Grams	35.242	340.993	0.10	0.7483
Monounsaturated Fat Grams	345.479	577.614	0.60	0.4405
Polyunsaturated Fat Grams	240.480	174.916	1.37	0.2428
Cholesterol Milligrams	87934.644	40043.111	2.20	0.1404
Carbohydrate Grams	5437.619	5083.996	1.07	0.3027
Fiber Grams	0.261	4.261	0.06	0.8046
Calcium Milligrams	716198.716	514968.507	1.39	0.2401
Calcium RDA Percent	10589.675	7961.067	1.33	0.2506
Phosphorus Milligrams	555454.407	461245.472	1.20	0.2742
Phosphorus RDA Percent	8042.520	7110.991	1.13	0.2892
Iron Milligrams	0.831	26.825	0.03	0.8605
Iron RDA Percent	4.383	2662.140	0.00	0.9677
Sodium Milligrams	5000.109	1565669.284	0.00	0.9550
Potassium Milligrams	1601797.493	917231.335	1.75	0.1883
Vitamin A IU	12731109.088	21001642.019	0.61	0.4374
Vitamin A RDA Percent	8325.607	13637.248	0.61	0.4358
Thiamin Milligrams	0.000	0.366	0.00	0.9747
Thiamin RDA Percent	11.215	3665.081	0.00	0.9560
Riboflavin Milligrams	1.613	0.699	2.31	0.1310
Riboflavin RDA Percent	11007.683	4784.439	2.30	0.1314
Niacin Total Milligrams	128.883	53.377	2.41	0.1223
Niacin RDA Percent	7315.827	3172.098	2.31	0.1309
Vitamin C Milligrams	1975.714	5131.452	0.39	0.5359
Vitamin C RDA Percent	6056.974	14018.898	0.43	0.5120
Protein Percent	33.822	22.056	1.53	0.2175
Carbohydrate Percent	60.869	105.419	0.58	0.4485
Fat Percent	207.976	102.971	2.02	0.1573

[1]Numerator DF = 1

[2]Denominator (Error) DF = 153

Table 29

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Presence of Metabolic Disorders in the Family.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	1033965.274	511425.864	2.02	0.1571
Calories RDA Percent	2030.823	1418.451	1.43	0.2333
Protein Grams	2074.540	1133.166	1.83	0.1780
Protein RDA Percent	11353.710	5800.510	1.96	0.1638
Fat Grams	4036.306	3052.537	1.32	0.2520
Saturated Fat Grams	1398.167	332.085	4.21	0.0419
Monounsaturated Fat Grams	375.220	577.419	0.65	0.4214
Polyunsaturated Fat Grams	5.755	176.450	0.03	0.8569
Cholesterol Milligrams	123712.051	39809.272	3.11	0.0799
Carbohydrate Grams	4750.537	5088.487	0.93	0.3355
Fiber Grams	0.105	4.262	0.02	0.8749
Calcium Milligrams	3378886.079	497565.321	6.79	0.0101
Calcium RDA Percent	53747.200	7678.992	7.00	0.0090
Phosphorus Milligrams	735721.181	460067.258	1.60	0.2079
Phosphorus RDA Percent	12171.081	7084.007	1.72	0.1919
Iron Milligrams	0.229	26.829	0.01	0.9264
Iron RDA Percent	888.836	2656.359	0.33	0.5638
Sodium Milligrams	8361483.627	1511051.745	5.53	0.0199
Potassium Milligrams	1042940.621	920883.995	1.13	0.2889
Vitamin A IU	199627.646	21083547.126	0.01	0.9226
Vitamin A RDA Percent	154.646	13690.653	0.01	0.9155
Thiamin Milligrams	0.572	0.362	1.58	0.2107
Thiamin RDA Percent	6070.530	3625.478	1.67	0.1976
Riboflavin Milligrams	0.140	0.709	0.20	0.656
Riboflavin RDA Percent	1321.600	4847.747	0.27	0.6023
Niacin Total Milligrams	78.299	53.708	1.46	0.2291
Niacin RDA Percent	4393.634	3191.198	1.38	0.2425
Vitamin C Milligrams	480.779	5141.222	0.09	0.7602
Vitamin C RDA Percent	1092.584	14051.345	0.08	0.7807
Protein Percent	6.707	22.234	0.30	0.5836
Carbohydrate Percent	17.627	105.702	0.17	0.6836
Fat Percent	0.848	104.325	0.01	0.9283

[1]Numerator DF = 1

[2]Denominator (Error) DF = 153

Table 30

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Presence of Malabsorption Disorders in the Family.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	420402.683	515436.077	0.82	0.3679
Calories RDA Percent	1213.632	1423.792	0.85	0.3573
Protein Grams	769.014	1141.698	0.67	0.4131
Protein RDA Percent	3715.488	5850.433	0.64	0.4267
Fat Grams	2108.581	3065.136	0.69	0.4082
Saturated Fat Grams	329.358	339.071	0.97	0.3259
Monounsaturated Fat Grams	205.790	578.527	0.36	0.5518
Polyunsaturated Fat Grams	72.104	176.016	0.41	0.5231
Cholesterol Milligrams	445.568	40614.935	0.01	0.9167
Carbohydrate Grams	2637.188	5102.299	0.52	0.4733
Fiber Grams	8.130	4.209	1.93	0.1666
Calcium Milligrams	702150.570	515060.325	1.36	0.2448
Calcium RDA Percent	10651.813	7960.661	1.34	0.2492
Phosphorus Milligrams	284993.141	463013.193	0.62	0.4339
Phosphorus RDA Percent	4151.318	7136.423	0.58	0.4468
Iron Milligrams	2.447	26.814	0.09	0.7630
Iron RDA Percent	1.700	2662.158	0.00	0.9799
Sodium Milligrams	438395.970	1562836.631	0.28	0.5971
Potassium Milligrams	380402.282	925214.311	0.41	0.5223
Vitamin A IU	8668118.236	21028197.514	0.41	0.5218
Vitamin A RDA Percent	5317.439	13656.909	0.39	0.5336
Thiamin Milligrams	0.238	0.364	0.65	0.4201
Thiamin RDA Percent	2270.775	3650.313	0.62	0.4315
Riboflavin Milligrams	1.154	0.702	1.64	0.2019
Riboflavin RDA Percent	7941.607	4804.479	1.65	0.2005
Niacin Total Milligrams	1.667	54.208	0.03	0.8610
Niacin RDA Percent	109.121	3219.201	0.03	0.8542
Vitamin C Milligrams	1.383	5144.356	0.00	0.9869
Vitamin C RDA Percent	0.425	14058.484	0.00	0.9956
Protein Percent	4.990	22.245	0.22	0.6364
Carbohydrate Percent	22.025	105.673	0.21	0.6486
Fat Percent	49.548	104.007	0.48	0.4911

[1] Numerator DF = 1

[2] Denominator (Error) DF = 153

Table 31

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Presence of Diabetes in the Family.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	48811.968	517864.77	0.09	0.7593
Calories RDA Percent	149.553	1430.747	0.10	0.7469
Protein Grams	183.047	1145.528	0.16	0.6899
Protein RDA Percent	1281.886	5866.339	0.22	0.6408
Fat Grams	442.803	3076.024	0.14	0.7049
Saturated Fat Grams	74.380	340.737	0.22	0.6410
Monounsaturated Fat Grams	46.285	579.569	0.08	0.7779
Polyunsaturated Fat Grams	9.556	176.425	0.05	0.8163
Cholesterol Milligrams	125376.821	39798.39	3.15	0.0779
Carbohydrate Grams	674.735	5115.126	0.13	0.7170
Fiber Grams	7.709	4.212	1.83	0.1781
Calcium Milligrams	195019.350	518374.908	0.38	0.5405
Calcium RDA Percent	2674.620	8012.799	0.33	0.5643
Phosphorus Milligrams	1836.083	464863.892	0.00	0.9500
Phosphorus RDA Percent	115.932	7162.798	0.02	0.8989
Iron Milligrams	0.106	26.829	0.00	0.9497
Iron RDA Percent	32.629	2661.956	0.01	0.9120
Sodium Milligrams	1297343.064	1557222.598	0.83	0.3628
Potassium Milligrams	582073.760	923896.196	0.63	0.4286
Vitamin A IU	11854866.413	21007369.095	0.56	0.4537
Vitamin A RDA Percent	7874.064	13640.199	0.58	0.4486
Thiamin Milligrams	0.149	0.365	0.41	0.5237
Thiamin RDA Percent	1854.089	3653.03	0.51	0.4773
Riboflavin Milligrams	0.000	0.710	0.00	0.9835
Riboflavin RDA Percent	3.559	4856.362	0.00	0.9784
Niacin Total Milligrams	196.024	52.938	3.70	0.0562
Niacin RDA Percent	11972.121	3141.665	3.81	0.0528
Vitamin C Milligrams	4094.838	5117.601	0.80	0.3725
Vitamin C RDA Percent	10228.050	13991.636	0.73	0.3939
Protein Percent	11.064	22.205	0.50	0.4813
Carbohydrate Percent	26.211	105.646	0.25	0.6191
Fat Percent	1.795	104.319	0.02	0.8958

[1] Numerator DF = 1

[2] Denominator (Error) DF = 153

Table 32

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Presence of Food Allergies in the Family.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	337672.366	515976.799	0.65	0.4198
Calories RDA Percent	855.315	1426.134	0.60	0.4399
Protein Grams	5.756	1146.687	0.01	0.9436
Protein RDA Percent	0.068	5874.717	0.00	0.9973
Fat Grams	3077.527	3058.803	1.01	0.3174
Saturated Fat Grams	111.307	340.496	0.33	0.5683
Monounsaturated Fat Grams	772.240	574.824	1.34	0.2482
Polyunsaturated Fat Grams	260.610	174.784	1.49	0.2239
Cholesterol Milligrams	15688.099	40515.310	0.39	0.5347
Carbohydrate Grams	974.546	5113.166	0.19	0.6630
Fiber Grams	0.052	4.262	0.01	0.9119
Calcium Milligrams	120575.147	518861.471	0.23	0.6305
Calcium RDA Percent	1551.923	8020.137	0.19	0.6606
Phosphorus Milligrams	10424.929	464807.756	0.02	0.8812
Phosphorus RDA Percent	66.700	7163.120	0.01	0.9233
Iron Milligrams	0.605	26.826	0.02	0.8808
Iron RDA Percent	563.634	2658.485	0.21	0.6458
Sodium Milligrams	54271.047	1565347.252	0.03	0.8525
Potassium Milligrams	110975.901	926975.267	0.12	0.7298
Vitamin A IU	6139025.274	21044727.534	0.29	0.5899
Vitamin A RDA Percent	3532.159	13668.578	0.26	0.6119
Thiamin Milligrams	0.207	0.364	0.57	0.4521
Thiamin RDA Percent	2190.552	3650.837	0.60	0.4398
Riboflavin Milligrams	0.000	0.710	0.00	0.9881
Riboflavin RDA Percent	14.620	4856.290	0.00	0.9563
Niacin Total Milligrams	3.798	54.195	0.07	0.7916
Niacin RDA Percent	264.021	3218.189	0.08	0.7749
Vitamin C Milligrams	3032.130	5124.547	0.59	0.4430
Vitamin C RDA Percent	7414.356	14010.026	0.53	0.4680
Protein Percent	7.866	22.226	0.35	0.5528
Carbohydrate Percent	41.114	105.548	0.39	0.5335
Fat Percent	84.899	103.776	0.82	0.3672

[1]Numerator DF = 1

[2]Denominator (Error) DF = 153

Table 33

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Presence of Neurologic Disorders in the Family.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	192569.610	516925.183	0.37	0.5425
Calories RDA Percent	401.559	1429.100	0.28	0.5968
Protein Grams	608.195	1142.750	0.53	0.4668
Protein RDA Percent	2970.104	5855.305	0.51	0.4774
Fat Grams	619.516	3074.869	0.20	0.6542
Saturated Fat Grams	168.783	340.120	0.50	0.4822
Monounsaturated Fat Grams	86.641	579.305	0.15	0.6995
Polyunsaturated Fat Grams	2.311	176.473	0.01	0.9090
Cholesterol Milligrams	10756.689	40547.542	0.27	0.6073
Carbohydrate Grams	856.849	5113.935	0.17	0.6829
Fiber Grams	0.254	4.261	0.06	0.8071
Calcium Milligrams	253873.840	517990.238	0.49	0.4849
Calcium RDA Percent	3869.766	8004.988	0.48	0.4879
Phosphorus Milligrams	398899.027	462268.710	0.86	0.3544
Phosphorus RDA Percent	6008.570	7124.284	0.84	0.3599
Iron Milligrams	17.326	26.717	0.65	0.4219
Iron RDA Percent	254.968	2660.502	0.10	0.7573
Sodium Milligrams	388575.949	1563162.253	0.25	0.6188
Potassium Milligrams	1268295.987	919411.084	1.38	0.2420
Vitamin A IU	2192082.405	21070524.546	0.10	0.7475
Vitamin A RDA Percent	1398.145	13682.525	0.10	0.7497
Thiamin Milligrams	0.353	0.363	0.97	0.3256
Thiamin RDA Percent	3928.774	3639.476	1.08	0.3005
Riboflavin Milligrams	1.119	0.703	1.59	0.2088
Riboflavin RDA Percent	7549.383	4807.043	1.57	0.2120
Niacin Total Milligrams	16.860	54.109	0.31	0.5775
Niacin RDA Percent	977.331	3213.527	0.30	0.5821
Vitamin C Milligrams	883.426	5138.591	0.17	0.6790
Vitamin C RDA Percent	2274.912	14043.618	0.16	0.6879
Protein Percent	4.957	22.245	0.22	0.6375
Carbohydrate Percent	15.680	105.715	0.15	0.7007
Fat Percent	2.403	104.315	0.02	0.8796

[1]Numerator DF = 1

[2]Denominator (Error) DF = 153

procedure. For clarification, "health problems in the family" referred to the immediate family living in that household consuming food prepared there and not to extended family health problems outside of the immediate household.

The 21 subjects indicating heart or circulatory disease in the family did consume a diet lower in proportion of calories from fat, lower in total fat, lower in saturated fat, lower in monounsaturated fat, lower in polyunsaturated fat, but higher in cholesterol. However, the difference was not significant. Both groups met the RDA at 100 percent or above for all nutrients.

Forty subjects indicating hypertension within the family consumed slightly less sodium and slightly more potassium but the differences were not significant. Both groups met the RDA for all nutrients except calories at 100 percent or above. Those indicating an absence of hypertension in the family consumed slightly fewer calories, 98 percent of the RDA.

There was no significant difference in dietary intake between the 16 subjects indicating the presence of stomach or intestinal disease and those that did not. Those with disease met the RDA at 95 percent for calcium. Both groups met the RDA at 100 percent or above for all other nutrients.

The seven subjects indicating liver, kidney, gallbladder, or pancreas disease consumed fewer calories, failed to meet the RDA at 90 percent or above for calcium, and had a diet lower in protein and higher in fat. The differences between the subjects indicating the

presence of disease and those who did not was not significant.

For subjects with metabolic disorders results showed a significant difference for saturated fat ($P < .0419$), quantity of calcium ($P < .0101$), percent of RDA for calcium ($P < .0090$), and sodium ($P < .0149$). Those indicating the presence of metabolic disorders consumed more saturated fat, more calcium, a higher percentage of the RDA for calcium, and more sodium. Both groups consumed above the RDA for calcium so these findings were not of practical importance. There were only five subjects in the group indicating the presence of metabolic disorders so these results may be distorted.

There were only two subjects indicating the presence of malabsorption disorders. Both of these subjects indicated lactose intolerance as the malabsorption disorder and both indicated they were taking a calcium supplement. In this study only dietary intake from food was investigated. Supplements were not included in the total quantity of calcium consumed. The results showed that persons with malabsorption disorders consumed 41 percent of the RDA for calcium, but with the calcium supplements they would have actually met the RDA for calcium. Those with malabsorption disorders also consumed fewer calories and less fat but the results were not significant.

There was no significant difference between the 12 subjects with diabetes present in the family and those without diabetes present. The consumption patterns between the two groups was almost identical for several nutrients. There was also no significant difference

between the 12 subjects indicating the presence of food allergies and those who did not. Only one subject indicated the presence of neurologic disease so the results could not be analyzed. Based on the finding related to metabolic disorders, hypothesis eleven was rejected.

Hypothesis Twelve. There is no significant relationship between nutrient intake and interest in nutrition.

The 11 subjects with interest in nutrition at level 3 on a 9 point scale met the RDA for calcium at less than 90 percent (see Table 34). Almost 50 percent of those subjects who indicated interest in nutrition at level 3 were in the 65-74 age range. The two subjects with the lowest level of interest in nutrition, level 2 on a 9 point scale, consumed the least amount of calories as fat (33 percent). No differences were significant so hypothesis twelve was not rejected.

Hypothesis Thirteen. There is no significant relationship between nutrient intake and interest in new foods and new food preparation ideas.

There was no significant relationship between interest in new foods and new food preparation ideas and nutrient intake so the hypothesis was not rejected. Table 35 contains the results from the analysis of variance procedure.

Waller-Duncan t Test

Further testing to show where the significant differences were at the .05 level was done with the Waller-Duncan t test. Findings from that testing are shown in Table 36.

Table 34

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Interest in Nutrition.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	542138.831	510073.700	1.06	0.3904
Calories RDA Percent	1168.478	1425.260	0.82	0.5722
Protein Grams	1354.560	1121.848	1.21	0.3022
Protein RDA Percent	5717.539	5804.778	0.98	0.4445
Fat Grams	3071.831	3048.329	0.01	0.4282
Saturated Fat Grams	457.306	331.122	1.38	0.2173
Monounsaturated Fat Grams	568.996	573.472	0.99	0.4393
Polyunsaturated Fat Grams	99.567	182.414	0.55	0.7985
Cholesterol Milligrams	33517.345	40420.990	0.83	0.5646
Carbohydrate Grams	4144.988	5131.227	0.81	0.5821
Fiber Grams	4.966	4.185	1.19	0.3138
Calcium Milligrams	511167.229	516176.086	0.99	0.4406
Calcium RDA Percent	6866.380	8025.325	0.86	0.5433
Phosphorus Milligrams	491641.256	458796.653	1.07	0.3846
Phosphorus RDA Percent	6308.353	7129.215	0.88	0.5201
Iron Milligrams	17.603	26.913	0.65	0.7105
Iron RDA Percent	1949.960	2661.211	0.73	0.6445
Sodium Milligrams	733629.266	1591860.885	0.46	0.8615
Potassium Milligrams	497177.976	935646.763	0.53	0.8097
Vitamin A IU	19220528.093	20956828.076	0.92	0.4950
Vitamin A RDA Percent	14175.836	13526.417	1.05	0.4003
Thiamin Milligrams	0.335	0.363	0.92	0.4902
Thiamin RDA Percent	3290.992	3643.261	0.90	0.5057
Riboflavin Milligrams	0.694	0.705	0.98	0.4451
Riboflavin RDA Percent	4524.138	4831.132	0.94	0.4803
Niacin Total Milligrams	93.979	52.558	1.79	0.0937
Niacin RDA Percent	5552.034	3122.723	1.78	0.0958
Vitamin C Milligrams	5696.644	5052.698	1.13	0.3490
Vitamin C RDA Percent	15047.561	13832.223	1.09	0.3740
Protein Percent	14.361	22.390	0.64	0.7211
Carbohydrate Percent	91.364	106.910	0.85	0.5441
Fat Percent	94.585	105.871	0.89	0.5134

[1]Numerator DF = 7

[2]Denominator (Error) DF = 148

Table 35

Analysis of Variance Summary for Dependent Variables of Nutrient Intake and Independent Variable, Interest in New Food and New Food Preparation Ideas.

Dependent Variable	Mean Square[1]	Error Mean Square[2]	F Value	PR > F
Calories Quantity	184100.600	529340.643	0.35	0.9456
Calories RDA Percent	828.923	1445.486	0.57	0.7984
Protein Grams	690.596	1156.399	0.60	0.7791
Protein RDA Percent	3920.285	5903.181	0.66	0.7224
Fat Grams	1514.808	3132.905	0.48	0.8664
Saturated Fat Grams	86.572	350.440	0.25	0.9809
Monounsaturated Fat Grams	371.285	584.263	0.64	0.7469
Polyunsaturated Fat Grams	105.351	182.663	0.58	0.7958
Cholesterol Milligrams	41235.000	40047.945	1.03	0.4164
Carbohydrate Grams	4910.316	5096.286	0.96	0.4669
Fiber Grams	2.660	4.305	0.62	0.7618
Calcium Milligrams	218228.009	532152.430	0.41	0.9134
Calcium RDA Percent	2996.959	8243.789	0.36	0.9382
Phosphorus Milligrams	271350.017	470561.860	0.58	0.7959
Phosphorus RDA Percent	4072.197	7256.495	0.56	0.8083
Iron Milligrams	22.714	26.698	0.85	0.5597
Iron RDA Percent	883.225	2724.103	0.32	0.9557
Sodium Milligrams	1023372.135	1581930.876	0.65	0.7372
Potassium Milligrams	682924.728	928520.877	0.74	0.6600
Vitamin A IU	15245171.156	21184985.596	0.72	0.6739
Vitamin A RDA Percent	12322.954	13622.836	0.90	0.5145
Thiamin Milligrams	0.408	0.359	1.13	0.3438
Thiamin RDA Percent	4355.518	3587.724	1.21	0.2946
Riboflavin Milligrams	0.446	0.718	0.62	0.7593
Riboflavin RDA Percent	2876.282	4922.900	0.58	0.7897
Niacin Total Milligrams	64.363	53.888	1.19	0.3062
Niacin RDA Percent	4016.122	3189.784	1.26	0.2693
Vitamin C Milligrams	3666.330	5158.811	0.71	0.6818
Vitamin C RDA Percent	10782.536	14056.06	0.77	0.6322
Protein Percent	29.178	21.638	1.35	0.2242
Carbohydrate Percent	126.830	105.086	1.21	0.2988
Fat Percent	111.869	105.007	1.07	0.3906

[1] Numerator DF = 3

[2] Denominator (Error) DF = 147

Table 36

Waller-Duncan t Test for Significant Differences in Mean Nutrient Intake.

Place of Residence = Independent Variable and Nutrient = Iron RDA Percent

City Brookings	Rural Non-Farm	Rural Town	Small Town
126.29	97.33	95.48	92.18

Age = Independent Variable and Nutrient = Iron RDA Percent

Age	Age	Age	Age	Age	Age	Age	Age
85 and Over	55-64	65-74	45-54	75-84	25-34	35-44	25 and Under
146.71	139.23	109.43	109.67	99.83	74.36	73.36	58.00

Level of Employment = Independent Variable and Nutrient = Thiamin Milligrams

Employed Outside the Home 20 Hours Per Week or Less	Full Time Homemaker	Employed Outside the Home 40 Hours Per Week or More	Employed at Home
1.5632	1.3718	1.1308	1.1625

Level of Employment = Independent Variable and Nutrient = Thiamin RDA Percent

Employed Outside the Home 20 Hours Per Week or More	Full Time Homemaker	Employed Outside the Home 40 Hours Per Week or More	Employed at Home
156.26	135.88	112.95	115.75

Age = Independent Variable and Nutrient = Calcium Milligrams

Age	Age	Age	Age	Age	Age	Age	Age
35-44	25-34	75-84	85 and Over	45-54	55-64	Under 25	65-75
1214.0	1192.9	1047.4	972.9	790.8	790.7	704.6	665.5

Table 36 (Continued)

Waller-Duncan t Test for Significant Differences in Mean Nutrient Intake.

Age = Independent Variable and Nutrient = Calcium RDA Percent

Age	Age	Age	Age	Age	Age	Age	Age
35.44	25-34	75-84	85 and Over	45-54	55-64	65-74	Under 25
151.73	144.71	130.67	121.57	98.93	98.89	83.13	70.50

Age = Independent Variable and Nutrient = Carbohydrate Percent

Age	Age	Age	Age	Age	Age	Age	Age
85 and Over	65.74	75-84	25-34	55-64	35-44	45-54	Under 25
53.771	47.493	46.383	45.264	43.140	42.836	41.237	35.850

Age = Independent Variable and Nutrient = Vitamin C Milligrams

Age	Age	Age	Age	Age	Age	Age	Age
55-64	85 and Over	75-84	65-74	45-54	35-44	25-34	Under 25
147.23	142.00	139.68	129.27	113.51	95.78	89.96	15.85

Age = Independent Variable and Nutrient = Vitamin C RDA Percent

Age	Age	Age	Age	Age	Age	Age	Age
85 and Over	75-84	55-64	65-74	45-54	35-44	25-34	Under 25
236.71	232.67	221.29	215.40	189.10	159.59	142.07	22.00

Means underlined by the same line are not significantly different at the .05 level.

Of the original 13 hypothesis for this study, eight were rejected. There were significant relationships between nutrient intake and the following demographic variables: place of residence, level of homemaker employment outside the home, age of homemaker, number and ages of children, years in Extension Homemakers, sources of nutrition information, nutrition instruction received within the year preceding the research study, and health problems in the family. No significant relationships were found between nutrient intake and the following demographic variables: educational level of homemaker, income, type of household, level of interest in nutrition, and level of interest in new food preparation ideas including new foods. Iron and calcium were identified most often as being the nutrients with practical significant relationships. Riboflavin, percent of calories from carbohydrate, and fat consumption also had practical significant relationship to demographic variables.

Chapter V

Summary, Implications, and Recommendations

The purpose of the study was to investigate relationships between nutrient intake and thirteen selected homemaker characteristics. The characteristics were place of residence, level of employment, age, education, income, household type, number of children in selected age ranges, number of years in Extension Homemakers, sources of nutrition information, sources of nutrition instruction, health problems in the family, interest in nutrition, and interest in new food preparation ideas, including new foods.

The original population for the study was 600 Extension Homemakers in Brookings County, South Dakota. A random sample of 160 homemakers participated in the study.

An overview of the demographic characteristics indicate that the subject selection was somewhat biased toward the middle income categories of $10,000 to $30,000. Low income households were under-represented and very few single parent homemakers were in the sample population. Overall, subjects in the sample were well educated with a larger representation in the labor force than the national average.

Dietary intakes found in this study were better than the children's dietary intakes in Brookings ten years ago. The subjects in this study were reasonably high in nutrient intake in relation to the calories consumed. Iron was identified as the nutrient consumed in the least amount. All participants in the child bearing years

failed to meet the RDA at 90 percent or above for iron. Calcium and vitamin C were not consumed in adequate amounts by certain categories of subjects.

Results showed more significant relationships of nutrient intake to age and/or children in the household than other demographic variables. Young homemakers and homemakers with children in certain categories tended to have lower nutrient intake. Place of residence was a factor in iron intake with subjects in Brookings consuming more iron. Subjects in the 65-74 age range consumed less calcium.

Fat was consumed as a larger percentage of calories than current recommendations would suggest. Very few groups consumed less than 35 percent of their calories as fat.

Continued effort in Cooperative Extension Service education should include emphasis on increasing the iron and calcium content of the diet while reducing fat content. The results showed calorie content close to the RDA or below for most individuals. When calorie content is low it becomes more difficult to consume adequate amounts of the nutrients. At the time the data from this study was analyzed there was an RDA for calories although by 1986 that recommendation had been eliminated. In order to assist individuals in maintaining normal weight, future education should be directed toward keeping the calorie count high enough to insure adequate nutrient intake while increasing physical activity to use excess caloric intake.

Efforts in nutrition education in the future should particularly address low-income homemakers and single parent family

needs since the demographic data from this study revealed that Extension efforts like Extension Homemakers have not reached those audiences in high proportions.

Homemakers in the 35-44 year age range were also under-represented in Extension Homemakers. Because of time commitments by homemakers in the labor force who also have children more effort will be needed to reach families through educational efforts other than meetings.

To identify specific nutritional problems in other localities Extension Agents/Home Economists with the Cooperative Extension Service could do dietary analyses for small groups in their respective counties. The cost would be prohibitive for doing large numbers on AGNET but costs of doing dietary analyses will decrease with integration of microcomputers into County Extension Offices.

Recommendations for further research include a focus on families with the female homemaker in the labor force and children present in the household. In dual-career families research should focus on the changing roles of family members to determine which family members shop for and prepare food. Research should also focus on the eating patterns of families to determine if they consume food in meal patterns or consume food by a periodic "grazing" pattern. Other factors that would potentially reveal more relationships include attitude toward food, value placed on food and time, other family values, cultural background, and family traits.

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Appendix A

DIETCHECK

When completing the DIETCHECK, list everything eaten and all liquid consumed. Each food item should be on a separate line. For example, the cereal, sugar, and milk should all be on a separate line. Each part of a recipe should be on a separate line if you had a combination food. There are a few foods such as potato salad that are standard so just list potato salad.

CHARACTERISTIC FORM

On the last page on the line list your nationality. On a separate line indicate husband's nationality.

CONFIDENTIALITY

You are the only person who will know your number so keep it in a location where you will be able to find it when it is time to ask for your personal DIETCHECK.

HOMEMAKER CHARACTERISTICS

For Office Use Only

The following information is requested to coincide with Dietcheck so we can have a better picture of the relationship between the characteristics of the families we serve and the variety of foods they eat.

A.) Indicate place of residence (Circle appropriate response number)

0 Rural-Farm
1 Rural Non-farm
2 Small Town
3 City of Brookings

B.) Indicate level of employment (Circle appropriate response number)

0 Full-Time homemaker
1 Employed outside the home 20 hrs. a week or less
2 Employed outside the home more than 20 hrs. a week
3 Employed at home (work for which you receive money (pay) (i.e. office, beauty shop, child care for others, sew, bake, decorate cakes for profit, contract jobs, music lessons, family, farm or business bookkeeping, farm/ranch partner, etc.)

C.) Indicate age (Circle appropriate response number)

0 Under 25
1 25-34
2 35-44
3 45-54
4 55-64
5 65-74
6 75-84
7 85 and over

D.) Indicate last grade completed (Circle appropriate response number)

0 Less than 8
1 8th grade
2 Some high school
3 12th grade (high school)
4 Two years of college or less
5 Vocation/technical training completed (Beauty School, Secretarial School, Nurses Training, etc.)
6 Bachelor's Degree
7 Master's Degree
8 Ph.D or equivalent

L.) Indicate all sources of nutrition information received within the last year (Circle all appropriate responses)

____ 0 Radio
1 TV
2 Newspaper
3 Magazine(s)
4 Book
5 Other - Specify _____

M.) Indicate all sources of nutrition instruction received within the last year (Circle all appropriate responses)

____ 0 Extension Homemakers' Meeting
____ 1 Extension Homemakers' County Project Training
____ 2 Special interest program offered through Extension (WON etc.)
____ 3 Nutrition education offered through private business
____ 4 Nutrition education offered through other community groups(WIC etc.)

N.) Indicate health problems in the family that affect dietary patterns (Circle all appropriate responses)

____ 0 Heart and other circulatory diseases
____ 1 Hypertension (High Blood Pressure)
____ 2 Stomach and intestinal diseases
____ 3 Liver, kidney, gall bladder and pancreas diseases
____ 4 Metabolic disorders
____ 5 Malabsorption disorders
____ 6 Neurologic disorders
____ 7 Diabetes
____ 8 Food allergies
____ 9 Other - specify _____

O.) As you look at all the interests you have, where would you rank your interest in nutrition? (Circle appropriate number response)

____

Not interested 0 1 2 3 4 5 6 7 8 9 very interested

P.) What is your level of interest in new foods and new food preparation ideas? (Circle appropriate number response)

____

Not interested 0 1 2 3 4 5 6 7 8 9 very interested

Q.) Race/Ethnic Group or Country of Ancestral Origin

Specify _____

Dietcheck

Number_____ Date_____

Sex Code_____ Age_____ (For children under 3, use months)_____months
1. Male
2. Female Height _____feet and _____inches Weight_____
3. Pregnant
4. Nursing mother Build (19 years and over) Small_____ Medium_____ Large_____

How many days?_____

When	What did you Eat or Drink? Describe food and drink	Amount Eaten	Amount Code	Food Code
6:00 a.m. - 9:00 a.m.				
			0	0
9:00 a.m. - 12:00 noon				
			0	0
12:00 noon - 3:00 p.m.				
			0	0
3:00 p.m. - 5:30 p.m.				
			0	0
5:30 p.m. - 8:30 p.m.				
			0	0
8:30 p.m. - 6:00 a.m.				
			0	0

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Appendix B

Dear

In the process of doing DIETCHECKS on the AGNET Computer System, I discovered that there was a great variation in the diets of program participants. Also, the people who had DIETCHECKS done, learned much about the nutrient intake.

To learn more about the dietary intake of Brookings County Extension Homemakers and to be able to provide DIETCHECKS as a service to Extension Homemakers, I applied for a General Mills Grant through the American Home Economics Association. I felt a summary of the dietary intakes would give our program planning process specific information which would help us better meet needs and interests of our homemakers for food preparation and nutrition education programs.

We received enough grant money to do DIETCHECKS for about 200 homemakers so you have been randomly selected to participate in the study. I now need your help in completing the study before mid-June so I can report to the American Home Economics Association.

Would you come to the County Extension Building at one of the following times to complete a 24 hour recall of food intake and a short survey form about age, family size, etc.? Come at the time that is convenient for you.

Downstairs Room

Thursday, May 31 - 1:30 p.m.
2:30 p.m.
3:30 p.m.
5:30 p.m.
7:30 p.m.

Friday, June 1 - 9:30 a.m.
10:30 a.m.
1:30 p.m.
2:30 p.m.
3:30 p.m.
5:30 p.m.
7:30 p.m.

Upstairs Room

Monday, June 4 - 9:30 a.m.
1:30 p.m.

I know this requires extra time for you at a busy time of the year but I really appreciate your help very much. To make the report completely confidential, you will be assigned a number when you arrive to complete your DIETCHECK.

Later this summer you can receive a free copy of your DIETCHECK by requesting it by number from the County Extension Office. You will be the only person who will know your own number in order to assure your complete privacy.

My most sincere thanks to you for helping in completing this project. I feel foods and nutrition education programs are so important and worth the extra time and effort spent in planning for them.

Sincerely,

Bernadine L. Enevoldsen
Extension Home Economist

June 8, 1984

Dear Extension Homemaker:

We really need your help in getting the DIETCHECK Study completed. Each person is important in this program because for the project to be statistically accurate and representative of all members, each person that was drawn in the random sample should have a daily diet done.

We are offering three additional days to do the group 24-hour recalls. Those days are listed below. For anyone who cannot come at any of the listed times, I will work out a time with you to do yours individually. It takes about 20-30 minutes to complete the survey form and the 24-hour recall of food intake.

Again I really appreciate your help in getting this completed. You are so important to this program. Thanks much for your help.

Sincerely,

Bernadine L. Enevoldsen
Extension Home Economist

BLE/bco

DIETCHECK TIMES

Upstairs Room:	Upstairs Room:	Downstairs Room:
Monday, June 11 - 1:30 p.m.	Tuesday, June 12 - 9:30 a.m.	Thursday, June 14 - 9:30 a.m.
2:30 p.m.	10:30 a.m.	10:30 a.m.
3:30 p.m.	11:30 a.m.	11:30 a.m.
4:30 p.m.	1:30 p.m.	1:30 p.m.
5:30 p.m.	2:30 p.m.	3:30 p.m.
6:30 p.m.	3:30 p.m.	4:30 p.m.
7:30 p.m.	4:30 p.m.	5:30 p.m.
	5:30 p.m.	6:30 p.m.
	6:30 p.m.	7:30 p.m.
	7:30 p.m.	