CONVENIENCE FOOD USE BY THE ELDERLY POPULATION

by

Kathleen Roe Walters

Thesis submitted to the Faculty of the

Virginia Polytechnic Institute and State University

in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

in

Human Nutrition and Foods

APPROVED:

J. M. Axelson, Chairperson

J. M. Pearson

Ø. Capps, Jr.

J. A. Driskell

October, 1983

Blacksburg, Virginia

CONVENIENCE FOOD USE BY THE ELDERLY POPULATION

by

Kathleen Roe Walters

(ABSTRACT)

Of the fifty foods used by the greatest number of elderly households in the USDA 1977 - 78 Nationwide Food Consumption Survey, 62 percent were nonconvenience foods. The percentages of nonconvenience and of basic, complex and manufactured convenience food classes reported most frequently by elderly households were similar to the percentages of each class reported by all households in the survey. The greatest share of the food dollar was allocated to nonconvenience foods by nonwhite female meal planners in the South or West in seasons other than winter. Nonconvenience foods supplied an average of 58 percent of the food energy and of most other nutrients to the household food supply. Comparison of the nutrient contribution of each food class relative to the energy supplied indicated complex convenience foods had lower nutrient densities (nutrients per 1,000 kilocalories) than did the other food classes. As the use of complex convenience foods, those foods most commonly thought of as convenience foods, increased, the nutrients per person in the household food supply decreased.

ACKNOWLEDGEMENTS

The author expresses deep gratitude to Dr. Julein Axelson for her patience, understanding and encouragement throughout the preparation of this research project. Her technical assistance was much utilized and greatly appreciated. Many thanks also to:

Dr. Joanne Pearson, for many hours of assistance in all areas of this project, but especially for her computer expertise which was shared freely.

Dr. Oral Capps, Jr., for developing the computer program used for this research and for his constructive advice.

Dr. Judy Driskell, for her valuable input.

The U.S. Department of Agriculture, for financial support of this project.

Stephen Walters, her son, for his continued cooperation and support.

A special friend, John McCann, without whose sacrifice the graduate program lending to this project would not have become a reality.

TABLE OF CONTENTS

LIST OF TABLES

Chapter I

INTRODUCTION

The proportion of the United States' population 65 years of age and over has been increasing steadily throughout this century. Compared with the total population, which has doubled since 1900, the elderly sector has quadrupled in number (Shock, 1970). Since 1970, the elderly population has risen at three times the rate of the rest of the population (Gallo and Boehm, 1978). One in nine Americans is included in this age group at present. By the year 2035, this number is expected to increase to one in five (Brotman, 1978). Due to decreased mortality in early years, there is a net increase of 1,000 elderly persons per day (Rowe, 1978). The greatest continued growth will be in the number of people 75 years old or older. The number between 65 and 74 years of age will increase for a time, then decrease (Bazzare, 1978). Interest in this group will escalate relative to their number because of their voting power and their impact on the economy (Weimer, 1982).

As the older population increases, so will the impetus to improve the quality of their lives. Although the mechanisms of the aging process are not thoroughly understood, it is apparent that steps can be taken to lessen the effects of aging. A gradual loss of cells results in declining adaptive and reserve capabilities accompanied by reduced renal

blood flow, cardiac output and lung function. Those processes which are genetically determined are less amenable to manipulation than are environmental factors. Nutrition is a variable which returns some measure of control to the older person over the aging process. This process is a highly individual one, a composite of many factors (Shock, 1970).

Provision of the necessary nutrients will allow optimal functioning on both the cellular and organ levels, within limits set by genetics and chronic illness. Selection of foods which will meet nutritional needs is the task, and often the dilemma, of the elderly person. Both the elderly consumer and those charged with providing meals and nutrition education to meet the needs of older people need information on the effects of food selection on nutrient intake. More information is needed on the characteristics of people utilizing different categories of food, to enable planning by the food and marketing industries, health care providers and nutrition and health educators working with older Americans.

One rapidly expanding category of foods used in varying degrees by the person over 64 years of age is convenience products. Convenience foods are defined for present purposes as:

> fully or partially prepared foods in which a significant amount of preparation time, culinary skills, or energy inputs have been transferred from the home kitchen to the food processor and distributor (Traub and Odland, 1979).

Households headed by men and women aged 65 years or over allocate an average of 40 percent of their food dollar to convenience items (Havlicek et al., 1982). While not so large a share as that contributed by younger households, this represents a large enough expenditure to warrant investigation into the characteristics of those using varying amounts and types of convenience foods. What impact convenience food use has on nutrient intake is also of interest. Information characterizing elderly convenience product users and relating consumption of convenience foods to nutrient intake can be utilized by the food industry and by nutrition professionals to plan and care for this expanding minority. At present, this information does not exist.

Definition of Terms

Basic convenience foods. Foods where processing is more related to a preservation method than ease of preparation; foods with a single or limited number of ingredients; foods with time or energy inputs but not culinary expertise built in.

Complex convenience foods. Foods which have a high level of time saving and/or energy inputs and culinary expertise built in; multi-ingredient prepared mixtures.

Manufactured convenience foods. Foods which have no home-prepared counterpart.

Nonconvenience foods. Fresh (unprocessed foods; home frozen or home canned or home preserved food items; and ingredient foods. Ingredient foods are processed food products used in food preparation; usually in the most basic form in their category, that either cannot be or are not commonly prepared in the home (Havlicek et al., 1982).

Elderly households. Households headed by individuals 65 years of age or older, determined by the developmental changes occuring at this age (Blocklind, 1976 and Buse and Salathe, 1978).

Objectives

The objectives of this research were to:

1. identify and compare basic, complex and manufactured convenience foods and nonconvenience foods used by the greatest number of households headed by three age groups: less than 65 years, 65 - 74 years, and 74 years and older.
2. determine which of the following characteristics:

geographic region
degree of urbanization
season
race
income
educational level
employment status
ethnic origin
food stamp recipient
sex of meal planner
shopping frequency
type store patronized
age of household head

of households headed by persons aged 65 years or older are associated with the degree of use of each class of convenience foods and nonconvenience according to share of the food dollar and money value of food.

3. determine the mean nutrient contribution of each class of convenience foods and nonconvenience foods to the food supply of households headed by persons aged 65 years or older.
4. assess the impact of use of each class of convenience and nonconvenience foods on the nutrient adequacy of the food supply of households headed by persons aged 65 years or older.

Chapter II

REVIEW OF LITERATURE

INTRODUCTION

Older Americans are a heterogenous group when age, health status and socioeconomic and educational levels are considered. How the aging process proceeds in an individual is, in part, related to nutrient intake (Weg, 1980). The elderly population is a nutritionally vulnerable group, due to an increased incidence of chronic disease, reduced energy expenditure coupled with decreasing caloric needs, diminishing financial resources and restricted mobility. Food choices must be made carefully to maximize nutrient intake for the number of kilocalories consumed. The nation's food supply changes in response to the needs and demands of its population and to technological advances. An ever-increasing array of new products and innovative processing methods confront consumers, complicating the decision making process. The elderly consumer may be especially disadvantaged in food selection upon finding familiar products replaced by more convenient forms and by new foods and food combinations. How these foods should be used, and the effect of their use on nutrient intake are unknown.

The following review of literature addresses the problems of aging affected by nutritional adequacy and the

nutrient intake of older people, as well as the food selection and shopping practices of the elderly population. The increasing prevalence and use of convenience foods by both the elderly and general populations will be reviewed. The reasons for food choices and their effects are increasingly important as the elderly population and the host of convenience foods available to it grow.

Factors Affecting The Nutrient Needs of Elderly Individuals

Nutritional considerations change as individuals age. The basal metabolic rate decreases 16 percent from age 30 to age 70; half the number of functioning muscle cells remain by age 80; and if body weight remains constant, fat accumulates in place of functioning cells. Energy expenditure from exercise is concurrently reduced. This necessitates a diet providing at least the same level of nutrients, but fewer kilocalories. The loss of sweet and salty taste buds, poor olfactory perception, reduced secretion by digestive glands and slowed peristaltic waves in the esophagus all have a negative effect on interest in and the ability to eat food (Busse, 1980).

Shock (1970) studied 700 men aged 20 to 96 years to assess the physiologic aspects of aging, based on group means. Reserve and adaptive capacities were found to diminish with increasing age. Following glucose loading, normal values were restored at a progressively slower rate.

Renal blood flow and breathing capacity decreased by 50 percent from ages 30 to 90 years. Fewer enzymes associated with energy metabolism were found with advancing age, and extracellular space increased significantly.

The net result of these changes is the need for selection of a palatable, nutrient-dense diet by elderly people, to meet their needs as modified by the aging process. Whether the more convenient forms of food available can meet these needs is questioned.

Nutrient Intake of the Elderly Population

The nutrient intake of aging people has been the focus of studies by numerous investigators. Findings have been generally in agreement. Brown et al. (1977) obtained ten dietary records from 23 elderly people in the Northeastern United States. The average subject was 77 years old, with less than a high school education, of normal weight, in good health, and lower middle class. The mean energy intakes were 88 percent of the Recommended Dietary Allowances (RDA). Mean protein intakes exceeded the recommended amounts, as did vitamin A, vitamin C, phosphorus, and iron. Men met the RDA for thiamin, women did so for niacin and riboflavin. All values exceeded two-thirds of the RDA. Calcium was the nutrient most often low on an individual basis. Eighty-six percent failed to consume the recommended amount. The authors pointed out that the margin of safety provided by

the RDAs do not apply to calorie allowances. The reduced energy expenditure of increasingly older persons and the use of only one standard for all of the elderly population regardless of age and physical condition may lessen the energy deficit indicated. The mean caloric intakes in this study were much higher than in other studies. The use of a ten-day food record may have provided a more accurate energy intake than the shorter periods used generally. The participation of these subjects in a longitudinal study reflects a motivated and nonisolated individual, who may not be the typical senior citizen.

In contrast, 24-hour recalls were collected from 28 rural elderly people (Rawson et al., 1978). Intakes below two-thirds of the RDA were revealed for kilocalories by men and for calcium by women. The recommended amounts were not met for mean calcium, kilocalories, and vitamin A intakes by men. Women were more frequently below the RDA for calcium. Mean intakes of protein, iron and vitamin C were adequate for both sexes. Half or more of the respondents were reported to have fallen below two-thirds of the RDA for energy, calcium and vitamin A. The use of one 24-hour recall on so small a group precludes drawing conclusions on usual intakes, however (Young et al., 1952). Intake was thought to be influenced positively by the availability of fresh vegetables from home gardens and negatively by the depressant effect of hot summer weather on appetite. Memory

failure by elderly subjects and day-to-day variation in intake may have further distorted the assessment of normal intake (Campbell and Dodds, 1967).

A larger study of 104 elderly people conducted by the Age Center of New England used both dietary recall and food records to determine intake (Davidson et al., 1962). Nutrients commonly consumed in inadequate amounts included vitamin A, thiamin, riboflavin, niacin, vitamin C and kilocalories. Calcium and iron intakes were low, even with the use of supplements. A significant finding was the intake of from four to eight percent of kilocalories from alcoholic beverages in half of the subjects. These subjects represent a group above average in mobility, motivation, health status and education. Incomes were less than $5,000 a year for three-fourths of those surveyed. Nutrient intake was related more to income than to education, in agreement with findings by Guthrie et al. (1972) and Harrill et al. (1976).

Two large-scale national nutrition surveys yielded similar information. The Ten State Nutrition Survey (TSNS) (1972) conducted by the United States Department of Health, Education and Welfare, examined the nutritional status of low income people from higher and lower income states. Persons aged 60 years and older had energy and iron intakes below the recommended levels. Low iron intake was the most prevalent nutrient deficiency found. From the elderly

subsample, only Spanish-Americans had an inadequate mean vitamin A intake. The RDA of 400 mg for calcium was met by all groups, when the mean intake was considered. The median intake was low for Spanish-Americans in low income states and blacks in high income states, however. In general, the people in lower income states had poorer nutrient intakes than did those in the higher income states.

The Health and Nutrition Examination Survey (HANES) (DHEW, 1974) included a sample of the total population, unlike the TSNS, which concentrated on the low income segment from higher and lower income states. Findings indicated low caloric intakes among older people, which decreased with increasing poverty, and low iron and calcium intakes, especially in the black population.

In both national surveys, the 24-hour recall method was used to gather dietary data. Memory loss may make this method unreliable for older subjects (Campbell and Dodds, 1967). Several researchers, however, feel that this method can discern adequately group dietary trends for very large samples (Linusson et al., 1974; Young et al., 1952). Results are frequently reported as individual intakes, rather than by group means. As data collected by this method are not representative of individuals, results reported in this manner are unreliable. Amounts consumed are often underestimated when the recall method is used, which may account for the consistently low caloric intakes

in studies of elderly people. Standards for this group may also be set at an unrealistically high level, considering their decreasing metabolic rate and activity levels (O'Hanlon and Kohrs, 1978). Each of the national surveys used a different standard of nutrient adequacy making it impossible to compare the findings.

The research presented establishes the elderly population as a nutritionally vulnerable group, further emphasizing the need for an adequate level of nutrients supplied from foods meeting reduced caloric requirements. Information on the relative nutrient and energy contributions of convenience and nonconvenience foods used by aging consumers is necessary to plan healthful diets.

Factors Influencing Food Selection by Elderly People

The food choices made by elderly people affect the rate and course of aging process which may contribute to the quality of life (Krehl, 1974; Rao, 1973). Many factors influence the food choices of senior citizens.

Food taste, convenience, health beliefs (Clarke and Wakefield, 1975), and price (Mason and Beardon, 1978) have been reported as influences on food selections of older people. The tendency to choose foods eaten in earlier years when self-esteem was higher is a consideration, as is the response of one's body to foods. Loss of teeth by 50 percent of those over 65, constipation and flatulence,

resulting from slowed gastric motility, along with decreased taste acuity and salivary flow modify food consumption (Busse, 1980).

Harrill et al. (1976) suggested that a lack of availability of preferred foods and the desire to control body weight guide food choices. Access to transportation and distance lived from a store dictate food purchases to a large extent, as does availability of storage and freezer space (Howell and Loeb, 1969; Learner and Kivett, 1981).

An extensive body of research has related dietary adequacy to age, income, education, and to a lesser extent race and sex. Age is negatively related to dietary adequacy and to valid nutritional beliefs (Clarke and Wakefield, 1975; Kohrs et al., 1982). Cohen (1974) stated that the decreased income which accompanies advancing age is the determining factor in dietary adequacy, rather than age itself. Throughout the literature, income was reported as positively related to an adequate nutrient intake (LeBovit and Baker, 1965; Davidson et al., 1962; Guthrie et al., 1972). The importance of distinguishing between those suffering reduced incomes only since retirement and those who have always had low incomes had been stressed (Howell and Loeb, 1969). Spending patterns are expected to differ between the two groups. A positive association exists between education and dietary sufficiency (Clancy, 1975; Hunter and Linn, 1979; Kohrs et al., 1982) and between

education and nutrition knowledge (Fusillo and Beloian, 1977). Dickens (1965) found this to be the case even with income held constant. Research has indicated that blacks and males are more prone to dietary inadequacy than other population groups (Hunter and Linn, 1979), with the effect of race being stronger than that of sex (Learner and Kivett, 1981).

Most recently a report by the United States Department of Agriculture (USDA) (Weimer, 1982) found a positive relationship between nutrient consumption by the elderly population and the money value of food in the home, which correlated strongly with income. Education of the homemaker and participation in meal and food stamp programs were also positively related to nutrient intake. The nutrient intake of females, blacks, urban dwellers, Southerners and increasingly older individuals was lower than that of their counterparts.

Food selection is a complex process involving multiple variables. Knowledge of the factors which influence the food choices of elderly people, including the extent to which they use convenience foods, may aid groups interested in nutrition and foods for this population group.

Food Selection and Consumption Habits of Elderly Persons

The food habits practiced by the older population have been the focus of periodic investigation through the years.

Research conducted by the USDA in 1957 (LeBovit and Baker, 1965) on 283 low income households headed by elderly individuals provided information for comparison with more recent studies. The group frequently skipped meals, often lunch. Breakfast was seldom skipped and usually sources of carbohydrate and vitamin C were consumed rather than breakfast meats. Snacking was reported by half the sample and provided more calcium than was provided by a regular meal. Men, more frequently than women, consumed alcoholic beverages as snacks. Single male households spent 13 percent of their food dollar on foods providing few nutrients, two and a half times the amount spent by women. One-third of the food dollar was used for the purchase of meats. Few meals were eaten away from home. While single men had lower caloric intakes than married men, married and single women had similar energy intakes.

More recently, Guthrie et al. (1972), using 24-hour recalls, found that a group of 109 rural elderly persons got more nutrients at breakfast than at any other meal, snacked half as much as other groups with similar incomes, and improved their dietary intake when using food stamps. Many spent less weekly than suggested by the lowest cost food plan developed by the USDA which can meet nutrient needs. Individuals with lower incomes used less meat and fruit than the more affluent respondents.

Todhunter et al. (1974), also using the 24-hour recall, surveyed 529 senior citizens in Tennessee. Breakfast was the favorite meal of one-third of the group and contained an egg or meat. Twenty-five percent of those surveyed ate only two meals a day, with the noon meal eaten by fewer black than white respondents. Food shopping was done primarily at supermarkets once a week by 40 percent of the elderly shoppers and more often by 36 percent. Black females shopped least often due to lack of transportation.

Rountree and Tinklin (1975) compared 104 persons living in an apartment complex for elderly people or in private homes. The apartment dwellers had lower incomes, were less educated, had more food faddist beliefs and more negative responses to questions concerning the use of convenience and commercially processed foods than those living in their own homes. Eight percent shopped at chain supermarkets close to home. Meal programs were utilized by 46 percent of the apartment residents and by 11 percent of those living in private homes. To overcome perceived problems in design of earlier research, Mason and Beardon (1978) surveyed 110 free-living elderly persons, as opposed to those residing in group facilities. Most of the subjects learned about new products from the media and the advice of friends. Most shopped once a week, comparing prices and using store brands. Sixty-six percent used coupons and six percent of the 13 percent eligible used food stamps.

A Consumer Expenditure Survey conducted by the USDA from 1972 - 1974 provided an update on the food buying habits of senior citizens (Gallo and Boehm, 1978). The median income of households headed by persons over 65 was less than half that of other households. Per capita food expenditures were similar for the two groups, elderly and nonelderly. Less of each food dollar spent by the elderly household was allocated to red meats, dairy products, beverages and prepared foods than by younger households. More of the food dollar was spent for fresh fruits, fresh vegetables, and poultry than by households headed by younger people.

In the 1977 - 1978 Nationwide Food Consumption Survey elderly households had a higher intake of nutrients per dollar, especially vitamins A and C, than did younger households (Rizek and Peterkin, 1980). The diets of elderly households were lower in those nutrients in dairy products, which were less used by this age group. Three-fourths of the 1,480 households headed by older persons had enough food of the types wanted, as did younger households.

A study of the effects of race and sex on the food related habits of 182 elderly people indicated that 96 percent of the black males ate a large breakfast, 40 percent of the black males ate a full evening meal and 70 percent of the white females ate a full evening meal (Hunter and Linn, 1979). Males ate more fatty meats and eggs than females.

Blacks, overall, had a poorer meal rating than did white respondents. Dietary adequacy was frequently related to educational and socioeconomic status and was generally lower for blacks than for whites. The effect of race was more evident than that of sex. Black males were the most vulnerable group, nutritionally.

Of the 394 elderly persons in Virginia surveyed by Moak and Miller (1980), half were black and half were white, representing varied income and educational levels. One half of the group prepared their own meals; the others had someone to prepare food in their own homes. Seventy-eight percent thought their diets were good or excellent. These ratings were unrelated to what was actually consumed. Milk, cottage cheese and pizza were unpopular foods, whereas bread, butter, eggs and citrus fruit were the four most frequently consumed foods. Chicken was the most popular meat. Kitchen equipment was adequate, except for freezer space. Food assistance was poorly utilized. Transportation problems, inconvenience and pride deterred those eligible from taking advantage of food stamp and meal programs.

Krondl et al. (1982) reported taste to be the most influential factor in food selection among 194 aging persons with a mean age of 70 years. The top third foods most used, or "core" foods, included whole wheat bread, eggs, potatoes, chicken, cheese, orange juice, carrots, margarine, bananas and breakfast cereals. Foods high in alcohol or fat were

used infrequently. Unpopular foods were nonfat milk, legumes and nuts. The diets of males were less varied than females' diets. Females used more fruit, vegetables, oil and mayonnaise than did the men, who used more processed sliced cheese, but not more eggs or meat as reported by Hunter and Linn (1979). Taste was the main reason given for choosing foods. Convenience was of less importance.

Older people emerge as conservative spenders in the food market. The simplicity and economy of the foods selected most frequently indicate that price, convenience, and tradition are criteria for choices made. As the food supply changes to include more convenience foods, it appears that choices made by the elderly population will also change, but will be guided by long standing habits, preferences and financial considerations. Knowledge of current practices will aid in predicting and interpreting new ones and will provide the basis for educational and feeding programs utilizing information on convenience food use by elderly people.

Convenience Food Use by Elderly Persons

As the ability of aging people to mix, chop, knead or otherwise manipulate food during preparation decreases, the use of foods having more of the preparation done by the manufacturer may increase. There is a discrepancy between the attitudes of elderly persons and their actual practices

involving the use of processed or convenience foods. Of an elderly group questioned on their feelings about convenience foods, 26 percent thought processing removed most of the nutritive value (Rountree and Tinklin, 1975). Most thought the nutrients were decreased if not removed. However, the majority used frozen orange juice, prepared cereals, and white bread. On the other hand, although frozen pot pies, frozen dinners, and cake mixes were thought to be easier to use by most, very few used frozen entrees and only 67 percent used cake mixes. Perceived additional expense of dried mixes by 79 percent may have deterred older households on fixed incomes from using them. Pudding and gelatin were used more frequently than entree mixes. Frozen vegetables were thought to be more expensive than canned. Flavor and nutrient content were rated highest for fresh vegetables despite the use of canned vegetables by 77 percent and frozen vegetables by 55 percent. The taste of frozen fruit pies and instant puddings was well liked. Flavor and ease of preparation outweighed cost and nutritive value in choosing between convenience and nonconvenience foods.

Clarke and Wakefield (1975) reported changes in the eating habits of older persons, including an increased use of pot pies, frozen dinners, canned soup and packaged desserts. Carbonated beverage use decreased with increasing age. Changes noted were attributed to difficulties with food preparation experienced by older people.

In 1957, before the large increase in marketing of convenience foods, LeBovit and Baker (1965) found some convenience food use by older people. Given their years of cooking and eating prior to the appearance of convenience foods in the marketplace, this group was expected to rely more on traditional, less on processed foods. The greater use of processed foods by higher income, younger households than by elderly households may be related to the money and time available to each group. Among those surveyed, 30 percent of the fruits and vegetables used were canned, few were frozen. Evaporated or dry milks were used by 43 percent, luncheon meats by 45 percent, soups and entree mixes by 20 percent, soft drinks by 29 percent, flour mixes by 15 percent, and 52 percent used ready-to-eat cereals. Plate and boxed meals were not used.

Among senior citizens surveyed more recently in Tennessee, frozen dinners were used by 20 percent of the white and 14 percent of the black respondents (Todhunter et al., 1974). Eighty-five percent used canned foods, and frozen foods were used by 99 percent and 64 percent of the white and black persons interviewed, respectively. Convenience foods, in general, were used by 50 percent of all men and of all women and by 40 percent of the black women. Sixty percent expressed willingness to try new foods.

Although easy-to-prepare foods were among those foods most frequently eaten by an older group surveyed by Krondl

et al. (1982), this was not an attribute of the majority of the foods selected. The availability of storage space and preparation time may have been factors in the tendency of this age group to use fewer convenience items in their diets.

Convenience foods are being used with greater frequency by elderly consumers as these food items have become more established in the marketplace. In the last quarter of a century many convenience products have become staples for meal planners of all ages. As the number of people which have grown up using these products and the number of convenience foods available increase, factors influencing their choice and the effect these choices have on dietary quality will be of growing importance. With this information, those engaged in educational programs and marketing efforts will be better equipped to address their audiences and market segments.

Convenience Food Use by the General Population

Sales of convenience foods have proliferated at a steady rate during the last several decades. In 1973, half of the foods purchased for use at home were convenience products (Traub and Odland, 1979).

Households surveyed in 1979 used convenience foods liberally (Ladies Home Journal, 1979). Convenience foods, particularly frozen foods, were used by 58 percent of those

who ate breakfast. Men and single individuals used fewer convenience foods than those with higher incomes or with children. The highest percentage of canned foods were consumed at lunch by higher income families. Canned and frozen foods were used at the evening meal by the two-thirds who used convenience foods for that meal. Low income families were the heaviest users in the evening. Contrary to what is generally expected, employed persons used fewer convenience foods than their counterparts who stayed at home.

A comparison of convenience foods and fresh or home-prepared foods was done by Traub and Odland (1979). The cost, yield, fuel, and time used in preparation, and the quality of each category, convenience and fresh or home-prepared, were examined. Convenience foods were defined as in Chapter I of this report. Foods in use before 1960 were termed "established" convenience foods; those coming on the market since 1960 were called "new generation". In general, basic products, like canned or frozen green beans, were in the former group. More complex items, like oriental vegetables frozen in a pouch, were in the latter group. Nonconvenience foods included fresh foods, defined as unprocessed foods such as meat, eggs and vegetables. Ingredient foods, classified as nonconvenience, were foods used in preparing other foods. Examples of ingredient foods were flour, sugar and milk.

Convenience foods were compared with similar home-prepared or with fresh items. The price paid for the various forms of a food available, fresh, home-prepared or processed, varied considerably. The expense of the higher priced convenience foods was compensated for by the greater volume of lower priced items purchased. Many convenience products were more expensive than nonconvenience foods due to the level of service built in or to short shelf life, as with gourmet items and baked goods. Food costs of 166 convenience foods were higher for 58 percent of the items, lower for 24 percent, and the same for 18 percent of the convenience foods than for the nonconvenience items on a per serving basis. The home-prepared items frequently included larger amounts of the most expensive ingredient, indicating that higher cost was for greater value. Season and city of purchase also affected price, as did choice of the canned, fresh, frozen or dried form of a food. Considering food and fuel costs and preparation time as a composite, half of the convenience foods with a nonconvenience counterpart cost less per serving than the counterpart did. If only food cost was compared, more than four-fifths of the convenience foods were more expensive than their nonconvenience counterparts.

Taste of convenience foods was rated by a sensory panel as "good" or better in most cases. Convenience

products received less than a "good" rating on at least one quality factor in eight of 34 foods tested.

The yield of many convenience products was less than the comparable home recipe. This is an advantage to the growing number of one- and two-person households, who may find a greater yield wasteful. A similar yield may not represent equal food value when comparing convenience and home-prepared foods. Convenience items in which expensive protein ingredients have been replaced with pasta, sauce, or gravy provide different levels of nutrients. Home-prepared recipes containing cheese, chopped vegetables or meat not included in the convenience form may supply less protein, vitamins or minerals than the convenience food does.

Any combination of these variables, for example, taste and cost, may be sacrificed in the interest of another, such as time, in choosing food. Knowledge of the relative merits of each food form, convenience or nonconvenience, is important in selecting foods to meet the needs of elderly consumers.

Recent work by Havlicek et al. (1982) provided another system for classifying food and characterizing convenience food users. Data from the 1977 - 1978 Nationwide Food Consumption Survey (NFCS) were used for this study of the general population. Established and new generation terminology was replaced by basic, complex and manufactured convenience foods. Basic represented single-item processed

foods; complex represented multi-ingredient processed items; and manufactured convenience foods were those with no home-prepared counterpart (Havlicek et al., 1982).

The 14,032 housekeeping (eating at least 10 meals in a week from the household food supply) households surveyed spent an average of 45 percent of their food dollar on convenience foods. Convenience foods were more costly than nonconvenience foods by 14 cents a pound. Households living in the Northeast spent the greatest amount on convenience foods. The smallest share of the food dollar was spent on convenience foods by those in the South and West and by those in nonmetropolitan areas (Havlicek et al., 1982).

Income was related to convenience food use. Those earning over $30,000 annually spent more than twice as much on convenience foods as those earning less than $5,000 per year. Almost twice as much was spent on nonconvenience products, also, by the higher income group. Part of this difference was accounted for by larger family size of higher income households. A higher percentage of the food dollar, which was independent of household size, was spent on convenience foods by higher income households than by lower income households. Money spent for convenience and nonconvenience foods increased with increasing household size, but decreased per household member as household size increased (Havlicek et al., 1982).

Differences in convenience food use were seen among population groups surveyed. Spanish respondents spent more on total food and on convenience foods than non-Spanish households; white non-Spanish respondents allocated the greatest share of the food dollar on convenience items, and blacks spent more on nonconvenience foods per household member than the other groups did.

The sex of the family member who usually planned, prepared and shopped for food affected convenience food use. When a male performed these functions, a greater part of the food dollar was spent for convenience products. More money was spent for all foods when a female head of household was involved (Havlicek et al., 1982).

Occupation of the head of the household was also related to the amount spent for convenience foods. Farmers, not unexpectedly, spent the least for convenience foods; clerical and sales people spent the least on nonconvenience products.

As years of education of the head of the household increased, so did money value and share of the food dollar spent for convenience foods. The mean money value of all food used by a household increased with advancing age, up to retirement age, when much less was spent for all food. The smallest portion of the food dollar was spent on convenience foods by households headed by individuals aged 65 years or older. Households headed by males or females under 21 years

of age used the largest share of the food dollar for convenience foods. The presence of preschool and preadolescent children increased the share of the food dollar allocated for convenience foods; senior citizens in the home had the opposite effect (Havlicek et al., 1982).

The decision to choose one form of a food over another is arrived at following consideration of many of the factors presented. The weight given to these factors will be different for each age group. Appreciation of the complexity of the decision-making process for aging people with decreased purchasing power and increasing infirmities is necessary to serve this group.

Summary

The elderly segment of the population is increasing in size. Sales and use of convenience foods have increased in America. The use of convenience foods by this population has not been adequately researched. The impact of the use of convenience foods on the nutrient value of diets of elderly Americans is unknown. Information on the elderly population as a market segment will enable those engaged in food sales to determine marketing strategies for convenience food sales to this group. The nutritional implications of convenience food use should be available to the consumer and to those involved in health care and meal programs serving the older population. Knowledge of factors involved in

selection of convenience foods can be used in planning nutrition education for various segments of the elderly population.

The following study was designed to investigate the extent of use of convenience foods by the elderly population, to identify the most widely used convenience and nonconvenience foods, to characterize convenience food users by socioeconomic variables and to assess the nutritional impact of the use of convenience foods on diets of older persons.

Chapter III

METHODOLOGY

The Data Base

The 1977-1978 USDA Nationwide Food Consumption Survey served as the data base for this study. A stratified probability sample of 14,032 housekeeping households across the 48 conterminous states was canvassed by trained interviewers. Housekeeping households were defined as those that have at least 10 meals from the household food supply. An initial contact with each household introduced the survey and familiarized the person responsible for food planning and preparation with the information they needed to collect during the following seven days. A follow-up interview recorded all foods or beverages used by the household during the preceding week. The quantity, form, and cost of each item used,the number of meals eaten at home, and the demographic characteristics of family members were entered on an extensive questionnaire (Anon., 1980). Households headed by persons 65 years of age or older were included in the present investigation. Elderly people living in households headed by younger individuals were excluded, as they were not expected to determine which foods the household consumed.

Household food consumption data reveal consumption patterns and some information on the nutrient content of foods used,although not necessarily eaten, by household members. Waste and food fed to animals were not accounted for, resulting in higher nutrient and energy intake per capita for household than for individual data (Hegsted, 1982). In determining household food and beverage consumption, present inventory, foods entering or leaving the house, and ending inventory were considered. Household data were collected by the recall method, aided by any notes, receipts or menus saved over a seven-day period. The seven-day recall period was of sufficient length to allow representation of foods supplying nutrients not well distributed throughout the food supply, foods containing vitamin A, for example (Hegsted, 1982). The normal variation from day-to-day in an average diet would have been less well represented in a shorter recall period. The use of trained interviewers in conducting the survey decreased the variation introduced by the use of different interviewers for data collection (Hegsted, 1982).

The NFCS was assumed to provide a pattern of food consumption by American households. These data were used to determine the convenience and nonconvenience foods used most widely by households headed by elderly people. The effect of their use on the nutrient adequacy of the diets of this population was also determined. Characteristics of

households associated with use of convenience and nonconvenience foods were provided by this study.

All foods or beverages used by households in the survey were categorized by degree of convenience, either as basic, complex, or manufactured convenience or nonconvenience foods (Havlicek et al, 1982). Basic convenience foods were defined as single-item processed foods, complex represented multi-ingredient processed items, manufactured were those with no home-prepared counterpart, and nonconvenience as fresh or ingredient foods used in preparing other foods (Appendix A).

Treatment of the Data

Statistical analysis of the data was carried out using the Statistical Analysis System (SAS, 1979). Programs using frequency tabulations, tallies of foods used, analysis of covariance and correlation coefficients developed by Havlicek et al. (1982) were adapted for use in this study to analyze data collected on the elderly population in the NFCS.

The sample was described in terms of the number and percent of the responses of three age groups to questions determining their income, region of residence, degree of urbanization, season surveyed, race, origin, educational level, employment status, sex of the meal planner, completeness of kitchen facilities, shopping frequency, patronage of

a given type of store, and participation in the Food Stamp Program. Households headed by individuals less than 65 years of age represented the greatest proportion of the population. Those headed by persons aged 65-74 years represented the younger elderly population more influenced by recent trends but who have passed 65 years of age, a developmental milestone in the life cycle (Blocklind, 1976; Buse and Salathe, 1978). Households headed by those over 74 years of age represented the very old population, the fastest growing group in society (Brotman, 1978), with a significantly decreased food intake (Steinkamp, et al., 1965) resulting in diets which more frequently fail to meet the recommended dietary allowances (RDA) than those of the younger elderly population (LeBovit, 1965). For these reasons, the use of convenience and nonconvenience foods was expected to differ among the groups. To be included in the study, an elderly person must have been head of the household. Older persons residing with families headed by a younger individual were expected to be less involved with meal planning and food selection.

All persons surveyed did not answer every question, causing the population size to vary. Several variables had a large selection of responses, making it necessary to collapse them into fewer, broader responses. From the 2,424 households headed by elderly people, 1,736 households (72 percent) were used for the present study.

The list of the most widely used foods was determined by a tally of the number of households using each of more than 4,000 foods reported in the survey, divided on the basis of age group and food class. The relationship between the use of each food class, determined by the share of the food dollar and the total amount spent for each, and region, urbanization, season, race, income, age, sex, education, and employment of the meal planner, origin, use of food stamps, shopping frequency, and store type used was determined using analysis of covariance, a combination of regression analysis and analysis of variance. In the analysis, one category of each variable was held out while its relationship to each of the other categories was determined.

Research has revealed that demographic variables influence food selection and, thereby, nutrient intake. Preferences vary with region of the country resided in (Burk, 1961), degree of urbanization (Adrian and Daniel, 1976), season of the year (Beloin, 1971), race and ethnic origin (Gallo, Salathe and Boehm, 1978). Income, education and age are related to food choices made (Adrian and Daniel), as are shopping frequency and store type patronized (Todhunter, 1974). Use of food stamps was found by different researchers to have an effect on types of food purchased (Nelson, 1979) and conversely, to have no such effect (Gallo, Salathe and Boehm, 1978). Males have a greater

incidence of dietary inadequacy (Hunter and Linn, 1979) indicating differences in food selection by the sexes.

The mean nutrient levels per nutrition unit (the sum of the RDAs for a nutrient for all those eating from the household food supply divided by the RDA for the adult male[1]) per day and the percent of a nutrient from each food class were determined using the SAS program. Pearson product-moment correlation coefficients of nutrient use by nutrition unit and alternatively the money value of each food class and the share of the food dollar spent for each food class were computed. Although the sodium contributed by each food class would have been pertinent information considering the health problems of the elderly population requiring a reduction in sodium intake, as values for sodium are changing, are not well quantified, and depend to some extent on the sodium content of any water used in food preparation, they were not included in the NFCS date.

Further calculations produced nutrient density ratios (NDR). Nutrient density is the amount of a nutrient per 1,000 kilocalories (kcal) in a food (Hansen, 1973). The NDR compares the nutrient density of a class of foods as a whole (Capps, et al., 1983). Nutrients per kcal for each food

[1]carbohydrate and fat were based on 21 meal equivalents as there is no RDA for these nutrients

class were multiplied by the 1980 RDA for energy (kcal) for elderly males (2400 kcal) and elderly females (1800 kcal), then divided by the RDA for the nutrient for the age-sex group. The NDR for vitamin A was calculated using International Units (I.U.) as the data was collected using the unit of measure rather than retinol equivalents (R.E.). Each ratio was truncated at 1.00 to prevent one nutrient supplied at a high level from compensating for one supplied at a low level from foods within a food class. Mean nutrient density ratios for each food class were determined. The nutrients for which the NDR was calculated were protein, calcium, iron, vitamin A, thiamin, riboflavin, and vitamin C. These nutrients were included because the food composition tables for these were more reliable than they were for magnesium, vitamin B_6, and vitamin B_{12}. Niacin was excluded because the conversion of the amino acid tryptophan to niacin would alter the level of the vitamin in the diet. Data on this conversion are not complete. Phosphorus, very widely distributed in the food supply, is considered adequate in American diets, so was also omitted (NAS/NRC, 1980).

Chapter IV

RESULTS AND DISCUSSION

Following a description of the survey sample, socio-economic indices of the use of each food class, the nutrient contribution of each category, correlations of each food class use and the nutrient value of household food, and the nutrient density of each food class will be reported and discussed. Comparisons of food use of each food class by the elderly population and the general population composed of households of all age groups, will be made using share of the food dollar and money value of food as indicators of extent of use.

Description of the Elderly Subsample

The survey sample included two groups of elderly persons, aged 65 - 74 years and 74 years and older. Comparisons were made between these two groups and households headed by individuals younger than 65 years of age. With advancing age, the socioeconomic variables characterizing the population shifted in many cases, giving a composite view of the population as it ages (Table 1). The number from the entire survey sample (14,032 households) who responded to questions on each variable depended on the

Table 1. Number and Percent of Households Headed by Three Age Groups of Persons by Socioeconomic and Demographic Variables

Variable		<65 years		65-74 years		74+ years	
		n	%	n	%	n	%
Income	$0-4,999	998	11.5	459	40.9	370	62.3
N=10,383	$5,000-9,999	1661	19.2	396	35.3	156	26.3
	$10,000-14,999	1879	21.7	153	13.6	40	6.8
	$15,000-19,999	1636	18.9	49	4.4	9	1.5
	$20,000-29,999	1683	19.4	43	3.8	10	1.7
	$30,000 and over	811	9.4	21	1.9	9	1.5
	Total	8669	100.1	1120	99.9	594	100.1
Region	Northeast	2901	25.0	358	23.7	194	22.9
N=14,020	North Central	3090	26.7	391	24.8	235	27.7
	South	3482	30.0	560	35.5	280	33.1
	West	2122	18.3	269	17.0	138	16.3
	Total	11596	100.0	1577	101.0	847	100.0
Urbanization	Central City	3521	30.4	493	31.2	305	36.0
N=14,020	Suburban Area	4345	37.5	493	31.3	219	25.9
	Nonmetropolitan Area	3730	32.2	592	38.5	323	38.1
	Total	11596	100.1	1577	101.0	847	100.0
Season	Spring	2893	24.9	375	23.8	204	24.1
N=14,020	Summer	2892	24.9	382	24.2	234	27.7
	Fall	2893	24.9	418	26.5	192	22.7
	Winter	2919	25.2	403	25.6	216	25.5
	Total	11596	99.9	1577	100.1	847	100.0
Race	White	9772	84.3	1392	88.3	739	87.3
N=14,010	Black	1366	11.8	167	10.6	98	11.5
	Other	424	3.7	16	1.0	8	0.9
	Total	11586	99.8	1577	99.9	847	99.7
Origin	Other than Spanish	10932	94.5	1550	98.3	827	97.9
N=13,994	Spanish	641	5.5	26	1.7	18	2.1
	Total	11573	100.0	1576	100.0	845	100.0
Education of	Elementary education or less	1405	14.7	376	41.4	179	51.3
Male Head of	Some high school	1240	13.0	149	16.4	61	17.5
Household	High school graduate	3174	33.1	197	21.7	49	14.0
N=10,835	Education beyond high school	3758	39.2	187	20.6	60	17.2
	Total	9577	100.0	909	100.0	349	100.0
Education of	Elementary education or less	1203	11.0	497	34.5	344	43.8
Female Head of	Some high school	1713	15.6	286	19.8	101	12.9
Household	High school graduate	4547	41.5	362	25.1	130	16.6
N=13,121	Education beyond high school	3501	31.9	297	20.6	210	26.8
	Total	10964	100.0	1442	100.0	785	100.1
Male employment	Full time	7062	74.9	90	9.8	19	5.3
N=10,690	Part time	619	6.6	86	9.4	13	3.7
	Unemployed	1746	18.5	735	80.7	320	91.0
	Total	9427	100.0	911	99.9	352	100.0
Female	Full time	3332	30.4	42	2.9	3	0.5
Employment	Part time	1662	15.2	82	5.7	7	1.0
N=13,126	Unemployed	5966	54.4	1323	91.4	709	98.6
	Total	10960	100.0	1447	100.0	719	100.1
Meal Planner	Female head only	9765	84.3	1298	82.3	609	71.9
N=14,001	Male head only	585	5.1	126	8.0	121	14.3
	Male and Female Heads	695	6.0	102	6.5	38	4.5
	Female head and someone else	350	3.0	29	1.8	37	4.4
	Male head and someone else	88	0.8	9	0.6	10	1.1
	Someone other than above	96	0.8	11	0.7	32	3.8
	Total	11579	100.0	1575	99.9	847	100.0
Completeness	Complete kitchen	11387	98.3	1528	96.9	822	97.1
of Kitchen	Shares kitchen	72	0.6	15	1.0	7	0.8
N=13,901	No kitchen	42	0.4	18	1.1	10	1.2
	Total	11501	99.3	1561	99.0	839	99.1

Table 1. (continued) Number and Percent of Households Headed by Three Age Groups of Persons by Socioeconomic and Demographic Variables

Variable		<65 years n	<65 years %	65-74 years n	65-74 years %	74+ years n	74+ years %
Shopping Frequency N=14,014	More than once a week	2264	19.5	428	27.1	238	28.2
	Once a week	5891	50.8	764	48.5	408	48.3
	Once every two weeks	2489	21.5	207	13.1	88	10.4
	Once a month or less	900	7.8	163	10.4	92	10.9
	Never	48	0.4	15	1.0	19	2.3
	Total	11592	100.0	1577	100.1	845	100.1
Type of Store Used N=13,911	Supermarket	10909	94.6	1458	93.5	726	87.8
	Small store	388	3.4	89	5.7	93	11.3
	Someplace else	229	2.0	12	0.8	7	0.9
	Total	11526	100.0	1559	100.0	826	100.0
Receives Food Stamps N=13,828	Yes	841	7.4	100	6.5	55	6.6
	No	10594	92.6	1458	93.6	780	93.4
	Total	11435	100.0	1558	100.1	835	100.0

[1]differences from 100.0 due to rounding

nature of the variable, giving different sample sizes in many cases.

Income levels were lower with progressing age, as household heads retired. The very old had the lowest incomes as they became unable to do even part-time work and income from savings and investments diminished. The largest percentage of all age groups resided in the South, the younger households were suburban dwellers, the 65 - 74 year olds favored nonmetropolitan areas, and the very old favored central cities, perhaps due to transportation and health care needs or because they had never migrated to surburban areas as young households. The four seasons were equally represented; the vast majority of those responding to the survey were white, and of other than Spanish origin, however. Very old male heads of the household were less likely to have finished high school than those aged 65 - 74 and much less likely than household heads younger than 65 years of age to have done so. All elderly female household heads finished high school at twice the rate of older males. As would be expected, full-time employment decreased with increasing years.

A female household head usually planned the meals, making her responsible for food selection. Progressively more males planned meals as they aged, perhaps due to infirmity of the female head. The very old were more likely to have someone other than the male or female head assuming

this responsibility, or helping with it. Very few of any age had incomplete kitchen facilities which would govern food choices to some extent. Most of all those surveyed shopped once weekly, more of the very old never shopped, by a small percentage. Smaller stores were patronized increasingly with advancing age, although most used supermarkets. Distance to a store and delivery and credit services may influence the decision to shop at smaller stores. Food stamp use was negligible across all age groups and did not escalate as retirement incomes decreased.

Foods Used by the Greatest Number of Households Headed by Elderly Persons

Based on the number of households using a food during the survey week and the age of the head of the household, of the fifty most frequently used foods (Appendix II), 62 percent were nonconvenience items both for the general and elderly populations. All further analyses will involve comparisons with the general population of all age groups rather than with households headed by those under 65 as a separate category. Fourteen percent were basic convenience foods. In the elderly population, 18 percent of those foods used were complex convenience foods, compared to 20 percent used by the general population (Havlicek et al., 1982). Manufactured convenience foods were six percent and four

percent of the fifty foods most often used by the elderly and general populations, respectively (Table 2).

The ten nonconvenience foods used most frequently by the general population, shown in Table 3, were identical to those most often used by the group aged 65 - 74 years. The oldest group, 74 years of age or older, substituted bacon for onions.

Convenience foods used by the greatest number of households headed by individuals less than 65 years of age are shown in Table 3. Those aged 65 - 74 years substituted ice cream, soft tub margarine and mayonnaise for cheese, bologna and catsup. The group aged 74 years and older used corn flakes in place of cola drinks, otherwise their food selections were similar to those the 65 - 74 year old group used. Of the ten most often used foods, only white bread and instant coffee were convenience foods. Choices made by increasingly older persons may reflect attempts to economize, the necessity for easily prepared, chewed and digested foods (Mason and Beardon, 1978), and a preference for foods familiar throughout their lifespans (Busse, 1980). Health concerns may further motivate elderly people in choosing foods, evidenced by their use of whole wheat bread, a choice having more of the above advantages. The information on nutritional adequacy of foods available when these individuals were learning their food purchasing habits many years

Table 2. Number and Percent of Households Using Fifty Most Frequently Used Foods

Food Class	General Population[1]		Population Aged 65-74 Years		Population 74 Years and Over	
	n	%	n	%	n	%
Nonconvenience	31	62	31	62	31	62
Basic Convenience	7	14	7	14	7	14
Complex Convenience	10	20	9	18	9	18
Manufactured Convenience	2	4	3	6	3	6

[1](Havlicek, Capps, and Axelson, 1982)

Table 3. Nonconvenience and Convenience Foods Used Most Frequently by Three Age Groups of Household Heads (by order of use)

Nonconvenience Foods

	General Population[1]	Population Aged 65-74 Years	Population 74 Years and Over
1.	white sugar, granulated	white sugar, granulated	white sugar, granulated
2.	white potatoes, fresh	white potatoes, fresh	white potatoes, fresh
3.	cow's milk, whole	cow's milk, whole	cow's milk, whole
4.	lettuce, crisphead	eggs	eggs
5.	eggs	stick margarine	stick margarine
6.	apples, fresh	lettuce, crisphead	bananas
7.	tomatoes, fresh	bananas	bacon, sliced
8.	onions, mature, fresh	apples, fresh	apples, fresh
9.	stick margarine	tomatoes, fresh	lettuce, crisphead
10.	bananas	onions, mature, fresh	tomatoes, fresh

Convenience Foods

	General Population	Population Aged 65-74 Years	Population 74 Years and Over
1.	white bread, enriched	white bread, enriched	white bread, enriched
2.	soft drinks, cola type	saltine crackers	coffee, instant
3.	saltine crackers	coffee, instant	saltine crackers
4.	peanut butter	orange juice, frozen concentrate	ice cream, except chocolate
5.	frankfurters	ice cream, except chocolate	orange juice, frozen concentrate
6.	orange juice, frozen concentrate	peanut butter	soft tub margarine
7.	bologna	soft tub margarine	peanut butter
8.	catsup	frankfurters	frankfurters
9.	cheddar or American process cheese	mayonnaise	mayonnaise
10.	coffee, instant	soft drinks, cola type	corn flakes

[1](Havlicek, Capps, and Axelson, 1982)

ago may also be a factor in the foods they used (Hunter and Linn, 1979).

Socioeconomic Indices of Convenience and Nonconvenience Food Use by the Elderly Population

Analysis of covariance was used to detect any association between the use of each food class, nonconvenience, and basic, complex, and manufactured convenience, by the elderly population and selected socioeconomic and demographic variables. The money value of the foods in each class and of all foods used and the share of the food dollar spent for each class of foods indicated extent of use.

Determinations of use of each food class were based on share percent of the food dollar spent, and money value ($) of foods used. The average expenditure of households headed by males and/or females 65 years of age or older according to share of the food dollar was 59 percent for nonconvenience, 19 percent for basic convenience, 16 percent for complex convenience, and 6 percent for manufactured convenience foods. The average money value of the foods used by elderly households during the survey week was $18.91 for nonconvenience, $5.88 for basic convenience, $5.12 for complex convenience, and $1.93 for manufactured convenience foods (Havlicek, et al., 1982).

Money Value of Food

Table 4. Relationships of Socioeconomic Variables and Food Classes by the Money Value of Food

Variable	Nonconvenience	Basic Convenience	Complex Convenience	Manufactured Convenience	Total Food
Intercept	14.2400* (1.5232)[1]	4.5967* (0.6973)	3.9943* (0.6871)	2.0397* (0.3065)	24.8706* (2.4005)
Region: South[2]					
Northeast	-1.1007 (0.6475)	0.7356 (0.2964)	1.0580* (0.2921)	-0.1368 (0.1303)	0.5561 (1.0204)
North Central	-1.4957 (0.6311)	-0.1232 (0.2889)	0.5670 (0.2847)	-0.2716 (0.1270)	-1.3235 (0.9946)
West	-1.3176 (0.7370)	-0.1128 (0.3374)	0.2676 (0.3325)	-0.2750 (0.1483)	-1.4378 (1.1615)
Urbanization: Nonmetropolitan					
Central City	-0.4465 (0.6205)	0.4545 (0.2841)	-0.4234 (0.2799)	-0.2897 (0.1248)	-0.7050 (0.9779)
Suburban	0.0690 (0.5979)	0.3524 (0.2737)	-0.4910 (0.2697)	-0.2111 (0.1203)	-0.2807 (0.9422)
Season: Summer					
Spring	-1.8429* (0.6851)	0.0952 (0.3137)	-0.2600 (0.3091)	0.0468 (0.1378)	-1.9609 (1.0798)
Fall	-0.9035 (0.6471)	0.1608 (0.2963)	-0.0602 (0.2919)	-0.1117 (0.1302)	-0.9146 (1.0198)
Winter	-2.1763* (0.6545)	0.1722 (0.2996)	-0.0068 (0.2953)	-0.0900 (0.1317)	-2.1010 (1.0315)
Race: White					
Black	2.9748* (0.8338)	-0.6992 (0.3817)	-0.2745 (0.3761)	-0.0897 (0.1678)	1.9113 (1.3140)
Other	10.2118* (2.5598)	0.3086 (1.1719)	0.1120 (1.1548)	-0.1749 (0.5150)	10.4575* (4.0341)
Income: $0-4,999					
$5,000-9,999	5.4176* (0.5608)	1.8320* (0.2567)	1.4936* (0.2530)	0.6264* (0.1128)	9.3697* (0.8838)
$10,000-14,999	9.2437* (0.8262)	2.7379* (0.3783)	2.3124* (0.3727)	0.8811* (0.1662)	15.1750* (1.3021)
$15,000-19,999	12.3123* (1.3293)	3.2048* (0.6086)	4.7752* (0.5997)	1.9631* (0.2675)	22.2552* (2.0950)
$20,000-29,999	10.9010* (1.4170)	4.2115* (0.6487)	4.3691* (0.6392)	2.1045* (0.2851)	21.5860* (2.2331)
$30,000 and over	10.6000* (1.8523)	5.2958* (0.8480)	3.5832* (0.8356)	2.1143* (0.3727)	21.5934* (2.9191)
Education of Meal Planner: At least a high school education					
Less than a high school education	2.1212* (0.5262)	0.1923 (0.2409)	0.5813 (0.2374)	-0.0061 (0.1059)	2.8886* (0.8293)
Employment Status of Meal Planner: Full or part time					
Unemployed	0.7119 (0.8870)	-0.2499 (0.4061)	-0.8079 (0.4001)	-0.2464 (0.1785)	-0.5924 (1.3979)
Origin: Other than Spanish					
Spanish	4.0499 (1.8120)	1.6853 (0.8296)	-0.3284 (0.8174)	0.5985 (0.3646)	6.0053 (2.8557)
Food Stamps: Does not receive					
Does receive	-1.9207 (0.8675)	-0.8921 (0.3972)	-0.4950 (0.3913)	-0.3465 (0.3913)	-3.6542* (1.3671)
Meal Planner: Female head only					
Male head only	-4.1114* (0.8013)	-1.0570* (0.3669)	0.7269 (0.3615)	0.2485 (0.1612)	-4.1929* (1.2629)
Male and female heads	1.7340 (1.0153)	1.2792* (0.4648)	1.8470* (0.4580)	0.5540* (0.2043)	5.4142* (1.6001)
Female head and someone else	2.6945 (1.4549)	1.4303 (0.6660)	3.1120* (0.6563)	0.8428* (0.2927)	8.0796* (2.2928)
Male head and someone else	5.3550 (2.5979)	1.6595 (1.1893)	4.1032* (1.1719)	0.4467 (0.5227)	11.5645* (4.0941)
Someone other than above	-2.5775 (2.2719)	-0.8446 (1.0401)	0.0278 (1.0249)	-0.2744 (0.4571)	-3.6687 (3.5804)

Table 4.(continued) Relationships of Socioeconomic Variables and Food Classes by the Money Value of Food

Variable	Nonconvenience	Basic Convenience	Complex Convenience	Manufactured Convenience	Total Food
Shopping frequency:	More than once a week				
Once a week	-0.6436	-0.0771	-0.0727	-0.0922	-0.8857
	(0.5649)	(0.2586)	(0.2548)	(0.1137)	(0.8902)
Once every two weeks	-0.1545	0.1484	-0.3832	-0.2850	-0.7744
	(0.8127)	(0.3721)	(0.3666)	(0.1635)	(1.2808)
Once a month or less	-1.4264	-0.5771	-0.4474	-0.4044	-2.8552
	(0.8724)	(0.3994)	(0.3935)	(0.1755)	(1.3748)
Never	-6.0597*	-1.7181	-1.1444	-0.7082	-9.6304*
	(2.1413)	(0.9803)	(0.9660)	(0.4308)	(3.3746)
Type of Store Used:	Supermarket				
Small store	-0.3059	0.0477	0.1551	-0.0291	-0.1322
	(0.8502)	(0.3892)	(0.3835)	(0.1711)	(1.3399)
Someplace other than above	-0.1732	0.5875	5.8020*	0.0586	6.2749
	(2.6707)	(1.2227)	(1.2048)	(0.5373)	(4.2089)
Age of Household Head:	65-74 years				
74 years and over	1.2108	-0.2594	-0.0314	0.0242	0.8959
	(0.7091)	(0.3246)	(0.3199)	(0.1427)	(1.1176)
F-ratio	12.69	7.83	9.33	7.37	15.30
r^2	0.1876	0.1246	0.1451	0.1182	0.2177

N= 1,736 households

*statistically significant at the 0.01 level

[1]standard error

[2]category withheld

The money value, or weekly cost, of food was significantly greater ($p < .01$) by those living in the Northeast than by those living in other regions for complex convenience foods (Table 4). More was spent for nonconvenience foods in the summer and fall than in the spring and winter seasons. The consumption of fresh garden foods during these seasons may have accounted for this finding. All nonwhite races used more nonconvenience foods than did white respondents. Nonwhite households, excluding blacks, used more of all foods. As income rose, more money was spent on each class of foods and on total food accordingly. An elderly meal planner with less than a high school education spent more on nonconvenience foods and on total food than a more educated meal planner spent.

Those receiving food stamps spent more on all foods than those not receiving food stamps, but was not associated with use of specific food classes. Food stamps allowed increased buying power by those willing or able to avail themselves of the food stamp program. Aging individuals sometimes decline to use food stamps due to inadequate transportation or a reluctance to accept assistance (Guthrie et al., 1972).

In households where meals were planned by anyone besides the male head alone, more was spent on nonconvenience and complex convenience foods; if by both heads, more went for basic convenience foods; and, if by a male

alone, significantly less was spent on basic convenience foods. The female head alone spent significantly less for complex or manufactured convenience foods and less for total food than did households with a male and a female head planning meals together or by a male or female head and someone else. A female with many years of experience possesses both the skill and interest necessary for the execution of economical meals prepared from more basic ingredients. A male may have elected to cook less or to use foods with more built-in preparation.

Forty-eight percent of the elderly households surveyed shopped once a week. If grocery shopping was never done by the elderly head of the household, less was spent on total food than if shopping was done more often. Although not significant, there seemed to be a trend to spend more for all food classes if shopping was done more than once a week than if shopping was done less frequently, indicating extra items are included on each shopping trip.

The type of store patronized was related to the amount spent on complex convenience foods only. More was spent for this group of foods if shopping was done in neither a supermarket nor a small store, although fewer than one percent patronized such stores. The larger selection offered by a supermarket would provide more fresh foods difficult to keep in a smaller store with a smaller

inventory and slower turnover. Where else shopping was done was not specified.

Other relationships between the money value of food and the above variables were not significant. The variables studied accounted for 22 percent of the variation in the money value of all foods, 19 percent of the variation in the money value of nonconvenience foods, and 12 percent, 15 percent and 12 percent of the variation in the money value of basic, complex, and manufactured convenience foods, respectively. Although low, these values are noteworthy because of the variability of individuals' household food supplies. The influence of the above variables is summarized in Table 5.

Share of the Food Dollar

Share of the food dollar spent for each class of foods was used to eliminate the effect of greater amount spent by households with higher incomes or additional members. As the percentage of the food dollar spent for one food class changed, the others fluctuated accordingly. A clearer idea of the relative effect spending for one group had on the others resulted. Elderly households residing in the South and West spent significantly more of each food dollar on nonconvenience foods than did the other regions (Table 6). Less was spent on basic convenience foods by all regions than by those in the Northeast, less on complex convenience

Table 5. Summary of Variables Characterizing Convenience and Nonconvenience Food Use by the Money Value of Food

Variable	Nonconvenience Foods	Convenience Foods: Basic	Complex	Manufactured	Total Food
Region	NSD[1]	NSD	Northeast	NSD	NSD
Urbanization	NSD	NSD	NSD	NSD	NSD
Season	Summer, Fall	NSD	NSD	NSD	NSD
Race	nonwhite	NSD	NSD	NSD	nonblack
Income	In general, as income increased, money value of all food classes and total food increased				
Education of Meal Planner	less than high school graduate	NSD	NSD	NSD	NSD
Employment of Meal Planner	NSD	NSD	NSD	NSD	NSD
Origin	NSD	NSD	NSD	NSD	NSD
Receives Food Stamps	NSD	NSD	NSD	NSD	NSD
Meal Planner	all but male head alone	male and female head	male and female head, female or male head and someone else	male and female head, female head and someone else	male and female head, female or male head and someone else
Shopping Frequency	more often than never	NSD	NSD	NSD	more often than never
Type of Store Used	NSD	NSD	neither a supermarket nor a small store	NSD	NSD
Age of Household Head	NSD	NSD	NSD	NSD	NSD

[1]not statistically significant

Table 6. Relationships of Socioeconomic Variables and Food Classes by Share of the Food Dollar

Variable	Nonconvenience	Basic Convenience	Complex Convenience	Manufactured Convenience
Intercept	0.5893* (0.0234)[1]	0.1834* (0.0271)	0.1397* (0.0155)	0.0876* (0.0088)
Region: South[2]				
Northeast	-0.0563* (0.0099)	0.0271* (0.0075)	0.0393* (0.0066)	-0.0101* (0.0037)
North Central	-0.0320* (0.0097)	0.0091 (0.0073)	0.0335* (0.0064)	-0.0107* (0.0036)
West	-0.0139 (0.0113)	0.0040 (0.0085)	0.0201* (0.0075)	-0.0102 (0.0042)
Urbanization: Nonmetropolitan				
Central City	-0.0107 (0.0095)	0.0211* (0.0072)	-0.0037 (0.0063)	-0.0067 (0.0036)
Suburban	0.0128 (0.0092)	0.0083 (0.0069)	-0.0149 (0.0061)	-0.0062 (0.0034)
Season: Summer				
Spring	-0.0214 (0.0105)	0.0161 (0.0079)	0.0007 (0.0070)	0.0046 (0.0039)
Fall	-0.0154 (0.0099)	0.0116 (0.0075)	0.0041 (0.0066)	-0.0002 (0.0037)
Winter	-0.0312* (0.0100)	0.0223* (0.0076)	0.0100 (0.0066)	-0.0010 (0.0038)
Race: White				
Black	0.0792* (0.0128)	-0.0404* (0.0097)	-0.0290* (0.0085)	-0.0098 (0.0048)
Other	0.1126* (0.0393)	-0.0534 (0.0297)	-0.0417 (0.0260)	-0.0175 (0.0147)
Income: $0-4,999				
$5,000-9,999	0.0062 (0.0086)	-0.0035 (0.0065)	-0.0070 (0.0057)	0.0044 (0.0032)
$10,000-14,999	0.0171 (0.0127)	-0.0077 (0.0096)	-0.0103 (0.0084)	0.0009 (0.0047)
$15,000-19,999	-0.0002 (0.0204)	-0.0244 (0.0154)	0.0126 (0.0135)	0.0120 (0.0076)
$20,000-29,999	-0.0044 (0.0217)	-0.0047 (0.0164)	-0.0104 (0.0144)	0.0195 (0.0081)
$30,000 and over	-0.0113 (0.0284)	-0.0030 (0.0215)	-0.0061) (0.0188)	0.0204 (0.0106)
Education of Meal Planner: At least a high school education				
Less than a high school education	0.0201 (0.0081)	-0.0165* (0.0061)	0.0020 (0.0053)	-0.0056 (0.0030)
Employment Status of Meal Planner: Full or part time				
Unemployed	0.0169 (0.0136)	0.0046 (0.0103)	-0.0103 (0.0090)	-0.0112 (0.0051)
Origin: Other than Spanish				
Spanish	-0.0140 (0.0278)	0.0143 (0.0210)	-0.0163 (0.0184)	0.0160 (0.0104)
Food Stamps: Does not receive				
Does receive	0.0022 (0.0133)	-0.0069 (0.0100)	0.0104 (0.0088)	-0.0058 (0.0050)
Meal Planner: Female head of household only				
Male head only	-0.0733* (0.0123)	-0.0018 (0.0093)	0.0600* (0.0081)	0.0151* (0.0046)
Male and female heads	-0.0227 (0.0156)	-0.0004 (0.0118)	0.0176 (0.0103)	0.0051 (0.0058)
Female head and someone else	-0.0386 (0.0223)	0.0032 (0.0169)	0.0356 (0.0148)	-0.0002 (0.0084)
Male head and someone else	-0.1009* (0.0399)	0.0360 (0.0301)	0.0720* (0.0264)	-0.0072 (0.0149)
Someone other than above	-0.0344 (0.0349)	0.0069 (0.0263)	0.0318 (0.0231)	-0.0043 (0.0131)

Table 6. (continued) Relationships of Socioeconomic Variables and Food Classes by Share of the Food Dollar

Variable	Noncon-venience	Basic Convenience	Complex Convenience	Manufactured Convenience
Shopping Frequency: More than once a week				
Once a week	-0.0100	0.0080	0.0055	-0.0035
	(0.0087)	(0.0065)	(0.0057)	(0.0032)
Once every two weeks	0.0077	0.0038	0.0005	-0.0120*
	(0.0125)	(0.0094)	(0.0083)	(0.0047)
Once a month or less	0.0133	0.0013	-0.0017	-0.0129*
	(0.0134)	(0.0101)	(0.0089)	(0.0050)
Never	-0.0533	0.0185	0.0249	0.0099
	(0.0329)	(0.0248)	(0.0217)	(0.0123)
Type of Store Used: Supermarket				
Small store	-0.0051	0.0056	0.0041	-0.0047
	(0.0130)	(0.0098)	(0.0086)	(0.0049)
Someplace else	-0.0363	0.0134	0.0418	-0.0189
	(0.0410)	(0.0309)	(0.0271)	(0.0154)
Age of Household Head: 65-74 years				
74 years and over	0.0227	-0.0205	-0.0006	-0.0017
	(0.0109)	(0.0082)	(0.0072)	(0.0041)
F-ratio	6.82	2.82	6.07	2.85
r^2	0.1104	0.0498	0.0995	0.0493

N= 1,736 households

*statistically significant at the 0.01 level

[1]standard error

[2]category withheld

foods by the South than other regions, and more on manufactured convenience foods by households in the South and West

In contrast, the general population in the South spent the greatest share of the food dollar on nonconvenience foods. Use of the basic convenience group was high in the West, as well as the Northeast. Complex food use by the general population was the same as for the elderly and manufactured convenience foods were allocated more of the food dollar by the general population in the North central as well as in the South and West where share of the food dollar determined greater use by older people (Havlicek et al., 1982).

Elderly households living in central cities spent more of their food dollar on basic convenience foods than nonmetropolitan or rural households headed by older persons spent. The general population in nonmetropolitan areas used more nonconvenience foods, those in central cities used more of all convenience foods and suburbanites used more manufactured convenience foods (Havlicek et al., 1982).

In the winter, a smaller percentage of the food money was spent on nonconvenience foods and a larger percentage on basic convenience foods than in the other seasons. The availability of fresh fruits and vegetables would cause a shift from the frozen and canned varieties in the basic convenience food class. The general population spent more on nonconvenience foods in the summer, more on complex

convenience foods in the winter and less on basic convenience foods in the summer.

Elderly white households spent less of their food dollar on nonconvenience foods than did other races, and more on basic and complex convenience foods than black households spent. Households headed by whites in the general population spent more on manufactured convenience foods (Havlicek et al., 1982).

Basic convenience foods comprised a larger share of the food dollar among meal planners who had at least a high school education than among those who were less educated, as with the general population, whose high school graduates also used more manufactured convenience foods. Nonconvenience foods were allotted more of the food dollar by people of all ages with less than a high school diploma (Havlicek et al., 1982).

If meals were planned by an elderly male household head alone, less of the food dollar was spent for nonconvenience foods, and more was spent on complex and manufactured convenience foods.

Shopping every two weeks or less often resulted in a smaller allocation of the food dollar for manufactured convenience foods. These items are perhaps added as unplanned extras in response to visual cues while shopping so would be purchased at a rate relative to the number of occasions on which they are seen.

Other findings were not statistically significant. In Table 7, a summary of the influence of the aforementioned variables are shown. These variables accounted for 11 percent of the variation seen in the share of the food dollar spent for nonconvenience foods, and 5 percent, 10 percent and 5 percent of the variation seen in basic, complex and manufactured convenience foods, respectively. As with the money value of each food class,these values, although low, are significant given the variability of individual's household food supplies.

Nutrient Contributions of Convenience and Nonconvenience Food Classes

Nutrients contributed by each of the food classes, nonconvenience, basic, complex and manufactured convenience, were determined using mean energy and nutrients per nutrition unit per day. A nutrition unit was defined by Havlicek et al. (1982) as the sum of the Recommended Dietary Allowances (RDA) for a nutrient for all those eating in a household, divided by the RDA for an adult male for the nutrient.

The population aged 65 years and older received an average of 58 percent of their food energy (kilocalories) from nonconvenience foods (Table 8). This was in keeping with the greater share of the food dollar (60 percent) spent on this food class. Basic convenience foods provided 15 percent of the food energy, the complex group contributed 20

Table 7. Summary of Variable Characterizing Convenience and Nonconvenience Food Use by Share of the Food Dollar

Variable	Nonconvenience Foods	Convenience Foods: Basic	Complex	Manufactured
Region	South West	Northeast	Northeast North Central West	South West
Urbanization	NSD[1]	Central City	NSD	NSD
Season	Summer Spring Fall	Winter	NSD	NSD
Race	nonwhite	nonblack	nonblack	NSD
Income	NSD	NSD	NSD	NSD
Education of Meal Planner	NSD	at least a high school education	NSD	NSD
Employment of Meal Planner	NSD	NSD	NSD	NSD
Origin	NSD	NSD	NSD	NSD
Receives Food Stamps	NSD	NSD	NSD	NSD
Meal Planner	someone other than male head, male head and someone else	NSD	male head, male head and someone else	male head
Shopping Frequency	NSD	NSD	NSD	more than once a week, once a week, never
Type of Store Used	NSD	NSD	NSD	NSD
Age of Household Head	NSD	NSD	NSD	NSD

[1]not statistically significant

Table 8. Mean Nutrient per Nutrient Unit per Day and Percent[1] of Nutrient Contributed by Each Food Class in Elderly Households

Nutrient	Nonconvenience Foods		Convenience Foods: Basic		Complex		Manufactured		Total Food
	Mean	%	Mean	%	Mean	%	Mean	%	Mean
food energy (kcal)	2269 (1219)[2]	58	591 (438)	15	791 (507)	20	252 (235)	7	3903
protein (g)	77.8 (40.5)	66	18.5 (18.3)	16	17.1 (11.9)	15	3.8 (4.1)	3	117.1
fat (g)	93.7 (56.8)	69	16.8 (17.7)	12	22.9 (18.6)	17	3.0 (4.1)	2	136.4
carbohydrate (g)	147 (113)	46	57 (50)	18	80 (53)	25	36 (33)	11	321
calcium (mg)	660 (423)	62	209 (259)	20	164 (112)	16	26 (36)	2	1060
iron (mg)	10.3 (6.4)	54	3.1 (3.4)	16	3.2 (2.2)	17	2.4 (2.8)	13	19
magnesium (mg)	278 (156)	58	105 (86)	22	64 (52)	13	33 (47)	7	482
phosphorus (mg)	1098 (567)	61	350 (334)	20	260 (197)	15	92 (120)	5	1801
vitamin A (I.U.)	4311 (2971)	57	1789 (1858)	24	628 (851)	8	809 (1044)	11	7537
thiamin (mg)	0.54 (0.6)	41	0.19 (0.3)	15	0.28 (0.3)	22	0.29 (0.4)	22	1.31
riboflavin (mg)	1.24 (1.0)	62	0.19 (0.4)	10	0.25 (0.3)	12	0.33 (0.5)	16	2.01
preformed niacin (mg)	18.5 (11.8)	52	6.8 (6.6)	19	5.6 (4.0)	16	4.8 (6.0)	13	35.7
vitamin B_6 (mg)	0.89 (0.6)	67	0.12 (0.2)	9	0.06 (0.1)	5	0.25 (0.4)	19	1.32
vitamin B_{12} (mcg)	4.49 (6.9)	74	0.81 (2.6)	13	0.48 (1.0)	8	0.27 (0.7)	5	6.05
vitamin C (mg)	89.2 (75.2)	55	63.2 (67.5)	39	4.0 (6.3)	2	6.8 (10.8)	4	163.2

[1]percent of mean kilocalories or nutrient for households surveyed; may not add up to 100% because of rounding

[2]standard deviation

percent, and the manufactured food class provided 7 percent of the kilocalories to the household food supply. Havlicek et al., (1982), using the same data base, found that the four food classes supplied similar percentages of food energy to the general United States population. Complex convenience foods provided more (23 percent) and nonconvenience foods less (55 percent) of the kilocalories, however. From the nonconvenience category, most nutrients were supplied to the elderly group at a higher level than to the general population, commensurate with its greater use and caloric contribution, with several exceptions. Calcium was supplied by nonconvenience foods at the same level to both population groups and thiamin was supplied at a lower level to the older group by nonconvenience foods. Similarly, less food energy and less of all nutrients were contributed by the complex convenience class, which was less utilized by the elderly group than by the general population (Havlicek et al., 1982).

Nonconvenience Foods

The percentage of some nutrients provided by the nonconvenience class varied from the percentage of kilocalories contributed by the class, ranging from 74 percent of the vitamin B_{12} to 41 percent of the thiamin. The nonconvenience class included fresh meats, which provide vitamin B_{12} and few thiamin-enriched grain products. This may have accounted for these outlying figures. The general

population received a substantially lower percentage of fat, carbohydrate, vitamin A and vitamin C from the group than did the elderly subsample. This may have been due to lower use of the nonconvenience food class (Havlicek et al., 1982).

Basic Convenience Foods

The basic convenience class generally supplied between 10 - 20 percent of the various nutrients, while providing 15 percent of the caloric intake. This was similar in all instances to data for the general population (Havlicek et al., 1982). Greater amounts of vitamin C (39 percent) and vitamin A (24 percent) were supplied relative to the caloric contribution of this class. Frequently used frozen orange juice, categorized as a basic convenience food, may have supplied high levels of vitamin C. Frozen and canned fruits and vegetables and their juices and fortified tub margarine may have supplied vitamin A from the basic convenience food category.

Only three nutrients or food components were supplied at less than the 15 percent caloric contribution of this class: fat (12 percent), riboflavin (10 percent) and vitamin B_{12} (9 percent). All values for elderly persons were similar to those for the general population (Havlicek et al., 1982).

Complex Convenience Foods

The complex convenience food class provided 20 percent of the calories in foods used by the elderly group compared with 23 percent in foods used by people of all ages (Havlicek et al., 1982). In like manner, a smaller percentage of all nutrients was supplied the elderly population by this food category. Vitamin C (2 percent), vitamin A (8 percent), vitamin B_{12} (8 percent) and vitamin B_6 (5 percent) were particularly low in the complex convenience group, which excludes most fruits, vegetables, meats and whole grains. Higher levels of carbohydrate (25 percent) were contributed by starch-based mixes and by commercially baked bread, the convenience food used by the greatest number of households of all ages.

Manufactured Convenience Foods

Manufactured convenience foods formed a small group of food items and accounted for only 7 percent of the caloric value of household foods used by elderly subjects, as well as by those of all ages (Havlicek et al., 1982). Most nutrients were supplied at proportionally low levels, with the exception of nutrients added in the fortification of ready-to-eat breakfast cereals, a large part of this food category. Carbohydrate was high (11 percent), as was iron (13 percent), thiamin (22 percent), riboflavin (16 percent), preformed niacin (13 percent), and vitamin B_6 (19 percent). Ready-to-eat cereals and saltines were both among foods eaten by the greatest number of households surveyed and

supply many of these nutrients. Manufactured convenience foods contributed thiamin, riboflavin and vitamin B_6 at a level greater than or equal to foods from the other convenience food classes which form a much larger part of the household food supply.

Correlation of Food Use and Nutrient Value of Household Food

Pearson product-moment correlation coefficients were determined for nutrient levels per nutrient unit and both share of the food dollar and the money value of food (Tables 9 and 10). As money value and share of the food dollar for each food class increased, most nutrient values of the household food also changed. Although most associations were statistically significant due to the very large sample size, the magnitude of the relationships was very small. The results should be applied only to large groups, rather than to individuals or small groups.

Share of the food dollar. As the share of the food dollar spent for nonconvenience foods increased, mean household values per nutrition unit for food energy, protein, fat, calcium, iron, magnesium, phosphorus, thiamin, riboflavin, preformed niacin and vitamin B_6 increased (Table 9). Vitamin A values decreased. Correlations of share of the food dollar for nonconvenience foods and carbohydrate, vitamin B_{12}, and vitamin C values were not statistically different from zero. Foods selected by the sample of all

Table 9. Pearson Product-Moment Correlation Coefficients of Nutrient Use per Nutrition Unit and Share of the Food Dollar for Four Food Classes

Nutrient	Nonconvenience Foods	Convenience Foods: Basic	Complex	Manufactured
food energy (kcal)	0.0874 0.0001	-0.0708 0.0004	-0.0505 0.0120	-0.0095* 0.6360
protein (g)	0.1289 0.0001	-0.0201* 0.3167	-0.1250 0.0001	-0.0921 0.0001
fat (g)	0.1282 0.0001	-0.1283 0.0001	-0.0278* 0.1667	-0.0481 0.0167
carbohydrate (mg)	0.0250* 0.2132	-0.0539 0.0073	-0.0004* 0.9861	0.0392* 0.0510
calcium (mg)	0.0552 0.0060	0.0149* 0.4587	-0.0981 0.0001	-0.0066 0.7420*
iron (mg)	0.1095 0.0001	-0.0555 0.0057	-0.1096 0.0001	0.0048* 0.8112
magnesium (mg)	0.0490 0.0148	0.0482 0.0165	-0.1137 0.0001	-0.0277* 0.1680
phosphorus (mg)	0.1067 0.0001	-0.0164* 0.4139	-0.1267 0.0001	-0.0348* 0.0832
vitamin A (I.U.)	-0.0519 0.0097	0.1223 0.0001	-0.0753 0.0002	0.0342* 0.0888
thiamin (mg)	0.0821 0.0001	-0.0593 0.0031	-0.0940 0.0001	0.0602 0.0027
riboflavin (mg)	0.0851 0.0001	-0.0655 0.0011	-0.0924 0.0001	0.0614 0.0022
preformed niacin (mg)	0.0474 0.0184	0.0248* 0.2175	-0.1029 0.0001	0.0040* 0.8419
vitamin B_6 (mg)	0.1194 0.0001	-0.0886 0.0001	-0.1114 0.0001	0.0469 0.0196
vitamin B_{12} (mcg)	0.0354* 0.0782	-0.0246* 0.2216	-0.0221* 0.2727	-0.0092* 0.6468
vitamin C (mg)	0.0370* 0.0660	0.1162 0.0001	-0.1610 0.0001	-0.0456* 0.0232

*not significant at the 0.01 level

Table 10. Pearson Product-Moment Correlation Coefficients of Total Nutrient Use per Nutrition Unit and Money Value of Food for Four Food Groups

Nutrient	Nonconvenience Foods	Convenience Foods: Basic	Complex	Manufactured
food energy (kcal)	0.3502 0.0001	0.2032 0.0001	0.1969 0.0001	0.1492 0.0001
protein (g)	0.4439 0.0001	0.3043 0.0001	0.2152 0.0001	0.1367 0.0001
fat (g)	0.4209 0.0001	0.2035 0.0001	0.2542 0.0001	0.1530 0.0001
carbohydrate (g)	0.3209 0.0001	0.2017 0.0001	0.2184 0.0001	0.1672 0.0001
calcium (mg)	0.2585 0.0001	0.1927 0.0001	0.1198 0.0001	0.1005 0.0001
iron (mg)	0.3628 0.0001	0.2123 0.0001	0.1495 0.0001	0.1549 0.0001
magnesium (mg)	0.3203 0.0001	0.2879 0.0001	0.1583 0.0001	0.1272 0.0001
phosphorus (mg)	0.3872 0.0001	0.2633 0.0001	0.1719 0.0001	0.1446 0.0001
vitamin A (I.U.)	0.0380* 0.0584	0.1234 0.0001	0.0050* 0.8032	0.0467* 0.0202
thiamin (mg)	0.3615 0.0001	0.2009 0.0001	0.1739 0.0001	0.1879 0.0001
riboflavin (mg)	0.3261 0.0001	0.1854 0.0001	0.1616 0.0001	0.1775 0.0001
preformed niacin (mg)	0.3269 0.0001	0.2790 0.0001	0.1613 0.0001	0.1562 0.0001
vitamin B_6 (mg)	0.4757 0.0001	0.2700 0.0001	0.2450 0.0001	0.2450 0.0001
vitamin B_{12} (mcg)	0.1674 0.0001	0.1055 0.0001	0.0979 0.0001	0.0842 0.0001
vitamin C (mg)	0.1997 0.0001	0.1988 0.0001	0.0277* 0.1691	0.0544 0.0091

*not significant at the .01 level

age groups had a different nutrient potential (Havlicek et al., 1982). Correlations for share of the food dollar for nonconvenience foods with calcium and magnesium were not statistically significant for the general population. All other changes in nutrients available in the food supply of the general population for the survey week were positively related to nonconvenience food use, with the exception of carbohydrate and vitamin A. The dairy products, meats, and flour included in the nonconvenience food class may have accounted for these positive relationships. Since fresh fruits and vegetables are nonconvenience foods in large part, the decrease in vitamin A intake relative to nonconvenience food use was unexpected. Carrots, for example, are a major source of vitamin A, and are among the 25 foods used by the greatest number of elderly households surveyed. This parodox can be explained by the low cost of fresh carrots, giving low weight to their contribution to nonconvenience foods by share of the food dollar spent for them. Meats, in contrast, represent a greater part of the food dollar, making their nutrient contribution more significant.

The extent of use of basic convenience foods affected the mean nutrient value of the food supply of both the elderly and general populations (Havlicek et al., 1982). Significant negative associations were found for food energy, fat, carbohydrate, thiamin, riboflavin, iron and vitamin B_6. Household use of magnesium, vitamin A and

vitamin C were positively related to the use of basic convenience foods. Calcium was positively related only for the general population and iron was negatively related only for the elderly group (Havlicek et al., 1982). Other findings were not statistically different from zero. Foods contained in the basic convenience food class were similar to those in the nonconvenience food class, but were commercially preserved by canning or freezing or altered by minor ingredient additions to provide limited convenience. The impact on nutrient values of the household food supply from either class of foods was potentially similar but differed in reality. Several forms of a food were not equally utilized, as with the use of fresh, frozen and canned meats or fresh and preserved fruits and vegetables. A particular form of food is selected based on its characteristics as a convenience or nonconvenience food. Widely used foods basic convenience foods were not the commercially processed counterparts of the most widely used nonconvenience foods. They were, as indicated in Appendix I: instant coffee, canned green beans and peas, soft tub margarine, peanut butter, frozen orange juice concentrate and processed cheese. Many of these foods are commonly used only in convenience form and supply a different array of nutrients from the basic convenience food class than are supplied from foods commonly used from the nonconvenience food class.

Use of the complex convenience food class by elderly households was negatively associated with all nutrients, although not significantly with fat, carbohydrate, or vitamin B_{12}. Carbohydrate values were positively related to use of complex convenience foods by the general population, otherwise the two groups were similar (Havlicek et al., 1982). White bread, in the complex convenience food class, was the most widely used convenience food by all ages, followed by ice cream, frankfurters, mayonnaise, whole wheat bread, mayonnaise-type salad dressing, jelly, bologna and catsup by older Americans. The same foods, including potato chips and beer, were used by the general population (Havlicek et al., 1982). Research indicates that packaged mixes and frozen entrees, in the complex convenience class, contain less meat or meat substitute, less chopped vegetables, and more pasta, breading and gravy per serving than home-prepared counterparts (Traub and Odland, 1979). Use of foods of this type may account for the negative correlation of complex convenience foods with all nutrients as proportionally more of the food dollar was allocated for them.

The manufactured convenience food category encompassed all foods with no counterpart commonly prepared at home. Foods frequently used from this class were saltine crackers, cola drinks, and corn flakes. Values for protein and fat were negatively associated with the share of the food dollar spent on manufactured convenience foods. Thiamin,

riboflavin, and vitamin B_6 were positively related to their use. The widespread use of enriched dry cereals and saltine crackers provided those nutrients supplied by the manufactured convenience food class. The population aged 65 - 74 years used cola drinks less often than the general population but more than those 74 years and older (Havlicek, et al., 1982). The effect of kilocalories supplied without nutrients by cola drinks is less a concern with the older population, who probably puts its food dollar to better use for financial or health reasons, than the general population does. Cereal was used by many older households, more so than by the general population, judging by its inclusion in the group of foods used by the greatest number of households in the survey (Havlicek et al., 1982). Manufactured convenience foods, few in number, represented a small part of the food dollar spent by any age group and contain nutrients added to fortified foods, in large part. This may account for so few nutrients being significantly related to share of the food dollar allocated to this food class.

Money value of food. Across all four food categories, as the amount of money spent on food increased, food energy and all nutrients increased (Table 10). All correlations were statistically significant, with the exception of vitamin A values from the nonconvenience, complex

convenience and manufactured convenience classes, and vitamin C from the complex convenience class.

Nutrient Density Ratios

Mean nutrient density ratios were used to compare the nutrient contribution of nonconvenience foods and each class of convenience foods relative to the food energy supplied by each. As a group, nonconvenience foods contained the highest level of nutrients per kilocalorie, complex convenience foods contained the lowest. (Table 11). The mean nutrient densities of all food classes were more favorable for elderly males than for elderly females, based on the RDA. The lower RDA for kilocalories for women caused this since the same pool of foods was used to determine the ratios. The elderly population had lower mean nutrient density ratios than did the general population did (Table 12).

This was due to the reduced energy requirement in old age. As the RDA for calories decreases, the nutrient density ratio also decreases. For elderly people, particularly women, this means needed nutrients must be supplied by lower calorie foods to meet both nutrient and calorie needs. The complex convenience food class supplies a much lower average level of nutrients when compared using nutrient density ratios than do the other food classes. Older people may find it necessary to curtail their use of this convenience food class.

Table 11. Nutrient Density Ratios[1] of Food Classes Used by Elderly Households

Nutrient		Nonconvenience Foods		Convenience Foods: Basic		Complex		Manufactured	
		computed	truncated	computed	truncated	computed	truncated	computed	truncated
protein (g)	M[2]	1.47	1.00	1.34	1.00	.93	.93	.65	.65
	F[3]	1.40	1.00	1.28	1.00	.88	.88	.62	.62
calcium (mg)	M	.87	.87	1.06	1.00	.62	.62	.31	.31
	F	.66	.66	.80	.80	.47	.47	.23	.23
iron (mg)	M	1.09	1.00	1.26	1.00	.97	.97	2.29	1.00
	F	.82	.82	.94	.94	.73	.73	1.71	1.00
vitamin A (I.U.)	M	.91	.91	1.45	1.00	.38	.38	1.54	1.00
	F	.85	.85	1.36	1.00	.36	.36	1.44	1.00
thiamin (mg)	M	.48	.48	.67	.67	.72	.72	2.33	1.00
	F	.43	.43	.60	.60	.65	.65	2.09	1.00
riboflavin (mg)	M	.94	.94	.55	.55	.54	.54	2.24	1.00
	F	.82	.82	.48	.48	.63	.63	2.62	1.00
vitamin C (mg)	M	1.57	1.00	4.28	1.00	.20	.20	1.08	1.00
	F	1.18	1.00	3.21	1.00	.15	.15	.81	.81
mean NDR	M		.89		.89		.62		.85
	F		.80		.83		.55		.81

[1] $NDR = \left(\frac{\text{nutrient units of each food class}}{\text{kcal of each food class}}\right)\left(\frac{\text{RDA}^4 \text{ for kcal}}{\text{RDA for nutrient}}\right)$

[2] male

[3] female

[4] based on 1980 for ages 51-75

Table 12. Comparison of Nutrient Density Ratios of the Elderly and General[1] Populations

Nutrient		Nonconvenience Foods		Convenience Foods: Basic		Complex		Manufactured	
		Elderly	General	Elderly	General	Elderly	General	Elderly	General
protein (g)	M[2]	1.00[3]	1.00[4]	1.00	1.00	.93	1.00	.65	.74
	F[5]	1.00		1.00		.88		.62	
calcium (mg)	M	.87	1.00	1.00	1.00	.62	.93	.31	.49
	F	.66		.80		.47		.23	
iron (mg)	M	1.00	1.00	1.00	1.00	.97	1.00	1.00	1.00
	F	.82		.94		.73		1.00	
vitamin A (I.U.)	M	.91	1.00	1.00	1.00	.38	.47	1.00	1.00
	F	.85		1.00		.36		1.00	
thiamin (mg)	M	.48	.52	.67	.62	.72	.77	1.00	1.00
	F	.43		.60		.65		1.00	
riboflavin (mg)	M	.94	1.00	.55	.51	.54	.61	1.00	1.00
	F	.82		.48		.63		1.00	
vitamin C (mg)	M	1.00	1.00	1.00	1.00	.20	.34	1.00	1.00
	F	1.00		1.00		.15		.81	
mean NDR	M	.88	.93	.89	.88	.62	.73	.85	.89
	F	.80		.83		.55		.81	

[1]general population includes all age groups (Havlicek et al., 1982)

[2]male

[3]truncated at 1.00

[4]general population combines male and female

[5]female

Chapter V

CONCLUSIONS AND RECOMMENDATIONS

The use of convenience foods by 1736 households headed by individuals aged 65 years or older included in the U.S. Department of Agriculture 1977-78 Nationwide Food Consumption Survey was examined. The basic, complex and manufactured convenience and nonconvenience foods used by the greatest number of households was tallied. Socioeconomic and demographic variables associated with use of each food class were examined. The nutrient contribution and the nutrient density ratios of each food class were calculated.

Conclusions

Based on the population surveyed, the following conclusions were reached:

1. Of the fifty foods used by the greatest number of households headed by elderly individuals, most (62 percent) are nonconvenience foods, including sugar, potatoes, milk, eggs, margarine, lettuce, bananas, apples, and tomatoes. Basic convenience foods used frequently were instant coffee, frozen concentrated orange juice, peanut butter, soft tub margarine, processed American cheese, canned green beans, and canned green peas. Complex convenience foods among the foods used by most households were white bread, ice cream (not chocolate), frankfurters, mayonnaise, whole wheat

bread, bologna, mayonnaise-type salad dressing, catsup, and jelly. Commonly used manufactured convenience foods were saltine crackers, cola soft drinks and corn flakes. Only 6 percent of the foods most frequently used by the largest number of older households were manufactured convenience foods.

2. Comparison of households headed by persons aged 65-74 years to those headed by persons 74 and older revealed use of identical percentage of each food class: 62 percent nonconvenience, 14 percent basic, 18 percent complex, and 6 percent manufactured convenience classes of the fifty foods used by the greatest number of households. Foods used were similar, with cucumbers and lowfat milk used more by 65-74 year old persons, and oatmeal and grapefruit used by more households headed by the oldest group.

3. The elderly population used slightly less complex convenience foods (18 percent) than did the general population, of all ages, (20 percent), but more (6 percent) manufactured convenience foods than the general population did (4 percent). Comparison of the foods used by the greatest number of households indicated many of the same foods were used,with more of the elderly group using corn flakes, whole wheat bread, oatmeal and grapefruit. More of the general population used potato chips, cabbage and beer.

4. Socioeconomic and demographic variables which were determinants of the share of the food dollar spent by older

people for each food class were region, urbanization, season, race, education of the meal planner, sex of the meal planner and shopping frequency. Nonconvenience foods represented more of the largest share of the food dollar during the summer, spring and fall in households with nonwhite female meal planners residing in the South or West. Households headed by nonblacks with a high school education or more, living in northeastern cities used the greatest share of the food dollar for basic convenience foods in the winter. Complex convenience food use was greatest for nonblack nonsouthern households whose meals were planned by a head of household with or without someone else's help. Male meal planners in the South and West who shopped once a week, more than once a week, or never used the greatest share of the food dollar on manufactured convenience foods.

5. The greatest total money was spent for nonconvenience foods in fall and summer in households headed by nonwhite, nonmale meal planners with less than a high school education. For all food classes, as income rose, so did the amount of money spent on food. The basic convenience food class was used most in terms of food dollars by male and female heads of the household planning meals together; least by male heads alone. Determinants of complex convenience food use included residence in the Northeast, meal planning by the male and female head of households together or either the male or female household head with the help of someone

else, and nonpatronage of supermarkets or small stores. Money spent for manufactured convenience foods was related only to meal planning by both male and female household heads together or by a female head of household and someone else.

6. Nonconvenience foods supplied an average of 58 percent of the food energy and a similar percentage of most nutrients to the household food supply. Exceptions were 74 percent of the B_{12} and 41 percent of the thiamin provided by nonconvenience foods. Basic convenience foods accounted for 15 percent of the kilocalories in the food supply. Vitamins C (39 percent) and A (24 percent) were high in this food class, and vitamin B_6 was low (9 percent). The complex convenience class supplied an average of 20 percent of the kilocalories and 25 percent of the carbohydrate, but just 2 percent of the vitamin C, 8 percent of the vitamin A and vitamin B_{12} and 5 percent of the vitamin B_6 available in the food supply. Only 7 percent of the food energy available to the household was from manufactured convenience foods. Nutrients supplied at greater than expected levels were carbohydrate (11 percent), iron (13 percent), thiamin (22 percent), and vitamin B_6 (19 percent).

7. Comparison of the overall contribution of each food class in relation to the food energy supplied (nutrient density ratios) indicated nonconvenience foods are adequate sources of iron for men and of protein and vitamin C for

both sexes. The basic food class provides sufficient protein, calcium, and iron for men, and vitamins C and A for men and women. The complex convenience food class was lacking in all nutrients in relation to calories for men and women. Iron, vitamin A, thiamin, and riboflavin were adequate for men and women and vitamin B_6 for men in foods from the manufactured convenience class. The mean nutrient density ratios were highest in the nonconvenience and basic classes, slightly lower in the manufactured convenience class, and considerably lower from the complex convenience class. In all cases elderly women, as a group, had less nutrients available based on their energy needs, in relation to their RDA. Heavy use of the complex convenience food class would make it difficult for elderly persons to meet their nutrient needs while not exceeding caloric needs.

8. As share of the food dollar spent for nonconvenience foods increased, food energy, protein, fat, calcium, iron, magnesium, phosphorus, thiamin, preformed niacin, and vitamin B_6 available per nutrition unit increased. Vitamin A decreased. Household use of magnesium and vitamins A and C increased when more of each food dollar was spent for basic convenience foods. Food energy, fat, carbohydrate, iron, thiamin, riboflavin, and vitamin B_6 decreased. As complex convenience food use increased, the level of all nutrients available to the household decreased, fat, carbohydrate and vitamin B_{12} not significantly. Thiamin,

riboflavin, and vitamin B_6 increased with increased share of the food dollar allocated to manufactured convenience foods; protein and fat decreased.

The small, but significant positive correlations between many nutrients and the use of nonconvenience foods by an elderly household indicate this food class will best provide for their nutrient needs. The small magnitudes of the correlation prevent the generalization that nutrient intakes will be low if convenience foods are used. A diet emphasizing nonconvenience foods may be advisable, however.

9. The amount of money spent on a food class was positively related to intake of all nutrients with a few exceptions.

Implications

In 1977-78, older Americans used primarily nonconvenience foods but spent 40 percent of each food dollar on convenience foods. The food choices made by this nutritionally vulnerable group could be enhanced by information on the effect the selections they make among the four classes of foods have on the nutrient adequacy of their diets. To assure a diet adequate in the nutrients included in the present study, the bulk of the food dollar should be spent on nonconvenience foods and on basic and manufactured convenience foods. As more of the food dollar is spent for complex convenience foods, less of all nutrients is

available to the household. The nutrient adequacy of any of the food classes is improved when more money, not a greater share of the food dollar is spent on it. This would be the case when food stamps are utilized, increasing the total spending power of the elderly consumer.

When considering the limited number of calories elderly people can consume with their reduced activity levels and slower metabolic rates, the complex convenience food class appears a poor choice, as nutrients are supplied in an unfavorable ratio to food energy in the foods used by the elderly households in this population. The other food classes provide aging people with a number of nutrients for a more moderate expenditure of food energy. Elderly women must be even more selective than their male counterparts in choosing foods, as less nutrients are available to them given their energy needs.

The information characterizing users of each food class could be used for planning marketing strategies. The convenience food market could target the elderly Southern Black person who is at present a low convenience food user.

A combination of the data characterizing elderly consumers and providing the nutrient strengths and weaknesses of each food class could form the basis for consumer education programs in the areas of nutrition, food preparation, and in learning to make food dollars count. Persons or agencies providing shopping services, feeding programs

and day care for aging individuals might benefit from knowledge of current food selection practices described.

The decision by elderly people to use one or another of several forms of a food might be guided by the information on the nutrient adequacy and nutrient density of each form. For example, fresh frozen or canned spinach would provide the same nutrients but less calories than creamed spinach in a boil-in bag. As programs to enable elderly people to remain in their homes rather than entering rest or nursing homes increase in number, this population can use the findings of the present study to determine calorie efficient and convenient ways to meet their nutrient needs.

The population described has, in general, a very limited income, limited education, is not working, is often a female planning meals for her own household and seldom takes advantage of the Food Stamp Program. Efforts to reach the elderly American to encourage more to participate in programs designed to meet their various needs should be based, in part, on these considerations.

Recommendations for Further Research

Analysis of covariance and correlation analyses were done using the general population of all age groups for comparison. The use of the nonelderly population less than 65 years of age for comparison with the younger and older elderly groups would have yielded more information on how

the three groups differ or are similar. The percentage of households using each of the 50 most commonly used foods would be useful in determining how wide-spread the use of each of the foods was.

REFERENCES

Adrian, J. and Daniel, R. 1976. Impact of socioeconomic factors on consumption of selected food nutrients in the United States. Am. J. Agri. Econ. 58:31.

Anonymous. 1980. Nationwide Food Consumption Survey results. Family Economics Review. Spring: 3.

Bazzare, T. L. 1978. Aging and nutrition education. Educational Gerontology. 3:149.

Beloin, A. M. 1971. Seasonal variations in U.S. diets. Family Economics Review. March: 25.

Blocklind, J. 1976. "Continuous Consumer Equivalence Scales. Martinez Nijhoff Publishing Co., In the Hague.

Brotman, H. 1978. Every ninth American, developments in aging. Report to the Special Committee on Aging, U.S. Senate.

Brown, P. T., Bergan, J.G., Parsons, E.P. and Krol, I. 1977. Dietary status of elderly people. J. Am. Dietet. A. 71: 41.

Buse, R.C. and Salathe, L.E. 1978. Adult equivalence scales: an alternative approach. Am. J. Agri. Econ. 60: 460.

Busse, E. W. 1980. Eating in later life: physiologic and psychologic factors. N.Y. State J. of Med. August: 1496.

Campbell, V. A. and Dodds, M. L. 1967. Collecting dietary information from groups of older people. J. Am. Dietet. A. 51: 29.

Capps, O., Axelson, J. and Havlicek, J. 1983. Impacts of convenience foods on the diets of U.S. households: Report No. 6 to Consumer Nutrition Center, USDA. VPI & SU.

Clarke, M. and Wakefield, L.M. 1975. Food choices of institutionalized vs. independent- living elderly. J. Am. Dietet. A. 66: 600.

Clancy, K. L. 1975. Preliminary observations on media use and food habits of the elderly. The Gerontologist. December: 529.

Cohen, C. 1974. Social and economic factors in the nutrition of the elderly. Proc. Nutr. Soc. 33: 51.

Davidson, C. S., Livermore, J., Anderson, P. and Kaufman, S. 1962. The nutrition of a group of apparently healthy aging persons. Am. J. Clin. Nutr. 10: 181.

Department of Health, Education and Welfare, Health Resources Administration, National Center for Health Statistics. 1974. Preliminary Findings of the First Health and Nutrition Examination Survey, United States, 1971-72: Dietary intake and biochemical findings, DHEW publication no. (HRA) 74-1219-1, Rockville, MD.

Dickens, D. 1965. Factors related to food preferences. J. Home Econ. 57: 427.

Fusillo, A. E. and Beloin, A. M. 1977. Consumer nutrition knowledge and self reported shopping behavior. Am. J. Public Health 67: 846.

Gallo, A. and Boehm, W. T. 1978. Food purchasing pattern of senior citizens. National Food Review, September: 42.

Gallo, A., Salathe, L. E. and Boehm, W. T. 1979. Senior Citizens: Food Expenditure Patterns and Assistance. AER- 426, ESCS, USDA. June.

Guthrie, H. A., Black, K. and Madden, J. P. 1972. Nutritional practices of elderly citizens in rural Pennsylvania. The Gerontologist. 12: 330.

Hansen, R. G. 1973. An index of food quality. Nutr. Rev. 31:1.

Harrill, I., Erbes, C. and Schwartz, C. 1976. Observations on food acceptance by elderly women. The Gerontologist 16: 349.

Havlicek, J., Axelson, J. and Capps, O. 1982. Impacts of convenience foods on the diets of U.S. households: Report No. 2 to Consumer Nutrition Center, USDA. VPI & SU.

Havlicek, J., Capps, O. and Axelson, J. 1982. Impacts of convenience foods on the diets of U.S. households: Report No. 3 to Consumer Nutrition Center, USDA. VPI & SU.

Havlicek, J., Capps, O., Axelson, J., Pearson, J. and Richardson, S. 1982. Outlook 83, 1983 Agricultural Outlook Conference, USDA, Washington, D. C., December.

Hegsted, D. M. 1982. The classic approach - the USDA Nationwide Food Consumption Survey. Am. J. Clin. Nutr. 35: 1302.

Helwig, J. T. and Council, K. A. 1979. SAS User's Guide. Cary, NC, SAS Institute, Inc.

Howell, S. C. and Loeb, M. B. 1969. Nutrition and aging, a monograph for practitioners. The Gerontologist 9: 7.

Hunter, K. I. and Linn, M. W. 1979. Cultural and sex differences in dietary patterns of the urban elderly. J. Am. Geriatric Soc. 27: 359.

Kohrs, M. B., O'Hanlon, P. and Ecklund, D. 1978. Title VII nutrition program for the elderly. J. Am. Dietet. A. 72: 487.

Krehl, W. A. 1974. The influence of nutritional environment on aging. Geriatrics. May: 65.

Krondl, M., Lau, D., Yurkiw, M. A. and Coleman, P.H. 1982. Food use and perceived food meanings of the elderly. Am. J. Dietet. A. 80: 523.

Ladies Home Journal. 1979. What's Happening to Mealtime? A Nationwide Survey of the Planning and Preparation of Meals in American Households. Ladies Home Journal. Spring.

Learner, R. M. and Kivett, V. R. 1981. Discriminators of perceived dietary adequacy among the rural elderly. J. Am. Dietet. A. 78: 330.

LeBovit, C. and Baker, D.A. 1965. Food Consumption and Dietary Levels of Older Households in Rochester, N. Y. USDA, Home Economics Research Report No. 25, ARS, Washington, D. C., U. S. Government Printing Office.

Linusson, E. E., Sanjur, D. and Erikson, E. C. 1974. Validating the 24- hour recall as a dietary survey tool. Arch. Latinoam. Nutr. 24: 277.

Mason, J. B. and Beardon, W. O. 1978. Profiling the shopping behavior of elderly consumers. The Gerontologist 18: 454.

Moak, S. W. and Miller, J. R. 1980. A study of food habits and nutritional status of elderly people in Southside Virginia. Research Report Series No. 2, Virginia State University, Petersburg, VA.

National Academy of Sciences/National Research Council. 1980. Recommended Dietary Allowances. National Academy of Sciences, Washington, D. C.

Nelson, P. E. 1979. Do Food Stamp and Other Customers Buy the Same Products in Supermarkets? National Economic Analysis Division, Economics, Statistics and Cooperative Service, USDA, Agricultural Economics Report No. 421.

O'Hanlon, P. and Kohrs, M. B. 1978. Dietary studies of older Americans. Am. J. Clin Nutr. 31: 1257.

Rao, D. B. 1973. Problems of nutrition in the aged. J. of the Am. Geriatric Society 21: 362.

Rawson, I. G., Weinberg, E. I., Harold, J. A. and Holtz, J. 1978. Nutrition of rural elderly in southwestern Pennsylvania. The Gerontologist 18: 24.

Rizek, R. L. and Peterkin, B. B. 1980. Food costs and practices of households with working women and elderly persons, Spring - Summer, 1977. Family Economics Review, Winter:13.

Rountree, J. L. and Tinklin, G. L. 1975. Food beliefs and practices of selected senior citizens. The Gerontologist 15: 537.

Rowe, D. 1978. Aging- a jewel in the mosiac of life. J. Am. Dietet. A. 72: 478.

Shock, N. W. 1970. Physiologic aspects of aging. J. Am. Dietet. A. 56: 491.

Steinkamp. R. C., Cohen, N. L. and Walsh, H. E. 1965. Resurvey of an aging population- fourteen year follow-up. J. Am Dietet. A. 46: 103.

Ten - State Nutrition Survey 1968 - 1970. 1972. V. Dietary, USDHEW, Center for Disease Control, Atlanta, GA.

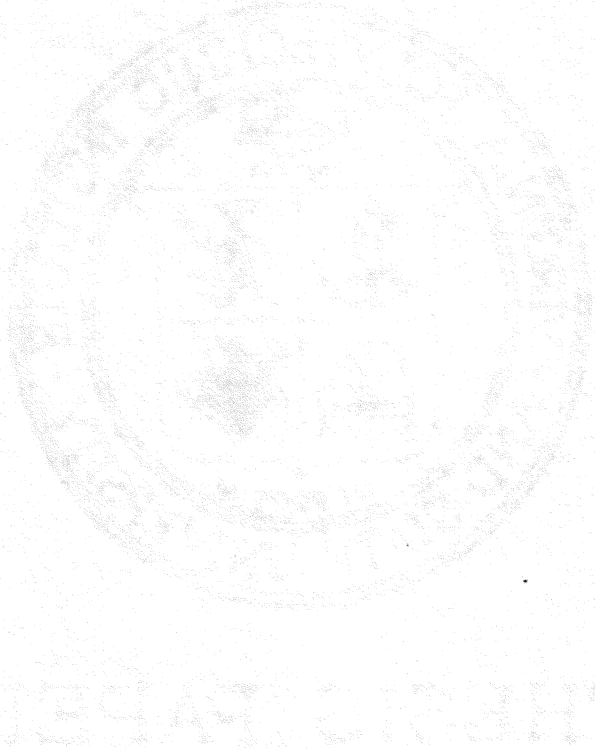
Todhunter, E. N., House, F. and Zwaag, R. V. 1974. Food acceptance and food attitudes of the elderly as a basis for planning nutrition programs. Tennessee Commission on Aging, Nashville, TN.

Traub, L. and Odland, D. 1979. Convenience Foods and Home - Prepared Foods: Comparative Costs, Yields, and Quality. USDA Agricultural Economics Report No. 429, August.

Weg, R. B. 1980. Prolomged mild nutritional deficiencies: significance for health maintenance. J. of Nutr. for the Elderly. 1:3.

Weimer, J. 1982. Factors Affecting the Nutrient Intake of the Elderly. ERS Staff Report No. AGES 820112, National Economics Division, Washington, D. C.

Young, C. M., Hagan, G. C., Tucker, R. E. and Foster, W. E. 1952. A comparison of dietary study methods. 2. Dietary history vs. seven - day record vs. 24 - hour recall. J. Am. Dietet. A. 28: 218.



APPENDIX A. Classification of Foods

Havlicek, et al., (1982) classified all foods used by respondents in the household portion of the Nationwide Food Consumption Survey into four categories, basic, complex, and manufactured convenience and nonconvenience foods. The following definitions were used in the present study:

1. Basic conveninece - foods where processing is more related to a preservation method than ease of preparation; foods with a single or limited number of ingredients; foods with time or energy inputs but not culinary expertise built in.
2. Complex convenience - foods which have a high level of time saving and/or energy inputs and culinary expertise built in; multi-ingredient prepared mixtures.
3. Manufactured convenience - foods which have no home-prepared counterpart.
4. Nonconvenience - fresh (unprocessed) foods; home frozen or home canned or home preserved food items; and ingredient foods. Ingredient foods are processed food products used in food preparation, usually in the most basic form in their category, that either cannot be or are not commonly prepared in the home (Havlicek, et al., (1982).

Groundwork for these classifications was laid by Traub and Odland (1979).

Examples of Four Classifications of Foods*

Basic convenience	Complex convenience	Manufactured conven.	Nonconvenience
Processed cheese	Cheese balls	Imitation cheese spreads	Natural cheeses
Dry milk and canned condensed and evaporated milk	Frozen desserts containing milk	Soy base infant formula	Fluid whole and skim milk
Soft tub margarine	Salad dressings	Ready-to-eat cereals	Cooking oils; stick margarine; butter
Quick cooking and instant cereals	Biscuit mix	Saltines and soda crackers	Regular cooking oatmeal
	Pancake, cake and cookie mixes		

Appendix A. Continued

Basic convenience	Complex convenience	Manufactured conven.	Nonconvenience
Self-rising flour and cornmeal	Ready-to-eat and commercially frozen breads, biscuits, pies, cakes, doughnuts and cookies	Toaster pastry	Flour; cornmeal; rice; macaroni
Dry bread crumbs		Breakfast bars	Home frozen pies, cakes, cookies, and waffles
Commercially canned and frozen meat, poultry and fish		Canned meal replacement or supplement	Fresh eggs; fresh and home frozen meat, poultry, fish
Whipped honey	Hotdogs, bologna and other luncheon meats; commercially frozen breaded fish	Gum drops; jelly beans; dietetic candy	
Commercially prepared french fries		Gin and rum	Brown and white sugar; honey; home preserved jam, jelly
Commercially prepared frozen and canned vegetables and their juices	Commercially prepared jam, jelly; chocolate, coconut and nut candies	Soft drinks	
Commercially canned and frozen fruits and juices			Cooked, fresh, and home canned potato
Powered instant coffee and tea	Potato chips		Fresh, home canned and home frozen vegetables; dried peas and beans
Commercially canned ades, punches, drinks, and fruit nectar	Commercially frozen vegetables with sauce		
	Commercially canned fruit pie filling		Fresh, home frozen and home canned fruits
Olives	Beer and wine		
Shelled nuts; peanut butter	Root beer		Bean or ground coffee and loose leaf or bag tea
	Commercially prepared pickles, catsup, relishes		Home canned fruit nectar
	Ready-to-eat commercially canned and frozen entrees and side dishes; commercially canned, frozen and dehydrated soups		Home prepared pickles and relishes
			Nuts, in shell
			Home frozen and home canned mixtures, including soups

* (Havlicek, et al., 1982)

APPENDIX B. Fifty Most Commonly Used Foods According to the Number of Households Using Each by Food Class.

Rank	General Population[1]	Food Class[2]	Population Aged 65-74 Years	Food Class	Population Aged 74 Years or Older	Food Class
1	white sugar, granulated	N	white sugar, granulated	N	white sugar, granulated	N
2	white potatoes, fresh	N	white potatoes, fresh	N	white potatoes, fresh	N
3	white bread, enriched	C	cow's milk, purchased	N	cow's milk, purchased	N
4	cow's milk, purchased	N	white bread enriched	C	white bread enriched	C
5	lettuce crisphead	N	eggs in shell, large	N	eggs in shell, large	N
6	eggs in shell, large	N	stick margarine, regular	N	stick margarine regular	N
7	apples, fresh	N	lettuce crisphead	N	bananas fresh	N
8	tomatoes, fresh	N	bananas, fresh	N	bacon, sliced	N
9	onions, mature, fresh	N	apples, fresh	N	coffee, inst., powdered	B
10	stick margarine, reg.	N	tomatoes fresh	N	apples, fresh	N
11	bananas, fresh	N	onions, mature, fresh	N	lettuce, crisphead	N
12	bacon, sliced	N	saltines, matzo, oysterettes	M	saltines, matzo oysterettes	M
13	all purpose flour, wheat	N	bacon, sliced	N	tomatoes, fresh	N
14	soft drinks, cola-type	M	coffee, inst., powdered	B	all purpose flour, wheat	N
15	saltines, matzo, oysterettes	M	all purpose flour, wheat	N	onions, mature, fresh	N

Appendix B. Continued

Rank	General Population[1]	Food Class[2]	Population Aged 65-74 Years	Food Class	Population Aged 74 Years or Older	Food Class
16	tea, leaf, loose or bag	N	tea, leaf, loose or bag	N	tea, leaf, loose or bag	N
17	peanut butter comm'l prep.[3]	B	coffee bean/ ground (incl. decaf.)	N	chicken broiler/ fryer RTC, fresh	N
18	coffee bean/ ground (incl. decaf.)	N	chicken broiler/ fryers RTC, fresh	N	coffee, ground/ bean (incl. decaf.)	N
19	frankfurters made from meat	C	cheddar/Amer. cheese, natural	N	ice cream, except chocolate	C
20	macaroni, spag., dry	N	orange juice, no sugar,	B	cheddar/Amer. cheese, natural	N
21	cheddar/Amer. cheese, natural	N	ice cream, except chocolate	C	cabbage, fresh	N
22	orange juice, no sugar, frozen conc.	B	peanut butter, comm'l prep.	B	carrots, no tops, fresh	N
23	bologna	C	carrots, no tops, fresh	N	orange juice, no sugar, frozen conc.	B
24	catsup, comm'l canned	C	cabbage, fresh	N	soft tub margarine	B
25	cheddar/Amer. processed cheese	B	celery, fresh	N	peanut butter, comm'l prep.	B
26	coffee, inst., powdered	B	soft tub margarine	B	hydrogenated fats, veg.	N
27	mayonnaise, reg.	C	cottage cheese, creamed	N	cottage cheese, creamed	N
28	chicken broilers/ fryers RTC[4], fresh	N	frankfurters made from meat	C	celery, fresh	N
29	ice cream, except choc.	C	hydrogenated fats, veg.	N	oranges, fresh	N

Appendix B. Continued

Rank	General Population[1]	Food Class[2]	Population Aged 65-74 Years	Food Class	Population Aged 74 Years or Older	Food Class
30	soft tub margarine	B	mayonnaise, reg.	C	frankfurters, made from meat	C
31	carrots, no tops, fresh	N	oranges, fresh	N	ground beef, lean	N
32	soybean oil, incl. Crisco, Wesson	N	soft drinks, cola-type	M	mayonnaise, reg.	C
33	hydrogenated fats, vege-table	N	corn flakes, plain	M	corn flakes, plain	M
34	oranges, fresh	N	cheddar/Amer. processed cheese	B	whole wheat bread	C
35	beans, green, comm'l canned	B	macaroni, spag., dry	N	beans, green, comm'l canned	B
36	potato chips	C	soybean oil, incl. Crisco, Wesson	N	white rice, enriched	N
37	celery, fresh	N	ground beef, lean	N	butter	N
38	salad dressing, mayo. type	C	white rice, enriched	N	soft drinks, cola-type	M
39	jelly, comm'l	C	whole wheat bread	C	eggs in shell, med.	N
40	cabbage	N	beans, green, comm'l canned	B	cheddar/Amer. processed cheese	B
41	cottage cheese, creamed	N	bologna	C	salad dressing, mayo. type	C
42	white rice, enriched	N	pork sausage, fresh	N	soybean oil, incl. Crisco, Wesson	N
43	lowfat and 2% milk	N	salad dressing, mayo. type	C	macaroni, spag., dry	N
44	butter	N	peas, green, comm'l canned	B	peas, green, comm'l canned	B

Appendix B. Continued

Rank	General Population[1]	Food Class[2]	Population Aged 65-74 Years	Food Class	Population Aged 74 Years or Older	Food Class
45	cucumbers, fresh	N	catsup, comm'l canned	C	oatmeal/rolled oats, reg.	N
46	pork sausage, fresh	N	eggs in shell, med.	N	jelly, comm'l	C
47	peas, green, comm'l canned	B	butter	N	pork sausage, fresh	N
48	ground beef, lean	N	lowfat and 2% milk	N	bologna	C
49	ground beef, regular	N	cucumbers, fresh	N	grapefruit, fresh	N
50	beer, ale	C	jelly, comm'l	C	catsup, comm'l canned	C

[1] Havlicek, et al., 1982.

[2] N = Nonconvenience

B = Basic Convenience

C = Complex Convenience

M = Manufactured Convenience

[3] Commercially prepared.

[4] Ready to cook.

The vita has been removed from the scanned document