1978

Food and nutrition competencies needed by older adolescents for personal and family living

Beatrice Asantewa Ofei
Iowa State University

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FOOD AND NUTRITION COMPETENCIES NEEDED BY OLDER ADOLESCENTS FOR PERSONAL AND FAMILY LIVING.

IOWA STATE UNIVERSITY, PH.D., 1978
Food and nutrition competencies needed by older adolescents for personal and family living

by

Beatrice Asantewa Ofei

A Dissertation Submitted to the Graduate Faculty in Partial Fulfillment of The Requirements for the Degree of DOCTOR OF PHILOSOPHY

Major: Home Economics Education

Approved:

Signature was redacted for privacy.

In Charge of Major Work

Signature was redacted for privacy.

For the Major Department

Signature was redacted for privacy.

For the Graduate College

Iowa State University Ames, Iowa

1978
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INTRODUCTION

The subject matter of food and nutrition is no more the exclusive domain for experts in the field. The majority of individuals in the United States are concerned about their nutrition and the foods they consume. For example, an opinion poll in 1966 indicated that only 54% males and 30% females ate whatever they wanted with no concern about putting on too much weight, while the rest said they engaged in dieting or some kind of weight watching through food consumption, in order to control their weights (Dwyer and Mayer, 1970). Public awareness of foods and their nutrients is not without reason. Since the 1890's, when Atwater produced the first dietary standards for the United States, the government and its agencies have published numerous food guides through the years for use by citizens (Hertzler and Anderson, 1974). The food guide is a translation of research findings on nutrient and nutrient needs into common foods so that the lay person can use it as a guide for food selection. When a food guide is published, government agencies and nutritionists make a genuine effort to bring the guide to the attention of the lay person, thereby increasing public awareness of the food it consumes. Sometimes results of research studies are transmitted directly to the public. Thus people are made aware that there is malnutrition among sections of the population (White House Conference on Nutrition, 1970; Nutritional Sciences Training Committee, 1970). Then as noted by Wagner (1970), after the ground work to awaken public awareness has been laid by nutritionists and government agencies, food faddists who often misrepresent the
true research findings for their own profit, begin to inform the public about what to eat to stay healthy.

Two other factors confounding these situations are societal and technological changes. Socially, the traditional role of fulltime homemaking for the woman is changing. According to Keniston (1975), in 1974 one out of three mothers of preschool children and half of all mothers with school aged children in two-parent families were in the labor force. This leaves less time for housework and meal preparation than before, even though there is evidence that men are assuming more responsibility for housework (Creasy, 1974). Technological advances, in the form of numerous food products, have helped the homemaker with these social changes. Manoff (1974) indicates that the foods stocked by the average supermarket have more than doubled within the last twenty years; and according to McGovern (1974), new products are added at the rate of 500 per year. Shelves and freezing cabinets of supermarkets are teaming with instant products and frozen meals requiring only minimal preparation time. It is not only the variety of available foods that has increased but also almost all available nutrients for consumption have increased per capita (U. S. Department of Agriculture, 1975). In addition, manufacturers add their bit of nutrition information through sales advertisements. Gussow (1972) noted that on children's television, 82% of all advertisements were of ingestible items. A more recent study indicated that there are still 69% of advertisements on children's television that are of ingestible items with poor nutritional values (Brown, 1977).
All the nutritional information and available food items have resulted in confusion for the lay person so that in the midst of plenty, there is malnutrition, manifested as either overnutrition or under-nutrition (Mayer, 1973). The concerned citizen therefore spends a considerable amount of effort worrying about what to consume to stay healthy and yet is not sure about how to interpret the sometimes conflicting information received. It is therefore important for the nutrition educator to constantly review, research and present current nutritional information to citizens at the appropriate time and place.

The mode of transmission of the culture which has been assumed as the most efficient for the fast-changing industrial world is formal education. The most appropriate avenue for presentation of nutritional information is therefore through formal education. The knowledge of nutrition and food concepts may not necessarily indicate sound nutritional practices (Schwartz, 1975); but this finding is not consistent (Caliendo and Sanjur, 1978). Other factors and sources affect an individual's food choices and patterns (Cosper and Wakefield, 1975), but in the school situation, the information can reach the majority of the audience at the same time, and the individual is a captive audience. In addition, studies by Walker and Hill (1975) of selected U. S. households indicated that the one single source where the majority of the respondents (41%) received their nutrition information was high school.

It is important to identify food and nutrition competencies for the high school level for two other reasons. The first is that high
school is an accepted terminal stage in the formal education system in the United States. Almost everyone is expected to complete high school. Thus by concentrating efforts on the food and nutrition courses offered up to the high school stage, the majority of the population will theoretically, be reached. Secondly, the high school years are years when the adolescent is seeking self identity (Ostrander and Snyder, 1970) and establishing relationships which most likely will result in marriage and a new family. It is the period when the individual is in a transitional stage and is open to revision of ideas. Behaviors and patterns once accepted from parents and relatives are questioned and examined on the basis of new information acquired from outside the family. This is therefore a teachable period for the individual. With the establishment of a new family, the individual is going to influence the nutritional patterns of both the spouse and the offspring (Lowenberg, 1974). Studies have indicated that husbands exert strong influences on the food choice within the family (Yetley, 1974; Cosper and Wakefield, 1975). It is thus important to periodically examine the food and nutrition offerings in high school for relevancy and comprehensiveness so that, the high school graduate will be equipped with the knowledge necessary to make good food selections.

The second factor which necessitates the present study is the surge for competency-based education (CBE). According to Houston and Brown (1975), "... over 200 articles and several entire journal issues and books have been devoted to CBE in the past two years". Hall and Jones (1976, p. 3-5) indicate that CBE resulted from four separate and
unrelated factors: 1) a teacher surplus; 2) a shift in expectations about college education by society and students; 3) public demand for accountability in professional training; and 4) the coincidental timing of research and development efforts related to instruction and learning. Efforts of CBE were initially concentrated mainly on teacher education. However currently, the concepts of CBE are being extended to the subject matter areas (Shugrue, 1973) and the elementary schools (Spady, 1977). Like many new developments, CBE has its opponents (e.g. Broudy, 1972; Ainsworth, 1977) and advocates (e.g. Dodl, 1973; Massanari, 1973). In spite of problems and criticisms, CBE has made a great impact since its inception in the early 1970's and appears to be here to stay (Brooks, Note 1).

CBE is education that focuses on students' acquisition of specific competencies (Hall and Jones, 1976, p. 10). That is the educational program includes a set of learning objectives or competencies that are stated in a way that their accomplishment can be observed in the form of specified learner behavior or knowledge. Minimum levels of achievement of these objectives are established as a criterion of success, and learning activities are geared toward helping students to achieve these minimum levels of competence. The primary step of CBE is therefore to specify explicitly, learner objectives or competencies. Dodl (1973) indicates that the specification of competencies serves three major purposes: 1) it describes or defines the desired product of the program; 2) it establishes major goals for the instructional program; and 3) it serves as a principal basis for student assessment.
Competencies are stated so as to make possible the assessment of student learning through direct observation of student behavior (Hall and Jones, 1976, p. 11). Two of the advantages of CBE are that the competencies and the criteria for their assessment are made known to the student prior to the commencement of the program; and instruction is individualized so that the student does not exit before the minimum competencies are attained.

Identifying food and nutrition competencies needed by older adolescents by completion of high school will serve two purposes. First it may serve as one of the bases for identifying teacher competencies for teacher preparation. Second it may serve as a first step toward the reassessment and updating of high school food and nutrition curriculum.

The aim of the present study is to identify food and nutrition competencies needed by older adolescents by completion of high school for satisfactory personal and family living.

The objectives of the present study are: 1) to identify basic competencies in the area of food and nutrition to be acquired by older adolescents by completion of high school; 2) to identify basic competencies acquired by youth who have graduated from high school and are attending college, area schools, or are not pursuing any further studies; 3) to compare differences in food and nutrition knowledge acquired by youth who studied food and nutrition in high school and those who did not; and differences in food and nutrition knowledge acquired by male and female respondents; 4) to identify food practices
of, and opinions about foods held by youths who have graduated from
high school; and 5) to make recommendations for curriculum planning.

Definitions of Terms

The following definitions were adopted for the present study.
Adolescence: "a period in human development occurring between puberty
and maturity and extending roughly from 13 or 14 years of age into
the early 20's; ... in highly industrialized societies, adolescence is
a long twilight zone in which society does not accord the adolescent
full adult responsibility" (Good, 1973, p. 16). Sebald (1977, pp. 8-9)
gave the following as the elements that signal the termination of
adolescence: 1) sociologically, the termination of status discontinuity;
2) psychologically, completing a number of developmental tasks and
achieving a modicum of consistent identity; 3) biologically, achieving
physiological maturity; 4) legally, reaching the age limit specified
by law; 5) economically becoming self-supporting and maintaining a
balance between production and consumption; and 6) traditionally, when
informal customs lift the last restrictions on adult privileges.
Older adolescent: Adapting from the definition of adolescence, and the
description of elements that signal the termination of adolescence,
older adolescence is defined as the period extending from 18 to 23 years
of age. It is marked socially by the completion of high school and/or
commencement of independent living. The terms "young adult" and "youth"
will be used synonymously with the term "older adolescent".
Need: a requirement for satisfactory growth, reproduction, health and
social competence (adapted from Good, 1973, p. 383).
Educational need: specific knowledge, skill or attitude which is lacking but which may be obtained and satisfied through learning experiences (Good, 1973, p. 383).

Nutrition: the science of providing adequate food for growth, maintenance and repair; and the physical state depending on adequate diet, assimilation of foods eaten, and desirable food habits (Good, 1973, p. 392).
LITERATURE REVIEW

The primary aim of the study was to identify food and nutrition competencies needed by older adolescents by the time of completion of high school for satisfactory personal and family living. The process of competency identification involves some background study of the target population. It is also necessary to investigate what has already been done in the field and the various approaches used to identify competencies. The review of the literature will focus on the following: 1) the nutritional status and dietary patterns of adolescents; 2) descriptions of some procedures for deriving competencies; 3) research related to methods followed for identification of home economics related competencies; and 4) research related to food and nutrition competencies for high school students.

Nutritional Status and Dietary Patterns

A study of the literature revealed that there have been many studies on the nutritional status and dietary patterns of selected populations within the United States in recent years. However most of these studies deal with low-income groups, racial minority groups, and special age groups (elderly and preschool children). This review on nutritional status and dietary patterns will include some studies on adolescents, including primary and secondary grades, and studies covering a wider age range.

Hodges and Krehl (1965) undertook the study of the teenage population in the state of Iowa to evaluate eating habits and also to
study the interrelationships between these habits and physical characteristics and biochemical values of a large number of factors. To achieve a representative sample, the State of Iowa was divided into four sections. Each section was divided into three subclasses of large, medium and small based on the high school enrollment. From each subclass, four schools were randomly selected. Using the school roster, 64 students were randomly selected from grades 9, 10, 11 and 12 in each school. Permission of the parents of the selected students was sought for their child's participation in the study. A total number of 2,045 students were examined (593 in 9th grade, 542 in 10th grade, 549 in 11th grade, 356 in 12th grade and 5 ungraded). Approval and cooperation of all state agencies were sought, including school boards and principals. The study was given advance publicity in order to obtain the best possible cooperation.

The survey team, consisting of four physicians, two dietitians, three laboratory technicians and a clerk-stenographer, visited 58 schools in 36 counties. The height and weight of each subject were taken after a card with demographic data was made. Age of onset of menstruation was recorded for girls. The subject's eyes, skin, lips, gums, tongue, teeth, thyroid, and extremities were examined briefly by a physician who also recorded the blood pressure. Every third subject was given a more detailed examination including examination of heart, lungs and abdomen, by another physician. Blood and urine samples were obtained from these latter subjects. Each subject was interviewed by a dietitian who collected information about food habits, food preferences and dislikes, and quantities of food usually consumed.
Biochemical analysis of the blood included the determination of hemoglobin and hematocrit; erythrocyte hemolysis; total protein; serum cholesterol; triglycerides; carotene; vitamins A, C, and B₁₂; alphatocopherol and folic acid. Protein components of albumin; alpha₁ globulin; alpha₂ globulin, beta globulin and gamma globulin were also determined. From the urine samples, the pH; content of albumin; sugar; blood; thiamine; riboflavin; pyridoxine; pantothenic acid; creatinine and creatine were determined. From the nutrition history, intakes of each of the essential nutrients, as well as a division of the diet into protein, fat, carbohydrate, type of fat, type of carbohydrate, "empty calories" and meal patterns were statistically evaluated.

There were 61 variables to be analyzed and only 124 girls and 128 boys supplied information on all the 61 variables. Analysis of data from these subjects included tabulations, determination of means, standard deviations, correlation coefficients and regression coefficients.

Results of the study included the following. Girls skipped breakfast more often than boys. Girls consumed 2,450 Calories/day while boys consumed 3,500 Calories/day. Protein intake of girls was substantially lower than that of boys. Boys consumed more fat than girls. As a group, the teenagers obtained 43.5% of their total Calories from fat, about 40 g of which was milk fat.

The physical examination indicated that the subjects were well built and appeared healthy. Their height and weight measures against the standard computed in the 1940's indicated that teenagers are heavier
and taller now than two decades ago. Skinfold measurement indicated that girls had slightly more fat than boys.

Average values from biochemical findings fell within the normal range, except that some of the subjects had high cholesterol values (using 200 mg/100 ml blood as the normal upper limit for this age group). Excretion of riboflavin was very high in a majority of the subjects. Hemoglobin values were below 12 g/100 ml in three boys and 29 girls. Triglyceride values were lower compared to adult values. Boys had higher triglyceride values than girls. There was sex differentiation in the distribution of blood protein components.

Correlation coefficients showed that at the .05 level of significance, body weight positively correlated with increase in triglyceride concentration and blood pressure but negatively correlated with cholesterol values. Protein intake was closely associated with fat intake and increase in height. Fat intake was associated with greater body weight and higher values of triglycerides. Calcium and riboflavin in the diet were closely associated with milk fat (which indicated that milk was their major source of these nutrients). Vitamin C was negatively associated with meal skipping (indicating that breakfast was the main time for vitamin C consumption). Iron in the diet positively related to dietary protein but negatively related to milk. (That is, those who took more milk took less of iron containing protein.) Niacin was associated with protein intake.

Only half of one percent of the students took vitamin supplements. Omission of breakfast (due to lack of time or family habits) was common.
Lunch, if consumed in the cafeteria, provided the most balanced meal of the day; but if bought elsewhere, was commonly composed of french fried potatoes, carbonated drink, candy, and sometimes hamburger. The evening meal was often taken with the family, and was composed of potatoes, meat, and dessert. Salads and vegetables were often served with the evening meal, but were not favored by the teenagers. Snacking after school, at bedtime or while studying was common. Snack items included milk, ice cream and cheese.

Physical examinations revealed swelling of interdental papillae as the most common lesion present, followed by nasolabial seborrhoea, enlargement of the thyroid gland, angular lesions, follicular hyperkeratosis, cheilosis and in very few, loss of knee jerk, tenderness of calf muscles, atrophy of papillae of the tongue, glossitis, and edema of the lower extremities.

Hodges and Krehl made some comments on their studies of which the following were included: average values conceal abnormal values at each end of the biological curve; the sample of low-socio-economic groups was very low; high school students have individual dietary habits which do not necessarily reflect either the economic status of their families or the recommendations of parents; dietary faddism was not infrequent and a restriction of intake to only a small number of familiar items was common; a sizable number of subjects, especially those not taking breakfast, had low vitamin C intake; a few had inadequate iron intake; the concept of balanced intake of foods should be stressed (for example a high intake of dairy products); and the group's dietary
fat intake was higher than recommended by the American Heart Association or other groups.

Coatney (1974) made a study of young adults to ascertain the food habits and dietary practices of young adults including food fads, fallacies and quackery. The study was conducted in public schools and colleges and universities in Central Louisiana.

The sample for the study was composed of 800 young adults made up of four groups of 200 students each from eighth grade, tenth grade, twelfth grade and college. Each group had equal numbers of males and females, selected on a stratified random basis. The instrument used was a structured questionnaire composed of sections for demographic information consisting of family background and student information, food habits, and food preferences. Data were collected by or under the direction of the investigator, and this ensured 100% return. Data were analyzed by the determination of frequency of meals and the adequacy and inadequacy of food intake; item analysis of food preferences to categorize preferences as likes, dislikes or never tasted. Methods of statistical analysis included one-way and two-way analysis of variance and Scheffé or Duncan Tests to identify individual groups.

In this study, Coatney found the following. The younger respondents consumed more adequate meals than the older respondents. Females consumed more adequate meals than males. Married students indicated the consumption of adequate meals more consistently. Those working full time consumed more frequent and adequate meals, but as parents' occupational status increased, adequacy of meals consumed decreased
among respondents. Rural respondents had poorer dietary practices. Respondents with parents who had the least amount of education were provided more frequent and adequate meals. Some factors contributing to wholesome dietary practices were identified as the continued use of the Basic 4 diet, family meal consumption within the home, and snack foods added to the daily nutrient intake. Snacks were a way of life for the majority of the sample. Vegetables were the least liked food. Liver was disliked, more by females than males. Foods liked by all participants included apples, bread, potato chips, ice cream, and hamburgers. Females indicated an interest in health/organic foods; while some male participants consumed fad diets.

Schwartz (1975) measured the nutritional knowledge, attitudes and practices of high school graduates. The objectives of her study were to 1) assess the effectiveness of a state high school nutrition education program; 2) contribute to present information derived from nutrition surveys; and 3) apply a knowledge-attitudes-practices model to determine the nature of the relationship of nutritional knowledge to attitudes and practices and the interrelationship of knowledge and attitudes with practices among the subjects of the study.

The sample for the study consisted of female graduates of selected Ohio high schools who had an opportunity to participate in a three-year Comprehensive Home Economics program following a revision of the curriculum guide. The subjects had graduated four years previous to the study, and thus were considered to be representative of young women as wives, mothers, students, and career or working women.
Three instruments were used to collect the data. One was a nutritional knowledge test consisting of 30 true-false statements related to general knowledge of nutritional concepts, food composition, misconceptions about food, and the application of basic nutrition principles. The second was an attitudes toward food and nutrition instrument, a test to determine subjects' perception of the importance of nutrition. It consisted of 30 statements reflecting attitude toward nutrition and eating habits, meal planning and food preparation. Both instruments, adapted from previous studies, sought two responses on each statement: the first was a designation of true or false and agree or disagree; the second was a designation of one to four degrees of certainty for the response, from very confident to very doubtful. The third method for data collection involved assessing dietary intake of subjects. The method included the recording of the frequency of intake during a three-day period of foods in 17 food groups as compared with the Basic 4 pattern. Descriptive information indicative of nutritional practices, such as the use of nutrient supplements, and sources of nutrition information were also sought.

The questionnaire was mailed to 1,000 randomly selected graduates from 300 schools. The subjects were selected from a population of 12,457 from 476 schools. Replies were obtained from 313 respondents, 171 of whom had food and nutrition in high school.

Data were presented in descriptive form, as mean scores and as percentages. Means on individual statements were also analyzed for trends.
The following were some results obtained by Schwartz. Previous enrollment in high school home economics courses with a unit in food, nutrition and health was not consistently associated with scores attained in tests of nutrition knowledge, attitudes, and practices. Though students with high school home economics background had higher mean scores than those without high school home economics background, the differences were not statistically significant. The respondents had a relatively high knowledge of nutrition concepts. Trend analysis indicated that respondents scored highest on general items related to nutritional concepts and lowest on those related to the need for vitamin supplements, food composition and the relationship of dietary fat to health. Scores on statements reflecting attitudes toward meal preparation were lower than those toward meal planning. There were no significant differences between scores on nutritional practices of respondents with high school home economics background and those without. Intakes of foods in the fruit and vegetable group and those in the bread and cereal group were below the Basic 4 recommendations for the majority of the respondents. For their sources of nutritional information, the home economist and the teacher were those most often sought help from in the professional group while mothers were the leading source for personal advice; and cookbooks and magazines were prominent among printed sources. While 38% of the respondents reported to be on reducing diets, a range of 4 to 38% reported using some vitamin and mineral supplements. Significant correlations were found between nutritional knowledge and attitudes and between nutritional attitudes and practices but not between nutritional knowledge and practices.
In the spring of 1965, a survey of food intake of a representative sample of 14,500 men, women and children in the United States was conducted by the U. S. Department of Agriculture as part of a nationwide household food consumption survey (U. S. Dept. of Agric., 1969). One aim of the survey was to identify those sex-age groups with diets most in need of improvement. The 14,500 persons were members of 6,200 households, a representative sample of all households in the United States.

The method used to collect data was the 24-hour recall for the day preceding the interview. Experienced interviewers collected the data. Respondents, usually the homemakers in the households, gave household information after which they were asked questions about 1) foods and beverages eaten; 2) ways foods and beverages were prepared; 3) amount of foods and beverages consumed; 4) time of day foods and beverages were consumed; and 5) whether the food was eaten at home or away from home. Information about the use of supplements was also obtained but this was not added to the nutritive content of the day's food. Data were collected over all days of the week.

The nutritive value of the foods was computed mainly from the U. S. Department of Agriculture Handbook No. 8, Composition of Foods: Raw, Processed, Prepared, revised 1963, and unpublished data of the Consumer and Food Economics Research Division.

The data were summarized in average quantities of foods, percentage of persons using those foods, the average quantities of nutrients in all foods eaten, and the percentage of the total nutrient contributed
by each major group of foods. These measures were computed for each group of persons classified by age and sex and were based on all persons in each cell. The average nutritive content of the food eaten by the different sex and age groups was compared with the 1968 Recommended Dietary Allowance, Food and Nutrition Board, National Academy of Sciences - National Research Council.

The review will consider results on persons from infancy to 34 years, unless the result was presented for a wider age group. For most groups by age and sex average diets approached (90 to 100%) or were above the recommended allowances for Calories and five of the seven nutrients studied — protein, vitamin A value, thiamin, riboflavin, and ascorbic acid. Diets were more than 30% below the recommendations in calcium and iron for several groups by sex and age.

The average number of Calories was about the same as the recommendations in the diets of males and about 10% below in the diets of females. Average intakes of protein for all age groups were over 100% of the recommended allowances with a range of about 110 to 250%.

Contributions of fat to the total Calories in the diets ranged from an average of 39% for infants to 45% for men 20–64 years.

The diets of several age groups of females were five to 15% below the recommendations for vitamin A value, thiamin and riboflavin; for males, amounts of thiamin were about five to 15% above the recommended allowances, and vitamin A values were about 10 to 75% above.

Calcium and iron, on the basis of average quantities in the diets, were the nutrients most often found below the recommended allowances.
of the Food and Nutrition Board. The average diets of girls 15 to 17 years were 34 to 37% below the recommended allowance for calcium.

The average diets of girls and women between nine and 54 years supplied amounts of iron that were 36 to 39% below the amounts suggested.

Diets of children under three years furnished about half the recommended allowance for iron, while average amounts of calcium were above recommendations. Children six to eight and boys nine to 11 and 18 to 19 years were not getting the amount of iron per 1,000 Calories of food that might be expected but they had average diets that met the recommended allowance for iron for their age groups.

The groups by sex and age with diets most in need of improvement included all age groups of females nine years and over and boys 12 to 17. For these groups, diets were low in more than one mineral or vitamin. All age groups of girls and women between nine and 55 years had diets furnishing at least 20% less than recommended allowances for calcium and iron.

Information about infants indicated that the average intake of milk from birth to 11 months was about 800 g or 3½ cups per day. The percentage of infants receiving sugars and sweets remained fairly constant. Percentages of infants receiving tomatoes and citrus fruits and dark green and deep yellow vegetables were higher for those three to five months of age (27%) than for those six to 11 months (17%). Eleven percent of infants birth to two months received foods which included tomatoes and citrus fruits and their juices. The average intake of Calories by infants up to three months of age was 50% above the recommended
dietary allowance; averages for the two groups of infants three to five months and six to 11 months were 15 and 20% above recommendations. Average protein, calcium, vitamin A value and riboflavin intakes from food were about two to three times the recommendations for each of the three age groups under one year. The diets of infants six to 11 months supplied less than half the amount of iron recommended.

Due to differential choice of food, the mix of foods within the meat group chosen by women 20 to 34 years contained more vitamin A per pound than that selected by men of the same age group.

Milk and milk products furnished a much larger proportion of the total Calories and nutrients in the diets of pre-school children than in the diets of older children and adults.

Quantities of most of the food groups eaten by men and boys were generally larger than those eaten by women and girls in the same age range, though similar proportions of males and females used some of the food groups. Exceptions to this statement were the use of the fruit and vegetable group. For this group, average quantities eaten by women and girls equalled or exceeded quantities eaten by men and boys at the same ages.

With the exception of infants, men and boys between nine and 19 years used the largest quantities of milk (2 to 3 cups per day); but this dropped sharply for men 18 to 19 years and 20 to 34 years of age (about one cup per day). Consumption of milk by females decreased fairly consistently between ages 12 and 55 years.
Quantities of meat, poultry and fish consumption increased for both males and females up to age 34 years and then decreased. Except for children, over 85% of the persons in each age group reported using some meat, poultry or fish during the day of the survey.

Consumption of tomatoes and citrus fruits increased from about two ounces for one to two year olds to over three ounces for 12 to 14 year olds. Girls 15 to 17 years showed a decrease in the quantities used while boys increased their intake.

Only 10 to 20% of all individuals ate dark green and deep yellow vegetables during the 24 hour period of the survey.

About one-third of the children and around half of the adolescents used soft drinks. In general, the average quantities of beverages other than milk and juices varied inversely with the average quantities of milk and milk products consumed.

The use of vitamin and mineral supplements declined with age. For example, the rates of use of supplements were 55% for infants up to 11 months of age; 43% for children one to two years old; and 12% for girls 12 to 17 years and boys and men 15 to 34 years of age. Use of supplements also declined with income level.

The first Health and Nutrition Examination Survey (HANES, 1971-72) was undertaken by the National Center for Health Statistics to establish a continuing national nutrition surveillance system under the authority of the National Health Survey Act of 1956. The purpose of the system is to measure the nutritional status for the U. S. population and monitor the changes in this status over time. The HANES is
the first program to collect measures of nutritional status for a scientifically designed sample representative of the U.S. civilian, noninstitutionalized population in a broad range of ages, 1-74 years. The program is on-going, but a preliminary report on dietary intake and biochemical findings has been issued (U.S. Dept. of Health, Education and Welfare, 1974).

The preliminary findings were based on the examination of 10,126 persons aged 1-74 years in a representative subset of 35 of the 65 primary sampling units (PSU's). These persons were composed of 73% whites, 26% Negroes and 1% other. The persons were from 14,147 persons, a probability sample of the total U.S. population (72.8% response rate). After completion of 20 PSU's a policy of remuneration was adopted and this increased participation.

The HANES was designed to provide data to assess the adequacy of dietary intake and the utilization of food under ordinary living conditions in relation to the health status of the people. The measurement methods to assess nutritional status were intended to detect both overt signs and symptoms of malnutrition as well as early "risk" signals. Four kinds of data were sought: 1) information on the subject's dietary intake, 2) a variety of biochemical tests made on blood and urine to determine levels of various nutrients, 3) clinical examination to detect stigmata of malnutrition and signs or conditions indicative of nutritional problems, and 4) various body measurements to detect abnormal growth and obesity. Estimates reported were calculated as though the examined persons represented a random subsample
of the persons in the same class. Findings were reported by age, sex, race and income. The Bureau of the Census cooperated in the sample design and in the initial visits to and interviewing of eligible households. Additional visits, interviewing and history taking were done by members of the HANES field teams. The teams included professional and paraprofessional medical and dental examiners, technicians, interviewers and other staff.

Food intake was measured by the 24-hour recall interviewing method. A dietary interview, lasting about 20 minutes per person was conducted at the examination center. Children up to age 12 years were accompanied by the adult responsible for the child's feeding. Food portion models were used as memory aids to assist the respondents in estimating amounts of food consumed. A computer program was used to determine the nutrient values of foods consumed. The program, adapted from a program developed at Tulane University, included the nutritive values of 2,483 food items appearing in the U. S. Department of Agriculture Handbook No. 8, 1963, as well as information from other sources. The nutrient intakes were evaluated against a HANES standard developed with advice from an ad hoc advisory group which considered standards from the World Health Organization, Interdepartmental Committee on Nutrition for National Defense Manual, National Research Council Food and Nutrition Board Recommended Dietary Allowance, and those used in the Ten State Nutrition Survey, 1971. Dietary intake measurements considered were Calories, protein, calcium, iron, and vitamins A and C.
The Nutritional Biochemistry Section of the Center for Disease Control (C.D.C.) performed all HANES laboratory work. Biochemical tests included determination on blood of hemoglobin, hematocrit and red blood cell count. Other tests on serum or plasma consisted of the determination of vitamins A and C, iron, total iron binding capacity, folates, total serum protein, albumin, magnesium and cholesterol. Determination from urine included the pH level, presence or absence of blood, albumin, glucose, creatinine, thiamine, riboflavin and iodine.

Results were presented for the age groupings 1-5, 6-11, 12-17, 18-44, 45-59 and 60 years and over; racial groups of whites and Negroes; and income levels of above poverty level and below poverty level. In calculating dietary intakes, vitamin and mineral supplements were not included. However, 22% of the sample used supplements regularly, 10% irregularly and 68% never.

The following are some results of the HANES. In this review only the results on dietary intakes dealing with the age groups up to 44 years in both racial groups and income levels will be presented unless the results were given for all age groups as a whole.

For all age groups, white persons in the income group above poverty level had the highest caloric intakes while Negroes in the lower income group had the lowest intakes. About 14% of white and 23% of Negro children ages one to five in both income groups had caloric intakes of less than 1,000 Calories.

White persons under 45 years of age in both income groups had higher protein intakes than did Negroes in similar age and income
groups. In these age groups, Negroes in the lower income group had the lowest mean protein intake. Protein consumption was closely related to total caloric intake in most age groups.

Mean nutrient intakes for calcium and vitamins A and C approached 90 to 100% of the standard for most age, income and race groups. Exceptions were for Negro females of childbearing age in both income groups who had mean calcium intakes below the standards; and white females in the lower income group also had below standard mean vitamin A intakes. In all age groups and at both income levels, mean calcium values were higher for whites than for Negroes. These mean values were concealing individual intakes because a substantial proportion of the individuals had intakes less than the standards. For example, 56% of the white females and more than 70% of the Negro females of ages 18 to 44 years in both income groups had calcium intakes less than the standard. Others who had calcium intakes below the standard were 34% of the Negro and 13% of the white children of ages one to five years in both income groups; 34% of the Negro and 17% of the white males of ages 18 to 44 years in both income groups.

The persons with vitamins A and C intakes below the standard include children aged one to 5 years (37 to 57% for vitamin A and 43 to 58% for vitamin C); 46-65% of males aged 18-44 years and about 73% of the females in the low income group.

The diets of three age groups in both races and both income groups were below the standards for iron intake. These groups were children aged one to five years; adolescents aged 12 to 17 years and females
aged 18 to 44 years. About 95% of the children of ages one to 5 years and females of ages 18 to 44 years in both race and income groups had iron intakes below the standards. Negroes of ages six to 11 years in the lower income group also had low iron intakes.

Summary

Some studies related to the nutritional status and dietary patterns of various age groups including adolescents, have been reviewed. The general findings of the studies were: 1) snacking and skipping meals, especially breakfast, were common among adolescents, 2) girls skipped breakfast more often than boys, 3) vegetables were not liked much by adolescents, 4) adolescents' food intakes may be restricted to only a few familiar foods, 5) foods liked most by adolescents included potato chips, ice cream, bread, apples, hamburgers and cheese, 6) older adolescents consumed more adequate meals than younger adolescents, 7) there were indications of inadequate intake of vitamins A, C and iron especially among females and those who skipped breakfast, 8) previous enrollment in high school food and nutrition courses was not consistently associated with scores for tests of nutrition knowledge, attitudes and practices, 9) knowledge of nutrition and positive attitudes toward nutrition were gained from sources other than high school home economics courses, and 10) knowledge of nutrition was not applied in food choices.

Procedures for Deriving Competencies

The terms "competency" and "competency-based education" (CBE) have become very popular terms in educational circles since the beginning
of the seventies. According to Dodl (1973) however, the term "competency" is not new but has been used by special educators since the early fifties. CBE gained popularity in the late sixties as a result of public demand for accountability in instructional education (Bell and Cummings, 1976). Some other factors, especially in teacher education (Hall and Jones, 1976, p. 2) also contributed to the CBE movement. Basically, CBE is an educational program planned, implemented and the outcome evaluated on the basis of some explicitly derived learner competencies. CBE has gained more ground in teacher education, but is now being applied more and more in the subject-matter areas.

A search in the literature did not reveal any established model for identification of competencies. There are however, some authors (e.g., Cooper, Jones and Weber, 1973; Dodl, 1973; and Hall and Jones, 1976) who have recommended some procedures to be followed for competency identification. These procedures will be listed and briefly described.

**Procedures as recommended by Cooper, Jones and Weber**

Cooper, et al. (1973) suggested four bases from which competency statements for teacher education may be generated. These were 1) Philosophical base, 2) Empirical base, 3) Subject-matter base and 4) Practitioner base.

**Philosophical base** The philosophical base must explicate assumptions and values regarding the nature of man, the purpose of
education and the nature of learning and instruction. These assumptions set parameters within which teaching competencies can be specified and, permit the specification of desired pupil outcome. From the parameters and the desired pupil outcome, the teacher's role is conceptualized. Once the role of the teacher has been conceptualized, it is possible to generate statements of teaching competencies. The validity of these competencies depend on their degree of consistency with the conceptualized role, the desired pupil outcomes and the assumption statements.

**Empirical base** Competencies generated from empirical base are linked to knowledge derived from experience or experiment, for example concepts, principles, generalizations and theories discovered and validated. Areas in which competencies may be derived from this base include cognitive, skills and performances.

**Subject matter base** In teacher education, competencies may be derived on the basis of the various disciplines and subject matter areas which the teacher is expected to teach. Competencies thus derived are mainly in the cognitive domain, but may also be performance based. Specifying teacher competencies from subject matter bases involve some difficult decisions. For example the knowledge or skills that are required as evidence of subject matter competency; and whether these competencies should reflect current curriculum of the schools.

**Practitioner base** This involves deriving competencies from a job analysis of what effective practitioners do in their teaching.
Competencies generated from this base claim their validity primarily on the fact that successful practitioners practice them.

**Procedures as recommended by Dodl**

Dodl (1973) in discussing the selection of competency outcomes for teacher education, suggested a procedure for competency derivation. The procedure was summarized in four basic categories: 1) Role analysis, 2) Theoretical model analysis, 3) Needs assessment and 4) Course translation.

**Role analysis** Role analysis implies a functional description of specific roles performed in the job situation. This is similar to what Cooper, *et al.* (1973) described as practitioner base. It includes observational data of practitioners, self-reporting of job tasks and future oriented conceptualization of new roles. The particular procedure adopted will depend on the type of learners from whom the competencies are derived. In the case of teacher competencies, the task varies with the school. Depending on the school, instruction may be primarily group based, individualized, highly structured, or student centered. The school can be staffed by autonomous teachers in self-contained classrooms or by teams of teachers working in open-space environments. Job tasks vary for each situation. Only repeated analyses of each role combination will yield generic competencies which fit all roles.

**Theoretical model analysis** Competencies can be predicted on the basis of theoretical models of instruction. The selection of
competencies will often be a logical derivation of those behaviors or tasks and actions required to carry out the operations theoretically required by a model for instructional behavior. Such behaviors may be derived deductively or from empirical research findings.

**Needs assessment**  
Needs assessment involves establishing the needs of the target audience. The needs will then be formulated into competencies for the audience to work towards their achievement. Needs assessment may be approached in several ways. Included are target audience observation and/or questioning to collect data on present competencies. Another may be interview or questionnaire of experts and target audience to collect data on what competencies target audience need to possess. These establish the gap between "what is" and "what should be". This gap constitutes the needs of the audience.

**Course translation**  
Course translation is simply the conversion of existing course content to behaviorally stated outcomes.

**Procedures as recommended by Hall and Jones**

According to Hall and Jones (1976, pp. 42-58) competencies are generated from assumptions that are held about the function of the learning task and the concomitant goals set for the learner. They list eight sources from which competencies may be identified. These sources are: 1) existing lists, 2) course translations, 3) course translations with safeguards, 4) taxonomic analysis, 5) input from the profession, 6) input from clients, 7) theoretical constructs and 8) task analysis.
Existing lists   Existing lists of statements of objectives and competencies may be available from various sources, for example textbooks. Hall and Jones (1976) warn that before such published competencies are accepted, one should remember to compare them with his/her own assumptions; as well as investigate the assumptions of the program for which the listed competencies were originally intended.

Course translations   Course translations are the same as described by Dodl (1973) above. Though this is the easiest approach to competency identification, Hall and Jones (1976) warn that it is dangerous to use only this approach because any gaps and overlaps of the curriculum being used will continue to exist in the competencies derived from it.

Course translation with safeguards   In this approach, other procedures are added to the course translation approach. One such approach may be to specify projections of "ideal" competencies and objectives in addition to the existing course competencies and objectives. Then a compromise final list may be obtained by studying both lists and revising them. Another procedure may be to utilize some technique, like the Delphi technique, to rate objectives and competencies submitted by other faculty members.

Taxonomic analysis   According to Hall and Jones (1976), this taxonomy is a bit different from those proposed by Krathwohl, Bloom and Masia (1964). They include the following: 1) cognitive competencies, which specify knowledge, understanding and awareness; 2) affective competencies, which relate to values, attitudes, interests and
appreciation; 3) performance competencies which require the demonstration of behaviors; 4) consequence or product competencies, which require the demonstration of the ability to bring about change in others; and 5) exploratory or expressive competencies, which provide experiences that may have value for prospective teachers even though specific expected outcomes from the experiences may not be identified or identifiable in advance.

**Input from the profession** In this approach, the program planners seek input from members of the profession. The input may be sought through interview, written questionnaire or other appropriate means. The opinions voiced by the professionals are then used as a basis for the competency derivation.

**Input from clients** Input from clients allows decision makers to obtain another perspective on professional competence. The approach is similar to what Dodl (1973) refers to as needs assessment. The clients should include the learners and the community.

**Theoretical constructs** In this area, a theoretical position is assumed by the program builders. Competencies can then be specified from theory. The approach combines the empirical base approach suggested by Cooper, et al. (1973), and the theoretical model analysis suggested by Dodl (1973). Hall and Jones (1976) point out that this approach enables the program planners to project into the future. However, they caution that unless properly designed, a learner who graduated through the theoretical construct may not fit into the current system.
Task analysis

Task analysis seeks an answer to the question "What competencies are known to be demonstrated by the effective practitioner in the field?". The approach is similar to "role analysis" suggested by Dodl (1973). In task analysis, a listing of all the tasks that might be included in the job is made. The steps involved in performance of each of the tasks are also listed. Competencies needed to accomplish the job are then derived from these listings.

Summary

All the authors point out that a complete list of competencies may often not be obtainable through the utilization of only one approach. A composite model must be utilized, because depending on the discipline being investigated, one approach may be more rewarding than another. For example, Hall and Jones (1976, p. 56) point out that whereas task analysis of a technician's job will indicate many relevant competencies, this approach will not yield much fruit when applied to the professional such as a teacher or doctor who is a successful applier of theory.

Methods Followed for Identification of Home Economics Related Competencies

In response to the increasing national emphasis on CBE, a CBE workshop for home economics educators was held at the 1974 national convention of the American Home Economics Association (A.H.E.A.). At the workshop, the Department of Home Economics Education at Iowa State University was designated as a clearing house to facilitate sharing of CBE research on a national basis. In response to this request, Hughes, Fields and Crawford (Note 2) conducted a national survey to determine
in which home economics areas CBE was being researched. According to the 40 responses to a questionnaire received from home economics teacher educators, 34 research projects were being conducted in 24 programs nationwide. The 34 projects were divided into four major categories. These four areas were: 1) assessment of CBE, which dealt mainly with pre-service teacher education; 2) identification and validation of competencies and criteria, which dealt with competencies for general pre-service teacher education, competencies and criteria of specific aspects of teacher education programs, and competencies for secondary occupational home economics programs; 3) development of home economics competency-based curriculum; and 4) other related research. Subject-matter competency identification was being conducted in Oregon State University and Marshall University.

Since the report of Hughes, et al. (Note 2), other studies dealing with competency identification have been reported. For example: 1) The Texas Education Agency (1975) has identified basic competencies for beginning teachers of vocational home economics. Subject-matter areas included were home management, consumer education, family living, food and nutrition, child development, clothing and textiles, and housing and home furnishing. Competencies for teacher preparation were also identified. 2) The Home Economics Teacher Educators of Pennsylvania (Note 3) have developed competencies and performance criteria for home economics teachers in the state. Apart from educator role competencies, competencies and performance criteria were derived for the following subject matter areas: clothing and textiles, food and nutrition, human
development and the family, living space, and management and consumer education. 3) The National Home Economics Teacher Educators, in February 1977, identified subject matter competencies and performance criteria for home economics teachers.

Other studies on competency identification were reported by Taylor (1973); Bedford (1975); and Gallagher (1975). The procedures followed by the groups at Marshall University and Oregon State University, the above mentioned individuals and the Home Economics Educators will be reviewed here.

In a Restudy of Teacher Certification in West Virginia in 1974, Blankenship, together with a study committee at Marshall University, West Virginia, identified competencies for teacher preparation programs in various home economics subject matter areas (Blankenship, Bennett, and Vickers, 1974; Blankenship, Note 4). The areas for which competencies were developed were: family relations and child development; home management and consumer education; housing, home furnishings, and equipment; food and nutrition; clothing and textiles; and home economics education. The Restudy committee consisted of teacher educators, subject matter specialists, teachers, supervisors and other home economists.

The following procedure was used to identify the competencies for each area. Pupil learnings (for Kindergarten through 12th grade) were identified. These learnings, stated as objectives and concepts and generalizations, were derived from a review of the literature, consultations, various curriculum guides, characteristics and needs of
students and the judgement of the working committee. The identified pupil learnings were used as a working paper to develop teacher competencies. These competencies were based on a literature review, various documents, and the committee's judgement. Competencies from each area were reviewed and modified by the entire committee. After many revisions, each set of competencies was approved by the entire committee. The recommendations were then presented to the Advisory Committee to the State Department of Education. After review, the recommendations were eventually approved by the Advisory Committee to the State Department of Education, the State Superintendent of Schools, and the Board of Education. These competencies in the final form were then submitted to each institution of higher education in the state that prepared home economics students to use as basis for developing programs.

In connection with high school home economics courses, the staff of Marshall University has completed some work on identification of home management competencies (Blankenship, Note 4). A task survey among homemakers was made and the competencies were derived from tasks performed frequently or considered important.

Two studies at Oregon State University, one in clothing and textiles and the other in food and nutrition, identified competencies needed by beginning teachers (Hotchkiss, 1976; Lee, Note 5). In both studies, the following model was followed: Criteria statements were developed from working materials which members of the Home Economics Education department had been involved in developing. These included: 1) a list of competencies that had been generated by the Home Economics Education
faculty with input from the various departments of the School of Education; 2) a taxonomy of subject matter in the various areas of home economics which was developed jointly by a home economics education faculty member and a member of the faculty with specialization in the subject matter. Using the criteria statements, a questionnaire was developed and submitted to practicing Oregon home economics teachers. Respondents were asked to designate on a five-point Likert type scale the importance of each criteria item in relation to the work of a novice teacher. The data were analyzed using factor analysis. Mean scores and standard deviations of the criteria items were also computed. The factors identified were considered to be the topics and within each topic one or more sub-factors were identified as competencies.

The major objective of Taylor's (1973) studies was to identify family life competencies needed by high school graduates as perceived by a group of participants attending public health prenatal classes. Taylor developed a questionnaire based on a synthesis of goals stated in 12 family life curriculum guides. The questionnaire offered a categorical rating scale for participants to respond to 70 competency statements. Data were analyzed by frequency counts and percentages of the sample indicating favorable responses on each item. In addition, Taylor utilized chi-square to test the null hypothesis that age, sex and educational level would be independent of responses on each individual competency statement.

Bedford's (1975) study was to develop a set of affective competencies and to identify related measurable behaviors for the entry level
dietitian. The procedure followed was in three stages. First, utilizing the Delphi technique, 262 concepts were generated and 41 affective competency statements developed by 19 experts who were members of the American Dietetic Association. Second, some faculty and dietetic practitioners at Kansas State University developed a set of behaviors for the effective beginning dietitian. In stage three, the behavior statements and the affective competency statements were combined into a five-part instrument. The instrument was submitted to 13 experts of the Delphi panel to be judged. Competency statements selected as important were those on which a consensus was reached by the panel.

A study to identify nutrition concepts essential for the education of medical students, and the place in the medical curriculum the concepts should be taught, was conducted by Gallagher (1975). To identify the nutrition concepts, opinionnaires were mailed to a stratified random sample of 800 physicians representing selected medical specialties, and a sample of 165 medical nutrition educators in the United States. The chi-square measurement was used to test significance of differences in responses among physician educators, physician non-educators and medical nutrition educators among physicians in varying medical specialties.

Between February 7 and 10, 1977, a national working clinic to develop subject matter competencies and criteria in home economics was held at Kansas City (Home Economics Teacher Educators, 1978). The clinic was sponsored by the U. S. Office of Education, Bureau of Occupational and Adult Education, Division of Vocational Technical
Education in cooperation with Region VII. Competencies and criteria were identified for clothing/apparel and textile products; consumer education and management; housing and living environments; human development and family; and nutrition and food management.

The presidents of the teacher education groups in the American Vocational Association and the American Home Economics Association (A.H.E.A.) identified persons to serve on a planning committee of the workshop. The workshop participants were then identified by the committee. The content structure in the home economics handbook "Contents and Generalizations: Their Place in High School Home Economics Curriculum Development" (1967) was revalidated and updated to some extent by the workshop participants with the cooperation of subject matter specialists. Teacher competencies and criteria for performance were then derived from the content structure. The competencies were again validated under the direction of the chairmen of the appropriate subject matter sections of AHEA, who circulated the materials to three or four specialists in each of the five areas. After the review of the specialists, committee members incorporated the specialists' suggestions into a handbook titled "Competencies for Home Economics Teachers." The lists of competencies were expected to serve as a basis for planning programs for beginning teachers in both consumer-homemaking and occupational home economics.

The area of nutrition and food management was divided into four topics. The topics were: significance of food; nature of food, provision of food; and occupations related to nutrition and food. Each topic had
a set of competencies with a set of criteria for performance with each competency. In developing the nutrition and food management competencies, the assumption was made that throughout life every individual should be able to make decisions on choices of food based on an understanding of needs as determined by 1) physiological state and physical activities; 2) knowledge of the nutrient composition of plant, animal, and formulated foods; 3) ability to distinguish between truth and distortion in relation to management of nutrition, food, and health; 4) personal likes; 5) cultural background; and 6) ability to use available resources whatever they may be. The competencies were developed for the purposes of disseminating these concepts.

Food and Nutrition Competencies for High School Students

In 1974 the Nutrition Program at Pennsylvania State University received a grant from the Nutrition Foundation to develop a coordinated nutrition education effort in Pennsylvania (Sherman, Lewis and Guthrie, 1978). The overall project was an attempt to design and implement nutrition education programs for all educational levels. A School Nutrition Education Curriculum Study (SNECS) team was established for the program. The team was comprised of members representing the fields of nutrition science, community nutrition education, science education, curriculum supervision and development, early childhood education, home economics education, health education, educational psychology, and testing and evaluation. The project was in five phases: 1) identification of nutrition content for the curriculum, 2) development of exemplary
curricular units, 3) preparation of teachers and other educators for utilizing the units, 4) planning for fuller implementation of the project and 5) evaluation of the curriculum and the project.

Stage one in the first phase dealt with the formulation of educational objectives, or competencies. These competencies were referred to as Project Learner Objectives (PLOs) to distinguish them from the learner objectives for units or lessons. The PLOs were to provide a base from which the nutrition content would be identified for various curricular components. The goal assumed in formulating the PLOs was to produce high school graduates who, after exposure to nutrition education for 12 or more years can think, feel and perform in a nutritionally literate manner making wise decisions for themselves and others.

The following procedure was followed in the identification of the PLOs. The SNECS team generated 15 subsets of skills, knowledge, and attitude areas considered crucial to good nutrition decision-making for the high school graduate. A grid defining four levels of application served as a device to cross-check the subsets for completeness and comprehensiveness. The subsets were then expanded as appropriate across the levels of application to yield 87 PLOs which were rewritten and edited several times until they represented real-world situational educational objectives. The 87 PLOs fit within five general criteria developed by the SNECS team. The five general criteria were: 1) why nutrients are needed, 2) amounts of nutrients needed, 3) ways of getting nutrients, 4) changes in nutritional needs, and 5) ways of studying nutrition.
The PLOs were developed into a seven-point scale instrument and tested on 60 independent nutrition and education professionals. The scale included a "no opinion" answer and respondents were also asked to add any further objective. The result of this test yielded 54 PLOs which were developed into a second instrument and tested on 52 members from the state dietetic and food service associations. Data were analyzed by computing means, and standard deviations for each item, item-total correlations and inter-item correlations. Results of the analysis yielded 40 PLOs.

The 40 PLOs were developed into a test instrument (Nutrition Education Priority Questionnaire) which was distributed to a sample of 1,000 members of the Society for Nutrition Education to review and rank in order of priority. The data from 60% of the returned questionnaires were subjected to factor analysis (employing a varimax rotation and plotting eigenvalues) (Barnette and Branca, 1978). The means, standard deviations and relative rank of items were also computed.

Results of the analysis indicated that the questionnaire had a high internal consistency (alpha index of reliability = .91) and a low average inter-item correlation (.19). On a one to seven Likert priority scale, item means ranged from 3.69 to 6.46. The factor analysis yielded an eight factor solution for 29 items with .50 or greater loading. Labels were assigned to the eight factors based on the nature of the items within a factor. The labels were: 1) social and cultural aspects of food choice and use, 2) planning nutritionally adequate meals, 3) relationship of nutrition and health, 4) application of scientific and
practical information in food choice decisions, 5) identification and solution of global nutrition-related problems, 6) solution of family and community nutrition-related problems, 7) nutrition as a career, and 8) food, nutrients and bodily function. Eleven of the 40 items did not load at .50 or greater on any of the eight factors and were therefore assigned to a miscellaneous category. These items were concerned with a wide range of issues in dealing with environmental aspects affecting food quality and nutrition, food costs, health problems associated with nutrition and cultural food patterns.

Summary

This review contained descriptions of some procedures for deriving competencies; methods followed for identification of some home economics related competencies; and food and nutrition competencies identified for high school students in the state of Pennsylvania.

Descriptions of bases from which competency statements may be generated as presented in three publications were reviewed. Some of these bases were philosophical; subject matter (including existing lists); practitioner (including role analysis and input from the clients); course translation with and without safeguards; taxonomic analysis; and theoretical constructs (including empirical base and theoretical model analysis). To get a complete list of competency statements for any field or subject matter, more than one base should be used.

The review of some of the methods used by researchers in home economics to derive competencies showed a commonality among the methods.
The common approach involved an initial listing of competencies from related literature and input of practitioners or the profession. These lists were submitted to experts for validation. Responses from the experts were subjected to statistical analyses to identify which competencies were important.

In the Pennsylvania State University study (SNECS), 29 competencies under eight food and nutrition topics were considered important for high school food and nutrition programs. Eleven other competencies dealing with a wide range of environmental aspects of food were assigned to a miscellaneous category. One topic for high school food and nutrition was identical to one topic suggested for home economics teachers by the Home Economics Educators (1978). Each of the other three topics for home economics teachers was more general than any of the other seven topics suggested by the SNECS team for high school food and nutrition courses.
METHOD OF PROCEDURE

The purpose of this study was to identify food and nutrition competencies needed by older adolescents by the time of completion of high school for satisfactory personal and family living.

The objectives for this study were: 1) to identify basic competencies in the area of food and nutrition to be acquired by older adolescents by the time of completion of high school; 2) to identify basic competencies acquired by youth who have graduated from high school and are attending college, area schools, or are not pursuing any further studies; 3) to compare differences in food and nutrition knowledge acquired by youth who studied food and nutrition in high school and those who did not; and differences in food and nutrition knowledge acquired by male and female respondents; 4) to identify food practices of, and opinions about foods held by youths who have graduated from high school; and 5) to make recommendations for curriculum planning.

To achieve the above objectives, the following approach was adopted: A preliminary list of competency statements was prepared. This list was submitted to experts to evaluate. Based on the competencies judged as important by the experts, a questionnaire was prepared and submitted to a selected sample of older adolescents. Results of the responses to the questionnaire were analyzed and used, together with the list of competencies judged as important by experts, to make recommendations.
Preliminary Identification of Competencies

Possible content areas (topics) of food and nutrition were identified through the review of relevant literature and consultation with a food and nutrition specialist. Literature surveyed included high school food and nutrition textbooks, journal articles reporting studies and findings on groups and individuals' nutritional knowledge and food habits; modules for food and nutrition programs; past theses related to the subject matter and a home economics handbook on concepts and generalizations (see Appendix A for a list of sources).

For each of the identified content areas, categories of competencies that were thought by the investigator to be needed for satisfactory living, were formulated based on the literature sources mentioned above. The level of complexity of the competencies was judged from the text presentation in some high school textbooks. A total of 171 competencies were formulated under 20 content areas (Appendix B).

Competency Rating

The list of competencies was submitted to 14 selected experts individually, to judge as to their importance for satisfactory living. The experts included two home economics education professors, three food and nutrition professors, two food and nutrition extension specialists, three high school home economics teachers, one food and nutrition research assistant, one hospital dietitian, one student health counsellor on weight reduction, and one food service director (Appendix C). Specifically, the experts were requested to rate the competencies as either "important" or "not important". Then the experts were asked
to suggest any further competencies considered important which had been left out, and to comment further with suggestions for rewording. Instruction may be found in the cover letter in Appendix D.

It was decided that competencies rated by at least 66% of the experts (based on returned responses) would be accepted as important. Percentage rating for each competency was calculated thus: Each competency was given one positive score for each rating of "important". One negative score was given for each rating of "not important". Scores were added together for each competency. The sum, as a fraction of the total responding, was multiplied by 100. For example:

Total number responding = 12
Total rating as "important" = +10
Total rating as "not important" = -2

Therefore percentage response as "important" = \[(10-2)/12 \times 100\] = 66.7%.

After identifying the important competencies using the above procedure, each respondent's paper was studied again for comments and suggestions made about any of the competency statements selected as important as well as any general comments. As a result of comments from experts, the wording in some statements was revised and other statements were omitted. A final list of 97 competency statements under 14 content areas was prepared (Appendix E).

Instrument Development

A questionnaire based on the competencies judged as important by at least 66% of the experts was developed. In addition, questions
seeking demographic data, respondents' opinions about certain practices and respondents' dietary practices were developed. The questions were divided into three sections: 1) 40 questions on dietary practices, 2) 35 opinion statements and "true or false" items, and 3) 87 multiple choice items (Appendix F).

Content validity of the instrument was sought by submitting the questionnaire to 14 experts to review. The experts were made up of: two home economics evaluation specialists, two high school home economics teachers, one food and nutrition extension specialist, three extension 4-H leaders, two food and nutrition professors, two food and nutrition graduate students, one food and nutrition research assistant and one extension home economist (Appendix C). Specifically, experts were asked to review the questionnaire with respect to the following: 1) whether the question was a fair one for the intended audience, 2) whether the question was clear and the concept represented in the question was correct, 3) whether the selected answer was the best in the multiple choice knowledge test; whether there was a better alternative not stated and/or whether there were other equally good alternatives to the selected one within the set of choices given. In addition, experts were urged to raise questions on the instrument which were not clear and give general comments. The two evaluation specialists were further requested to comment on the wording, the format and the arrangement of the questions (Appendix D).

Twelve of the experts returned the questionnaire with comments. The comments were studied and the questionnaire revised, incorporating
suggestions. As a result of the review by experts, the questionnaire was reduced to 95 questions and redesigned into four sections: 1) 15 items seeking demographic and nutritional information, 2) 27 items on respondents' dietary practices, 3) 20 opinion statements, and 4) 33 multiple choice items on food and nutrition knowledge. The knowledge questions were based on 29 competency statements judged as important by the majority (at least 91%) of the experts.

Some of the statements in section three presented the same concepts appearing in questions in other sections. For example: Item 32 (section three) "Using TV commercials and other advertisements as a source of nutritional knowledge" is similar to Item 50 (section four) "The primary aim of advertisement of food products is to 1) help a person select more nutritious meals, 2) increase the sale of the products, 3) increase a person's nutritional knowledge, 4) help a person make bargain purchases." The assumption underlying the inclusion of section three was that usually people will give an opinion which reflects their actual practice if the opinion statement is presented in a nonthreatening, neutral tone. It was hoped therefore, that the response to an opinion statement compared to that of the related question would indicate how the respondent's knowledge relates to his/her practice.

Pilot Testing

The instrument was submitted to 20 Iowa State University students similar to the selected sample for pilot testing. The students were either freshmen or sophomores. None of them had taken any food and
nutrition courses at the college level. The aim of the pilot test was to
determine the usability of the instrument. Respondents were requested to
make any necessary comments on the instrument especially regarding the
length of time taken to complete the questionnaire, difficulty of
individual items and clarity of statements and questions.

From the results of the pilot test, some items were revised and the
instrument was written in its final form (Appendix G). The instrument in
its final form was not submitted to the experts. The instrument was pre­
sented in two forms. One provided spaces on the form for response to
the opinion questions and the other required respondents to answer on
IBM answer sheets.

Sample

A deliberate sample of three groups was selected.

1) Iowa State University home economics students (coded as I.S.U.). The
criteria for selection of the students were that they should have com­
pleted high school within the last two years and/or should be either
freshmen or sophomores and should not have taken any courses in food and
nutrition at the college level. The sample selected as meeting these
criteria were 90 students just starting a 100-level food and nutrition
course.

2) Des Moines Area Community College students (coded as A.C.C.). The
criteria used for selection were that the students should be freshmen and
should not be taking food and nutrition courses. A total of 103 students
in freshman classes for Medical Laboratory Technicians, Arts and Sciences,
Auto Mechanics and Computer Programming were obtained for this study.
3) High school graduates presently not pursuing any further studies (coded as N.A.C.). The criterion for selection was that the individual should have finished high school within the last two years. To obtain this group, a letter was sent to selected high school home economics teachers within Iowa requesting them to supply the names and addresses of at least 10 such people. The list of teachers contacted and the initial and follow-up letters sent to them are presented in Appendices H and D. The teachers contacted supplied 125 names and addresses.

Data Collection

The questionnaires were administered personally to the 90 I.S.U. students who responded and handed them to the investigator during a single class period. Nine of the responses could not be used because forms were incompletely filled out. Eight responses returned by mail were added to the remaining 81 forms. The sample size for the I.S.U. group was therefore 89.

The questionnaires were administered personally to the 103 students from the area community college (A.C.C.) by the investigator. Some of the respondents answered and handed back the questionnaires in class while others took the questionnaires and returned them at a later time. The response rate for the A.C.C. group was 83%. Eleven responses could not be used because four questionnaires were not completed and seven were only partially completed. Usable responses were 74. The size of the sample from the area community college was therefore 74.

The addresses of 22 out of the 125 names obtained to represent the group not pursuing any further studies (N.A.C.) were incomplete. The
questionnaires with stamped self-addressed envelopes were therefore sent to 103 people by mail. Five days after the date set for the return of the questionnaire, a follow-up letter was sent to those who had not returned the questionnaire. The cover letter for the questionnaire and the follow-up letter are shown in Appendix D. The response rate for the N.A.C. group was 57%, but 14 of the respondents were attending college and 45 were not. Eight of the 14 attending college were enrolled at Iowa State University. For purposes of analysis, the mailed responses from I.S.U. students were added to responses obtained from I.S.U. students who were personally administered the questionnaires. The responses from the remaining six who were attending college were deleted. Thus the sample size for the group not pursuing any further studies was 45.

Respondents who were administered the questionnaire personally by the investigator were asked to respond to sections two through four on IBM answer sheets. The group who were sent mailed questionnaires answered on the questionnaire form. All groups answered section one on the questionnaire form.

Data Analysis

Each respondent was given a code number (for example: I.S.U. 001; A.C.C. 259; N.A.C. 128). Responses from the N.A.C. group were each transferred to an IBM answer sheet. Questions in section one were re-numbered to follow the numbering system on the IBM answer sheets, then answers to section one were transferred to each respondent's answer sheet. Data from each respondent were punched onto computer cards.
Percentages of responses to individual items were calculated for the total sample and for the three subgroups. Total and subtotal mean scores and standard deviations for the multiple choice knowledge test were computed. An item analysis was computed for the individual items in the knowledge test based on the answers of the respondents from I.S.U. who studied food and nutrition in high school. Answers from this subgroup were chosen for the item analysis because all the respondents had had a prior formal exposure to food and nutrition courses and because respondents completed the questionnaire under the investigator's supervision. The Kuder-Richardson Formula 20 was used to compute reliability of the knowledge test. A one-way analysis of variance, using the Statistical Package for the Social Sciences (S.T.S.S.) program, was computed to determine if mean score differences in the knowledge test were related to certain variables such as sex, nutritional background and educational background. The Scheffé's method (Kirk, 1968, p. 90) was used to make comparisons among the mean scores of the three subgroups.

In order for a comparison to be significant with the Scheffé's method, $F_{\text{obs}}$ must be greater than $F'$

$$F_{\text{obs}} = \frac{(\bar{X}_1 - \bar{X}_2)^2}{\sum C_j^2 / \sum n_j}$$

where $F_{\text{obs}}$ is the $F$ value as calculated from the observed means, $\bar{X}_1$, $\bar{X}_2$ are the means being compared, $C_j$ is coefficient of contrast.
\( n_j \) = number of scores in the jth treatment level

\( \text{MS}_e \) = the mean square of the residual or error

\[ F' = (k - 1) F_{a;v_1,v_2} \]

where \( F_{a;v_1,v_2} \) = tabled value of F for \( v_1 \) and \( v_2 \) degrees of freedom

\( k \) = number of treatment levels

Summary

A two stage approach was utilized to identify basic competencies in food and nutrition needed by older adolescents by completion of high school. The first stage involved an initial derivation of competencies in food and nutrition, validation of the competencies by experts and subsequent revision to a final form. The second stage involved the development of a questionnaire based on the competencies; the use of the questionnaire to collect data from a sample of the target population, and the analysis of the data to identify competencies acquired and competencies not acquired. A schematic presentation of the procedure is presented in Figure 1.
Stage I

Preliminary derivation of competencies

Submission of competency list to experts

Validation of competencies

Revision of competency list

Competencies judged important to be acquired

Stage II

Questionnaire developed

Validation of assessment instrument

Assessment of competency acquisition

Analysis of response

Competencies acquired

Competencies not acquired

Figure 1. Model of procedure for competency derivation
RESULTS AND DISCUSSION

The purpose of this study was to identify competencies in food and nutrition needed by older adolescents by the time of completion of high school for satisfactory personal and family living. A list of competencies was submitted to experts to rate. Based on some of the competencies judged as important, a questionnaire was developed and sent to three groups of high school graduates for response. Respondents were from Iowa State University (I.S.U.), area community college (A.C.C.) and graduates not pursuing any further studies (N.A.C.).

The results to be presented here consist of two types of data:
1) competencies needed by older adolescents in food and nutrition and
2) data obtained from the three groups of respondents. Data obtained from the respondents are presented as follows: 1) demographic information about the sample, 2) characteristics of the food and nutrition knowledge test as an instrument of measurement, 3) group mean scores of the knowledge test, 4) basic competencies acquired by respondents as measured by the knowledge test, 5) food and nutrition content areas that respondents indicated a need for information, 6) ten dietary practices of the respondents, 7) sources respondents considered as most reliable for nutritional information, 8) respondents' opinions about dietary practices, and 9) comparison of the knowledge of and attitude toward a concept as measured by the knowledge test and opinions about certain dietary practices. The chapter is concluded with a general discussion of the findings and limitations of the study.
Competencies Needed by Older Adolescents

A list of 171 competency statements under 20 content areas were compiled and submitted to experts to judge as to their importance for older adolescents for satisfactory personal and family living. An analysis of the responses indicated that 110 of the competency statements were rated important by 66% or more of the respondents. Table 1 indicates the rating of importance of the statements by experts.

Table 1. Rating of importance of competency statements by experts

<table>
<thead>
<tr>
<th>Number of competency statements rated important</th>
<th>Percentage respondents rating as important</th>
</tr>
</thead>
<tbody>
<tr>
<td>19</td>
<td>100</td>
</tr>
<tr>
<td>17</td>
<td>91</td>
</tr>
<tr>
<td>34</td>
<td>83</td>
</tr>
<tr>
<td>19</td>
<td>75</td>
</tr>
<tr>
<td>21</td>
<td>67</td>
</tr>
<tr>
<td>110</td>
<td></td>
</tr>
</tbody>
</table>

Following suggestions of the experts, corrections and rewording of some of the statements were made and a final list of 97 competency statements under 14 content areas was obtained (Appendix E). Six content areas in the original list of 20 were eliminated, following suggestions of the experts. The content areas eliminated were "special food needs"; "food supply"; "kitchen environment"; "creative cooking"; "foods around the world"; and "outdoor cooking". Competency statements
under these content areas which were judged important by experts were put under related content areas. For example, a competency statement judged important under "special food needs" was put under "nutrient requirements".

Demographic Information

Subjects were asked to record some personal data in order to help understand the results of the study better. The items analyzed from the personal data section of the questionnaire included: age, sex, marital status, number of children, and the study of food and nutrition in high school.

Age

The age distribution of respondents is shown in Table 2. Out of the 208 youth 184 were between 18 and 23 years of age, with 117 being 18 or 19 years old. Two were below 18 years of age and 24 were above 23 years of age. Distribution within sample groups indicated that 19 out of the 24 respondents above 23 years of age were in the area community college. A comparative examination of some of the data from

Table 2. Age distribution of sample

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>I.S.U. (%)</th>
<th>A.C.C. (%)</th>
<th>N.A.C. (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Below 18</td>
<td>1 (N = 89)</td>
<td>1 (N = 74)</td>
<td>0 (N = 45)</td>
<td>1 (N = 208)</td>
</tr>
<tr>
<td>18-19</td>
<td>60 (N = 89)</td>
<td>42 (N = 74)</td>
<td>73 (N = 45)</td>
<td>56 (N = 208)</td>
</tr>
<tr>
<td>20-21</td>
<td>29 (N = 89)</td>
<td>23 (N = 74)</td>
<td>24 (N = 45)</td>
<td>26 (N = 208)</td>
</tr>
<tr>
<td>22-23</td>
<td>6 (N = 89)</td>
<td>8 (N = 74)</td>
<td>0 (N = 45)</td>
<td>5 (N = 208)</td>
</tr>
<tr>
<td>Above 23</td>
<td>4 (N = 89)</td>
<td>26 (N = 74)</td>
<td>2 (N = 45)</td>
<td>12 (N = 208)</td>
</tr>
</tbody>
</table>
people older than 23 years or younger than 18 years and those between 18 and 23 years of age did not reveal any marked differences therefore they were grouped together for analysis.

Sex

Sixty-eight (33%) of the respondents were males and 140 (67%) were females. Within the sample group, sex distribution was as shown in Table 3.

Table 3. Sex distribution of respondents

<table>
<thead>
<tr>
<th>Group</th>
<th>Male Number</th>
<th>Male %</th>
<th>Female Number</th>
<th>Female %</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.S.U.</td>
<td>18</td>
<td>20</td>
<td>71</td>
<td>80</td>
</tr>
<tr>
<td>A.C.C.</td>
<td>36</td>
<td>49</td>
<td>38</td>
<td>51</td>
</tr>
<tr>
<td>N.A.C.</td>
<td>14</td>
<td>31</td>
<td>31</td>
<td>69</td>
</tr>
</tbody>
</table>

Marital status and number of children

One hundred and seventy-five (84%) of the respondents were single and only 33 (16%) were married. Distribution of married and single individuals within sample groups is shown in Table 4.

One hundred and eighty-two (88%) of the respondents had no children; 13 (6%) had one child each; nine (4%) each had two children and, four (2%), all from the A.C.C. group had three or more children each. Only two from the I.S.U. group had children whereas 19 from the A.C.C. group and five from the N.A.C. group had children.
Table 4. Marital status of respondents

<table>
<thead>
<tr>
<th>Group</th>
<th>Single Number</th>
<th>Single %</th>
<th>Married Number</th>
<th>Married %</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.S.U.</td>
<td>86</td>
<td>97</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>A.C.C.</td>
<td>60</td>
<td>81</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td>N.A.C.</td>
<td>29</td>
<td>64</td>
<td>16</td>
<td>36</td>
</tr>
</tbody>
</table>

Study of food and Nutrition in high school

Food and nutrition was studied by 119 (57%) of the respondents in high school while 89 (43%) did not study food and nutrition in high school. Table 5 shows the sample distribution of the study of food and nutrition in high school.

Table 5. Study of food and nutrition in high school

<table>
<thead>
<tr>
<th>Group</th>
<th>F &amp; N course Number</th>
<th>F &amp; N course %</th>
<th>No F &amp; N course Number</th>
<th>No F &amp; N course %</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.S.U.</td>
<td>45</td>
<td>51</td>
<td>44</td>
<td>49</td>
</tr>
<tr>
<td>A.C.C.</td>
<td>39</td>
<td>53</td>
<td>35</td>
<td>47</td>
</tr>
<tr>
<td>N.A.C.</td>
<td>35</td>
<td>78</td>
<td>10</td>
<td>22</td>
</tr>
</tbody>
</table>

To obtain subjects for the N.A.C. group, some home economics teachers in high schools were asked to supply names and addresses of recently graduated students. It is likely that the teachers contacted suggested predominantly those students with whom they had had contact. This would explain why most of the respondents in the N.A.C. group had completed food and nutrition courses.

Excluding therefore the group which are presently not pursuing further studies, this study indicates that by completion of
high school roughly 50% of the youth have had some food and
nutrition courses.

Of those who had had a food and nutrition course in high school,
95 (80%) were females and only 24 (20%) were males. Sex distribution
for those who took courses in food and nutrition at the high school
level is shown in Table 6. The figures indicated that a smaller propor­
tion of males took food and nutrition courses in high school. Considering

Table 6. Sex distribution of respondents who took food and nutrition
courses in high school

<table>
<thead>
<tr>
<th>Group</th>
<th>Female Number</th>
<th>%</th>
<th>Male Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.S.U.</td>
<td>42</td>
<td>93</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>A.C.C.</td>
<td>26</td>
<td>67</td>
<td>13</td>
<td>33</td>
</tr>
<tr>
<td>N.A.C.</td>
<td>27</td>
<td>77</td>
<td>8</td>
<td>23</td>
</tr>
<tr>
<td>Total</td>
<td>95</td>
<td>80</td>
<td>24</td>
<td>20</td>
</tr>
</tbody>
</table>

that only 20% of the I.S.U. students sampled were males (Table 3), it
appears that not anymore males enroll in food and nutrition courses
at the university level than they do in high school.

Characteristics of Knowledge Items

To achieve objectives two and three, that is, identify basic
competencies acquired by different subgroups of youth, a 33 item knowledge
test was developed, included in the questionnaire and administered to
the subjects. In order to interpret the data for objectives two and
three, it was necessary to evaluate the effectiveness of the test.
It is therefore appropriate to present in brief the characteristics of this portion of the questionnaire. Table 7 shows the distractor analysis, the indices of difficulty and discrimination and the standard deviation of the test items for 45 subjects. These subjects were a subgroup of the respondents from I.S.U. who studied food and nutrition in high school. Responses from this group were chosen for item analysis of the knowledge test items because the respondents have had formal exposure to food and nutrition courses and also because they answered the questions together within the same environment and under the direction of the investigator.

**Test results**

Raw scores on the 33 item test ranged from 9 to 24 with a mean of 18.20 and standard deviation of 3.69 for 45 subjects. The standard error of measurement for the test was 2.48.

**Reliability**

Using the Kuder-Richardson Formula 20 to measure the internal consistency of the test, the reliability quotient obtained was .55. Reliability quotients vary from zero to 1.0; and the closer the reliability quotient of a test is to 1.0, the better the test is as an instrument for evaluation. As a sole basis for evaluation, the reliability estimate should be .90 or higher (Student Counseling Service, 1973). The reliability quotient of .55 for this test was therefore very low. However, the reliability quotient is more meaningful if it is obtained from the results of a test based on a program to which
Table 7. Difficulty, discrimination and distractor analysis of the multiple choice knowledge items (N = 45)

<table>
<thead>
<tr>
<th>Item number</th>
<th>Difficulty index</th>
<th>Discrimination index</th>
<th>Standard deviation</th>
<th>Distractor analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>48&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.49&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.38&lt;sup&gt;c&lt;/sup&gt;</td>
<td>.50</td>
<td>5</td>
</tr>
<tr>
<td>49</td>
<td>.40&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.12</td>
<td>.49</td>
<td>12</td>
</tr>
<tr>
<td>50</td>
<td>.98</td>
<td>.17</td>
<td>.15</td>
<td>0</td>
</tr>
<tr>
<td>51</td>
<td>.62&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.28&lt;sup&gt;c&lt;/sup&gt;</td>
<td>.48</td>
<td>0</td>
</tr>
<tr>
<td>52</td>
<td>.96</td>
<td>.22&lt;sup&gt;c&lt;/sup&gt;</td>
<td>.21</td>
<td>0</td>
</tr>
<tr>
<td>53</td>
<td>.38&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.13</td>
<td>.43</td>
<td>11</td>
</tr>
<tr>
<td>54</td>
<td>.53&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.09</td>
<td>.50</td>
<td>4</td>
</tr>
<tr>
<td>55</td>
<td>.42&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.11</td>
<td>.49</td>
<td>19</td>
</tr>
<tr>
<td>56</td>
<td>.71</td>
<td>.18</td>
<td>.45</td>
<td>0</td>
</tr>
<tr>
<td>57&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.44&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.46&lt;sup&gt;c&lt;/sup&gt;</td>
<td>.50</td>
<td>3</td>
</tr>
<tr>
<td>58</td>
<td>.29</td>
<td>.15</td>
<td>.45</td>
<td>13</td>
</tr>
<tr>
<td>59</td>
<td>.22</td>
<td>.13</td>
<td>.42</td>
<td>7</td>
</tr>
<tr>
<td>60&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.53&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.36&lt;sup&gt;c&lt;/sup&gt;</td>
<td>.50</td>
<td>14</td>
</tr>
<tr>
<td>61</td>
<td>.91</td>
<td>.33&lt;sup&gt;c&lt;/sup&gt;</td>
<td>.28</td>
<td>2</td>
</tr>
<tr>
<td>62</td>
<td>.84</td>
<td>.17</td>
<td>.36</td>
<td>3</td>
</tr>
<tr>
<td>63</td>
<td>.53&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.07</td>
<td>.50</td>
<td>0</td>
</tr>
<tr>
<td>64</td>
<td>.76</td>
<td>.0</td>
<td>.43</td>
<td>0</td>
</tr>
<tr>
<td>65</td>
<td>.56&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.15</td>
<td>.50</td>
<td>13</td>
</tr>
<tr>
<td>66</td>
<td>.80</td>
<td>.57&lt;sup&gt;c&lt;/sup&gt;</td>
<td>.40</td>
<td>8</td>
</tr>
<tr>
<td>67&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.49&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.38&lt;sup&gt;c&lt;/sup&gt;</td>
<td>.50</td>
<td>13</td>
</tr>
<tr>
<td>68</td>
<td>.22</td>
<td>.23&lt;sup&gt;c&lt;/sup&gt;</td>
<td>.42</td>
<td>21</td>
</tr>
<tr>
<td>69</td>
<td>.49&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.18</td>
<td>.50</td>
<td>22&lt;sup&gt;d&lt;/sup&gt;</td>
</tr>
<tr>
<td>70</td>
<td>.69&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.24&lt;sup&gt;c&lt;/sup&gt;</td>
<td>.46</td>
<td>3</td>
</tr>
</tbody>
</table>

<sup>a</sup>Best items.

<sup>b</sup>Items with difficulty index between .30 and .70.

<sup>c</sup>Items with discrimination index between .20 and .40 or over .40 with standard deviation >.20.

<sup>d</sup>The correct response.

<sup>e</sup>Items with correlation below .05 or negative.
Table 7. continued

<table>
<thead>
<tr>
<th>Item number</th>
<th>Difficulty index</th>
<th>Discrimination index</th>
<th>Standard deviation</th>
<th>Distractor analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>71</td>
<td>.09</td>
<td>.11</td>
<td>.28</td>
<td>4^d 1 11 29</td>
</tr>
<tr>
<td>72^a</td>
<td>.67^b</td>
<td>.43^c</td>
<td>.47</td>
<td>5 5 30^d 5</td>
</tr>
<tr>
<td>73</td>
<td>.16</td>
<td>^e</td>
<td>.36</td>
<td>1 3 34 7^d</td>
</tr>
<tr>
<td>74^a</td>
<td>.64^b</td>
<td>.34^c</td>
<td>.48</td>
<td>29^d 1 4 11</td>
</tr>
<tr>
<td>75</td>
<td>.20</td>
<td>.30^c</td>
<td>.40</td>
<td>21 9 9^d 6</td>
</tr>
<tr>
<td>76^a</td>
<td>.67^b</td>
<td>.60^c</td>
<td>.47</td>
<td>30^d 15 0 0</td>
</tr>
<tr>
<td>77^a</td>
<td>.56^b</td>
<td>.36^c</td>
<td>.50</td>
<td>20 25^d 0 0</td>
</tr>
<tr>
<td>78^a</td>
<td>.69^b</td>
<td>.62^c</td>
<td>.46</td>
<td>14 31^d 0 0</td>
</tr>
<tr>
<td>79^a</td>
<td>.40^b</td>
<td>.34^c</td>
<td>.49</td>
<td>27 18^d 0 0</td>
</tr>
<tr>
<td>80</td>
<td>.89</td>
<td>.08</td>
<td>.32</td>
<td>39^d 5 0 0</td>
</tr>
</tbody>
</table>
respondents have been specifically subjected. In the present case, respondents did not undergo any particular program on which the test items were based. Thus the low reliability quotient obtained does not necessarily indicate that the test is a poor one.

**Difficulty index**

The difficulty indices of the 33 items vary from 9 to 98. The difficulty of an item is indicated by the percentage of respondents who answered the item correctly. The difficulty index is the fraction of correct responses to the total number of subjects taking the test. A good instrument should have both very easy items with almost 100% difficulty index and very difficult items with almost zero percent difficulty index, however, most of the items should be of medium difficulty with indices from .30 to .70 (Student Counseling Service, 1973). The difficulty indices of 19 out of the 33 items lie between .30 and .70. Eight items had difficulty indices above .70 and the difficulty indices of six items were below .30. The majority of the items thus had acceptable levels of difficulty for the intended audience. As indicated in Appendix I, more items measuring competencies in the areas of food safety, food storage and food selection tended to be more difficult while items measuring competencies in the area of sanitation and safety in the kitchen tended to be easy.

**Discrimination index**

The discrimination index of an item indicates the degree to which it discriminates between respondents with high and low achievement.
The discrimination index varies between -1.0 and 1.0. A positive discrimination index indicates that the item discriminates in the same direction as the total test score and is therefore presumably reflecting achievement of desired objectives (Gronlund, 1971, p. 252). Two of the test items (numbers 64 and 73) had no discrimination power, the rest discriminated positively. The higher the discrimination index, the better the item except when the standard deviation is very low (below .20). An item with a low standard deviation will show a spuriously high discrimination index. Best items should have discrimination indices between .20 and .40 or over .40 with a standard deviation higher than .20 (Student Counseling Service, 1973).

Distractor analysis

Distractor analysis indicates how well the distractors or decoys are functioning. A plausible distractor should be chosen by at least one person out of a group of 50 respondents (Student Counseling Service, 1973). Analysis of the test items indicated that two items each had two nonfunctioning distractors, while nine other items each had one nonfunctioning distractor. Seven items each had one distractor which attracted more respondents than the correct answer. Three other items each had one distractor that attracted as many respondents as the correct response.

Best items

Based on the criteria of discrimination index between .20 and .40 or over .40 with a standard deviation above .20; difficulty index between .30 and .70 and the selection of each distractor by at least one person,
the best items in the knowledge test were Items 48, 57, 60, 67, 72, 74, 76, 77, 78 and 79.

Summary

The food and nutrition knowledge test was subjected to an item analysis to determine the quality of the test as an instrument of measurement. All items except two discriminated positively, the difficulty indices of 19 items were between .30 and .70, and 11 items had nonfunctioning distractors. Only six items attained the criteria for best items. The reliability coefficient of the test as measured by the Kuder-Richardson Formula 20 was only .55.

Group Mean Scores of the Knowledge Test

The mean scores and standard deviations of respondents' answers to the knowledge test were calculated for different subgroups. The results, including the number of respondents for each subgroup, are shown in Table 8. A three-way analysis of variance was computed to determine if mean score differences in the knowledge test were related to certain variables such as sex, nutritional background and educational background. Results of the analysis of variance for the three variables and their interactions are shown in Table 9. Results will be presented in terms of each of the three variables.

Educational background

Data in Table 8 indicated that the I.S.U. group had the highest mean score for the knowledge test followed by the N.A.C. group. The A.C.C. group had the lowest mean score. From the F ratio for educational
Table 8. Mean scores and standard deviations of the knowledge test

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>Range</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>17.16</td>
<td>3.67</td>
<td>7-24</td>
<td>208</td>
</tr>
<tr>
<td>Education:&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total I.S.U.</td>
<td>18.09</td>
<td>3.65</td>
<td>8-24</td>
<td>89</td>
</tr>
<tr>
<td>F &amp; N&lt;sup&gt;b&lt;/sup&gt;</td>
<td>18.20</td>
<td>3.69</td>
<td>9-24</td>
<td>45</td>
</tr>
<tr>
<td>No F &amp; N&lt;sup&gt;c&lt;/sup&gt;</td>
<td>17.98</td>
<td>3.60</td>
<td>8-24</td>
<td>44</td>
</tr>
<tr>
<td>Total A.C.C.</td>
<td>16.18</td>
<td>3.65</td>
<td>7-24</td>
<td>74</td>
</tr>
<tr>
<td>F &amp; N</td>
<td>16.74</td>
<td>3.61</td>
<td>10-24</td>
<td>39</td>
</tr>
<tr>
<td>No F &amp; N</td>
<td>15.54</td>
<td>3.59</td>
<td>7-24</td>
<td>35</td>
</tr>
<tr>
<td>Total N.A.C.</td>
<td>16.93</td>
<td>3.28</td>
<td>9-23</td>
<td>45</td>
</tr>
<tr>
<td>F &amp; N</td>
<td>17.14</td>
<td>3.28</td>
<td>9-23</td>
<td>35</td>
</tr>
<tr>
<td>No F &amp; N</td>
<td>16.20</td>
<td>3.19</td>
<td>10-21</td>
<td>10</td>
</tr>
<tr>
<td>Sex:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>15.79</td>
<td>3.78</td>
<td>7-24</td>
<td>68</td>
</tr>
<tr>
<td>Females</td>
<td>17.83</td>
<td>3.46</td>
<td>8-24</td>
<td>140</td>
</tr>
<tr>
<td>Nutrition:&lt;sup&gt;d&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F &amp; N</td>
<td>17.42</td>
<td>3.62</td>
<td>9-24</td>
<td>119</td>
</tr>
<tr>
<td>No F &amp; N</td>
<td>16.82</td>
<td>3.76</td>
<td>7-24</td>
<td>89</td>
</tr>
</tbody>
</table>

<sup>a</sup>Where the respondent is attending school.

<sup>b</sup>Respondents who studied food and nutrition in high school.

<sup>c</sup>Respondents who did not study food and nutrition in high school.

<sup>d</sup>High school food and nutrition background.
Table 9. Analysis of variance of knowledge scores in relation to three variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sum of squares</th>
<th>Degrees of freedom</th>
<th>Mean square</th>
<th>F value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main effects</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td>96.419</td>
<td>1</td>
<td>96.419</td>
<td>7.842**</td>
</tr>
<tr>
<td>Nutrition</td>
<td>2.248</td>
<td>1</td>
<td>2.248</td>
<td>.183</td>
</tr>
<tr>
<td>Education</td>
<td>84.989</td>
<td>2</td>
<td>42.495</td>
<td>3.445*</td>
</tr>
<tr>
<td><strong>2-way interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex:Nutrition</td>
<td>39.596</td>
<td>1</td>
<td>39.596</td>
<td>3.220</td>
</tr>
<tr>
<td>Sex:Education</td>
<td>22.978</td>
<td>2</td>
<td>11.489</td>
<td>.934</td>
</tr>
<tr>
<td>Nutrition:Education</td>
<td>12.837</td>
<td>2</td>
<td>6.418</td>
<td>.522</td>
</tr>
<tr>
<td><strong>3-way interactions</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sex:Nutrition:Education</td>
<td>46.294</td>
<td>2</td>
<td>23.147</td>
<td>1.883</td>
</tr>
<tr>
<td><strong>Explained</strong></td>
<td>396.563</td>
<td>11</td>
<td>36.051</td>
<td>2.932</td>
</tr>
<tr>
<td><strong>Residual (Error)</strong></td>
<td>2409.857</td>
<td>196</td>
<td>12.295</td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>2806.419</td>
<td>207</td>
<td>13.558</td>
<td></td>
</tr>
</tbody>
</table>

* p < .05

** p < .01
background in Table 9 it may be concluded that mean knowledge test scores between the three sample groups attending school at either I.S.U. or A.C.C. or not attending school (N.A.C.) were significantly different from each other \( (p = .033) \). By means of the Scheffé's test (see Table 10) it was ascertained that the I.S.U. subgroup scored significantly higher than the A.C.C. subgroup but not significantly higher than the N.A.C. subgroup. The mean scores for the A.C.C. and the N.A.C. subgroups were not significantly different from each other.

**Sex**

Data in Table 8 showed that females had a higher mean score on the knowledge test than males. From the F ratio for sex (Table 9) it may be concluded that the mean knowledge test scores of the male and the female respondents were significantly different \( (p = .006) \).

**Nutritional background**

Respondents who studied food and nutrition in high school scored slightly higher on the knowledge test than those who did not study food and nutrition in high school (Table 8). However, as indicated from the F ratio for nutrition in Table 9, the difference was not statistically significant. Within each educational subgroup, the respondents who studied food and nutrition in high school did slightly better on the knowledge test scores than those who did not study food and nutrition. From the F ratios (Table 9) for interactions of the variables, however, it may be concluded that the differences between mean scores for those with
Table 10. Summary of the Scheffé's test to compare the mean scores for I.S.U., A.C.C., and N.A.C.

Decision Rules

Given: 05 significance level = α, v₁ = 2, v₂ = 205, and k = 3;

\[ F_{α;v_1,v_2} = 3.04 \]

Therefore \( F' = (k - 1)F \)

\[ = 6.08 \]

Difference between means if significant if \( F_{\text{obs}} > F' \)

Calculations

\( \bar{X}_{\text{I.S.U.}} = 18.09; \ n_{\text{I.S.U.}} = 89 \)

\( \bar{X}_{\text{A.C.C.}} = 16.18; \ n_{\text{A.C.C.}} = 74 \)

\( \bar{X}_{\text{N.A.C.}} = 16.93; \ n_{\text{N.A.C.}} = 45 \)

\( C_j = 1 \)

\( C_{j'} = -1 \)

\( M_{S_e} = 12.295 \)

\( F_{\text{obs}} = \frac{(\bar{X}_1 - \bar{X}_2)^2}{M_{S_e} \frac{\sum C^2}{n_j}} \)

Therefore

\( F_{\text{obs}} \) for I.S.U. vs. A.C.C. = 12.01

\( F_{\text{obs}} \) for I.S.U. vs. N.A.C. = 3.28

\( F_{\text{obs}} \) for A.C.C. vs. N.A.C. = 1.28

Decision

Difference between mean scores for I.S.U. and A.C.C. is significant.

Difference between mean scores for I.S.U. and N.A.C. is not significant.

Difference between mean scores for A.C.C. and N.A.C. is not significant.
and without food and nutrition background within each educational sub-
group, were not statistically significant. The only interaction which
approached significance \((p = .074)\) was that of sex and nutritional
background, but the size of the male sample who had food and nutrition
in high school \((24)\) (Table 6) was viewed as too small to draw any
definite conclusions about the differences in scores.

Summary

In this section, mean scores of subgroups on the knowledge test have
been presented and discussed. Females scored significantly higher than
males and respondents from I.S.U. also scored significantly higher
than respondents from the area community college but not significantly
higher than respondents not attending school. Respondents who studied
food and nutrition in high school consistently did better, but not
significantly so, on the knowledge test than those who did not study
food and nutrition in high school.

Competencies Acquired by Respondents

Ninety-seven competency statements were judged as important for
older adolescents by completion of high school, by at least 66% of the
experts contacted. Some of these competency statements were selected
for measurement. A 33 multiple choice knowledge test was developed
based on 29 of the competency statements that were judged as important
by at least 91% of the experts. The list of competency statements
used as basis for the knowledge test is shown in Appendix I.

Data in Table 11 show the percentage of respondents in each group
Table 11. Competencies acquired by respondents

<table>
<thead>
<tr>
<th>Item Number</th>
<th>I.S.U. (N = 89)</th>
<th>A.C.C. (N = 74)</th>
<th>N.A.C. (N = 45)</th>
<th>Total (N = 208)</th>
</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td>47</td>
<td>35</td>
<td>56</td>
<td>45</td>
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<tr>
<td>49</td>
<td>42</td>
<td>51</td>
<td>53</td>
<td>48</td>
</tr>
<tr>
<td>50</td>
<td>96&lt;sup&gt;a&lt;/sup&gt;</td>
<td>93&lt;sup&gt;a&lt;/sup&gt;</td>
<td>82&lt;sup&gt;a&lt;/sup&gt;</td>
<td>92&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>51</td>
<td>61</td>
<td>38</td>
<td>38</td>
<td>48</td>
</tr>
<tr>
<td>52</td>
<td>94&lt;sup&gt;a&lt;/sup&gt;</td>
<td>89&lt;sup&gt;a&lt;/sup&gt;</td>
<td>91&lt;sup&gt;a&lt;/sup&gt;</td>
<td>92&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>53</td>
<td>31</td>
<td>14</td>
<td>16</td>
<td>22</td>
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<tr>
<td>54</td>
<td>47</td>
<td>23</td>
<td>36</td>
<td>36</td>
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<tr>
<td>55</td>
<td>38</td>
<td>15</td>
<td>18</td>
<td>25</td>
</tr>
<tr>
<td>56</td>
<td>67&lt;sup&gt;a&lt;/sup&gt;</td>
<td>50</td>
<td>58</td>
<td>59</td>
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<tr>
<td>57</td>
<td>39</td>
<td>12</td>
<td>22</td>
<td>26</td>
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<tr>
<td>58</td>
<td>37</td>
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<td>33</td>
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<td>59</td>
<td>18</td>
<td>22</td>
<td>20</td>
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<tr>
<td>60</td>
<td>60</td>
<td>66&lt;sup&gt;a&lt;/sup&gt;</td>
<td>80&lt;sup&gt;a&lt;/sup&gt;</td>
<td>66&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>61</td>
<td>82&lt;sup&gt;a&lt;/sup&gt;</td>
<td>84&lt;sup&gt;a&lt;/sup&gt;</td>
<td>89&lt;sup&gt;a&lt;/sup&gt;</td>
<td>84&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>62</td>
<td>75&lt;sup&gt;a&lt;/sup&gt;</td>
<td>70&lt;sup&gt;a&lt;/sup&gt;</td>
<td>73&lt;sup&gt;a&lt;/sup&gt;</td>
<td>73&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>63</td>
<td>57</td>
<td>51</td>
<td>51</td>
<td>54</td>
</tr>
<tr>
<td>64</td>
<td>79&lt;sup&gt;a&lt;/sup&gt;</td>
<td>86&lt;sup&gt;a&lt;/sup&gt;</td>
<td>82&lt;sup&gt;a&lt;/sup&gt;</td>
<td>82&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>65</td>
<td>53</td>
<td>69&lt;sup&gt;a&lt;/sup&gt;</td>
<td>78&lt;sup&gt;a&lt;/sup&gt;</td>
<td>64</td>
</tr>
<tr>
<td>66</td>
<td>72&lt;sup&gt;a&lt;/sup&gt;</td>
<td>65&lt;sup&gt;a&lt;/sup&gt;</td>
<td>64</td>
<td>68&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>67</td>
<td>52</td>
<td>39</td>
<td>38</td>
<td>44</td>
</tr>
<tr>
<td>68</td>
<td>21</td>
<td>27</td>
<td>24</td>
<td>24</td>
</tr>
</tbody>
</table>

<sup>a</sup>Competencies acquired by a particular subgroup.

<sup>b</sup>Competencies acquired by the whole group.

<sup>c</sup>Competencies acquired by two subgroups.
<table>
<thead>
<tr>
<th>Item Number</th>
<th>I.S.U. (N = 89)</th>
<th>Percentage response</th>
<th>N.A.C. (N = 45)</th>
<th>Total (N = 208)</th>
</tr>
</thead>
<tbody>
<tr>
<td>69</td>
<td>57</td>
<td>57</td>
<td>60</td>
<td>58</td>
</tr>
<tr>
<td>70</td>
<td>71^a</td>
<td>61</td>
<td>69^a</td>
<td>67^c</td>
</tr>
<tr>
<td>71</td>
<td>8</td>
<td>9</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>72</td>
<td>70^a</td>
<td>68^a</td>
<td>58</td>
<td>66^c</td>
</tr>
<tr>
<td>73</td>
<td>18</td>
<td>11</td>
<td>11</td>
<td>14</td>
</tr>
<tr>
<td>74</td>
<td>65^a</td>
<td>59</td>
<td>44</td>
<td>59</td>
</tr>
<tr>
<td>75</td>
<td>29</td>
<td>22</td>
<td>27</td>
<td>26</td>
</tr>
<tr>
<td>76-80</td>
<td>65^a</td>
<td>59</td>
<td>63</td>
<td>62</td>
</tr>
</tbody>
</table>
that correctly answered each item. In this study a competency will be considered attained as measured by this instrument if 65% or more of the respondents answered correctly the question pertaining to that competency. If the correct response was selected by less than 65% of the respondents the competency will be considered not attained.

Results will be presented for the sample as a whole and then for each group within the sample.

The total group

Analysis of the results of the knowledge instrument to identify basic competencies which had been acquired by high school graduates indicated that there were some competencies in food and nutrition which respondents in all the three subgroups had acquired while there were others which none of them had acquired (Table 11). There were five competencies which had been acquired by all the three groups; these were:

"identifies the role of advertising in food selection"

"selects nutritious snacks"

"applies safety precautions in food handling"

"maintains a clean environment in the kitchen"

"stores cleaning agents closed tightly, apart from food products and beyond the reach of children"

Four items measuring four competencies, each had a score of 65% or more because two of the three subgroups had high percentage scores on them; these competencies were:

"practices personal cleanliness when handling and storing
food products" (not acquired by the I.S.U. group)

"recognizes left-over foods which do not store satisfactorily for future use" (not acquired by the N.A.C. group)

"accepts the responsibility of a consumer in the marketplace" (not acquired by the A.C.C. group)

"distinguishes between wholesome and spoiled foods" (not acquired by the N.A.C. group)

As measured by the knowledge instrument, 16 of the competencies had not been acquired by any of the three subgroups. As indicated in Appendix I, the areas in food and nutrition that respondents attained some of the competencies specified were: food selection, food habits, food safety, sanitation and safety in the kitchen, meal planning, and marketing. Areas in which none of the subgroups attained any of the competencies were: significance of food, nutrient sources, nutrient requirements, home food preservation, and food storage.

I.S.U. group

From the results presented in Table 11, 11 questions had a response rate of 65% or more. As measured by the knowledge instrument, therefore, this group had acquired 11 out of the 29 competencies. In addition to the competencies acquired by the whole group, the following were the competencies acquired by the I.S.U. group:

"recognizes that everyone needs the same basic nutrients but in varying amounts"

"interprets grocery store information on unit pricing to select the best food buys"
"substitutes a food item of similar value to one sought".

**A.C.C. group**

Table 11 indicates that nine items were responded to correctly by 65% or more of the respondents. Thus, as measured by the knowledge instrument, nine competencies had been acquired by the A.C.C. group and 20 had not been acquired. The competency which had been acquired by the respondents in this subgroup but was not listed for the whole group was:

"uses the knowledge of nutrient needs and food availability and cost in meal planning".

**N.A.C. group**

Data in Table 11 showed that eight competencies, as measured by the knowledge instrument, had been acquired by the N.A.C. group and 21 competencies had not been acquired. The competency which had been acquired by this subgroup but was not listed for the whole group was:

"uses the knowledge of nutrient needs and food availability and cost in meal planning".

**Summary**

A 33 multiple choice knowledge test to determine which of 29 competencies had been acquired by high school graduates in three subgroups was developed and submitted to respondents. Results indicated that some competencies had been acquired by respondents in all the subgroups while others had not been acquired by any of the respondents.
Five out of the 29 competencies had been acquired by the group as a whole and 16 had not been acquired. The remaining eight competencies had been acquired by one or two of the subgroups but not the whole group. Competencies acquired by particular subgroups were 11 for the I.S.U. group; nine for the A.C.C. group; and eight for the N.A.C. group. Of the 11 food and nutrition content areas represented in the knowledge test, respondents did not achieve any competencies in five of them. Some competencies in the other content areas were also not achieved.

Need for Food and Nutrition Information

One major objective of any educational program is to meet the needs of program recipients by offering the type of content or information participants request. Respondents in this study were asked in one question (No. 26) to indicate how often they wished they could have more information about food and nutrition. In another question respondents were asked to indicate on a list of suggested content areas in food and nutrition the types of information they desired.

In the question about how often respondents wished they could have more information, 35% said often or very often; 35% said sometimes, and 30% said seldom or never. The results to the question about what type of information respondents wished for are presented in Table 12. Respondents' selections were fairly well-distributed among the content areas listed, although more people (43%) wanted more information about budgeting and food purchasing while fewer people (27%) wanted
Table 12. Need for food and nutrition information

<table>
<thead>
<tr>
<th>Subject matter area</th>
<th>I.S.U. Number</th>
<th>I.S.U. %</th>
<th>A.C.C. Number</th>
<th>A.C.C. %</th>
<th>N.A.C. Number</th>
<th>N.A.C. %</th>
<th>Total Number</th>
<th>Total %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Budgeting and food purchasing</td>
<td>39</td>
<td>44</td>
<td>31</td>
<td>42</td>
<td>19</td>
<td>42</td>
<td>89</td>
<td>43</td>
</tr>
<tr>
<td>Food selection and meal planning</td>
<td>47</td>
<td>53</td>
<td>22</td>
<td>30</td>
<td>17</td>
<td>38</td>
<td>86</td>
<td>41</td>
</tr>
<tr>
<td>Food preparation</td>
<td>40</td>
<td>45</td>
<td>22</td>
<td>30</td>
<td>13</td>
<td>27</td>
<td>75</td>
<td>36</td>
</tr>
<tr>
<td>Nutrition misinformation</td>
<td>39</td>
<td>44</td>
<td>23</td>
<td>31</td>
<td>9</td>
<td>20</td>
<td>71</td>
<td>34</td>
</tr>
<tr>
<td>Relationship between food and disease</td>
<td>27</td>
<td>30</td>
<td>18</td>
<td>24</td>
<td>11</td>
<td>24</td>
<td>56</td>
<td>27</td>
</tr>
<tr>
<td>No information needed</td>
<td>11</td>
<td>12</td>
<td>24</td>
<td>32</td>
<td>17</td>
<td>38</td>
<td>52</td>
<td>25</td>
</tr>
<tr>
<td>Other</td>
<td>9</td>
<td>10</td>
<td>--</td>
<td>--</td>
<td>1</td>
<td>2</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>

Information about the relationship between food and disease. The results from the two questions indicated that 25% to 30% felt they never or scarcely needed any nutrition information. Of these people, the largest percentages were from the A.C.C. and the N.A.C. group (32% and 38%, respectively); only 12% from the I.S.U. group indicated they did not need any information. A study by Ikeda (1975) of poor homemakers in four counties in California indicated that the main nutrition information they required were also about food purchasing, meal planning and food preparation. Steidl (1975) also indicated the homemaking tasks young married women considered as most complex were meal preparation, meal planning and food marketing. The present finding may, therefore, not be limited to only older adolescents in this study but may be a general requirement.
Dietary Practices of Respondents

Tyler (1949) has suggested that education is a process of changing the behavior patterns of people and that educational objectives or competencies represent the kinds of changes in behavior that an educational institution seeks to bring about in its students. Tyler (1949) suggests that one way to identify needed changes in behavior patterns is to study the current behavior patterns of the learners. In this study, questions were asked to identify selected dietary practices of the respondents. The dietary practices investigated were 1) respondents' favorite snacks, 2) criticisms received about food habits, 3) reasons for skipping meals, 4) meal patterns, 5) diets followed by respondents, 6) use of dietary supplements, 7) attitude toward food consumption, 8) factors affecting cooking at home versus eating out, 9) dietary practices and social occasions, and 10) attitude toward new food and unfamiliar dietary practices.

Favorite snacks

Subjects were asked to list three of their favorite snacks excluding plain coffee or tea. The ten most frequently listed items are shown in Table 13. Appendix J, Table 28, gives a list of other items mentioned by respondents. A response of the word "beverage" was omitted as were responses of the words "tea", "coffee" and "iced tea". A general response of "drinks" was deleted.

Apart from nonalcoholic carbonated drinks (soda, pop, or soft drinks), which were the most favorite snack items for all the three groups, the rank order of favorite snacks varied among the groups.
Table 13. Ten most favorite snacks of older adolescents

<table>
<thead>
<tr>
<th>Food item</th>
<th>I.S.U. (N = 92)</th>
<th>A.C.C. (N = 81)</th>
<th>N.A.C. (N = 44)</th>
<th>Total (N = 217)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-alcoholic carbonated drinks</td>
<td>62</td>
<td>59</td>
<td>61</td>
<td>61</td>
</tr>
<tr>
<td>Fruits&lt;sup&gt;a&lt;/sup&gt;</td>
<td>52</td>
<td>25</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td>Cereals and bread&lt;sup&gt;b&lt;/sup&gt;</td>
<td>20</td>
<td>27</td>
<td>14</td>
<td>22</td>
</tr>
<tr>
<td>Cookies</td>
<td>23</td>
<td>20</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>Milk&lt;sup&gt;c&lt;/sup&gt;</td>
<td>14</td>
<td>20</td>
<td>20</td>
<td>18</td>
</tr>
<tr>
<td>Chips&lt;sup&gt;d&lt;/sup&gt;</td>
<td>14</td>
<td>23</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>Candy</td>
<td>15</td>
<td>16</td>
<td>11</td>
<td>15</td>
</tr>
<tr>
<td>Ice cream and yogurt</td>
<td>20</td>
<td>10</td>
<td>9</td>
<td>14</td>
</tr>
<tr>
<td>Crackers</td>
<td>15</td>
<td>6</td>
<td>16</td>
<td>12</td>
</tr>
<tr>
<td>Cheese</td>
<td>10</td>
<td>9</td>
<td>18</td>
<td>11</td>
</tr>
</tbody>
</table>

<sup>a</sup>Excluding fruit juices which were listed as "juice". The fruits frequently listed were apples and oranges.

<sup>b</sup>Including popcorn and breakfast cereals but excluding other cereal products.

<sup>c</sup>Including chocolate milk.

<sup>d</sup>Some had "dips" with the chips.
Fruits were the second favorite items for both the I.S.U. and N.A.C. groups but the third for the A.C.C. group. Cereal products ranked second in choice for the A.C.C. group. Milk was the seventh favorite item for the I.S.U. group but milk, along with cookies ranked third for the N.A.C. group and fifth for the A.C.C. group. Alcoholic drinks were listed as the seventh most favorite item by the A.C.C. group but did not appear in the top ten for either the I.S.U. or the N.A.C. groups. Juice, along with cereal products and chips ranked seventh for the N.A.C. group but did not make the top ten for the other groups. Hamburger was the eighth most favorite snack for the A.C.C. group though it was the 18th and 19th for the N.A.C. and the I.S.U. groups, respectively. Apart from fruits which ranked fairly high in selection by respondents of this study, the ten most favorite items listed were similar to those mentioned by respondents in the studies of Hinton (1962). The selection of alcoholic drinks by 14% of the A.C.C. group as compared to 5% of the I.S.U. and 7% of the N.A.C. groups may be due to the fact that there were more older adults within the A.C.C. group.

It is important to note that fruits were the second most preferred snack of the respondents; however, vegetables did not make the first ten list. This finding is consistent with that of Coatney (1974) who showed that though apples were liked by the participants of her study, vegetables were not their favorite. Probably fruits were eaten more because they are easily available from vending machines, just like soft drinks but unlike vegetables. As Manoff (1974) suggested, convenience can be a strong motive in food purchasing.
However, milk is also easily available from vending machines but it was not as much preferred as carbonated soft drinks. Obviously convenience is not the only motive in food selection, but one out of many others (Lowenberg, 1974).

Criticisms received about food habits

From a list of common criticisms people usually receive about their food habits, respondents were asked to mark whichever applied to them. Table 14 shows the answers given by respondents. Thirteen percent of the respondents indicated that they were not criticized, while 48% said they were criticized for not eating the right foods.

The least criticism received by this group was about eating too slowly, while eating too fast was the second most frequent criticism. Eating too fast was the most frequent criticism received by the I.S.U. and

<table>
<thead>
<tr>
<th>Criticism</th>
<th>Percentage responding</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I.S.U. (N = 89)</td>
</tr>
<tr>
<td>Not eating the right foods</td>
<td>43</td>
</tr>
<tr>
<td>Eating too fast</td>
<td>51</td>
</tr>
<tr>
<td>Skipping meals</td>
<td>37</td>
</tr>
<tr>
<td>Eating too much</td>
<td>29</td>
</tr>
<tr>
<td>Eating too little</td>
<td>21</td>
</tr>
<tr>
<td>Eating too often</td>
<td>22</td>
</tr>
<tr>
<td>Not criticized</td>
<td>12</td>
</tr>
<tr>
<td>Eating too slowly</td>
<td>11</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
</tr>
</tbody>
</table>
N.A.C. groups but it was the third frequent criticism for the A.C.C. group. Skipping meals was quite high in the rating of criticisms.

**Reasons for skipping meals**

Meals may be skipped by people for various reasons. Studies (Hodges and Krehl, 1965; Manno, 1974) have indicated that adolescents very often skip meals. In this study, respondents were asked to indicate, from a list of possible reasons for skipping meals, those that applied to them (Table 15). Respondents' main reasons for skipping meals were: either "trying to lose or maintain weight" (50%) or "in a hurry to do something else" (56%). The least reason for skipping meals among the respondents was because they were not hungry.

One sign of good health is good appetite and as concluded from mortality figures by Heald (1973), the adolescent stage is a very healthy period (in terms of disease but less in terms of accidents).

<table>
<thead>
<tr>
<th>Reasons</th>
<th>I.S.U. (N = 89)</th>
<th>A.C.C. (N = 74)</th>
<th>N.A.C. (N = 45)</th>
<th>Total (N = 208)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Generally in a hurry to do something else</td>
<td>51</td>
<td>68</td>
<td>49</td>
<td>56</td>
</tr>
<tr>
<td>Trying to lose or maintain weight</td>
<td>57</td>
<td>38</td>
<td>56</td>
<td>50</td>
</tr>
<tr>
<td>Foods served at meal not usually liked</td>
<td>13</td>
<td>14</td>
<td>4</td>
<td>12</td>
</tr>
<tr>
<td>Seldom hungry</td>
<td>8</td>
<td>11</td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td>Other</td>
<td>10</td>
<td>12</td>
<td>9</td>
<td>11</td>
</tr>
</tbody>
</table>
The first reason for the I.S.U. group (57%) and the N.A.C. group (56%) was trying to lose or maintain weight. This was the second reason for the A.C.C. group (38%). Sixty-eight percent of the A.C.C. group skipped meals because they were in a hurry to do something else; while 51% of the I.S.U. group and 49% of the N.A.C. group skipped meals for the same reason. One possible reason why such a high percentage of the A.C.C. group were in a hurry might have been because most of them commute to school. Some other reasons given by respondents but not listed in the table were that they skipped breakfast because they were either too lazy to get up early enough for it, or they had overslept. On the whole, there was not much difference between the group not attending school and the two groups in college. This study indicates that skipping meals was mainly due to lack of time or an intention to lose or maintain weight.

Meal patterns

Respondents were asked to indicate the number of times per week each of the regular three meals was eaten and also the number of times snack was consumed after supper. Table 16 shows the responses. Twenty-one percent of the respondents skipped breakfast while four percent and one percent skipped lunch and supper respectively each day. While only 24% ate breakfast each day of the week, 49% ate lunch and 61% ate supper each day of the week. The least popular meal was therefore breakfast while the most popular meal was supper. Respondents were not asked for reasons for skipping any particular meal, but as shown in
Table 16. Meal patterns of respondents

<table>
<thead>
<tr>
<th>Number of times per week</th>
<th>Breakfast (N = 208)</th>
<th>Lunch (N = 208)</th>
<th>Supper (N = 208)</th>
<th>After supper snack (N = 203)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td>21</td>
<td>4</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>1-2</td>
<td>19</td>
<td>9</td>
<td>4</td>
<td>37</td>
</tr>
<tr>
<td>3-4</td>
<td>13</td>
<td>14</td>
<td>8</td>
<td>18</td>
</tr>
<tr>
<td>5-6</td>
<td>22</td>
<td>24</td>
<td>25</td>
<td>16</td>
</tr>
<tr>
<td>7</td>
<td>24</td>
<td>49</td>
<td>61</td>
<td>20</td>
</tr>
</tbody>
</table>

Table 15, meals were skipped primarily due to lack of time or an intention to avoid weight gain. Apparently it was breakfast which suffered most in terms of meals skipped.

Body activities are at a minimum during rest therefore most of the food eaten before rest is converted to fat and stored if the total daily caloric intake is in excess of requirement. Respondents were asked to indicate how often they consumed snacks after the evening meal. In Table 16, the data indicated that seven percent did not have any evening snacks while 20% had evening snack each day of the week. In the knowledge instrument, one item (No. 51) tested respondents' knowledge about effects of snacking before bed-time. Forty-eight percent of the respondents correctly indicated that the heavy snack before bed might be responsible for the subject's weight gain, while 42% thought the weight gain was due to eating frequently. This latter response is a misconception because eating five or six times a day
does not necessarily lead to weight gain (Davidson, Passmore, Brock and Truswell, 1975, p. 291). Considering that 86% of the respondents ate supper at least five days a week and that 43% were trying some self-prescribed weight reduction diet, the number consuming evening snacks five or more days a week (36%) was high. This finding, together with the fact that 52% of the respondents did not know that heavy snacking before bedtime may be a habit that leads to weight gain, indicates that respondents require more knowledge about factors concerning weight control.

Respondents were asked to indicate the number of times in a week meals were prepared at home and eaten by them. The results are indicated in Table 17. The figures in Tables 16 and 17 indicated that not all the meals respondents said they ate were prepared at home. Generally, fewer lunches and suppers were prepared at home. Almost half of all suppers eaten each day were not prepared and eaten at home.

**Diets followed by respondents**

Diets being followed by older adolescents are indicated in Table 18. Fifty-two percent of all respondents did not follow any general
Table 18. Diets followed by respondents (N = 208)

<table>
<thead>
<tr>
<th>Diet</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>General diets:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No diet</td>
<td>109</td>
<td>52</td>
</tr>
<tr>
<td>Weight reduction, own choice</td>
<td>89</td>
<td>43</td>
</tr>
<tr>
<td>Weight reduction, prescription</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>For weight gain, own choice</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>For weight gain, prescription</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Special diets:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No special diet</td>
<td>175</td>
<td>84</td>
</tr>
<tr>
<td>Diabetic diet</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Low cholesterol diet</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Ulcer diet</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>20</td>
<td>10</td>
</tr>
</tbody>
</table>

diet; while 43% followed a self-prescribed weight reduction diet, and two percent followed a doctor-prescribed weight reduction diet. Only three percent followed a diet to gain weight, two percent by themselves and one percent prescribed by a physician. In connection with special diets, 84% followed no special diet, five percent identified a special diet and 10% listed diets being followed.

There were three diets among the 20 "other" special diets listed by respondents that were not directly related to weight reduction. All the other 17 diets described were aimed at losing weight. For example: "weight watchers" diet; eating only one meal a day; reduction of starches and fats intake; reducing total intake at each meal; and eating less and exercising more. The three special diets not directly connected with weight reduction were: a diet for hypothyroidism; a diet to achieve a desirable physique for a contest; and a diet of selected foods for training purposes. It is obvious from Table 18 that
while respondents were quite healthy (only a few of them needed medical help with diets), quite a fair proportion of them were weight conscious and were making efforts, nutritionally, to reduce their weights. No information was sought about respondents' weight or height, therefore it is not known whether respondents' concern about weight is a genuine concern or just an unwarranted preoccupation.

Use of dietary supplements

Table 19 gives respondents' answers concerning the use of vitamin and mineral supplements. According to the results, 36% of the youth voluntarily took vitamin supplements while 14% voluntarily took mineral supplements. Four percent of the respondents took vitamin and mineral supplements as prescriptions. Substantially more people in this study used supplements than were recorded by Hodges and Krehl (1965) for Iowa teenagers, and by the national survey in 1965 (U.S. Dept. Agric. 1969) for similar age groups.

<table>
<thead>
<tr>
<th>Supplements</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Vitamins:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No vitamins</td>
<td>125</td>
<td>60</td>
</tr>
<tr>
<td>Vitamins, own choice</td>
<td>74</td>
<td>36</td>
</tr>
<tr>
<td>Vitamins, prescription</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td><strong>Minerals:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No minerals</td>
<td>170</td>
<td>82</td>
</tr>
<tr>
<td>Minerals, own choice</td>
<td>30</td>
<td>14</td>
</tr>
<tr>
<td>Minerals, prescription</td>
<td>8</td>
<td>4</td>
</tr>
</tbody>
</table>
Comparison of snacking with other data

Fifty percent of all respondents skipped meals because they were trying to lose or maintain their weight (Table 15); also about the only diet most of the respondents (43%) followed was a self-imposed weight reduction diet (Table 18). However, 61% of the respondents listed carbonated soft drinks, which are generally regarded as "empty calorie" food items, as their favorite snacks. Moreover, the data in Table 13 also indicated that high calorie snack items like cookies and candies (22% and 15%, respectively) ranked high in selection as snacks. These results imply that respondents were either not aware of caloric value of these snack items or they did not consider snack as contributing substantially to the overall nutrient intake.

In connection with the consideration of snack as part of the total daily intake, respondents were asked their opinions about the importance of considering snacks as part of the total diet. Fifteen percent of the respondents did not think it was important; 30% thought it was somewhat important and, 55% thought it was important or very important to consider snacks as part of the total diet. There were therefore 45% of the respondents who did not think that snacks contributed much to the daily total food intake yet, out of the 208 respondents, only three percent did not eat any snack. Twenty-six percent had one snack a day; 40% had two; 21% had three and nine percent had four or more snacks each day. For those who had snacks, only seven percent did not have snacks after supper (Table 16); and as many as 20% had snacks after supper each day.
One knowledge item testing respondents' ability to identify misconceptions about food gave some idea about respondents' knowledge of caloric value of nutrients. The item asked respondents to identify the statement which is a misconception among the following:

1. Alcohol gives more energy for the same weight than either protein or carbohydrate.
2. For an adequate diet, every meal has to contain food from the meat group.
4. For safety, home canned vegetables must be boiled for 10 to 20 minutes before eating.

Out of the 208 respondents, 57% selected the first option above as the misconception. This response supports the findings of Dwyer and Mayer (1969) that some youth have poor concepts of caloric content of various foods.

It can be said therefore that the majority of the respondents consumed snacks each day, but 45% of them did not consider snack as contributing substantially to the total nutrient intake. Moreover, the majority of the respondents were not very familiar with the caloric contribution of nutrients.

**Attitude toward food consumption**

Respondents were asked how often they worried about eating too much and how often they wished they could eat more. In connection with eating too much, 50% of the respondents said they worried very often
or often; 24% said they worried sometimes, and 26% said they seldom or never worried. About eating more, 22% of the respondents said they wished often or very often that they could eat more; 19% said they had this wish sometimes; and 60% said they seldom or never wished they could eat more. These results indicate that more respondents (50%) worried about eating too much compared to those (22%) who wished they could eat more. The results here are consistent with respondents' answers concerning diets for weight reduction and weight gain.

Factors affecting cooking at home versus eating out

Respondents were asked to indicate whether they would prefer to cook or to eat out if they had adequate money and ingredients and they had to offer a meal to friends. They were further asked to indicate their reasons for each choice. Responses concerning reasons for cooking at home or eating out are shown in Table 20. Sixty-two percent of the respondents said they would prepare the meal at home while 38% said they would eat out. As indicated in Table 20, the reason for more than one half of the respondents who preferred to cook the meal was because they enjoyed cooking. Over one-fifth of them said it was because their friends would appreciate it better while one-seventh of them would cook at home because it was cheaper. Only less than five percent of them preferred to cook because it was more convenient. In contrast, about one-third of those who chose to eat out did so because of convenience while for about one-fifth of them it was because they thought their friends would appreciate it. Thus for
Table 20. Factors affecting cooking at home versus eating out

<table>
<thead>
<tr>
<th>Factors</th>
<th>Response Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Cooking at home:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I enjoy cooking</td>
<td>74</td>
<td>36</td>
</tr>
<tr>
<td>It is cheaper to prepare meals at home</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td>Friends will appreciate more a meal</td>
<td>29</td>
<td>14</td>
</tr>
<tr>
<td>prepared myself</td>
<td></td>
<td></td>
</tr>
<tr>
<td>It is more convenient to prepare it at home</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Not applicable</td>
<td>79</td>
<td>38</td>
</tr>
<tr>
<td><strong>Eating out:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not good at cooking</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>Do not have time</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Friends and I prefer eating out</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>More convenient to take friends out</td>
<td>32</td>
<td>15</td>
</tr>
<tr>
<td>Other</td>
<td>9</td>
<td>4</td>
</tr>
<tr>
<td>Not applicable</td>
<td>129</td>
<td>62</td>
</tr>
</tbody>
</table>

this group of respondents, the major factor for preparing meals at home was because of the enjoyment derived out of it, either by the individual or by friends, even though their responses indicated that cooking was not considered particularly convenient. If the individual decided to take friends out to eat however, then it was mainly due to the convenience rather than the fact that friends might prefer it better or that there was a lack of time or that they were poor cooks. Most of the respondents who listed other reasons for eating out said it was because of the change of environment.

On the whole, respondents' answers indicated that in contrast to the general opinion about youth preferring to "eat on the run" due to lack of time, more of these respondents enjoyed cooking, preferred to offer
friends their own cooked meals; and if they took friends out to eat, it would be mainly because of the convenience.

**Dietary practices and social occasions**

Respondents were asked to indicate the number of times they engaged in certain social occasions and the type of foods consumed during those occasions. Indicated in Table 21 were the number of times respondents attended parties. The data in Table 21 indicated that respondents were not very much socially oriented as far as having parties where food is consumed was concerned. Moreover, some of the respondents marked that they attended these social occasions without listing any food items. The responses also indicated that the social occasion least engaged in was having parties at home for friends while the one respondents engaged in most was gathering together with friends at public places.

Foods consumed more frequently by those who provided a list are indicated in Table 22. A general response of the word "drinks" was
Table 22. Foods consumed at social occasions

<table>
<thead>
<tr>
<th>Foods consumed</th>
<th>Percentage responding</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Parties in respondent's home</td>
</tr>
<tr>
<td>Meat&lt;sup&gt;a&lt;/sup&gt;</td>
<td>62</td>
</tr>
<tr>
<td>Chips</td>
<td>38</td>
</tr>
<tr>
<td>Pizza</td>
<td>30</td>
</tr>
<tr>
<td>Alcoholic drinks&lt;sup&gt;b&lt;/sup&gt;</td>
<td>30</td>
</tr>
<tr>
<td>Carbonated soft drinks</td>
<td>26</td>
</tr>
<tr>
<td>Crackers</td>
<td>37</td>
</tr>
<tr>
<td>Cereals and bread&lt;sup&gt;c&lt;/sup&gt;</td>
<td>22</td>
</tr>
<tr>
<td>Hamburger</td>
<td>12</td>
</tr>
<tr>
<td>Potatoes</td>
<td>12</td>
</tr>
<tr>
<td>Cheese</td>
<td>23</td>
</tr>
<tr>
<td>Salad and relishes</td>
<td>17</td>
</tr>
<tr>
<td>Desserts</td>
<td>15</td>
</tr>
<tr>
<td>Vegetables</td>
<td>17</td>
</tr>
<tr>
<td>Sandwiches</td>
<td>9</td>
</tr>
<tr>
<td>Tacos and chili</td>
<td>7</td>
</tr>
<tr>
<td>Milk</td>
<td>8</td>
</tr>
<tr>
<td>Ice cream and yogurt</td>
<td>7</td>
</tr>
<tr>
<td>Spaghetti</td>
<td>5</td>
</tr>
<tr>
<td>Cookies</td>
<td>6</td>
</tr>
<tr>
<td>Candy</td>
<td>5</td>
</tr>
<tr>
<td>Fruits</td>
<td>3</td>
</tr>
</tbody>
</table>

<sup>a</sup>Includes items generally in the meat group except pulses, nuts and seeds.

<sup>b</sup>Mainly beer.

<sup>c</sup>Includes corn.
omitted due to uncertainty about categorization. As shown in Table 22, even though similar items were selected at these social occasions, the frequency of consumption of the foods varied among the three social occasions, with the exception of meat and fruits. Meat was the most frequently consumed food item while fruits were the least frequently consumed food items among the list of 21 food items. Chips were eaten more frequently when the gathering was in a house than when it was at a public place, but the reverse was true for hamburgers and potatoes. Both soft drinks and alcoholic drinks were consumed less at public places than when respondents gathered in a house. Whereas there is the probability that coffee was consumed at public places, it may also be probable that the figures shown did not indicate the true picture because the general listing of the word "drinks" was omitted.

The impression gathered from the data in Table 22 was that respondents tended to consume more filling items like hamburgers and pizza, and items like meat, potatoes and salads which are generally considered as meal items (as opposed to snack items like chips, crackers and cheese) when gathered at a public place than when gathered in a house. Also at social occasions in the home when food was consumed, respondents generally preferred less nutritious food items like chips, soft drinks, alcoholic drinks and crackers as compared to the more nutritious food items like fruits, milk and vegetables. Meat, which was an exception to the above observation, featured prominently in the food items consumed at social occasions, whether in the home or at public places.
Attitude toward new food and dietary practice

Respondents were asked to indicate what they would do if offered a new food and, if told a new food featured had to be eaten by hand. Results of respondents' answers are presented in Tables 23 and 24.

Table 23. Behavior toward new food

<table>
<thead>
<tr>
<th>Behavior</th>
<th>I.S.U. (N = 89)</th>
<th>A.C.C. (N = 74)</th>
<th>N.A.C. (N = 45)</th>
<th>Total (N = 208)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refuse to eat it</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Take a bite to see how it tastes</td>
<td>44</td>
<td>64</td>
<td>47</td>
<td>51</td>
</tr>
<tr>
<td>Try it because that is what one is expected to do</td>
<td>8</td>
<td>3</td>
<td>11</td>
<td>7</td>
</tr>
<tr>
<td>Take a bite because it is interesting to try new foods</td>
<td>44</td>
<td>31</td>
<td>36</td>
<td>38</td>
</tr>
<tr>
<td>Other</td>
<td>1</td>
<td>1</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 24. Behavior toward an unfamiliar dietary practice

<table>
<thead>
<tr>
<th>Behavior</th>
<th>I.S.U. (N = 89)</th>
<th>A.C.C. (N = 74)</th>
<th>N.A.C. (N = 45)</th>
<th>Total (N = 208)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eat with your hand</td>
<td>80</td>
<td>76</td>
<td>80</td>
<td>78</td>
</tr>
<tr>
<td>Request a spoon</td>
<td>9</td>
<td>19</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td>Decline to eat the food</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Leave the place immediately</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

As indicated in Table 23 about half of the respondents would accept and taste a new food offered to them to get the feel of it; while one third of the respondents would accept and taste it because it is interesting to try new things. Only two percent said they would refuse to eat new food. The other two percent said their reaction would depend
on the type of food and where offered. In connection with the method of eating, more than three quarters of the respondents indicated they would be willing to take the food the way it was suggested, while three percent would decline to take the food, and one percent would adopt the extreme approach of leaving the premises (Table 24). The respondents indicated from these results, that they were receptive to new ideas about foods and unfamiliar ways of service.

Responses were analyzed for the three educational subgroups to find whether there were any differences. As shown in Table 23 and 24 all three subgroups had similar attitudes towards new foods and unfamiliar dietary practices, except that the A.C.C. group appeared to be a little bit more conservative towards adopting an unfamiliar dietary practice compared to the other two groups.

Sources for the Most Reliable Nutrition Information

Each respondent was asked to list three sources he/she considered to be the most reliable for obtaining food and nutrition information. The ten most frequently cited sources are shown in Table 25. Appendix J, Table 29 gives the other sources listed by respondents. Apart from books which were listed most frequently by each of the three subgroups, the ranking of the sources varied among the subgroups somewhat. For example, 25% of the I.S.U. group listed the specialist as a reliable source while only nine percent and five percent of the A.C.C. and N.A.C. groups respectively listed the specialist. Again T.V. and cookbooks ranked quite high on the list of the N.A.C. group but low
Table 25. Ten major sources considered the most reliable for food and nutrition information

<table>
<thead>
<tr>
<th>Source</th>
<th>I.S.U. (N = 88)</th>
<th>Percentage responding</th>
<th>A.C.C. (N = 78)</th>
<th>N.A.C. (N = 40)</th>
<th>Total (N = 206)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Books(^a)</td>
<td>64</td>
<td>44</td>
<td>40</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>Magazines/pamphlets</td>
<td>24</td>
<td>35</td>
<td>40</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Class/Teacher</td>
<td>28</td>
<td>26</td>
<td>25</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Parents</td>
<td>25</td>
<td>26</td>
<td>23</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Physician</td>
<td>27</td>
<td>24</td>
<td>18</td>
<td>24</td>
<td></td>
</tr>
<tr>
<td>Labels on packages</td>
<td>20</td>
<td>17</td>
<td>33</td>
<td>21</td>
<td></td>
</tr>
<tr>
<td>T.V.</td>
<td>10</td>
<td>18</td>
<td>23</td>
<td>16</td>
<td></td>
</tr>
<tr>
<td>Specialist(^b)</td>
<td>25</td>
<td>9</td>
<td>5</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Newspapers(^c)</td>
<td>17</td>
<td>9</td>
<td>21</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Cookbooks</td>
<td>8</td>
<td>12</td>
<td>23</td>
<td>12</td>
<td></td>
</tr>
</tbody>
</table>

\(^a\)Includes textbooks and encyclopedia.

\(^b\)Includes "dietitian"; "hospital"; "food and nutrition specialist"; and, "health service".

\(^c\)Includes advertisements.
on the I.S.U. group's list; and while eight percent of the A.C.C. group considered the health food store as a reliable source, neither the I.S.U. group nor the N.A.C. group listed this source. Comparing the groups, it appeared that the N.A.C. group relied heavily on the printed matter and the media for nutrition information than the I.S.U. group. Both the A.C.C. and the N.A.C. groups considered T.V. more often as a source for nutrition information than experts like those in extension service and the specialists. However, a study by Brown (1977) showed that the nutrition information conveyed by T.V. was quite poor. If respondents, especially those not pursuing further studies after high school depend that much on T.V., then perhaps some pressure should be brought to bear on advertisers to improve the quality of nutrition information presented. As a whole group, 51% of the respondents listed books and 31% listed magazines and pamphlets. Class, school or teacher which was the third highest listed source was selected by 27% of the respondents. This was low in comparison to the 41% of the participants in the study by Walker and Hill (1975) who selected high school as their source for nutrition information. Parents (mainly mothers) ranked fairly high as a source of reliable information for this group.

Opinions About Certain Dietary Practices

People have certain beliefs about, and adopt certain habits and practices concerning food selection, purchasing and consumption, which they may not like to, or may not be able to verbalize directly.
However, these beliefs and habits are usually reflected in the opinions they express about similar situations exposed to them. Thus apart from the direct information on some dietary practices that respondents were asked to give, they were also asked to express their opinions on certain practices. The situations presented were based on some of the competencies judged important by the experts. The intention of this portion of the studies was to find out how respondents felt about the concepts presented in the selected competencies.

Respondents were asked to express their opinions on a five point scale ranging from "very important" to "not at all important" concerning the practices indicated in Table 26. Though there is no one correct opinion to any of these practices, opinions were expected to aggregate around certain points due to the general desirability or undesirability of the practice. Responses considered desirable for each practice are indicated in the table. Responses to each opinion item will be discussed in terms of the competency it relates to and where applicable, in comparison with answers to related direct questions.

**Making a list of items needed before shopping**

This item was based on the competency "plans needs before purchasing". The supermarket has more food items, presented in more appealing ways than ever before (McGovern, 1974). Every effort is made by manufacturers and their advertising agents to lure consumers to purchase their products. It is most desirable, therefore, to plan and list
Table 26. Opinions about certain dietary practices (N = 208)

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Practice</th>
<th>Percentage responding</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td>Making a list of items needed at home before going to the store</td>
<td>43( ^a )  43( ^a ) 11   2   0</td>
</tr>
<tr>
<td>29</td>
<td>Considering other family members needs when planning food purchases</td>
<td>44( ^a )  41( ^a ) 10   3   2</td>
</tr>
<tr>
<td>46</td>
<td>Considering individual needs when planning meals</td>
<td>39( ^a )  46( ^a ) 13   3   0</td>
</tr>
<tr>
<td>30</td>
<td>Buying foods according to brand names</td>
<td>2        9   61  24( ^a )  5( ^a )</td>
</tr>
<tr>
<td>40</td>
<td>Studying special ads before shopping</td>
<td>32( ^a )  38( ^a ) 20   8   2</td>
</tr>
<tr>
<td>41</td>
<td>Comparing prices of similar food items in the store before purchasing</td>
<td>45( ^a )  38( ^a ) 13   3   0</td>
</tr>
<tr>
<td>36</td>
<td>Determining from food inventory, recipes and menus the foods which need to be purchased, before shopping</td>
<td>46( ^a )  36( ^a ) 13   3   1</td>
</tr>
<tr>
<td>37</td>
<td>Choosing a shop because it appears clean inside</td>
<td>31( ^a )  44( ^a ) 22   3   1</td>
</tr>
<tr>
<td>38</td>
<td>Choosing a shop because it offers friendly service</td>
<td>24( ^a )  41( ^a ) 29   4   2</td>
</tr>
<tr>
<td>39</td>
<td>Choosing a shop because it offers lower prices</td>
<td>33( ^a )  42( ^a ) 22   3   0</td>
</tr>
<tr>
<td>43</td>
<td>Consuming milk or milk products everyday</td>
<td>63( ^a )  25( ^a ) 9    2   1</td>
</tr>
</tbody>
</table>

\( ^a \)Response considered desirable.
items needed before shopping. The responses judged desirable were therefore "very important" and "important". Eighty-six percent of the respondents thought it was very important or important to make a shopping list before going out to shop. Only two percent considered the practice not very important. In another question, respondents were asked to indicate which of the following actions they most often performed in shopping for food supplies: 1) Plan and make a list of items needed before shopping. 2) Select food items on the basis of what is on sale. 3) Buy food items according to what attracts you in the store. 4) Other. Sixty-eight percent of the respondents selected the first option; five percent selected the second option, and 20% selected the third option. Thus 86% of the respondents felt it was important to plan and list needed items before shopping and 68% actually did that most of the time. There were, however, 20% who most often bought food items according to what attracted them, or on impulse. Probably respondents who bought on impulse did that because although they believed that planning and listing items before purchasing was an important practice, they did not know why it was important and therefore had not adopted the practice themselves.

**Considering needs when planning food purchases and meals**

The two practices in items 29 and 46 were based on two competencies: "Considers other individuals or family needs when planning food purchases" and "considers individual needs when planning meals", which were rated important by experts. Responses considered most desirable for both items were therefore "very important" and "important".
Eighty-five percent of the respondents gave the most desirable response for each of the two items, while only five percent and three percent of the respondents did not think that the behaviors in items 29 and 46, respectively, were important. Respondents were, therefore, aware of the importance of these practices and had favorable attitudes toward them.

Reducing food costs through wise food management

Opinion items 30, 40, and 41 were based on the competency "reduces food costs through wise food management". Buying foods according to brand names is not the best way to get good items at minimum prices. Brand name food items may cost as much as 41% more over the store brand item or no-name item without being necessarily of better quality ("No-name foods", 1978). The most appropriate responses to opinion item 30 were "not very important" and "not at all important". Twenty-nine percent of the respondents gave these answers. However, 61% thought it was somewhat important and 11% thought it was important or very important to shop according to brand names. It may be said, therefore, that many of the respondents were not aware that purchasing brand-name items may cost more without yielding better quality.

The most desirable responses for opinion item 40 were "very important" and "important" because this behavior can lead to substantial savings. Seventy percent of the respondents gave these answers while 20% thought the behavior was somewhat important. A majority of the respondents were, therefore, aware of the beneficial effects of studying special ads before shopping.
The most desirable responses for opinion item 41 were "very important" and "important" because the practice can yield substantial savings without the loss of quality. In Table 26 the data indicated that 83% of the respondents gave these answers. Thirteen percent thought the practice was somewhat important. Most of the respondents were, therefore, aware of the useful practice of comparing prices of similar food items before purchasing.

Determining needs before shopping

The practice in item 36 was a competency which was judged important by 83% of the experts. The responses thought desirable were, therefore, "very important" and "important". Eighty-two percent of the respondents gave these answers and 13% thought the practice was somewhat important. In another question, respondents were asked to indicate how often they took inventory of their stored food items. Replies showed that 44% took inventory of stored foods before each shopping. The question did not apply to 35% of the respondents. Ten percent never took inventory of their stored food items. The majority of respondents were, therefore, aware of this behavior; and of those who had stored food items, many of them practiced the behavior.

Choosing a market

Opinion statements 37, 38 and 39 were based on the competency "choosing a market on the basis of sanitation, convenience, service offered and quality of foods sold", which was rated important by 83% of the experts. Responses considered most desirable for items 37, 38
and 39 were, therefore, "very important" and "important". Those who gave these responses were 75%, 65% and 75%, respectively, for items 37, 38 and 39. A further 22%, 29% and 22% in the same order thought these practices were somewhat important. Respondents were, therefore, aware of the criteria for selecting a shopping place.

**Daily consumption of milk**

Respondents were asked to indicate how important they considered the consumption of milk or milk products everyday. Eighty-eight percent thought it was important or very important. Only three percent thought it was not important. Respondents were, therefore, aware of the significance of milk in the diet. However, only 18% of the respondents said they selected milk for a snack. It was likely, therefore, that plain milk or chocolate milk as a drink was not attractive enough for this age group.

**Summary**

Respondents' opinions were sought about certain dietary practices. The following were some results indicated: the majority of the respondents felt that it was important to plan and make a list before shopping but some of the respondents most often purchased food on impulse; most of the respondents thought that considering needs before food purchasing or meal planning was important; most of the respondents thought that it was important to purchase items according to brand names; respondents believed that studying special ads and comparing prices on similar items were important practices; a greater percentage of
the respondents thought that it was important to take inventory of stored food items, and of those who had stored food items, the majority of them took inventory before shopping; the selection of a shopping place on the basis of sanitation, friendly service and reasonable prices was considered important by the majority of the respondents; and only three percent of the respondents did not think that it was important to consume milk each day.

Comparison of Attitude Toward and Knowledge of a Concept

In a study by Schwartz (1975) related to nutritional knowledge, attitudes and practices of high school graduates in Ohio, it was concluded that there was no positive relationship between the knowledge of nutrition and the respondents' food practices. In the present study, opinions of respondents were sought on certain competencies for which knowledge was evaluated. These competencies were:

"applies knowledge of food costs to planning meals within the economic level of the family"

"identifies the role of advertising in food selection"

"accepts the responsibility of a consumer in the market place"

"distinguishes between wholesome and spoiled foods"

"reads food labels carefully and correctly"

"selects foods according to nutrient content"

The assumption was that people's opinions about certain situations and/or practices often reflect their attitudes toward the concept exemplified
by the situations. It was hoped, therefore that a respondent's opinion of a practice compared to his/her answer to a related knowledge question would indicate how the respondent's knowledge of the concept relates to his/her attitude.

Respondents were asked to mark their opinions on a five-point scale ranging from "very important" to "not at all important" concerning the following practices:

Item Number

31  Combining meat with cheaper meat substitutes in dishes
32  Using T.V. commercials and other advertisements as a source of nutritional knowledge
33  Making the supermarket manager aware that the food offered for sale is not satisfactory
34  Selecting only undented cans when buying canned foods
35  Using ingredient labels on foods as a guide to food selection
42  Choosing food according to its' nutritional value

Though there is no one correct opinion on any of these practices, opinions were expected to aggregate around certain points due to the general desirability or undesirability of the practice. Responses considered desirable for each practice are shown in Table 27 which gives the percentage responses to the opinion item and the percentage of correct responses to the corresponding knowledge item. Each pair will be discussed separately.
Table 27. Responses to opinion items and their corresponding knowledge items (N = 208)

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Opinion score</th>
<th>Knowledge score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>% responding</td>
<td>% correct</td>
</tr>
<tr>
<td>1</td>
<td>2 3 4</td>
<td>5</td>
</tr>
<tr>
<td>31</td>
<td>2 12 36 37</td>
<td>13 67 44</td>
</tr>
<tr>
<td>32</td>
<td>3 7 31 36 23</td>
<td>50 92</td>
</tr>
<tr>
<td>33</td>
<td>25 27 24 11 12</td>
<td>70 67</td>
</tr>
<tr>
<td>34</td>
<td>38 16 24 13 9</td>
<td>72 66</td>
</tr>
<tr>
<td>35</td>
<td>32 36 22 8 2</td>
<td>75 26</td>
</tr>
<tr>
<td>42</td>
<td>43 36 17 3 1</td>
<td>54 36</td>
</tr>
</tbody>
</table>

^Response considered desirable.

**Application of knowledge of food costs in meal planning**

The responses judged most desirable for the opinion item 31 were "very important" and "important" because the knowledge and utilization of meat or meat substitutes was assumed to be a healthy nutritional practice. The data in Table 27 indicated that only 14% of the respondents considered the combination of meat with cheaper meat substitutes in dishes as very important or important. However, 44% of the respondents were able to correctly select the cheapest food item among four of comparable nutritive value. Thus more respondents had the knowledge about what to substitute for meat in order to cut down on cost than considered the practice important.

**The role of advertising in food selection**

The manufacturers' primary aim in advertisement is to promote the sale of their products and not to teach consumers the nutritional value
of foods. Thus the responses considered appropriate for opinion item 32 were "not very important" and "not at all important". Fifty-nine percent of the respondents did not consider advertisement as an important source of nutritional information. To the corresponding knowledge item, 92% correctly indicated that the primary aim of advertising was to increase the sale of the products. In another question, respondents were asked to name a reliable source for nutritional information. The data, shown in Table 25 indicated that 16% suggested T.V. and 15% suggested newspapers and advertisements. These results indicated that though almost every respondent knew the aim of advertisement, there were 41% of them who considered it as a somewhat important, important or very important source for nutritional information (Table 27); and 31% would recommend advertisements and T.V. as reliable sources for nutrition information. At the present time, the amount of reliable nutrition information T.V. commercials and other advertisements carry is so little that it is a misconception to consider these media as sources of reliable nutrition information.

Consumer's responsibility in the market place

Making the manager of a store aware of unsatisfactory merchandise is both asserting one's personal rights as well as protecting other consumers and promoting good sale practices. The most desirable responses to opinion item 33 were therefore "very important" and "important". Fifty-two percent of the respondents thought it was important or very important to make the supermarket manager aware of an unsatisfactory product and 24% others thought it was somewhat important.
In the knowledge instrument, 67% of the respondents correctly answered that the important thing to do when one was not satisfied with a purchased food item was to return it to the store manager. These results showed that respondents' knowledge and attitude about what to do with a case of an unsatisfactory merchandise were similar.

**Distinguishing between wholesome and spoiled food**

The contents of a dented can are not necessarily spoiled. However, the chances that the contents are contaminated by microorganisms or by the exposed metal of the can are high. Thus though it is not very important to automatically shun any canned food in a dented can, it is important to examine the dented can very well before selecting it. A slight dent due to handling may not cause any problem but, a badly dented can or a bulging can should not be selected. The expected responses for opinion item 34 were therefore "very important"; "important" or "somewhat important" depending on the condition of the dent. In Table 27 it is shown that 78% of the respondents gave one or the other of these responses. For the knowledge item, 66% of the respondents correctly identified tomato paste in a bulging can as being spoiled. Thus, slightly more of the respondents thought that a damaged can should not be selected, than were able to identify spoiled food.

**Reading food labels carefully and correctly**

The purpose of government regulations on ingredient and nutrient listing on food products is to aid the consumer in satisfactory food selection (Mayer, 1973, pp. 150-151). The desirable responses for the
opinion item 35 were therefore "very important" and "important". To 86% of the respondents, using ingredient labels on foods as a guide to food selection was very important or important. However, only 26% of the respondents could correctly interpret an ingredient label on a food product. When respondents were asked in another question for reliable sources for nutritional information, 21% of them mentioned labels on food packages (Table 25). It may be concluded from these results that a majority of the respondents were aware of the importance of labels on packages in food selection and one fifth of them recommended it as a good source for nutritional information; but only a few of them could correctly interpret a label.

Selecting food according to its nutritional content

For satisfactory health, it is a good practice to base one's food selection on nutrient value. The desirable responses for opinion item 42 were therefore "very important" and "important". Forty-three percent of the respondents thought it was very important to choose food according to its nutritional value, and 36% thought it was important. In another item (No. 25) respondents were asked to indicate how often they thought food eaten had anything to do with one's health. To this question, 44% said very often; 33% said often; 18% said sometimes and only four percent said seldom or never. However, when respondents were asked to select the most nutritious lunch among four options, only 36% were able to select the correct one. This indicates that most of the respondents were aware that foods should be selected on the basis of nutrient content but the majority of them were not aware of the nutrient
content of some dishes. Three other knowledge items (numbers 52, 53 and 65) tested respondents' knowledge of nutrient content of foods and the correct responses were 92%; 22%; and 64%, respectively. Thus, out of the four items that tested respondents' knowledge of nutrient content of foods, only one of them was correctly answered by the majority of the respondents. On the whole therefore, respondents were not very familiar with the nutrient content of foods.

Summary

A comparison of respondents' knowledge of certain concepts and their attitude toward the concept was made. Results indicated that respondents had the knowledge about meat substitutes but did not care about using meat substitutes in dishes; respondents knew that the primary role of advertising was to promote sale, but 31% of them considered advertisements as a source for nutrition knowledge; respondents' attitude toward, and their knowledge about the consumer's responsibility in the market place were similar; respondents were more aware of the potential hazard of a damaged can than were able to identify a spoiled canned food; respondents knew the use of food labels but only a few could correctly interpret a label; and respondents believed it was important to select food according to its nutritional value but not many of them were knowledgeable about nutrient content of foods.

General Discussion of Findings and the Limitations of the Study

There are many factors about the present study which set limitations on the generality or applicability of the results obtained here to the
general population. The study may be divided into three major portions as far as limitations are concerned: 1) derivation of competencies judged important for older adolescents; 2) data on the opinions and the dietary practices of respondents; and 3) data collected with the knowledge instrument.

Concerning the competencies identified as important for older adolescents, the criteria used to shorten the preliminary list of competencies were not stringent enough. That is, experts were asked to give only two responses of "important" or "not important" and to supply general comments. There were some experts who indicated that they would have preferred to indicate the degree of importance rather than give an "all or none" response. With this type of response, and the fact that there were only 12 respondents, it was not feasible to perform any statistical analysis on the results obtained from the experts. Thus, the list is perhaps too long and could possible be narrowed down. However, the applicability of the present list to the target population is not necessarily limited.

One major factor was that the sample from which the data was collected was not randomly selected. Other factors concerning the sample are the following. The majority of the respondents (87%) were within the age range of 18 to 23 years, with one percent below 18 years and 12% above 23 years. However, age distribution within the age range defined was not uniform because 55% of the respondents were either 18 or 19 years old. There were twice as many females as males. The majority of the respondents (84%) were single and only 12% of the respondents had
children. The majority of the respondents (79%) were students attending a university or an area community college. Almost all the respondents attending the university were enrolled in a food and nutrition course, even though half of them did not study food and nutrition in high school; and 78% of the respondents not in school studied food and nutrition in high school. These statistics are not assumed to be representative of any state or national statistics for the age group selected. The results of the data on opinions and dietary practices collected from this group of sample are therefore strictly applicable only to the respondents, and not to the general high school graduates from Iowa, or the 18 to 23 years age group in Iowa.

The applicability of the data based on the food and nutrition knowledge test is further limited by the reliability of the test as an instrument for measurement. Item analysis of the instrument and the calculation of the coefficient of internal consistency for the instrument indicated a low coefficient of reliability (.55). Thus the mean scores on the test may not be absolutely valid. Secondly, the knowledge instrument was not based on a table of specifications which proportionately represented each major area of food and nutrition as identified in the list of competencies, but on the percentage of experts who judged a particular competency as important. Competencies were therefore included on an individual basis rather than to represent a content area. The results indicated that there were areas in which no competency was acquired, but in some cases (e.g., the area of "significance of food"), there was only one competency represented for that area.
In some areas where more competencies were represented, results indicated that some of the competencies were acquired while others were not. For example, each of the areas "food habits" and "food selections" had four competencies represented and only one competency out of the four for each area was acquired. Thus, when results are interpreted for the food and nutrition areas, these facts should be taken into consideration.

The results are more meaningful if discussed for individual competencies than for the areas they represent. Furthermore, since most of the competencies were measured with only one item, the acquisition of the competency is dependent on the difficulty of the item.

Although there were all these limitations, with caution, the results could be utilized as indicators of certain trends and therefore as basis for further research and for educational planning for this age group. The following are some results from the present study which are indicative of certain trends which require attention in food and nutrition program planning.

Males scored significantly lower on the knowledge test compared to females; and respondents who studied food and nutrition in high school consistently scored slightly higher on the knowledge test compared to those who did not study food and nutrition in high school. The demographic data indicated that only 20% of the respondents who studied food and nutrition in high school were males. Since studies by Yetley (1974) and by Cosper and Wakefield (1975) have indicated that husbands have the strongest influence on the family's food selection in the home, it is important to encourage males to study food and nutrition so that their influence on the family's food choice would be more beneficial.
Results of the knowledge test to measure basic competencies which have been acquired by respondents indicated that out of the 29 competencies measured, only five had been acquired by all the subgroups according to the criteria used. The total number of competencies acquired by all subgroups together was 13, indicating that 16 competencies had not been acquired by any of the subgroups. Particularly absent in the list of competencies acquired were those competencies in the areas of the knowledge of nutrient sources and nutrient requirements. However, respondents thought it was important to select foods according to their nutrient content. This is an indication that one area in which respondents might be receptive to more information would be the areas of the nutrient content of foods and the nutrient requirements of individuals.

Food selection and meal planning was the second highest content area in food and nutrition that the respondents indicated they wished for more information. The following results are indicative that such information would be benefited. Even though 21% of the respondents skipped breakfast and 43% were on a self-prescribed weight reduction diet, only three percent did not consume snacks and 30% consumed three or more snacks each day. Moreover, 20% had snacks after supper each day. Further, respondents' attitudes toward food consumption indicated that more (50%) worried about eating too much compared to those (20%) who wished they could eat more. The reasons for these answers were not sought. Other results indicated that some respondents were not very familiar with the caloric contribution of nutrients and some did not consider snacks as contributing to the total nutrient intake.
Respondents indicated that they preferred cooking and serving meals to friends at home more than taking friends out, but their actual practice showed that although they did not have parties very often, when respondents got together with friends, it was usually at a public place. These results seem to contradict each other. However, the former answer was about what respondents preferred to do when given a choice; while the latter concerned what respondents actually did. The inconsistency might be due to the fact that first, at least half of the respondents were students living in dormitories where having parties may not be quite convenient; second, the respondents were mostly students and young adults who might not only have limited funds but might also have to spend most of what they had primarily on education. Thus, though they might have wanted to entertain friends at home, they could not put it into practice.

Almost all the respondents considered the daily consumption of milk as important, however, as a snack item, only 18% selected milk or chocolate milk. It is probable that this age group does not favor milk as a drink. Vegetables were not consumed much by respondents as a snack or at parties but fruits were a favorite snack item as were carbonated soft drinks. Opinions of respondents on certain food practices were generally favorable, except in the case of purchasing food items according to brand names. In this case, the majority of the respondents thought that this practice, contrary to findings, was an important one.
Respondents' knowledge of a concept and their attitude toward the practice of the concept were not always similar. For example, respondents thought that food labels were an aid in wise food selection, but only a few could correctly interpret a label. Also, 41% of the respondents considered advertisement as a somewhat important or an important source of reliable nutrition information though the majority of them knew that the primary aim of advertising was to promote the sale of goods.

Answers to the three questions related to food and nutrition information gave some ideas about respondents' felt need for information and where they would most often look for the information. In this study, the trend appeared to be that the respondents who did not pursue any further education after high school relied more on the printed matter and the media while the respondents at the university preferred mostly books and the professionals. To the extent that classes, teachers and the specialists may present more current information, high school students should be made aware of such sources so that when out of school, these sources would be utilized. Also, more of the N.A.C. and A.C.C. respondents felt that they did not need any further information of food and nutrition yet the mean scores on the knowledge test indicated that they performed poorer than the I.S.U. group. One may therefore say that the respondents in the I.S.U. group as a whole did not only have more food and nutrition knowledge but they were more aware of their need for information and they preferred to seek the information from more
current reliable sources. The reverse seemed to apply to the respondents not attending college.

Even though only 27% of the respondents said they would like more information about food and disease, 43% of the respondents indicated that they were on a self-prescribed weight reduction diet and 77% often related food consumption and health. It may be concluded, therefore, that some of the respondents did not view overweight as contributing toward a disease or as a health hazard.
SUMMARY AND RECOMMENDATIONS

Summary

The aim of the study was to identify food and nutrition competencies needed by older adolescents by the time of completion of high school for satisfactory personal and family living. The objectives which contributed to the accomplishment of the aim of the study were: 1) to identify basic competencies in the area of food and nutrition to be acquired by older adolescents by the time of completion of high school; 2) to identify basic competencies acquired by youth who have graduated from high school and are attending college, area schools, or are not pursuing any further studies; 3) to compare differences in food and nutrition knowledge acquired by youth who studied food and nutrition in high school and those who did not; and differences in food and nutrition knowledge acquired by male and female respondents; 4) to identify food practices of, and opinions about foods held by youth who have graduated from high school; and 5) to make recommendations for curriculum planning.

To achieve the above objectives, a two stage approach was adopted for the study. First, utilizing various literature sources and consultation with a subject matter specialist, a preliminary list of 171 competency statements under 20 content areas in food and nutrition was prepared. The list was submitted to 14 experts to judge individual competencies as either important or not important for older adolescents for satisfactory personal and family living. Experts were also asked to suggest other competencies and to comment generally about the list of competency statements. Second, a four-section 95-item questionnaire
was developed and administered to three groups of high school graduates, some by mail and others personally. The questionnaire was made up of 1) demographic data and general nutrition information, 2) dietary practices, 3) opinion statements on some dietary practices, and 4) a food and nutrition knowledge test based on 29 of the competencies judged important by the experts. The sample groups were: 1) 89 freshmen and sophomore students from Iowa State University (I.S.U. group), 2) 74 freshmen from the Des Moines Area Community College (A.C.C. group), and 3) 45 high school graduates not pursuing any further studies (N.A.C. group).

Data obtained from respondents were analyzed by computing percentages of responses, mean scores and standard deviations on the knowledge test, and performing the three-way analysis of variance to determine differences of knowledge scores as related to the variables sex, educational background and nutritional background. The Scheffé's method was used to make comparisons among the mean scores for the I.S.U., A.C.C., and N.A.C. subgroups. The quality of the knowledge test was determined, based on answers from 45 respondents, by performing an item analysis and using the Kuder-Richardson Formula 20 to compute the reliability for internal consistency.

Analysis of the data from the experts showed that 97 out of the 171 competency statements were judged as important for older adolescents by completion of high school.

The demographic data showed that 43% of the respondents studied food and nutrition in high school but only 20% of those who studied
food and nutrition in high school were males.

Analysis of the 33-item food and nutrition knowledge test indicated that the test had a low reliability coefficient of .55. There were 11 items with nonfunctioning distractors, 19 items with difficulty index between .30 and .70 and all but two items with discrimination index above .05.

Analysis of the test scores showed that female respondents scored significantly higher (p = .006) than male respondents; respondents from the I.S.U. group scored significantly higher (p = .033) than the A.C.C. group; and respondents with high school food and nutrition background scored consistently higher, but not significantly so, than respondents without high school food and nutrition background. The results of the knowledge test also indicated that out of the 29 competencies evaluated with the test, five had been achieved by all subgroups and 16 had not been achieved by any subgroup. Respondents from the I.S.U. group acquired more competencies (11) than respondents from the other two subgroups. Some of the respondents (57%) indicated a poor knowledge about the caloric value of nutrients.

The data on the dietary practices showed that 21% of the respondents skipped breakfast and 24% had breakfast everyday; supper was the most preferred meal; respondents skipped meals mainly due to lack of time or a desire to avoid weight gain; almost all (97%) consumed snacks everyday, and 20% consumed snacks after supper each day yet 45% of the respondents did not think it was important to consider snacks as part of the total diet; the most favorite snacks were soft drinks and fruits;
at least 43% of the respondents were on a diet to avoid weight gain or to reduce weight; 36% were taking vitamin supplements and 14% were taking mineral supplements on their own volition; almost twice as many of the respondents preferred cooking at home for friends, than taking friends out, because of the enjoyment derived from cooking; the main reason for eating out was for the convenience; and respondents were receptive to new foods and unfamiliar ways of serving food.

Other findings from the dietary practices data showed that respondents did not hold parties frequently in the house but preferred to gather with friends at public places; foods from the meat group were consumed by the majority of the respondents at social occasions; with the exception of the meat group, respondents preferred less nutritious foods like chips, soft drinks, alcoholic drinks and crackers at social occasions than more nutritious foods like fruits, milk and vegetables; and although almost all the respondents considered the daily consumption of milk as important, only a few consumed milk as a snack or at social gatherings.

Respondents indicated that the most frequently received criticisms were: not eating the right foods, eating too fast, and skipping meals.

Respondents indicated a need for more information in the areas of budgeting and food purchasing, food selection and meal planning more than in any other area.

Books, followed by magazines and pamphlets, were the most frequent sources for nutrition information for respondents. Parents, teacher
or the classroom and the physician were also important sources for nutrition information.

Respondents' answers to opinion statements showed that most had positive attitudes toward some desirable dietary practices. However, respondents' knowledge of a concept and their attitudes toward the practice of the concept were not always similar.

**Recommendations**

As a result of the present studies, the following recommendations were made.

**For future research**

1) The effectiveness of the knowledge test could be established and the test utilized as a tool for further research.

2) Evaluate other identified competencies not evaluated in this study with an appropriate instrument.

3) Study snacking patterns in relation to regular meal consumption patterns of youth for implications in nutrition education.

4) Identify research to determine whether individuals in this age group are generally overweight.

5) Evaluate the feasibility of utilizing T.V. as a major medium for nutrition education.

6) Identify the degree to which the food and nutrition competencies in this study are being taught in high school home economics courses.

**For curriculum planning**

1) The basic competencies identified for high school graduates
should be used to revise and/or update the existing food and nutrition programs in high schools.

2) As a basis for home economics teacher education at the undergraduate levels, use the basic competencies identified for high school graduates for prospective teachers.

3) Encourage males to enroll in food and nutrition courses in high school.

4) Encourage Extension nutrition education for the consumer for the correct reading and interpretation of food labels so that maximum benefit may be derived from the labels.

5) Utilize T.V. as a medium for nutrition education.

6) Encourage teaching which relates food and nutrition knowledge to practice.

7) High school students should be made more aware of reliable agents in the community such as the extension personnel, teachers and the clinic dietitian from whom nutrition information could be obtained.

8) Relate food consumption patterns and weight control as well as other factors affecting weight regulation and health in nutrition education.

9) Identify misconceptions about foods, and caloric values of foods and nutrients in nutrition education.
ACKNOWLEDGEMENTS

I wish to express my sincere gratitude to Dr. Irene Beavers, my major professor, for her guidance, understanding and encouragement throughout my entire studies and especially during the research program and the development of the dissertation. I am also grateful to the members of my committee, the late Dr. Eleanore Kohlmann for her help and suggestion of the research topic; Dr. Alyce Fanslow for advice on the questionnaire construction and data analysis; Dr. Pilar Garcia for help with the identification of the food and nutrition competencies; Dr. William Runyan for help with the identification of, and data collection from the I.S.U. respondents; Dr. Damaris Pease and Dr. John Bath for their helpful suggestions at various stages.

I am also grateful to Mrs. Lois Campbell, Arts and Science Department, Des Moines Area Community College, Ankeny, for arrangement and help with the data collection from the college; Mrs. Lillie Magilton and Dr. Alan Bates for help with the pilot testing of the questionnaire; the experts and the high school home economics teachers and to all the respondents for their contributions toward the research study.

I wish to acknowledge the congenial atmosphere accorded me by the faculty and my fellow graduate students of the Home Economics Education Department throughout my stay and study at Iowa State University.

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LITERATURE CITED


REFERENCE NOTES


APPENDIX A: LITERATURE SOURCES USED FOR FORMULATING COMPETENCIES
LITERATURE SOURCES USED FOR FORMULATING COMPETENCIES

Books


Cronan, Marion L., and Atwood, June C. Foods in Homemaking. Peoria, Ill.: Chas A. Bennett Co., Inc., 1965.


Theses


Related Journals

American Journal of Clinical Nutrition
American Journal of Public Health
Forecast for Home Economics
Home Economics Research Journal
Journal of the American Dietetic Association
Journal of Home Economics
Journal of Nutrition Education
What's New in Home Economics

Other Resource Materials


APPENDIX B: PRELIMINARY LIST OF COMPETENCIES
1. **Significance of food.**
   The learner:
   a. understands (explains, accepts) the significance of food for proper health, growth and development.
      important not important
   b. appreciates (detects, prizes) the emotional satisfaction others derive from food.
      important not important
   c. utilizes food as a means for establishing and maintaining a good relationship.
      important not important
   d. distinguishes between physiological and psychological dependence on food.
      important not important
   e. uses food for socializing.
      important not important
   f. considers food as one form of socializing approach.
      important not important
   g. additional competencies

2. **Food habits**
   The learner:
   a. identifies various influences that affect the food patterns of individuals.
      important not important
   b. relates the role of the senses to food selection and dietary practice.
      important not important
   c. recognizes the effect of individual and group values on food practices.
      important not important
   d. identifies the significance emotions play in food habit formation.
      important not important
   e. is aware that food habits are partly learned and partly developed.
      important not important
   f. identifies some cultural aspects of food habits.
      important not important
   g. analyses food habits.
      important not important
h. relates dietary patterns of groups of people to circumstances of living.

important not important

i. identifies the role of advertising in food selection.

important not important

j. distinguishes between true and false information in advertising.

important not important

k. examines emerging trends in society that are affecting dietary patterns.

important not important

l. realizes which dietary trend is worth following and which is not suitable for him/her.

important not important

m. willingly forgoes an undesirable dietary habit.

important not important

n. realizes that people are influenced by their personal experiences with food.

important not important

o. selects nutritious snacks

important not important

3. Nutrients
The learner:

a. identifies nutrients needed by every organism.

important not important

b. recognizes food sources of particular nutrients.

important not important

c. recalls the functions of the nutrients in the body.

important not important

d. relates physical and/or emotional well being to good food.

important not important

ea. identifies a good common source of a nutrient.

important not important

f. differentiates between the functions of the different vitamins.

important not important
g. explains the need for varied diet.
   important not important

h. describes the process of food conversion to nutrients in the body.
   important not important

i. rates (selects) foods according to their nutrient content.
   important not important

j. identifies sources of reliable nutrition information.
   important not important

k. evaluates factors leading to the acceptance of food fads and fallacies.
   important not important

l. distinguishes between food fact and fad.
   important not important

m. estimates calorie values of simple diets.
   important not important

n. recognizes that everyone needs the same basic nutrients but in varying amounts.
   important not important

o. Additional competencies

4. Nutrient requirement
   The learner:
   a. knows (identifies) the basic four.
      important not important

   b. uses the basic four.
      important not important

   c. relates nutrient needs to health status.
      important not important

   d. explains the varied needs of nutrients for different ages, activities and physiological states.
      important not important

   e. recognizes physical symptoms of malnutrition.
      important not important

   f. knows the effect of drugs, diseases and/or emotion on nutrient needs of an individual.
      important not important
g. relates healthy appearance and balanced dietary pattern
   important not important

h. demonstrates nutritional behavior to reflect knowledge of the nutritive values of foods and the importance of a balance among nutrients.
   important not important

i. Additional competencies

5. Special food needs
   The learner:
   a. recognizes physiological changes in sickness that necessitate special nutrient requirements.
      important not important
   b. understands (interprets) the need for special nutrient balance in the course of pregnancy and lactation.
      important not important
   c. differentiates between regular and special nutrient requirements for age and groups.
      important not important
   d. selects his/her food according to his/her particular needs.
      important not important
   e. modifies his/her dietary pattern to suit a special need as nutritional needs change temporarily or permanently.
      important not important
   f. participates in efforts and programs aimed toward improved nutritional status for self and others.
      important not important
   g. follows physicians' orders regarding special diets for individuals.
      important not important
   h. Additional competencies

6. Food supply
   The learner:
   a. knows (identifies, recognizes) the sources for food assistance programs in the U.S.A.
      important not important
b. identifies the major producing areas of particular foods in the U.S.A.
   important  not important

c. interprets the function of research in food production.
   important  not important

d. recognizes the role of international organizations in food supply and distribution.
   important  not important

e. relates population growth and food production.
   important  not important

f. is aware of the effects of political decisions on food supply.
   important  not important

g. understands (realizes) that nutrient values of foods can be altered through agricultural practices and climatic changes.
   important  not important

h. is aware of similarities and differences in nutrient content among foods.
   important  not important

i. Additional competencies

7. Food safety
   The learner:
   a. differentiates between a food additive and a contaminant.
      important  not important

   b. assesses the nutrient value of imitation products.
      important  not important

   c. recognizes a safe additive
      important  not important

   d. understands (explains) the importance of food processing.
      important  not important

   e. assesses the effects on food nutrients of different processing techniques.
      important  not important

   f. compares the value of preservation to the value of availability.
      important  not important

   g. evaluates the safety of food additives.
      important  not important
h. identifies food contaminants.
  important  not important

i. is aware of government's role in maintaining food safety.
  important  not important

j. identifies some factors that affect food safety.
  important  not important

k. is aware of food allergies and its prevention.
  important  not important

l. distinguishes between food allergy and food poisoning.
  important  not important

m. practises cleanliness of person and good health when handling and storing food products.
  important  not important

n. uses stored foods within suggested safe storage time limits.
  important  not important

o. Additional competencies.

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8. Sanitation and safety in the kitchen

The learner:

a. applies safety precautions in food handling.
   important  not important

b. maintains a clean environment in the kitchen.
   important  not important

c. recognizes unsafe appliances.
   important  not important

d. applies appropriate first aid when needed.
   important  not important

e. identifies factors in the kitchen that can affect the safety of foods.
   important  not important

f. employs sanitary procedures to making baby formula and caring for bottles.
   important  not important

g. disposes of leftover foods that will not maintain quality and also garbage.
   important  not important
h. identifies items that are safety hazards and need to be washed with care.
   important          not important
i. stores cleaning agents tightly stoppered, apart from food products, and beyond reach of children.
   important          not important
j. employs appropriate cleaning methods if there is illness in the home.
   important          not important
k. handles dishes and silverware with clean hands.
   important          not important
l. identifies surfaces that need regular cleaning.
   important          not important
m. Additional competencies

9. **Kitchen environment**
   The learners:
   a. selects the most efficient approach to meal preparation.
      important          not important
   b. combines activities smoothly and orderly in the kitchen.
      important          not important
   c. plans before execution.
      important          not important
d. practices conservation of all natural resources in the kitchen.
   important          not important
e. plan and dovetail food preparations to save time.
   important          not important
f. Additional competencies

10. **Meal planning**
    The learner:
    a. considers individual needs in planning meals.
       important          not important
b. combines (employs) the knowledge of nutrient needs, food costs and availability in meal planning.
   important not important

c. translates nutrition information into actual daily needs.
   important not important

d. recognizes that individual preferences and values affect food selection and meal planning.
   important not important

e. relates occasion to type of meal to be served.
   important not important

f. uses sensory qualities in planning foods to achieve acceptability.
   important not important

g. recalls measures of foodstuffs necessary to qualify as a serving portion in the food groups.
   important not important

h. demonstrates ability to make necessary adjustments in the basic four plan to meet needs of all individuals in the family.
   important not important

i. applies knowledge of food costs to planning meals within the economic level of the family.
   important not important

j. demonstrates the ability to use the food exchange system to plan meals for people on special diets.
   important not important

k. identifies deficient areas in the family diet.
   important not important

l. recognises leftover foods which store satisfactorily for future use.
   important not important

m. reduces food costs through wise food management.
   important not important

n. Additional competencies

11. Food preparation
   The learner:

   a. recognizes that the method of handling and preparation of a food item affects its chemical and physical properties.
      important not important
b. applies the correct procedures in preparation of a food type to retain its goodness.
   important  not important

c. combines foods into appetizing dishes.
   important  not important

d. utilizes alternate ways to give variety to the menu.
   important  not important

e. relates food qualities to its methods of preparation.
   important  not important

f. estimates serving portions of fresh produce per weight, meats per cut, and canned foods per size.
   important  not important

g. tastes and seasons food before serving to others.
   important  not important

h. prepares foodstuffs so they are clean before serving.
   important  not important

i. Additional competencies

12. Food service
   The learner:
   a. serves foods appropriately for the occasion.
      important  not important

   b. accepts different ways of serving food.
      important  not important

   c. selects acceptable method of meal service.
      important  not important

   d. creates a relaxed atmosphere at mealtime.
      important  not important

   e. understands importance of serving fresh, wholesome food.
      important  not important

   f. estimates preparation times carefully so that all foods are ready to serve at mealtime.
      important  not important

   g. serves meals in the style the family prefers.
      important  not important

   h. serves food attractively to family and/or patient.
      important  not important
Additional competencies

13. **Home food preservation**
The learner:
   a. identifies various methods to preserve food.
      important not important
   b. relates the qualities of foods to their methods of preservation.
      important not important
   c. analyses the advantages and disadvantages in home food preservation.
      important not important
   d. demonstrates a food preservation technique.
      important not important
   e. labels all foods preserved in the home as to content, date, and special preservation method.
      important not important

14. **Creative cooking**
The learner:
   a. modifies recipes to create variety.
      important not important
   b. produces meals without recipes.
      important not important
   c. substitutes equivalent food item in a recipe.
      important not important
   d. combines foods in appealing way.
      important not important
   e. garnishes foods to improve appearance and color.
      important not important

f. Additional competencies
15. **Foods around the world**

The learner:

**a.** accepts differences in the treatment of a food item among various groups.

- important
- not important

**b.** understands that a people’s foodways are intricately connected with their cultural and climatic conditions.

- important
- not important

**c.** realizes that an adopted food practice may not necessarily be the best one.

- important
- not important

**d.** is aware that food practices evolve over a long time and are not easily changed.

- important
- not important

**e.** accepts that people’s food practices can be affected by exposure to new culture, new climate and new knowledge.

- important
- not important

**f.** Additional competencies.

16. **Outdoor cooking**

The learner:

**a.** is aware of the possible hazards of outdoor cooking.

- important
- not important

**b.** creates a social occasion out of outdoor cooking.

- important
- not important

**c.** applies the **common** procedures when cooking outside.

- important
- not important

**d.** Additional competencies.

17. **Marketing**

The learner:

**a.** plans needs before purchasing

- important
- not important

**b.** utilizes knowledge of physical qualities of foods in food selection.

- important
- not important
c. considers other individuals or family needs in planning food purchases.
   important not important

d. discriminates between information and emotional advertisement.
   important not important

e. determines from food inventory, recipes, and planned menus the foods which need to be listed on the market order and purchased.
   important not important

f. chooses a market on the basis of sanitation, convenience, service offered and quality of foods sold.
   important not important

g. accepts the responsibility in the market place of a customer and consumer.
   important not important

h. Additional competencies

18. **Buying guide to food**

The learner:

a. recognizes the many forms into which a food item can be processed and presented for sale.
   important not important

b. applies the U.S.D.A. grading system of food types in food selection and purchasing.
   important not important

c. applies knowledge of food qualities in food selection.
   important not important

d. substitutes a food item of similar value to one sought.
   important not important

e. interprets grocery store information on unit pricing to select the best food buys.
   important not important

f. reads food labels carefully and correctly to purchase only foods needed.
   important not important

g. Additional competencies
19. Food storage

The learner:

a. recognizes the effect of temperature on food qualities.
   important not important

b. recognizes the effect of microorganisms on foods.
   important not important

c. explains food spoilage.
   important not important

d. demonstrates the techniques of storage of a food item.
   important not important

e. identifies the type of storage techniques suitable for foods under particular environmental conditions.
   important not important

f. distinguishes between wholesome and spoiled foods.
   important not important

g. takes periodic inventory of stored foods.
   important not important

h. uses proper wrappings or containers for storing foods.
   important not important

i. realizes that proper storage conserves nutrient values, maintains acceptable flavors, color and texture.
   important not important

j. Additional competencies

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20. Careers in foods and nutrition.

The learner:

a. identifies jobs requiring foods and nutrition background.
   important not important

b. identifies the requirements for foods and nutrition related jobs.
   important not important

c. Additional competencies.
APPENDIX C: EXPERTS CONSULTED
List of Experts for Competency Rating

Ms. Kay Munson
Extension Nutritionist
Iowa State University

Ms. Phyllis Olson
Extension Nutritionist
Iowa State University

Dr. Pilar Garcia
Professor, Food and Nutrition
Iowa State University

Dr. Mark Love
Assistant Professor, Food and Nutrition
Iowa State University

Ms. Margaret Tait
Assistant Professor, Food and Nutrition
Iowa State University

Dr. Alyce Fanslow
Associate Professor, Home Economics Education
Iowa State University

Miss Blanche Miller
Assistant Professor, Home Economics Education
Iowa State University

Ms. Ruth Smith
Food and Nutrition Research Assistant
Iowa State University

Ms. Melba Gschneider
Dietitian, McFarland Clinic
12th and Douglas, Ames

Dr. Jane Domke
Counselor, Student Health Service
Iowa State University

Mr. Thomas Walsh
Director, Student Food Service
Iowa State University

Mrs. Mary Bell
Home Economics Teacher
Harding Junior High
Des Moines, Iowa 50313
Mrs. Mary Hammer
Home Economics Teacher
McComb Junior High
Des Moines, Iowa 50310

Mrs. Joan Moore
Home Economics Teacher
Alden Community High School
Homemaking Department
Alden, Iowa 50006
List of Experts for Validation of Questionnaire

Dr. Alyce Fanslow
Associate Professor, Home Economics Education
Iowa State University

Dr. Jerelyn Schultz
Assistant Professor, Home Economics Education
Iowa State University

Dr. Pilar Gracia
Professor, Food and Nutrition
Iowa State University

Dr. William Runyan
Associate Professor, Food and Nutrition
Iowa State University

Ms. Ruth Smith
Food and Nutrition Research Assistant
Iowa State University

Mrs. Jean Hassebrock
Home Economics Teacher
Ames Senior High
Ames, Iowa 50010

Mrs. Donna Schepers
Home Economics Teacher
Ames Senior High
Ames, Iowa 50010

Ms. Pauline Maiks
Extension Nutritionist
Iowa State University

Mrs. Mae Belle Godown
Extension Home Economist, Retired
1249 McKinley
Ames, Iowa 50010

Ms. Judy Homen
Assistant Leader, 4H and Youth Programs
Iowa State University

Ms. Sue Kruse
Assistant State Leader, 4H and Youth Programs
Iowa State University
Ms. Shirley Stakey
State 4H Program Assistant
Iowa State University

Ms. Ardyth Gillespie
Graduate Student, Food and Nutrition
Iowa State University

Mrs. Mary Elizabeth Wagner
Graduate Student, Food and Nutrition
Iowa State University
Dear Beatrice Ofei in the Home Economics Education Department is making a study about older adolescents' dietary habits as part of the work toward a doctorate degree.

The aim of the study is to delineate foods and nutrition competencies needed by adolescents by completion of high school education so that they can satisfactorily apply nutrition knowledge and practice sound dietary habits for good health in this age of fast technological and social changes.

The research design involves initial identification of these competencies and their subsequent validation by experts of their importance. To enable Beatrice to design an appropriate questionnaire for the respondents, your experience and ability to validate the competencies is needed. Enclosed is the list of competencies and you are requested to rate them.

We recognize the demands being made on your time, and know that you are very busy, but we hope you will find time to cooperate and give the enclosed list your earliest attention. Because of current social and technological changes, it is possible that youth needs are also changing, and educationists have to constantly review curriculum offerings for their relevancy. High school foods and nutrition courses urgently need this help because dietary patterns are directly affected by social and technological changes. Your contribution in this research is therefore very much needed.

Directions

In deriving these competencies, it is assumed that completion of high school is the end of formal education in foods and nutrition for adolescents. Thus they require the requisite knowledge in this area to carry them through life as individuals, parents, and members of society. The lists of competencies are therefore to be rated with this in mind.

1. After each competency is provided a place for you to mark if the competency is important or not important.

   Important   Not Important

   Please mark which is appropriate.

2. At the end of each major section is provided a blank space. This is to enable you to suggest any competencies you deem important which have been left out.
3. Any other general suggestion is also very welcome. Please feel free to include such suggestions on the blank sheet included.

If you have any questions concerning this study, please call or write to Beatrice Ofei. Her phone number is 292 7086 and her address is 110 H University Village.

We ask that you return the questionnaire in the enclosed, stamped, self-addressed envelope before October 17 or within two weeks after receiving it.

Your assistance is very much appreciated.

Sincerely,

Dr. Irene Beavers
Professor

Beatrice A. Ofei
Graduate Student
Dear Beatrice Ofel, a graduate student in the Department of Home Economics Education, is conducting a study about older adolescents' dietary habits as part of the work toward a doctorate degree.

Based on a preliminary set of competencies, the attached questionnaire has been developed. The intended respondents for this questionnaire are recent graduates of high schools, some already in colleges and others not attending school. Information sought include (1) nutrition knowledge possessed and (2) some managerial and psychological problems faced in the area of foods and nutrition.

You are requested to review the questionnaire for its appropriateness. Where there is one best answer in a multiple choice question, that answer has been indicated. Specifically, you are requested to check whether
(1) the one selected is really the best answer,
(2) there are other equally good alternatives to the one selected,
(3) there is a better alternative not stated,
(4) the question is a fair one for the intended audience, and
(5) whether the question is clear and the concept represented in the question is correct.

You are urged to make as many comments as you think necessary on the questionnaire form to help the review of the questionnaire before pretesting.

If you have any questions concerning this study, please call or write to Beatrice Ofel. Her phone number is 292-7086 and her address is 110 H University Village, Ames 50010.

We ask that you return the questionnaire in the enclosed self-addressed envelope before January 4 or as early as possible.

Thank you very much for your time and cooperation.

Sincerely Yours,

Dr. Irene Beavers
Professor

Beatrice A. Ofel
Graduate Student
Dear

Beatrice Ofei in the Home Economics Education Department at Iowa State University is making a study about older adolescents' dietary habits as part of the work toward a doctorate degree.

The aim of the study is to delineate foods and nutrition competencies needed by adolescents, by completion of high school, which will enable them to satisfactorily apply nutrition knowledge and practice sound dietary habits for good health in this age of fast technological and social changes.

The research design involves administering a questionnaire to a sample of older adolescents who have recently graduated from high school (within the last year or two). We require about 100 subjects in this category who are currently not pursuing any further studies, and will be grateful to you for suggesting at least ten such persons' names and addresses whom we can contact.

The responses from subjects will be treated anonymously and all respects of individual rights to privacy will be observed. If so desired, please indicate that you do not want us to refer to your name in our correspondence with the subject.

Thank you for your cooperation.

Sincerely,

Dr. Irene Beavers
Professor

Beatrice A. Ofei
Graduate Student
November 18, 1977

Dear

A letter dated October 6, 1977 was sent to you from Dr. Irene Beavers (Professor), and Ms. Beatrice Ofei (Graduate Student) requesting for at least ten names and addresses of recent graduates (within the last two years) who are currently not in school. This is to enable Beatrice Ofei to collect some information concerning older adolescents' dietary habits, as part of the work toward a doctorate degree.

We have as yet received no reply from you and would appreciate it very much if you could take some time to compile the list and forward it to Beatrice Ofei. Ideally, we would like equal numbers of males and females but would appreciate any proportion you send. These past students need not have taken nutrition courses before. As indicated before, responses from subjects will be treated anonymously.

We hope to hear from you as early as possible. If you have already replied to the above mentioned letter, then please disregard this reminder. Thank you very much for your cooperation.

Sincerely,

Beatrice Ofei.
Dear

This study is being conducted by the Home Economics Education Department of Iowa State University.

Your help is needed.

You have been selected for a special survey because you are a high school graduate. We are interested in knowing the competencies needed by the present day high school graduate in foods and nutrition which will enable him/her to practice satisfactory dietary habits even without further formal education. You must admit that with so much nutrition information floating around, we need to make sure that before the young adult leaves high school he/she has the necessary ability to judge information received so that a sensible food choice for maximum dollar value may be made.

We realize that this is a demand on your time; but we feel that you would have made a great contribution towards the education of future youngsters in high schools in the area of foods and nutrition by completing and returning this questionnaire.

Your answers will be kept confidential. Along with the replies of other cooperators, they will be summarized to give an overall report and make recommendations for planning educational programs. The form has a code number only to enable us to identify and later contact those who do not return the questionnaires. NO FURTHER REFERENCE WILL BE MADE TO YOU AS AN INDIVIDUAL AFTER WE RECEIVE YOUR RESPONSE.

The questionnaire is divided into sections. Each section tells you what to do. In most cases all that is required of you is for you to circle the number corresponding to the response most appropriate to you.

Your effort to answer and return this questionnaire is greatly appreciated. We ask that you return the questionnaire in the enclosed, stamped, self-addressed envelope before March 1, 1978 or within 10 days after receiving it.

Sincerely,

Irene Beavers
Professor
Home Economics Education

Beatrice Ofei
Graduate Student

Dear

About two weeks ago you received a foods and nutrition questionnaire in which you were asked to give your responses. Possibly your answer sheets are now in the mail. If so, please ignore the rest of this letter.

It is extremely important that we include your response in this study. After analysis and summary of responses, we hope to make recommendations for revision of foods and nutrition programs in high schools. However, these recommendations need to be based on a representative sample of high school graduates in Iowa, hence the importance of the inclusion of your response.

If by chance you do not have, or have misplaced the questionnaire, please drop us a card to the address given below and we will be happy to send you a new one.

Sincerely,

Beatrice A. Ofei

110 H University Village

Ames, Iowa 50010.
APPENDIX E: COMPETENCIES TO BE ACQUIRED BY OLDER ADOLESCENTS FOR
SATISFACTORY PERSONAL AND FAMILY LIVING
Competencies to be Acquired by older adolescents for satisfactory
Personal and Family Living

Nutrition and Health

1. Significance of food

The learner:
- comprehends the interrelationship between food and good health, growth and development.
- distinguishes between physiological and psychological needs met by food consumption.
- appreciates the emotional satisfaction others derive from food.

2. Nutrient sources

The learner:
- recognizes food sources of particular nutrients.
- recalls the functions of the nutrients in the body.
- relates physical and/or emotional well being to good food.
- recognizes the relationship between good health and consumption of varied diets.
- selects foods according to their nutrient content.
- identifies sources of reliable nutrition information.
- distinguishes between food fact and fad.
- estimates caloric values of simple diets.
- is aware of similarities and differences in nutrient content among foods.

3. Nutrient requirements

The learner:
- uses the basic four.
- relates nutrient intakes to health status.
- relates healthy appearance to balanced dietary status.
recognizes that everyone needs the same basic nutrients but in varying amounts.

demonstrates nutritional behavior to reflect knowledge of the nutritive values of foods and the importance of a balance among nutrients.

understands the need for special nutrient balance in the course of pregnancy and lactation.

selects food according to particular needs.

follows physicians' orders regarding special diets for individuals.

4. Food safety

The learner:

- differentiates between a food additive and a contaminant.
- assesses the nutrient value of imitation products.
- understands the importance of food processing.
- is aware of the government's role in maintaining food safety.
- identifies factors that affect food safety.
- distinguishes between wholesome and spoiled foods.
- practices personal cleanliness when handling and storing food products.
- uses stored foods within suggested safe storage time limits.

Food Management

5. Meal planning

The learner:

- considers individual needs when planning meals.
- uses the knowledge of nutrient needs and food availability and cost in meal planning.
- relates occasion to type of meal served.
- uses sensory qualities in planning foods to achieve acceptability.
recalls measures of foodstuffs necessary to qualify as serving portion in the food groups.

applies knowledge of food costs to planning meals within the economic level of the family.

identifies deficient areas in the family diet.

reduces food costs through wise food management.

recognizes leftover foods which do not store satisfactorily.

6. Meal preparation

The learner:

recognizes that the method of handling and preparation of a food item affects its quality.

applies the correct procedures in preparation of a food type to retain its nutritional quality.

utilizes different methods of preparation to give variety to menu.

relates types of food to method of preparation.

selects the most efficient approach to meal preparation.

plans kitchen activities before execution.

plans and dove-tails food preparations to save time.

combines foods in appealing way.

is aware of the possible hazards of outdoor cooking.

7. Food service

The learner:

serves food appropriately for the occasion.

accepts different ways of serving food.

selects acceptable method of meal service.

contributes to a relaxed atmosphere at mealtime.

estimates preparation times carefully so that all foods are ready to serve at mealtime.
serves food attractively.

8. Home food preservation

The learner:
identifies various methods to preserve food.
relates the properties of foods to their methods of preservation.
analyzes the advantages and disadvantages in home food preservation.

9. Food storage

The learner:
recognizes the relationship between temperature and growth of microorganisms with respect to food quality.
demonstrates the techniques of storage of a food item.
identifies the type of storage techniques suitable for foods under particular environmental conditions.
takes periodic inventory of stored foods.
uses proper wrappings or containers for storing foods.
realizes that proper storage conserves nutrient values, maintains acceptable flavors, color and texture.

10. Sanitation and safety in the kitchen

The learner:
applies safety precautions in food handling.
maintains a clean environment in the kitchen.
recognizes unsafe appliances
applies appropriate first aid when needed.
disposes of leftover foods that will not maintain quality.
identifies kitchen utensils that are safety hazards and need to be washed with care.
stores cleaning agents closed tightly, apart from food products and beyond reach of children.
employs appropriate cleaning method if there is illness in the home.

Food Habits

11. Food habits

The learner:
- identifies factors that affect the food patterns of individuals.
- recognizes the effect of individual and group values on food practices.
- is aware that food habits are partly consciously and partly unconsciously acquired.
- identifies some cultural aspects of food habits.
- understands that a peoples' foodways are intricately connected with their cultural and climatic conditions.
- is aware that food practices evolve over a long time and are not easily changed.
- analyzes personal food habits.
- examines emerging trends in society that are affecting dietary patterns.
- realizes which dietary trend is worth following and which is not suitable for the individual.
- willingly forgoes an undesirable dietary habit.
- realizes that people are influenced by their personal experiences with food.
- selects nutritious snacks.
- recognizes that individual preferences and values affect food selection and meal planning.

Consumer Behavior

12. Food selection

The learner:
- identifies the role of advertising in food selection
recognizes the many forms into which a food item can be processed and presented for sale.

applies the U.S.D.A. grading system of food types in food selection and purchasing.

applies knowledge of food qualities in food selection.

interprets grocery store information on unit pricing to select the best food buys.

reads food labels carefully and correctly.

13. Marketing

The learner:

substitutes a food item of similar value to one sought.

plans needs before purchasing.

selects foods according to good texture and appearance.

considers other individuals or family needs when planning food purchases.

distinguishes between true and false information in advertising.

determines from food inventory, recipes and planned menus the foods which need to be listed on the market order and purchased.

chooses a market on the basis of sanitation, convenience, service offered and quality of foods sold.

accepts the responsibility of a consumer in the market place.

Careers

14. Careers in food and nutrition

The learner:

identifies jobs requiring food and nutrition background.
QUESTIONNAIRE

Age: [175]

Sex: Male Female

Marital status: Married Single

Number of children: 0 1 2 3 or more

Year completed high school: 1977 1976 1975 Earlier

Length of time studied Foods and Nutrition in high school: Quarters Semesters Years

Occupational status: Employed less than 20 hours a week

Employed more than 20 hours a week

Not employed

Are you a student? Yes No

Section I: DIETARY PRACTICES

Directions: The following questions seek information about your general food habits. In most cases, you are required only to circle the response applicable to you. In a few cases where the responses supplied do not apply in your case, you are required to circle OTHER and then in the space provided, to state your particular response.

Please circle the number of days per week you eat the following meals.

<table>
<thead>
<tr>
<th>Meal</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Breakfast</td>
<td>0</td>
<td>1-2</td>
<td>3-4</td>
<td>5-6</td>
<td>7 days per week</td>
</tr>
<tr>
<td>2. Lunch</td>
<td>0</td>
<td>1-2</td>
<td>3-4</td>
<td>5-6</td>
<td>7 days per week</td>
</tr>
<tr>
<td>3. Supper/dinner</td>
<td>0</td>
<td>1-2</td>
<td>3-4</td>
<td>5-6</td>
<td>7 days per week</td>
</tr>
</tbody>
</table>

Please circle how many of these meals are prepared at home and eaten by you—including packed meal—and how many are obtained from outside and eaten by you—either at a restaurant, cafeteria or a vending machine.

<table>
<thead>
<tr>
<th>Meal</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
</tr>
</thead>
<tbody>
<tr>
<td>4. Breakfast prepared at home</td>
<td>0</td>
<td>1-2</td>
<td>3-4</td>
<td>5-6</td>
<td>7 days/week</td>
</tr>
<tr>
<td>5. Breakfast obtained outside</td>
<td>0</td>
<td>1-2</td>
<td>3-4</td>
<td>5-6</td>
<td>7 days/week</td>
</tr>
<tr>
<td>6. Lunch prepared at home</td>
<td>0</td>
<td>1-2</td>
<td>3-4</td>
<td>5-6</td>
<td>7 days/week</td>
</tr>
<tr>
<td>7. Lunch obtained outside</td>
<td>0</td>
<td>1-2</td>
<td>3-4</td>
<td>5-6</td>
<td>7 days/week</td>
</tr>
<tr>
<td>8. Supper prepared at home</td>
<td>0</td>
<td>1-2</td>
<td>3-4</td>
<td>5-6</td>
<td>7 days/week</td>
</tr>
<tr>
<td>9. Supper obtained outside</td>
<td>0</td>
<td>1-2</td>
<td>3-4</td>
<td>5-6</td>
<td>7 days/week</td>
</tr>
</tbody>
</table>
10. Please circle how many snacks and drinks (excluding plain coffee or tea) per day you have. Leave blank if no snacks.
   A. Morning snack only
   B. Afternoon snack only
   C. Evening snack only
   D. Morning and afternoon snack
   E. Morning, afternoon and evening snack

11. List five (5) items that are your **most** favorite snacks or drinks, or that you **most** usually have.
   A.
   B.
   C.
   D.
   E.

12. Are you taking any vitamin supplements?
   A. No
   B. Yes, own choice
   C. Yes, doctor's prescription

13. Are you taking any mineral supplements?
   A. No
   B. Yes, own choice
   C. Yes, doctor's prescription

14. Which of the following general diets are you currently following?
   A. No diet
   B. Weight reduction (own choice)
   C. Weight reduction (doctor's or dietitian's prescription)
   D. For gaining weight (own choice)
   E. For gaining weight (doctor's or dietitian's prescription)

15. Which of the following special diets are you currently following?
   A. No diet
   B. Diabetic
   C. Modified fat
   D. Ulcer diet
   E. Other (specify)

16. Meals may be skipped for various reasons, some of which are indicated below. Please circle the letter corresponding to any which is applicable to you. (Leave blank if not applicable)
   A. I am seldom hungry.
   B. I do not like the foods usually served at the meal.
   C. I am generally in a hurry to do something else.
   D. I am watching my weight.
   E. Other(s) (specify)

17. Do you worry about eating too much?
   A. Very Often
   B. Often
   C. Sometimes
   D. Seldom
   E. Never
18. Do you wish you could eat more?
   A. A Great Deal  B. Much  C. Sometimes  D. Seldom  E. Never

19. Do you think the kind of food you eat has anything to do with your health?
   A. A Great Deal  B. Much  C. Some  D. A Little  E. Not At All

20. Do you wish you could have more information about foods and nutrition in general?
   A. A Great Deal  B. Much  C. Some  D. A Little  E. No

21. If you wish for more information about foods and nutrition, circle all of the following areas you would wish for more information.
   A. General nutrition knowledge
   B. Relationship between food and disease
   C. Food preparation
   D. Food selection and meal planning
   E. Other (specify)

What responsibility do you usually have at home for family meals?

22. Plan meals:
   A. Often  B. Sometimes  C. Seldom  D. Never

23. Prepare all food for one or more meals:
   A. Often  B. Sometimes  C. Seldom  D. Never

24. Prepare some of the food for one or more meals:
   A. Often  B. Sometimes  C. Seldom  D. Never

25. Prepare one or more of my own meals:
   A. Often  B. Sometimes  C. Seldom  D. Never

26. Set the table:
   A. Often  B. Sometimes  C. Seldom  D. Never

27. Wash the dishes:
   A. Often  B. Sometimes  C. Seldom  D. Never

28. Buy the food:
   A. Often  B. Sometimes  C. Seldom  D. Never

29. If a food you had never tasted before was served to you, what would you do?
   A. Refuse to eat it.
   B. Take a bite to see how it tastes.
   C. Try it because that is what you are expected to do.
   D. Take a bite because it is interesting to try new foods.
   E. Other (Specify)

30. Are you criticized by others (family members and/or friends) for what and how you eat?
   A. Very Often  B. Often  C. Sometimes  D. Seldom  E. Never
If you are criticized, circle the most important reason for which you are criticized in each of the next two items below:

31. A. Eating too much  
B. Eating too little  
C. Skipping meals  
D. Eating too often  
E. Other (Specify)

32. A. Not eating the right foods  
B. Eating too fast  
C. Eating too slowly  
D. Not using good table manners  
E. Other (Specify)

33. If you had the foods to prepare a particular meal at home for you and your friends on the one hand and, on the other hand you also had the money to purchase that meal in a restaurant, what would you prefer to do?  
A. Prepare the meal at home  
B. Eat at a restaurant

34. If you chose to prepare the meal at home, which of the following reasons affected your decision most?  
A. I enjoy cooking.  
B. It is cheaper to prepare meals at home.  
C. My friends will appreciate more a meal I prepared myself.  
D. It is more convenient for me to prepare it at home.  
E. Other (Specify)

35. If you chose to purchase the meal at a restaurant, which of the following reasons affected your decision most?  
A. I am not good at cooking.  
B. I do not have the time to prepare the meal.  
C. My friends and I prefer eating out.  
D. It is more convenient for me to take someone out.  
E. Other (Specify)

36. How often do you take inventory of food items in your cupboards and storage places?  
A. Before each shopping  
B. About once a month  
C. About once every three months  
D. About once a year  
E. Never

37. How often do you shop for food items?  
A. Every day  
B. Two or three times a week  
C. Once a week  
D. Once a month  
E. Less than once a month
Below are some questions about social occasions at which food is usually served. Circle the number of times you take part in such activities and list the foods usually eaten.

38. Occasion
Parties for friends at your own home

A. About once or twice a year
B. About once a month
C. About once a week
D. More than once a week
E. Never

39. Occasion
Parties in the home of your friends

A. About once or twice a year
B. About once a month
C. About once a week
D. More than once a week
E. Never

40. Occasion
Getting together with friends in public eating places

A. About once or twice a year
B. About once a month
C. About once a week
D. More than once a week
E. Never

Section II: OPINION STATEMENTS

Directions: The following statements are some opinions and beliefs people have about food. Read each statement carefully and circle the appropriate response.

If you agree, circle A.
If you disagree, circle B.
If you think it can be either right or wrong depending on other factors, circle C.
If you are not sure, circle D.

41. Honey is more nutritious than sugar.
A. B. C. D.

42. Molasses is not any more nutritious than sugar.
A. B. C. D.

43. Just eating the things you like will provide enough nourishment.
A. B. C. D.

44. The nutritional status of a growing girl will affect her future pregnancy and child birth performance.
A. B. C. D.

45. Though beets contain vitamins and minerals, they do not have enough iron to make blood richer.
A. B. C. D.

46. Onions will cure a cold.
A. B. C. D.

47. Any food sold in a supermarket is good for a person.
A. B. C. D.

48. Snacks are never as good for you as regular meals.
A. B. C. D.
49. Alcohol gives more energy for the same weight than either protein or carbohydrate. A. B. C. D. 
50. Pregnant or breastfeeding mothers require more nutrients than their husbands. A. B. C. D. 
51. A person who eats enough food will always be healthy. A. B. C. D. 
52. Milk is a good food for most people at all ages. A. B. C. D. 
53. A person needs to eat only if he is hungry. A. B. C. D. 
54. Weighing the right amount means being properly nourished. A. B. C. D. 
55. It is harmful to eat an acid fruit and milk at the same meal. A. B. C. D. 
56. All human beings require the same kinds of nutrients. A. B. C. D. 
57. Canned or frozen food is just as nutritious as food made from scratch. A. B. C. D. 
58. Fertilized eggs do not contain any more nutrients than unfertilized eggs. A. B. C. D. 
59. Maintaining a balanced dietary pattern ensures a healthy appearance. A. B. C. D. 
60. Pets should never be allowed in the kitchen. A. B. C. D. 
61. Hands should be washed thoroughly after handling raw food before handling cooked food. A. B. C. D. 
62. All home canned vegetables must be boiled for 10 to 20 minutes before tasting or eating. A. B. C. D. 
63. Canned meat and fish require dry cool storage but not refrigerator storage. A. B. C. D. 
64. Individual needs should be considered when planning family meals. A. B. C. D. 
65. Milk which accidentally gets frozen is not spoiled. A. B. C. D. 
66. Wilted and damaged vegetables are not good at any price. A. B. C. D. 

Rate in order of importance how you view the following shopping practices. For those you consider very important, or that need to be done always, give a rating of (A). Those you consider not at all important, or should never be done, give a rating of (E). Give a rating from (B) to (D) depending on the degree of importance.

67. Making a list of items needed at home before going to shop. A. B. C. D. E. 
68. Considering other family members' needs when planning food purchases. A. B. C. D. E. 
69. Buying foods according to brand names. A. B. C. D. E. 
70. Determining from food inventory, recipes and menus the foods which need to be purchased before shopping. A. B. C. D. E. 
71. Choosing a shop because it offers friendly service. A. B. C. D. E. 
72. Choosing a shop because it appears clean inside. A. B. C. D. E. 
73. Choosing a shop because it offers lower prices. A. B. C. D. E. 
74. Studying special ads before shopping. A. B. C. D. E. 
75. Comparing prices of similar food items in the store before purchasing. A. B. C. D. E.
Section III: FOODS AND NUTRITION KNOWLEDGE

Directions: Read each item carefully. Unless otherwise directed, select the one correct or best statement or phrase which answers the question or completes the sentence and put a circle around the letter corresponding to that statement or phrase. For example:

Which of these groups of items best represent the composition of cheese?

A. Carbohydrate, fat, vitamin C
B. Calcium, protein, fat
C. Vitamin A, vitamin C, calcium
D. Protein, vitamin A, carbohydrate

76. Circle the most nutritious snack.

A. Doughnuts and Coke
B. Candybar and milk
C. Peanuts and orange juice
D. Popcorn and diet Pepsi

77. Which of these items need to be washed separately?

A. Kitchen knives
B. Forks
C. Glasses
D. Plates
E. Cooking bowls (sauce pans)

78. When vegetables are cooked in water, they

A. lose nutrients
B. become mushy
C. lose flavor
D. lose color

79. The most important thing to do before starting to prepare any meal is to

A. roll up the long sleeves of a blouse or shirt
B. wash hands with water and soap
C. put on an apron
D. assemble all necessary ingredients

80. Frozen chicken or turkey can safely be kept in a deep freezer for

A. not more than 2 months
B. between 2 and 6 months
C. between 6 and 9 months
D. up to 12 months

81. People are often advised to eat varied diets because

A. no one food contains all nutrients.
B. serving different foods together produces a very nice eye appeal.
C. that way, they can adjust better to new foods in a strange situation.
D. then different tastes can be developed.
Tom lives alone and hates to prepare his meals from scratch. He therefore shops every three months and eats from canned and prepared products.

82. Is it likely he will experience any nutrient deficiencies?
   A. Yes
   B. No
   C. Not sure

83. What nutrient, if any, will he have a deficiency of?
   A. Iron
   B. Vitamin C (ascorbic acid)
   C. Calcium
   D. Vitamin B₁ (thiamine)
   E. None of the above

84. Circle the food with the highest amount of calories.
   A. One cup of cooked mashed potatoes
   B. One cup of mayonnaise
   C. One cup of whole fresh milk
   D. One cup of Coke

85. The food that would spoil most quickly on a picnic would be
   A. Peanut butter and jelly sandwiches
   B. Baked custard
   C. Orange juice
   D. Carrot sticks

86. Four year old Dennis has got badly bleeding and sore gums. What do you think might be the cause?
   A. He eats too much candy
   B. He doesn't take in enough flouride
   C. His teeth are not cleaned properly
   D. He doesn't take in enough vitamin C

87. To get the same supply of nutrients and appreciably reduce cost, meat can be combined in a dish with
   A. Eggs
   B. Cheese
   C. Beans
   D. Broccoli

88. Which of these parts of the body is most affected by lack of vitamin D?
   A. Hair
   B. Eye
   C. Heart
   D. Bone

89. Which is the best order in which to prepare the following meal: meat loaf (1 hour); baked potatoes (1½ hours) and green bean casserole (½ hour)?
   A. Put all three at once in the oven and then remove as they get done.
   B. Potatoes, then meat loaf and casserole ½ hour later.
   C. Potatoes and meat loaf together then casserole 1 hour later
   D. Potatoes, then meat loaf after ½ hour, then casserole after another ½ hour
90. The temperature range for rapid growth of most microorganisms is

A. 60 to 120°F (16 to 49°C)
B. 40 to 80°F (5 to 27°C)
C. 80 to 140°F (27 to 60°C)
D. 125 to 165°F (52 to 74°C)

John has finished the family's weekly grocery shopping on a summer afternoon and is about to leave for home when his friend Dave runs into him and tells him of a one-hour 30%-off sale at a store on some jackets both have been wanting to buy but could not afford at the regular price.

91. Should John leave the groceries in the car and go to the store with Dave or forget about the sale and take the groceries home?

A. Go with Dave
B. Take groceries home

92. Give one reason for your choice.

93. Nancy's mother decided to invite twenty classmates of Nancy and Bob over to her house for lunch when their child was christened. What is the most convenient way to serve the meal?

A. Formal table setting (English style)
B. Plates dished up and served to seated guests
X C. Buffet style
D. Plates dished up and guests asked to collect them

94. Mrs. Smith insists that her 13 year old Brenda should have three glasses of milk each day though Brenda thought as a teenager, she had finally been weaned off milk. What do you think is Mrs. Smith's reason?

A. She doesn't think Brenda is old enough to go off milk.
X B. She thinks as a teenager, Brenda needs extra milk for accelerated growth.
C. She thinks milk is good for everyone no matter how old or young.
D. She feels this is one way in which she can continue to exercise her authority over Brenda.

95. Which food group is under-represented in the following meal?
Pork chops; baked potato and muffin with butter; baked custard; one glass of milk

A. Cereal group
B. Meat group
C. Milk group
X D. Vegetable and fruit group

96. List three sources you consider most reliable or helpful for obtaining nutrition information

A. 
B. 
C. 

97. Most traditional West African dishes have long cooking times. Which reason do you think best explains this pattern of food preparation?

A. Life is not as hectic there so people have more time for preparing food.

B. They do not have a variety of convenience foods as we do here. **(Correct Answer)**

C. With warm and humid climate, foods need to be cooked well to ensure safety.

D. The people have developed a taste for foods prepared this way.

98. In the following entry-level jobs in a restaurant which job would benefit from having someone with a food and nutrition background?

A. cash-register operator

B. bus boy/girl

C. kitchen helper **(Correct Answer)**

D. kitchen cleaner

99. The open kettle method of food preservation should not be used for any food except

A. low acid foods

B. jellies **(Correct Answer)**

C. high acid foods

D. soft fruits and vegetables

100. Ingredients listed on a food product container reads: pasteurized cultured milk, apricots, sugar, corn sweeter, food starch, gelatin, natural flavors. How may this be interpreted?

A. It means there is more milk than any other ingredient in the product. **(Correct Answer)**

B. There is no relationship between the order of items listed and their proportions in the product.

C. It means milk is one of the ingredients in greatest amount.

D. Not sure what it means

101. Which of the following factors do you think will most influence the type of foods individuals select?

A. The foods sold in vending machines

B. Foods liked by the person's friends

C. Foods the person sees other people eat **(Correct Answer)**

D. The way in which new foods are offered to the person

E. Stories the person hears about the types of foods other people eat.

102. The following is an advertisement. Each statement is labeled for easy identification. Circle the statement in the advertisement which is misleading.

A. Magic Germkill isn't like any other disinfectant.

B. It leaves your tubs cleaner than ever before.

C. All hospitals use Magic Germkill above any other disinfectant. **(Correct Answer)**

D. No house should be without this valuable disinfectant.

103. Cleaning agents must be stored

A. anywhere in the kitchen except on stoves, if well stoppered.

B. at the bottom shelf, separate from food items.

C. at the top shelf, out of reach of children.

D. at a spot safe from contamination and children. **(Correct Answer)**
104. How many people will a pound of whole fish and a pound of fish fillet each serve?

A. 1,3  
B. 2,4  
C. 3,4  
D. 2,2

105. If you are not satisfied with a purchased food item, you would

A. telephone the supermarket and warn them to offer better merchandise.  
X B. return it to the store manager immediately.  
C. call the local F.D.A. office and lodge a complaint.  
D. avoid shopping in that particular store and warn friends about shopping there.

106. Canned sliced fruits compared to the same fruits canned whole are usually

A. cheaper for the same weight.  
B. more expensive for the same weight.  
C. of the same price for the same weight.  
D. have no relationship in price for the same weight.

107. Which of these is not likely to be a food additive if it occurs in milk?

A. Vitamin A  
X B. Fungicide  
C. Sugar  
D. Riboflavin

108. Ordinary bleached flour is

A. more nutritious than unbleached flour but less nutritious than whole wheat flour.  
B. less nutritious than both unbleached flour and whole wheat flour.  
X C. as nutritious as unbleached flour but less nutritious than whole wheat flour.  
D. less nutritious than unbleached flour which is less nutritious than whole wheat flour.

109. Which of the following has been added to "fortified margarine"?

A. A and D vitamins  
B. B and C vitamins  
C. Polyunsaturated fats  
D. Yellow coloring

110. Food processing may

A. destroy some nutrients in foods.  
B. make some nutrients easier to absorb.  
C. have no effect on some nutrients.  
X D. involve all of the above.  
E. involve none of the above.

111. Bread will not become moldy as rapidly if placed in a refrigerator because

A. darkness retards the growth of mold.  
B. cooling prevents the bread from drying out rapidly.  
C. mold requires both heat and light for best growth.  
X D. cooling retards the growth of fungi.
112. A list of features which are likely to help you get the most for your money when shopping is:

A. Unit pricing, open dating, food labels, selective discount pricing
B. Aisle indicators of items, advertising, shop assistance, brand names
C. Advertising, clear shelf arrangement, convenient packaging
D. Coupon system, large selection of package sizes, self service.

113. Each nutrient
A. provides energy for work and play.
B. has specific uses in the body.
C. works best by itself.
D. is found in almost every food.

114. A good substitute for milk if you need calcium is
A. green leafy vegetables
B. carrots or canteloupes
C. any citrus fruit
D. pears or apples

115. The best plant source of iron would be
A. potatoes and tomatoes
B. pears and apricots
C. spinach and raisins
D. cauliflower and carrots

Circle the food in each pair which has greater food value per dollar spent.

116. A. Chicken thighs
B. Pork chops

117. A. Potatoes
B. Macaroni

118. A. Fortified white bread
B. Whole wheat bread
Section III: FOODS AND NUTRITION KNOWLEDGE

Directions: Read each item carefully. Unless otherwise directed, select the one correct or best statement or phrase which answers the question or completes the sentence and put a circle around the letter corresponding to that statement or phrase. For example:

Which of these groups of items best represent the composition of cheese?
A. carbohydrate, fat, vitamin C
B. calcium, protein, fat
C. vitamin A, vitamin C, calcium
D. protein, vitamin A, carbohydrate

76. The major nutrients found in meat are
XA. Protein, fat
B. Protein, carbohydrate
C. Protein, calcium
D. Protein, iron

77. The best first aid to give to a burn is to
A. put grease on it.
XB. cool it with cold water.
C. clean it and break blisters.
D. do nothing to it.

78. Foods should not be allowed to sit on a counter or table for long because
A. it makes the kitchen look cluttered.
XB. bacteria rapidly grow in food at room temperature.
C. it is a temptation for nibbling in-between meals.
D. the house pet and/or roaches will get at the food.

79. Microorganisms are prevented from getting into food because
A. they tend to give undesirable flavors to food.
XB. they give off poisonous waste chemicals.
C. they reduce food nutrients by living on them.
D. they change the chemical nature of food nutrients.

80. The difference between "choice" and "good" meat is that
A. "choice" is more nutritious than "good".
B. "choice" is more tender than "good".
C. "choice" has less fat than "good".
XD. "choice" has more flavor than "good".

81. If Sally is overweight and wants to reduce a little bit, which of the following would you recommend for her?
A. Skip breakfast and eat regular lunch and dinner servings.
B. Eat breakfast bar, fruit salad and yogurt for lunch and a regular dinner.
C. Eat regular breakfast and dinner and have cookie and coke for lunch.
XD. Eat all three meals but reduce the servings of fatty and starchy items.
82. Skimmed milk, unless it is fortified, has virtually no
   A. Vitamin C
   X B. Vitamin D
   C. Vitamin E
   D. Vitamin A

83. Cooking meat at moderate temperature
   A. increases the nutrient content.
   X B. makes it tender and palatable.
   C. makes it stringy and tough.
   D. prevents it burning easily.

84. Some people preserve foods (by canning or freezing) for future use because
   A. home food preservation greatly reduces cost.
   X B. it makes the food available the whole year round.
   C. home preserved food is germ-free and healthy.
   D. there is far less nutrient loss in home preserved food.

85. When refrigerated milk is put in a pre-cooled thermos bottle, it
   should be consumed within
   A. 4 hours
   X B. 8 hours
   C. 24 hours
   D. 48 hours

86. Enriched breads and cereals are
   A. high in calories and minerals.
   X B. not needed by adults
   C. high in proteins and minerals
   D. high in vitamins and minerals

Mrs. Kelley, an African, married to a Caucasian American would not prepare
any pork dish in the house though she does not object to Mr. Kelley
eating pork at a restaurant. They have been married for seven years,
and she's still not even tasted pork, though she confesses there is
nothing wrong with the meat.

87. Mark the one reason below which you think best explains Mrs. Kelley's
   behavior.
   A. Mrs. Kelley never ate pork before she married Mr. Kelley.
   X B. Pork is not valued by Mrs. Kelley's African tribe as edible meat.
   C. Mrs. Kelley accepts that pork may be good for her husband but is
definitely harmful to her.
   D. Mrs. Kelley does not know what is good for her nutritionally.

88. Do you think Mrs. Kelley should at least prepare pork for her husband
   and children since Mr. Kelley loves pork?
   A. Yes
   B. No

89. What is your reason?
   A. There are a lot of other types of meat they can eat.
   B. It is not nice to force a person to do what he/she obviously
dislikes.
   C. She should not deny her family what is obviously good food just
because she does not appreciate it.
   D. Children must be exposed to all available foods as they
develop their food habits.
   E. Pork should really not be eaten anyway because it is not healthy.
90. The main aim of processing food is to
   A. increase the variety of selection.
   B. increase the nutritive value of the food.
   X C. maintain the wholesomeness of the food for a longer time.
   D. save the consumer time in the preparation of meals.

91. The Recommended Dietary Allowances are the levels of intake of essential nutrients considered adequate to meet the needs of
   A. the average person.
   X B. all healthy persons.
   C. people with special needs.
   D. specific age groups.

92. For safety, refrigerated prepared foods must be used within
   A. One week
   B. Two weeks.
   X C. Two days.
   D. Four days.

93. A possible hazard of outdoor cooking is
   A. getting food poisoning.
   B. spreading ash around.
   X C. starting a fire.
   D. getting dirt into food.

94. Pregnant women require iron supplements even when their food intake is adequate because
   X A. their need for iron is more than can be easily obtained from natural foods.
   B. during pregnancy, women are not able to use iron efficiently.
   C. without extra supply of iron, they will produce deformed babies.
   D. iron is needed to help proper absorption and use of proteins in foods.

95. Which of the following fruits may be a suitable substitute for oranges in providing similar nutrients?
   A. Apples
   B. Cherries
   C. Apricots
   X D. Grapefruits

96. To determine which of equivalent items in a supermarket is cheapest for the same nutrient content, you will
   A. look for wide selection in different sizes.
   B. look for brand names.
   X C. use unit pricing index.
   D. Seek advice from the store attendant.

97. The following statement is a misconception:
   X A. For an adequate diet, every meal of the day has to contain food from the meat group.
   B. People usually select food on the basis of availability than on what is good for them.
   C. Food habits are partly learned and partly developed.
   D. Obese people do not necessarily have nutrient reserves.
98. When cooked, a cup of dried prunes or raisins will yield,
   A. 2 cups.
   B. 3 cups.
   C. 4 cups.
   D. 5 cups.

99. Men and women between ages of 25 and 35 years who are of average height and weight need
   A. different nutrients in the same amounts.
   B. the same nutrients in different amounts.
   C. different nutrients in different amounts.
   D. the same nutrients in the same amounts.

100. A nutritionally adequate diet is most likely to be provided by eating
   A. a wide variety of foods.
   B. three meals a day.
   C. some health foods daily.
   D. foods rich in protein.

101. Which of these foods should not be stored as leftovers?
   A. Vegetable salads with oil dressings.
   B. Turkey sandwiches.
   C. Macaroni and cheese casserole.
   D. Banana pudding.

102. Overweight can result with an excess intake of
   A. carbohydrates.
   B. proteins.
   C. calories.
   D. fats.

103. Which of these parts of the body has a special need for vitamin A?
   A. Hair
   B. Eye
   C. Heart
   D. Bone

104. Angeline wants to conserve energy. How would you recommend she should cook her dinner of beef, carrots and potatoes?
   A. Boil beef till tender, boil carrot, make mashed potatoes, seasoning appropriately.
   B. Braise beef and carrots on the range till done, make mashed potatoes.
   C. Braise beef then bake with peeled carrots and potatoes in covered casserole dish.
   D. Make beef and carrots into stew on the range and boil potatoes in salted water.

105. Circle the function that is best performed by foods in the fruits and vegetable group.
   A. Builds blood cells.
   B. Builds body tissues.
   C. Fights infections.
   D. Protects nervous system.
You are invited to a monthly international gathering where you are told that the food featured has to be eaten with the hand. By looking at the food, you feel it can equally be eaten with a spoon.

106. Would you
A. Eat with your hand.
B. Request for a spoon.
C. Decline to eat the food.

107. In only one sentence, explain your action.

List of

108. The following foods all contain good sources of fat:
✓ A. Nuts, ground beef, avocado
B. Nuts, corn, macaroni
C. Hamburger, oranges, avocado
D. Macaroni, oranges, corn

109. Which of the following lists contain all the four food groups?
A. Milk, bread, cheese, turkey
B. Grapes, bread, carrot, turkey
C. Milk, bread, carrot, turkey
D. Milk, eggs, bread, turkey

110. To get the maximum nutrient value out of oranges, they should be
✓ A. served raw and immediately after preparation.
B. served raw but allowed to chill in the refrigerator.
C. served as reconstituted orange juice concentrate.
D. served anyway an individual chooses.

111. The addition of baking soda to vegetables may
✓ A. make the vegetables more digestible.
B. cause undesirable changes in flavor.
C. allow nutrients to remain the vegetable.
D. help vegetables retain their color.

112. Where is it likely that a new couple in town will get the most reliable nutrition information?
A. From the friends they acquire.
B. From the supermarket manager.
✓ C. From the dietitian at the local clinic.
D. From their child's teacher.

113. The best storage place for a bottle of cooking oil is
A. in the cupboard over the refrigerator.
B. in the cupboard over the cooking range.
C. on the counter next to the cooking range.
✓ D. in the cupboard away from the range and the refrigerator.

114. Give one reason for your choice in 113.
115. Which nutrient provides the most energy per ounce?
   A. carbohydrates
   B. vitamins
   X C. fats
   D. proteins

116. Which of the following statements is correct?
   A. Cooking temperatures destroy all bacteria that cause illness.
   B. Cold temperatures permit slow growth of all bacteria that cause food spoilage.
   X C. Cooking temperatures destroy most but not all bacteria that cause illness.
   D. No bacteria that cause food spoilage can stand freezing temperatures.

Circle the food in each pair which has greater food value per dollar spent.

117. A. Powdered milk       B. Fresh whole milk
118. A. Oatmeal           B. Corn flakes
119. A. Round steak       X B. Hamburger
APPENDIX G: QUESTIONNAIRE ADMINISTERED TO RESPONDENTS
FOODS AND NUTRITION QUESTIONNAIRE

General directions:

This questionnaire is divided into four (4) sections. Each section has some directions as to how questions should be answered. Please read each question carefully and circle the number which corresponds to the appropriate response with a pencil.

Please do not consult anyone or any book in answering this questionnaire. Please answer all questions unless otherwise directed.

Section I: GENERAL INFORMATION

A. Demographic data

1. Age
   1. Below 18 years
   2. 18-19
   3. 20-21
   4. 22-23
   5. Above 23

2. Sex
   1. Male
   2. Female

3. Marital status
   1. Single
   2. Married

4. Number of children
   1. 0
   2. 1
   3. 2
   4. 3 or more

5. Year of high school graduation
   1. Earlier than 1975
   2. 1975
   3. 1976
   4. 1977

B. Nutritional information

10. List three (3) items that are your most favorite snacks or drinks, or that you most frequently consume (excluding plain coffee or tea).
   1.
   2.
   3.

11. Meals may be skipped for various reasons, some of which are indicated below. Please circle the numbers corresponding to any which are applicable to you.
   1. I am seldom hungry.
   2. I do not like the foods usually served at the meal.
   3. I am generally in a hurry to do something else.
   4. I am trying to lose or maintain my weight.
   5. Other (please state) ___________________________________________________________________

12. List three (3) sources you consider most reliable or helpful for obtaining nutrition information.
   1.
   2.
   3.

13. Which one of the following do you do most often in shopping for food supplies?
   1. Plan and make a list of items needed before shopping.
   2. Select food items on the basis of what is on sale.
   3. Buy food items according to what attracts you in the store.
   4. Other (please state) ___________________________________________________________________
14. People are sometimes criticized for the food they eat and/or how they eat. The following are some reasons for criticism. Circle all the reasons that may be applicable to you.

1. Not criticized
2. Eating too much
3. Eating too little
4. Skipping meals
5. Eating too often
6. Not eating the right foods
7. Eating too fast
8. Eating too slowly
9. Other (please state)

15. If you wish for more information about foods and nutrition, circle all of the following areas in which you wish for more information.

1. Do not wish to have more information
2. Relationship between food and disease
3. Food preparation
4. Food selection and meal planning
5. Nutrition misinformation
6. Budgetting and food purchase
7. Other (please state)

Section II: DIETARY PRACTICES

Directions: Please respond to these questions according to your behavior when you last lived in a home environment, if you are not doing so now.

There is no one correct answer in any of the questions in this section. Just select the alternative that is applicable to you.

A. Questions 1-19: Please circle the number of the appropriate response.

1. How many days per week do you eat breakfast?
   1. I don't eat breakfast
   2. 1-2
   3. 3-4
   4. 5-6
   5. 7

2. How many days per week do you eat lunch?
   1. I don't eat lunch
   2. 1-2
   3. 3-4
   4. 5-6
   5. 7

3. How many days per week do you eat supper?
   1. I don't eat supper
   2. 1-2
   3. 3-4
   4. 5-6
   5. 7
Questions 4-6: How many of these meals per week are prepared at home (either by you or someone else) and eaten by you (including sack lunch)?

4. Breakfast prepared at home
   1. None
   2. 1-2
   3. 3-4
   4. 5-6
   5. 7

5. Lunch prepared at home
   1. None
   2. 1-2
   3. 3-4
   4. 5-6
   5. 7

6. Supper prepared at home
   1. None
   2. 1-2
   3. 3-4
   4. 5-6
   5. 7

7. How many snacks (excluding plain coffee or tea) per day do you have?
   1. No snack or drink (skip to question 9)
   2. One
   3. Two
   4. Three
   5. Four or more

8. How many snacks and drinks per week (excluding plain coffee or tea) do you have between supper and bedtime?
   1. No snack or drink
   2. 1-2
   3. 3-4
   4. 5-6
   5. 7 or more

9. Are you taking any vitamin supplements?
   1. No
   2. Yes, own choice
   3. Yes, doctor's prescription

10. Are you taking any mineral supplements?
    1. No
    2. Yes, own choice
    3. Yes, doctor's prescription

11. Which of the following weight control diets are you currently following?
    1. No diet
    2. Weight reduction (own choice)
    3. Weight reduction (doctor's or dietitian's prescription)
    4. For weight gain (own choice)
    5. For weight gain (doctor's or dietitian's prescription)

12. Which of the following special diets are you currently following?
    1. No special diet
    2. Diabetic
    3. Low cholesterol
    4. Ulcer diet
    5. Other (please state)
13. If a food you have never tasted before was served to you, what would you do?
1. Refuse to eat it
2. Take a bite to see how it tastes
3. Try it because that is what one is expected to do
4. Take a bite because it is interesting to try new foods
5. Other (please state)

14. You are invited to a monthly international gathering where you are told that the food featured is to be eaten with the hand. By looking at the food, you feel it can equally be eaten with a spoon. Would you
1. eat it with your hand?
2. request a spoon?
3. decline to eat the food?
4. leave the place immediately?
5. Other (please state)

15. Assuming both money and ingredients are available to you and you want to offer your friends a meal, what would you prefer to do?
1. prepare the meal at home
2. take them out to eat (if you choose this answer, then skip to question 17)

16. If you chose to prepare the meal at home, which of the following reasons affected your decision most? (skip after this to question 18)
1. I enjoy cooking.
2. It is cheaper to prepare meals at home.
3. My friends will appreciate more a meal I prepare myself.
4. It is more convenient for me to prepare it at home.
5. Other (please state)

17. If you chose to purchase the meal at a restaurant which of the following reasons affected your decision most? (choose only one answer)
1. I am not good at cooking.
2. I do not have the time to prepare the meal.
3. My friends and I prefer eating out.
4. It is more convenient for me to take someone out.
5. Other (please state)

18. How often do you take inventory of food items in your cupboards and storage places?
1. Before each shopping
2. About once every month or two
3. About once or twice a year
4. Never
5. Does not apply to me

19. How often do you or your household shop for food items?
1. Every day
2. Two or three times a week
3. Once a week
4. Once a month
5. Less than once a month

C. Questions 20-22: Below are some questions about social occasions at which food is usually served. Mark the number of times you take part in such activities and list the foods usually eaten.

20. Parties for friends at your home

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Foods usually eaten</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. About once or twice a year</td>
<td></td>
</tr>
<tr>
<td>2. About once or twice a month</td>
<td></td>
</tr>
<tr>
<td>3. About once a week</td>
<td></td>
</tr>
<tr>
<td>4. More than once a week</td>
<td></td>
</tr>
<tr>
<td>5. Never</td>
<td></td>
</tr>
</tbody>
</table>
21. Parties in the home of your friends
1. About once or twice a year
2. About once or twice a month
3. About once a week
4. More than once a week
5. Never

22. Getting together with friends at public eating places
1. About once or twice a year
2. About once or twice a month
3. About once a week
4. More than once a week
5. Never

23. Do you worry about eating too much?
24. Do you wish you could eat more?
25. Do you think the kind of food you eat has anything to do with your health?
26. Do you wish you could have more information about foods and nutrition?
27. How often do you plan at least a whole day’s menu in advance?

Section III: Individual Foods and Nutrition Practices

People adopt certain habits and practices about shopping, meal preparation and attitude toward foods. The following are some practices. Please rate them according to how important they are to you, using the following scale:

Very important; should be done always
Important; should be done often
Somewhat important; should be done sometimes
Not very important; should seldom be done
Not at all important; should never be done

28. Making a list of items needed at home before going to the store.
29. Considering other family members’ needs when planning food purchases.
30. Buying foods according to brand names.
31. Combining meat with cheaper meat substitutes in dishes.
32. Using TV commercials and other advertisements as a source of nutritional knowledge.
33. Making the supermarket manager aware that the food offered for sale is not satisfactory.
34. Selecting only undented cans when buying canned foods.
35. Using ingredient labels on foods as a guide to food selection.
36. Determining from food inventory, recipes and menus the foods which need to be purchased, before shopping.
37. Choosing a shop because it appears clean inside.  
38. Choosing a shop because it offers friendly service.  
39. Choosing a shop because it offers lower prices.  
40. Studying special ads, before shopping.  
41. Comparing prices of similar food items in the store before purchasing.  
42. Choosing food according to its' nutritional value.  
43. Considering a snack as a part of the total diet.  
44. Consuming milk or milk products every day.  
45. Keeping the family pet out of the kitchen.  
46. Considering individual needs when planning meals.  
47. Washing hands thoroughly after handling raw food before handling cooked food.  

Section IV: FOODS AND NUTRITION KNOWLEDGE

Please circle the one best response to each question.

48. The function that is best performed by foods in the fruits and vegetable group is:
   1. building the red blood cells
   2. building body tissues
   3. fighting infections
   4. supplying energy

49. Which of the following factors do you think will most influence the type of foods an individual selects?
   1. Attractive advertising in the media.
   2. Foods liked by the person's friends.
   3. Stories heard about the types of foods other people eat.
   4. The way in which new foods are offered to the person.

50. The primary aim of advertisements on food products is to
   1. help a person select more nutritious meals
   2. increase the sale of the products
   3. increase a person's nutritional knowledge
   4. help a person make bargain purchases

51. Wanda, who wants to lose an extra five pounds she gained during winter, adopted the following meal pattern:
   Breakfast: fruit juice
   Mid-morning snack: candy bar and plain coffee
   Lunch: one serving each of meat, vegetable, fruit and milk; plus two serving of a cereal product
   Late afternoon snack: 12 ounces vanilla milk shake
   Supper: no food
   Before bed snack: six cookies and 12 ounces of hot chocolate

Instead of losing weight, she is slowly but steadily gaining weight. What, most probably, is responsible for her weight gain?
   1. Too large a lunch
   2. Late afternoon snack
   3. Before bed snack
   4. Eating too frequently
52. Which is the most nutritious snack?
   1. doughnuts and coke
   2. candy bar and milk
   3. peanuts and orange juice
   4. popcorn and diet Pepsili

53. A good substitute for oranges if you need vitamin C is:
   1. apples
   2. apricots
   3. cherries
   4. strawberries

54. The most nutritious lunch is:
   1. roast beef sandwiches, milk and cookies
   2. cheeseburger, tomatoes and chocolate milk
   3. yogurt, fruit salad and skim milk
   4. hamburger, muffin and milk chocolate

55. Which of the following statements is a misconception?
   1. Alcohol gives more energy for the same weight than either protein or carbohydrate.
   2. For an adequate diet, every meal has to contain food from the meat group.
   4. For safety, home canned vegetables must be boiled for 10 to 20 minutes before eating.

56. Men and women between ages of 24 and 35 years who are of average height and weight need
   1. different nutrients in the same amounts.
   2. the same nutrients in different amounts.
   3. different nutrients in different amounts.
   4. the same nutrients in the same amounts.

57. Which of the lists contain examples from all four food groups?
   1. milk, bread, cheese, spinach
   2. grapes, macaroni, carrot, beef
   3. ice cream, muffins, lettuce, eggs
   4. milk, beans, bread, pork

58. Which of the following does the government not do in maintaining food safety for the consumer?
   1. determining pesticide residue levels in foods
   2. inspecting food processing plants
   3. stipulating levels of all food additives
   4. setting quality standards on certain foods

59. Frozen chicken or turkey can safely be kept in a deep freezer for
   1. not more than 2 months.
   2. between 2 and 6 months.
   3. between 6 and 9 months.
   4. up to 12 months.

60. The most important thing to do before starting to prepare any meal is to
   1. plan order of preparation.
   2. wash hands with water and soap.
   3. make sure the recipe is understood.
   4. assemble all necessary ingredients.

61. Cooked foods should not be allowed to sit on a counter or table for a long time because
   1. dirt in the air will settle on the food.
   2. bacteria rapidly grow in food at room temperature.
   3. it is a temptation for nibbling in-between meals.
   4. the house pet and/or roaches will get at the food.
62. Which of the following practices is least important in the kitchen?
1. Washing equipment as they are used
2. Keeping the pet out of the kitchen
3. Using separate towels for wiping hands and dishes
4. Cleaning the oven after each use

63. Bread will not become moldy as rapidly if placed in a refrigerator because
1. mold requires light for growth.
2. cooling prevents the bread from drying out rapidly.
3. cooling retards the growth of mold.
4. mold requires both heat and light for best growth.

64. Cleaning agents must be stored
1. anywhere except on stoves, if well stoppered.
2. at the bottom shelf, separate from food items.
3. at the top shelf, out of reach of children.
4. anywhere safe from contamination and children.

65. Bernice has a limited amount of money and is pregnant. Which of the following meat sources should she increase in her diet for maximum nutrition and minimum cost?
1. eggs
2. chicken
3. liver
4. hamburger

66. The food that should not be saved as left-over from a picnic would be
1. peanut butter and jelly sandwiches
2. baked custard
3. orange juice
4. baked beans

67. To get a similar supply of nutrients and appreciably reduce cost, meat can be combined in a dish with
1. eggs.
2. cheese.
3. beans.
4. mushrooms.

68. The open kettle method of food preservation should not be used for any food except
1. low acid foods.
2. jellies.
3. tomatoes.
4. soft fruits and vegetables.

69. Most traditional West African dishes have long cooking times. Which reason do you think best explains why this method of food preparation evolved?
1. With warm and humid climate, foods need to be cooked well to ensure safety.
2. Life is not as hectic there so people have more time for preparing food.
3. They do not have a variety of convenience foods as we do here.
4. The people have developed a taste for foods prepared that way.

70. If you are not satisfied with a purchased food item, the important thing to do is to
1. telephone the supermarket and complain about the product.
2. return it to the store manager immediately.
3. call the local F.D.A. office and lodge a complaint.
4. avoid shopping in that particular store and warn friends about shopping there.

71. Potatoes stored below 40°F (5°C) for a week or more will
1. become sweet.
2. turn green.
3. lose nutrients.
4. shrivel.
72. Which of the following foods may be considered spoiled?
   1. frozen milk
   2. yogurt with the liquid separated
   3. tomato paste in a bulging can
   4. molded cheese

73. The difference between "choice" and "good" meat of the same cut is that "choice"
   1. is more nutritious than "good".
   2. is less tender than "good".
   3. has less fat than "good".
   4. has more fat than "good".

74. A list of features which are likely to help you get the most for your money
    when shopping is:
   1. unit pricing; open dating, food labels; selective discount pricing.
   2. aisle indicators of items, advertising; shop assistance; brand names.
   3. advertising; clear shelf arrangement; convenient packaging.
   4. coupon system; large selection of package sizes; self-service.

75. Ingredients listed on a food product container reads: pasteurized cultured
    milk, apricots, sugar, corn sweetener, food starch, gelatin, natural flavors.
    How may this be interpreted?
   1. It means milk is one of the ingredients in greatest amount.
   2. There is no relationship between the order of items listed and their
      proportions in the product.
   3. It means there is more milk than any other ingredient in the product.
   4. The manufacturer wants to call attention to the presence of milk in the
      product.

Questions 76-80: Circle the number for the food in each pair that
has greater food value per dollar spent.

76. 1. powdered milk
   2. fresh whole milk

77. 1. round steak
   2. ground beef

78. 1. pork chops
   2. chicken thighs

79. 1. cauliflower
   2. cabbage

80. 1. potatoes
   2. macaroni
APPENDIX H: HOME ECONOMICS TEACHERS IN IOWA

CONTACTED TO SUPPLY NAMES FOR THE N.A.C. GROUP
Home Economics Teachers in Iowa Contacted to Supply Names for the N.A.C. Group

Miss Ruth Baumgartner  
Roosevelt Senior High  
Des Moines, Iowa 50213

Mrs. Freda Bumgarner  
Harmony (Farmington) Senior High  
Farmington, Iowa 52626

Mrs. Ruth Buck  
Newton Senior High  
Newton, Iowa 50208

Mrs. Effie Crawford  
Clarke (Osceola) Senior High  
Osceola, Iowa 50213

Mrs. Phyllis Garnant  
Lincoln Senior High  
Des Moines, Iowa 50315

Mrs. Jean Hassebrock  
Ames Senior High  
Ames, Iowa 50010

Mrs. Dorothy Kruse  
Eastern Allamakee (Lansing) Senior High  
Lansing, Iowa 52151

Mrs. Sally Manatt  
Nevada Senior High  
Nevada, Iowa 50201

Mrs. Betty Symons  
Roland-Story Senior High  
Story City, Iowa 50248

Miss Patricia Titus  
North Senior High  
Sioux City, Iowa 51109

Mrs. Dee Warden  
Lake Mills Senior High  
Lake Mills, Iowa 50450
Mrs. Emily Wycoff
Chariton Senior High
Chariton, Iowa  50049

Mrs. Betty Yungschlager
Griswold Senior High
Griswold, Iowa  51535
APPENDIX I: COMPETENCY STATEMENTS EVALUATED IN THE KNOWLEDGE TEST
Competency Statements Evaluated in the Knowledge Test

1. Significance of food

The learner comprehends the interrelationship between food and good health, growth and development (48).¹

2. Food habits.

The learner:

- identifies factors that affect the food patterns of individuals (49).
- analyzes personal food habits (51).
- selects nutritious snacks (52).
- understands that a people's foodways are intricately connected with their cultural and climatic conditions (69).

3. Food selection

The learner:

- identifies the role of advertising in food selection (50).
- applies the U.S.D.A. grading system of food types in food selection and purchasing (73).
- interprets grocery store information on unit pricing to select the best food buys (74).
- reads food labels carefully and correctly (75).

4. Nutrient sources

The learner:

- recognizes food sources of particular nutrients (53).
- selects foods according to their nutrient content (54).
- distinguishes between food fact and fad (55).

5. Nutrient requirements

The learner:

¹Item number which represents the competency.
recognizes that everyone needs the same basic nutrients but in varying amounts (56).

uses the basic four (57).

6. Food safety

The learner:

is aware of government's role in maintaining food safety (58).

uses stored foods within suggested safe storage time limits (59).

practices personal cleanliness when handling and storing food products (60).

identifies factors that affect food safety (63).

distinguishes between wholesome and spoiled foods (72).

7. Sanitation and safety in the kitchen

The learner:

applies safety precautions in food handling (61).

maintains a clean environment in the kitchen (62).

stores cleaning agents closed tightly apart from food products, and beyond the reach of children (64).

8. Meal planning

The learner:

uses the knowledge of nutrient needs and food availability and cost in meal planning (65).

recognizes leftover foods which do not store satisfactorily for future use (66).

applies knowledge of food costs to planning meals within the economic level of the family (67).

9. Home food preservation

The learner identifies various methods to preserve food (68).
10. Food storage

The learner realizes that proper storage conserves nutrient values, maintains acceptable flavors, color and texture (71).

11. Marketing

The learner:

accepts the responsibility of a consumer in the marketplace (70).

substitutes a food item of similar value to one sought (76-80).
APPENDIX J: TABLES
Table 28. Other favorite snacks of older adolescents

<table>
<thead>
<tr>
<th>Food item</th>
<th>I.S.U. (N = 92)</th>
<th>A.C.C. (N = 81)</th>
<th>N.A.C. (N = 44)</th>
<th>Total (N = 217)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcoholics drinks (^a)</td>
<td>5</td>
<td>14</td>
<td>7</td>
<td>9</td>
</tr>
<tr>
<td>Juice (^b)</td>
<td>7</td>
<td>7</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>Vegetables</td>
<td>10</td>
<td>7</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>Pizza</td>
<td>8</td>
<td>6</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Desserts (^c)</td>
<td>7</td>
<td>6</td>
<td>9</td>
<td>7</td>
</tr>
<tr>
<td>Nuts and seeds</td>
<td>5</td>
<td>5</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Meat (^d)</td>
<td>4</td>
<td>6</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>Hamburgers (^e)</td>
<td>1</td>
<td>12</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>Sandwiches</td>
<td>2</td>
<td>5</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Potatoes and fries</td>
<td>-</td>
<td>7</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Salads</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Spaghetti</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Hot dogs</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>0</td>
</tr>
<tr>
<td>Soups</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>0</td>
</tr>
</tbody>
</table>

\(^a\)Mainly beer.

\(^b\)Fruit juice and juice drinks.

\(^c\)All items judged as dessert.

\(^d\)All meat items including eggs but excluding those listed separately.

\(^e\)Including cheesburgers.
Table 29. Other sources considered most reliable for food and nutrition information

<table>
<thead>
<tr>
<th>Source</th>
<th>I.S.U. (N = 88)</th>
<th>A.C.C. (N = 78)</th>
<th>N.A.C. (N = 40)</th>
<th>Total (N = 206)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government source(^a)</td>
<td>7</td>
<td>13</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td>Friends</td>
<td>7</td>
<td>9</td>
<td>3</td>
<td>7</td>
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<tr>
<td>Extension service</td>
<td>11</td>
<td>3</td>
<td>3</td>
<td>6</td>
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<tr>
<td>Food service</td>
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<td>5</td>
<td>4</td>
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<tr>
<td>4-H</td>
<td>5</td>
<td>1</td>
<td>5</td>
<td>3</td>
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<tr>
<td>Health food store</td>
<td>-</td>
<td>8</td>
<td>-</td>
<td>3</td>
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<tr>
<td>Personal experience</td>
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<td>Radio</td>
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<td>-</td>
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<tr>
<td>Sibling</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Social service</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>0</td>
</tr>
</tbody>
</table>

\(^a\)Includes "FDA"; "USDA" and, "State Reports".