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Factors related to the eating behavior and dietary adequacy of girls 12 to 14 years of age

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FACTORS RELATED TO THE EATING BEHAVIOR AND DIETARY ADEQUACY OF GIRLS 12 TO 14 YEARS OF AGE

by

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INTRODUCTION

Reasons for Study

Adolescence is a period of accelerated growth and development. At this period the individual is advancing from childhood to adulthood and is attempting to assert himself as a maturing individual. Early adolescence is marked by rapid physical growth of skeletal and soft tissues; sexual maturation; and changes in interests, attitudes and emotional responses. As a result this is a period of stress in all aspects of development: physiological, psychological, emotional and social. To the nutritionist these changes mean increased needs for energy and essential nutrients to meet the demands of chemical growth. They mean differentiation in the nutritional needs of boys and girls and changes in the attitudes of adolescents toward food.

The food practices of adolescents and young adults have been of concern to many research workers in many universities and colleges and to personnel in health agencies as well as to parents, teachers, dietitians and physicians. Surveys of large numbers of children have been undertaken to obtain information on food intake and nutritional status. Some of these have included biochemical tests to determine the concentration of nutrients in blood and excreta. The dietary habits of many adolescents, particularly girls, are not good

according to current standards. Between-meal snacks often provide mainly food energy. Frequently breakfasts are omitted and the nutrients missed are seldom replaced by the foods eaten at other times.

Some inadequacies often found in the diets of adolescent girls are calcium, due to a low consumption of milk, vitamin A and ascorbic acid, due to insufficient intakes of carotene-rich and ascorbic acid-rich vegetables and fruits. In some studies the B-complex vitamins and iron intakes are low, an observation that indicates a need for increasing the intake of meat and/or whole grain and enriched cereal products (40). A study of the nutrient intakes of Iowa children (17) also focuses attention on adolescent girls as a group whose nutrition needs special attention. Poor diets for this group are particularly serious since girls at this age are approaching the child bearing years and their nutritional state can affect the health of the future generation. Stearns (50) points out that among teen-age mothers there is a high incidence of complications during pregnancy and of defective infants. She states:

> The girl who marries during her mid-teens is apt to be a girl poorly nourished through most of her lifetime and to be equally ill-equipped to meet the many psychological problems inherent in establishing a successful marriage and the new family. It is not surprising, therefore, that she is the least successful mother in producing a healthy full-term infant. These young adolescent girls greatly need counseling in nutrition and in the whole area of preparation for successful family life. (50, p. 1668)

Present programs of nutrition education for the adolescent girl apparently are not so effective as they should be in helping her to establish good food practices. Food preferences and the selection of food are determined by a number of factors (45, 51). Stiebeling and Dreis (51) point out a number of persons believed to be responsible for food choices. They state that customs, attitudes and eating habits not only grow out of cultural, social and economic backgrounds but also out of personal experiences with food. Further knowledge of these factors and how they affect eating behavior particularly of girls would be helpful in planning for nutrition education, and nutrition teaching would be effective if they were taken into account. To date, however, little is known about these factors and their interrelationships.

The objective of the present study was to investigate the relationship of a number of factors to eating behavior and the selection of an adequate diet. Eating behavior indices for this investigation were:

percentage of meals missed

mean number of snacks per day

mean number of different items of food consumed per day

mean number of servings of food per day

mean number of repeated meals per day

mean number of servings of milk and equivalents per day

mean number of servings of vitamin C-rich food per day

mean number of carotene-rich foods per day

mean caloric value from intake of foods low in nutrients.

Dietary adequacy is represented by a score that was determined from the percentages of the recommended number of servings of the foods in the food group plan (56) which were eaten each day. If the recommended number of servings from these basic groups were taken each day, the nutrients supplied may be expected to meet the Recommended Dietary Allowances of the National Research Council.

Selection of Factors

Independent variables

Studies of Iowa children (17) revealed that there was a greater trend toward poor nutrition in girls after 12 years of age than in those under 12. The question has arisen as to the cause of this change in food practices. Was this phenomenon related primarily to the fact the girls were growing older, to the onset of menses or to an interaction between the two? The relationship of social status has also been suggested as a limiting factor for the adequacy of diets of adolescents. The present study was so designed that these factors and their interrelationships could be investigated not only in relation to eating behavior but also to all of the factors studied as dependent variables.

Dependent variables

Since previous studies showed Iowa girls to have a tendency toward poor nutrition particularly at the beginning of adolescence, a question was raised concerning the relationship of physical development and maturation to dietary practices. Physiological development, therefore, was selected as a factor to be investigated in this study.

Overweight has been observed to be a problem among adolescent girls by many investigators including the Iowa group. The picture is complicated by the findings that body size of adolescent girls was apparently unrelated to their intake of energy and most nutrients. Since the relationship of energy expenditure and energy intake to body size has been well established over the years, explanations for this apparent discrepancy have been sought. Level of activity of the girls was investigated in the present study.

It is known that taste buds atrophy and disappear with age and there is some indication, at least for older aged adults, that food preferences change with a decrease in taste sensitivity (55). The possibility that sensitivity to the four basic tastes is a factor in food choices and eating behavior was investigated in the present study.

Emotional stress connected with the attempt of the girl to identify herself with her role as a woman might be expected to affect her behavior, including eating behavior. Therefore,

this point was investigated in this study.

Since personal values provide a basis for making choices, they must be considered among factors influencing eating behavior and the selection of food. Because childhood and adolescence are periods of value formation, it is important that educational programs should be concerned with the values involved in food selection. To plan effectively for nutrition education, knowledge is needed concerning values which most closely relate to good food practices. An attempt was made to assess the relationship of the values of health, status, sociability, independence and enjoyment of food to eating behavior and dietary adequacy.

It has long been the contention of nutritionists that enjoyment of a wide variety of foods is closely associated with good food habits. In the present study an attempt was made to evaluate the relationships among food enjoyment, food experience and the selection of an adequate diet.

Basic to planning an educational program in nutrition is the need to know whether knowledge of nutrition is a factor related to quality of diet. An attempt was made to determine the relationship between nutrition knowledge and the selection of an adequate diet.

Because intelligence is closely related to ability to make rational choices in life this was a factor investigated in the present study in relation both to food practices and

performance on the nutrition knowledge test.

A number of investigations (28, 38, 48, 49, 58, 59) have shown that food acceptance is related to psychological adjustment although no studies in the literature have reported findings for young adolescents. For this reason an attempt was made in this study to assess overall psychological adjustment.

Conditions within the home conceivably may affect the attitude of children toward food. Some of these factors which were believed to be pertinent to the present investigation were the employment of mothers outside the home, participation of mothers in various kinds of organizations, family criticism of food practices and the responsibility of the girls for family meals.

REVIEW OF LITERATURE

Many different approaches by workers in numerous disciplines have been used in the study of eating behavior. A large number of investigations were concerned with food habits. Of these, many have used laboratory animals. In this review, only studies pertinent to the present investigation of factors related for the most part to the eating behavior of children and adolescents will be included. Those selected for presentation are representative of work published during the last 30 years. Investigations using laboratory animals and descriptive studies of food intakes and food preferences in which no attempt was made to relate intake to factors will be excluded.

The review is divided into 12 sections organized according to the factors currently investigated in relation to eating behavior. These factors are: physiological maturation, overweight, activity, socio-economic status, education of mother, employment of mother, psychological adjustment, family relationships, knowledge of nutrition, taste sensitivity, food preferences and monotony of the diet.

Physiological Maturation

The age of menarche varies over a wide range of years. Factors influencing the onset of the menses are in part genetic and in part environmental. The influence of diet

on the age at menarche was investigated by Kralj-Cercek (32). Information regarding the exact dates of menarche and food intake was obtained by questionnaire from 223 girls in two secondary schools in Slovenia (Yugoslavia) and 82 girls from the island of Susak. Diets were classified in the author's terms as proteinous, mixed and carbohydratic according to the way the girls responded to the questionnaire and according to the girls' own classifications of their diets. The method used for classification was not given.

Significant differences as determined by "t" scores were obtained. For girls who ate predominantly proteinous food menarche occurred at an earlier age than for girls who ate a mixed diet; those who ate predominantly carbohydratic food menstruated last. For the Slovenian girls the mean age in years at menarche was as follows:

Diet	Number	Mean age at menarche
Proteinous	46	13.65 ± 0.153*
Mixed	75	13.42 ± 0.145*
Carbohydrate	103	14.10 ± 0.111*

Similar results were obtained for the 82 girls of the island of Susak.

Social "origin" based on parent's vocation in relationship to age at menarche was also investigated. The girls were

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*Standard error of the mean.

classified into three groups but the exact method of classifying the vocations was not given. The girls of highest social origin had menarche first, then the intermediate and the lowest group last. The "t" scores for the differences between the three groups were significant. The age in years at menarche in relation to social-status classification of the 223 girls was:

Social origin	Number	Mean age at menarche
High	80	13.22 ± 0.134*
Medium	123	13.71 ± 0.104*
Low	20	14.20 ± 0.282*

Dietary classifications, however, did not follow the order of the social-status classifications. The three types of diets were quite uniformly distributed among the three social-status groups as follows:

Social status	Type of diets		
	Proteinous %	Mixed %	Carbohydrates %
High	25.0	32.5	42.5
Medium	32.4	27.8	49.8
Low	25.0	35.0	50.0

The author concluded, therefore, that the earlier menarche observed in the girls belonging to the higher social-status classification was due to some factor other than diet.

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*Standard error of the mean.

Overweight

A number of investigations have been made of the relationship of overweight in adolescents to their dietary practices. Several workers have shown that overweight children and adolescents have poor diets and once they become overweight they do not tend to have as high an intake of food energy as their leaner age-mates. Only a sampling of such studies will be reviewed here.

A pilot study was conducted by Hampton et al. (27) in Berkeley, California, to gather data about family eating practices and dietary intakes of 28 girls 15-18 years of age. Information was collected by means of a questionnaire concerning eating practices and knowledge of nutrition, height and weight records and a three-day diet record.

The height-weight data were evaluated by plotting on a Metzel Grid and the dietary records were analyzed by the method of Leichsenring and Wilson. Six girls were classified as obese although their average daily intake of food energy was less than that of girls in the other channels of the Metzel Grid. As compared with the 19 girls the obese girls also had diets poorer in protein, iron and ascorbic acid. The girls in the obese group indicated an awareness of their obesity and expressed a desire to correct it.

Eating practices of obese high school girls were investigated by Johnson et al. (30). Two matched groups of 28 obese

girls and 28 non-obese girls were selected from three upper grades of a high school in one of the suburbs of Boston. The former were selected on the basis of maintaining for one year the physique status of A_4 or heavier according to a modified Wetzel Grid which had additional extreme channels. For each obese girl a non-obese control was selected on the basis of similarity of chronological age, height and school grade. The control girls were in Wetzel Grid channels A_1, A_2 or B_1, at the time of their most recent physical examination.

A diet history was used for collecting dietary information and the caloric and protein content of the diets were calculated. It was noted that only seven obese girls had grown as much as one-half inch in the preceding 12 months while, by contrast, the control girls were still growing. As judged by menarcheal age the obese girls showed a tendency to earlier maturation than the control girls.

The food energy value of the diets of the obese girls was significantly lower and a lower mean protein intake accompanied the lower food energy intake of the obese group as compared with that of the control group. There was no significant difference between the obese and control groups in percentage of total calories derived from protein. The groups had snacks in the afternoon and at bedtime. More of the control girls had snacks in the afternoon but the difference was not significant. An almost equal number in each

group had bedtime snacks. The number of girls who skipped breakfast was higher for the obese than non-obese group but not significantly so.

Food intake and body size of Iowa children were studied by Eppright et al. (18). A sample of 61 schools was drawn and within the schools random samples of children of all ages, totaling approximately 1200, were chosen. Seven-day dietary records were kept by the children or their mothers. The collection periods were distributed throughout the school year. After height and weight records were taken and data were plotted on the Wetzel Grid, a measure of body size, called the developmental level, was obtained. To study the relationship of nutrient intake to body size, the mean developmental levels with standard deviations were computed for the children at successive years. The subjects were subdivided into three groups: those whose developmental levels were within plus or minus one standard deviation from the Iowa mean for their age group; those whose developmental levels were more than one standard deviation below the mean; and those whose developmental levels were more than one standard deviation above the mean.

The mean daily nutrient consumption of the children of the three groups was computed at successive years. From 6 through 11 years the oversize girls in the various age groups usually had the largest mean intakes of food energy, protein,

calcium and ascorbic acid, but after age 12 for most ages, by successive years, the diets of the oversized girls contained less protein, less calcium and a lower energy value than the diets of the undersized girls.

Pickenpaugh (44) studied nutritional and physical characteristics of 27 Iowa girls of medium physique (channels A_2, A_1, A or B_1 on the Wetzel Grid) matched by height and age with 27 very heavy and obese girls. The girls were 7 to 13 years of age at the beginning of the study. Dietary data were obtained from food consumption records for 15 separate two-day periods during the space of a year and a nutrition history taken during the summer and fall 1956. Some related information was obtained from the mothers. Mean daily caloric values of the intakes were calculated for three periods of time, the spring of 1954, the 1954-1955 school year and the 1955-1956 school year. Differences in energy value of the food intakes between the two groups of girls were not significant, although the tendency was toward the greater intakes for girls of medium build. When individual cases were studied, two of the three who moved from the heavy to the medium group decreased their food energy intake during the time that the physique change was taking place. When two of the three girls changed from the medium group to the very heavy and obese group, their food energy intakes were increased during the period prior to the change in physiques.

The heavy and obese girls were more mature physiologically than their age-mates of medium physique.

Activity

Since it appears that the intake of energy from food is less for obese than non-obese girls several investigators have studied activity in relation to food intake and body size. Hampton et al. (27) questioned the 25 teen-age girls in their study regarding preference for types of leisure activities and classified the answers as active or inactive in nature. A score was given indicating the amount of energy spent in the activity. The possible scores ranged from zero for a subject with very sedentary preferences to 8 for one with very active preferences in leisure activities. The mean for each group in the Wetzel Grid channels were as follows: obese, 2.7; stocky, 3.0; normal, 3.9; and lean, 4.0. While the sample was small and the technique described by the investigators as crude, they believed that the trend was in the expected direction.

Johnson et al. (30) obtained information by interview on physical activity of the 29 obese girls and their non-obese controls. A list of usual activities was established and the subjects were asked how much time they devoted to each, daily or weekly. An effort was made to cover the entire school year, making proper allowances for seasonal differ-

ences. The total number of hours was then summed and averaged on a weekly basis and compared with the actual number of hours in a week. Activities were classified into groups according to ratings of energy expenditures based on estimation of energy expenditure above basal requirements. The number of hours spent in the various kinds of activities was multiplied by a factor based on the mean energy expenditure for the group to obtain activity indices.

Both the obese girls and their controls were considered sedentary since 80 per cent and 85 per cent of their time, respectively, had spent in a combination of sleeping, lying still, or sitting. Active sports and other strenuous activities accounted for the greatest difference in level of activity and was significantly less for the obese than for the control group. The former had significantly lower activity indices than the control group. In only six cases were the activity indices of the obese girls equal to, or greater than, that of their controls.

Pickenpaugh (44) studied physical activity of the 27 pairs of obese and non-obese girls 7-15 years of age matched on the basis of height and chronological age. A record of activities was kept by each girl for a 24 hour period four different times during a year. On the basis of reports of energy expended for various activities, the activities recorded by the girls were classified into four categories:

sleep, mild activity, moderate activity and vigorous activity. The activity records were evaluated for the mean amount of time spent in each of these categories. No significant differences in physical activity were found for the two groups.

Socio-economic Status

Socio-economic status has often been suggested as a limiting factor for the quality of the diet. The relationship of income to foods consumed has been studied by many investigators over the years. Since only studies made during a period of comparative prosperity would be applicable to the investigation, none of those done during the depression years has been included in this presentation. Three recent studies which are representative of current work will be reviewed.

Covan et al. (14) investigated socio-economic status based on the occupation of the father in relation to food habits of the adolescent. Information pertaining to personal history and family background was obtained by questionnaire from 126 adolescents in three different areas of the midwest. In order to evaluate their dietary habits students were asked to list all foods they had eaten the previous day and to indicate the frequency with which these types of meals were eaten.

It appeared that the occupation of the father had a decided relationship to the nutritional adequacy of the diet.

Students whose fathers were engaged in farming apparently received the best diets. Professional families ranked next to farmers, clerical and managerial were next, followed by the laboring group. The rank of each occupational category was uniform in all three areas.

Lollis (37), on the other hand, found no relationship between income which was highly correlated with the occupation of the father and the dietary adequacy of 340 high school girls in Oklahoma. The diet was sampled by a 24-hour-recall of foods eaten at four different times of the year.

Lack of relationship between the quality of the diet and income was also observed by Wilhelmy et al. (61) in a nutritional status survey in Groton Township, New York. These authors suggested that family incomes today are generally at a sufficiently high level so that income is not at present a significantly limiting factor in family food habits.

Education of the Mother

Another factor often suggested as being related to family food practices is the educational level of the mother. Lollis (37) investigated the educational levels of the mothers in relation to the food preferences and dietary adequacy of 340 high school girls. Information was obtained by questionnaire administered both to the girls and their mothers. Results indicated that the mothers and daughters had very similar

likes and dislikes in food. The educational level of the mothers appeared to be an important factor in the quality of the family diet; the better educated the mother, the better the family diet.

In a study conducted by Young et al. (62) in two cities in New York, Rochester and Syracuse, data concerning the level of nutritional knowledge of a representative cross-section sample of homemakers and their practices in feeding their families were obtained by personal interview. Information was acquired from 531 Rochester and 515 Syracuse homemakers concerning the quantities of certain key foods used during the previous week. The foods included milk, eggs, meat, fish and poultry; citrus fruits, tomatoes and their juices; vegetables and breadstuffs. These quantities were compared with the needs of the members of the household. Foods indicated as having been served in the previous 24 hours were analyzed for adequacy according to the basic food group plan. Both qualitatively and quantitatively those homemakers who reported having studied "about what to eat" fed their families better than those who had not had this information.

Contrary to these findings Helhelmy et al. (61) in Groton Township, New York, found no apparent relationship between availability of nutrients in the family diet and the formal education of either the husband or wife or to the amount of nutrition education of the wife.

Psychological Adjustment

The relationship between food aversions and psychological adjustment has been investigated by a number of workers. Smith et al. (49), using as their subjects 318 college students and 107 high school pupils, tested the hypothesis that a high frequency of food aversions is related to a high level of anxiety. Data were collected by means of a check list of 29 foods on which the subjects indicated those foods they disliked so much they refused to eat them. Taylor's Manifest Anxiety Scale consisting of 49 items was also administered.

The mean number of food aversions was 3.41 for the college and 3.94 for the high school group. Mean anxiety scores were 14.99 and 17.97, respectively, for the two groups. When the groups with high- and low-anxiety scores were compared with respect to number of food aversions by means of the chi-square test, the results supported the hypothesis that high anxiety scores tend to be accompanied by high frequency of food aversions.

McCarthy (38) studied the difference in the number of food aversions of 48 children between the ages of two years and seven years six months, 14 of whom were classified as feeding problems. Data were obtained by interviewing the mothers to ascertain attitudes of children toward 72 foods according to the following categories: like, indifferent, dislike but eat, refuse, or not offered. In the feeding-

problem group as compared with the non-problem group there was a much lower percentage of liked foods and a much higher percentage of foods to which the children were indifferent or which they disliked or refused.

Hallersberg (26) studied the food patterns of adolescents in relation to stage of adjustment. Data used to determine food patterns were obtained from a questionnaire given to two groups of college students and their mothers. The number in the sample was not reported. The students were asked to indicate their preference for 100 foods or cooked dishes by stating whether they would like to have the food served often, occasionally, seldom or never. This list, according to the author, was designed to focus attention on likes and dislikes rather than on the reasons for preferences. By some method not described food patterns were determined from responses to questions concerning the reasons for extreme food likes and dislikes, and concerning beliefs about the effect not eating the disliked foods and from the results from the check list.

In evaluating the food patterns, Hallersberg used the liking of 75 per cent of all dishes as an indication of a "positive pattern". A higher percentage of likes was considered as indicative of an undiscerning attitude for all available food which the author believed would be a sign of immaturity. A few "nevers", the author stated, indicated a moderate degree of emotional sensitivity toward food which

was thought to be essential for enjoyment. Consequently 5-10 per cent "nevers" were considered to be consistent with "good food habits" and included as part of the criteria for a "positive food pattern". The pattern was considered to be negative when there were less than 5 per cent or more than 20 per cent of "nevers". The classification used for food patterns was as follows:

positive - likes approximately 75% of foods; dislikes 5-10%

medium - likes 50-75% of foods; dislikes 10-20%

negative - likes more than 85% or less than 50% of the foods; dislikes more than 20% or less than 5%

The "level of maturity" or "stage of adjustment" was based on an analysis of answers to certain questions from which a maturity profile was determined. Classification of students ranged from one to six types on a scale from unadjusted and immature to well adjusted and mature.

Upon comparing the stage of maturity and the food pattern, it was found that of the 16 students with positive food patterns, 10 were classified as well adjusted while six were definitely immature. Of the 15 cases rated as having a high degree of immaturity, none had positive food patterns, five had medium and one had a negative food pattern. The author interpreted these data to indicate that while relatively mature people may have good food patterns, really mature individuals probably always have good food habits. In the

summary the statement was made that "good food habits are definitely related to the adolescents' general adjustment".

Family Relationships

It has been theorized that food practices of adolescents reflect their rearing. Hallersberg (28) in addition to studying the relationship of psychological adjustment to food practices was interested in describing the type of family attitude which consistently leads to adjusted children with good food habits.

Questionnaires designed to ascertain family training in food habits were given to the mothers. A different set of questions planned to determine the attitudes of the adolescents toward this training was administered to them. The families were classified into three groups, strict, intermediary and lenient, on the basis of the family training in food habits. By comparing stage of adjustment for each adolescent with the classification of his family pattern an attempt was made to discover whether any of the three types of family patterns was most often associated with good adjustment in adolescents. The findings, however, did not indicate any single type of family pattern which appeared to produce mature adjustment. The author concluded that:

> Maturity depends upon the parents' adaptability to the needs of a changing younger generation and to a cultural pattern which has no code as yet, but is itself in transition. (26, p. 51)

The relationship of eating habits of a child to his home background and his social adjustment was studied by Baldwin (3, 4). A group of 76 mothers was interviewed about the eating habits of their nursery school children. The appetite, "finicalness" and table behavior of each subject were investigated. The appetite rating was determined from the amount of food eaten, the consistency of the appetite, speed of eating and frequency of food eaten between meals. "Finicalness" was rated in terms of the child's likes and dislikes of specific foods and his resistance to new foods or to new methods of preparation. The author stated that "finicalness" was primarily a measure of emotional attitudes toward certain types of food rather than a measure of the amount eaten. Table behavior included manners, distractability, conversation, dawdling, spilling and cheek packing. Findings were as follows:

	Appetite		Table manners	
	Good N	Poor N	Good N	Poor N
Finical	10	23	6	27
Not finical	23	17	23	22

Home visits were made to each home twice during the year to observe the child and appraise the home environment. The homes of children with good appetites were characterized by strict discipline but the children seemed to be accepted and assured that they were loved and accepted even though punished.

These children appeared to be well adjusted.

Coerciveness and restriction even if only moderately severe but wisely administered did not appear to be effective in making the children non-finical. Coercion tended to reinforce dislike rather than overcome it. A wide acceptance of foods and lack of "finicalness" were generally found among children from homes where there was an abundance of affection and attention.

Employment of Mother

It has been suggested that employment of mothers outside the home may be an influencing factor on food practices of a child. Two investigations of the relationship of employment of mothers to the eating behavior of adolescents will be reviewed here.

Among other factors, Coven et al. (14) studied the relation of employment of mothers to the food habits of 126 adolescents in three high schools in different areas of the country. Information relating to family background including employment of mothers was obtained by questionnaire. Dietary adequacy was evaluated for each pupil from a list of all foods reported as eaten the previous day and the frequency with which these types of foods were eaten. No significant dietary differences were found between the dietary adequacy of children of working and non-working mothers.

In her investigation of some factors influencing dietary habits of 340 adolescent girls Lollis (37) obtained information by questionnaire regarding employment of the mothers as well as other home conditions. Four 24-hour recall records of food intakes were obtained from the girls in each of the four seasons of the year and used to evaluate the adequacy of their diets. The daughters of working mothers indicated more independence, liked a greater variety of foods, had much more responsibility for preparation of meals and care of the home than daughters of non-working mothers. They also showed more interest in food preparation in home economics classes in high school than did the daughters of non-working mothers. No relationship between employment of mother and quality of the subject's diet was found, however.

Knowledge of Nutrition

The question is often asked whether or not food practices are influenced by knowledge of how to select an adequate diet. A large number of investigations have been made of the relationship of knowledge of nutrition to food habits. In their study of diets of 25 adolescent girls Hampton et al. (27) obtained from the girls evaluations of their own diets as well as answers to questions indicating nutritional knowledge about some concepts that might motivate improvement of eating habits. Most of the girls rated their own diets as fair or

good. This rating agreed with the interpretation of the authors. The majority of the subjects, however, agreed that "teen-agers" today do not have good food habits. The girls were equally divided as to whether food eaten by high school students would affect the health of their children. The majority believed that obesity was caused by eating too much, and more than half coupled this with insufficient exercise as a cause of obesity. Three of the obese girls stated that they had been on "fad" or "crash" diets. A large number stated that lack of time prevented adolescents from having an adequate diet. The authors concluded that the answers to the questionnaire indicate that the girls themselves need further information in the selection of a nutritionally adequate diet and that some way should be devised to persuade parents of these girls to provide a cheerful, relaxed atmosphere for meal-time activity in the home. Merely teaching the girls the basis of a good diet, they concluded, would not change the situation.

Covan et al. (14) gave a short objective test to 142 high school pupils in three communities to determine their knowledge of nutritional needs in relation to the adequacy of their diet. The nutrition test included a list of 42 foods of which three were included as "trick" items and the pupils were asked to state the approximate amount of each substance in their diets. The tests were scored as "excel-

lent", "average" or "poor". Information about their dietary habits was obtained from the foods the pupils listed as having consumed the previous day and the frequency with which these types of foods were consumed. Diets were scored according to the percentage of adequacy as compared to the standard food group plan for the school scent. The results of the tests indicated that those who were well informed about nutrition had the most adequate diets.

Whitehead (30) studied the effect of nutrition education on the food choices of adolescents. The investigation was divided into two parts: the effects after one year and after two years of nutrition education. There were 274 boys and girls 11 to 14 years of age, divided between the control and research classes. The two groups were as carefully matched as possible on the basis of their home ownership, occupations of the head of the household and income.

Dietary surveys were made to determine nutrition problems or educational needs. Seven-day food intake records were included and these records were evaluated qualitatively in terms of 10 food groups so that if the recommended number of servings of the food groups were included each day, the nutrients supplied would meet the Recommended Dietary Allowances of the National Research Council. The results of the initial survey indicated that there was no significant difference between the research and control groups with respect

to their nutrient intakes.

For the one-year group, dietary surveys were made on three occasions: before the program of nutrition education began, immediately following one year of nutritional instruction, and at the close of the second year during which no instruction was offered. Following one year of nutrition education there were marked differences between intakes of all food groups by the research and control pupils. The greatest differences in food consumption were in butter or margarine, whole grain cereals, other vegetables and citrus fruit. In all cases the research class had the greater intakes. One year after the nutrition instruction program had ceased the intakes of the research class were considerably greater than those of the control in all but three food groups. The intakes of these three were comparable: non-citrus fruit, citrus fruit, and green leafy vegetables. The intake of both groups, however, was not so high one year after the nutrition education program as immediately after the year of nutrition education but the intake of the subjects of the research group did not decrease as much as the controls.

In the nutrition education program carried on for two consecutive years surveys of food intake were made at four different times: before the program began, at the end of one year of nutritional instruction, after a second year of instruction and at the close of a third year during which no

nutrition instruction was given. The intakes of all food groups except non-citrus fruits of the research class showed an over-all increase after one year of nutrition education. After two years of nutrition education, the research class reported considerably higher intakes than the control class for all 10 food groups and intakes above the recommendations for all food groups except non-citrus fruit and potatoes. A year after the nutrition instruction ended, the research class had intakes higher than those of the control class for all food groups except non-citrus fruit. The subjects in the research group ate more meat, cereals, butter or margarine and other vegetables than recommended amounts; citrus fruit consumption was 82 per cent of the recommendation. The control subjects reported an intake of only one food group, namely, meat, greater than 100 per cent of the recommendation, with intakes of the other nine groups below 80 per cent of the standard.

The author concluded that programs of nutrition education caused the increases in the dietary scores of the research classes. These increases in intakes of food were considered as improvements in nutrition. Two years of nutrition education were more effective than one year in producing increased intakes.

The use of increased intake of foods as an indication of improved nutrition, however, has been questioned by

Goodhart (24). He believes that educational programs designed to increase the consumption of particular foodstuffs are not the answer to improving the quality of the diet. Any addition of foods must be accompanied by the subtraction of an equivalent number of calories in the form of other foods. He states that:

> Dietary inadequacies do exist and are common in the United States where there is a plethora of food and where obesity is considered to be a public health problem of the first order. They are particularly prevalent and serious among adolescent girls and young women. This problem cannot be solved simply by encouraging an increased consumption of food. (24, p. 612)

Studying the problem from a different standpoint, Anderson (2) investigated the influence of previous nutrition teaching on the dietary practices of 161 college students enrolled in freshman food and nutrition courses. The students included 121 women and 40 men between the ages of 17 and 49 years. By questionnaire data were obtained concerning the number of years of homemaking students had taken in high school and their attitudes toward the nutrition education they had received. For each student adequacy of nutrient intake was estimated from three-day dietary intake records that were evaluated according to the basic food group plan. A score for each student was derived from the teacher's evaluation of the dietary. The mean score for men was 81.6 and for women, 78.4. In relation to previous homemaking courses mean scores were as follows:

One year	78.5
Two years	73.7
Three years	75.2
Four years	77.3

Almost two-thirds of the total number of students believed that they had been motivated to improve their food habits through the homemaking courses; however, approximately one-fifth reported that they did not now have good food habits. Except for the students with one year of homemaking, the percentage of students responding that they had been motivated to improve their food habits by their homemaking increased with each year of homemaking studied. Part of the reason for the higher scores for the group with one year of homemaking was that it included men who had taken a year of home economics before they came to college. Of the students reporting that they had not been motivated to observe good food habits before coming to college, two-thirds believed that they did not now have good food habits although they had not yet received instruction in nutrition.

Eight per cent of the students from all groups who had taken homemaking courses reported that they had received no nutrition education. Four women reported that the quality of nutrition education they had received was poor.

Correlation between homemaking in secondary school and dietary quality was greatest for those students who had had four years of homemaking, $r = 0.42$ and least for those who had 2 years, $r = 0.06$. From this study it appears that for

college women students the amount of high school homemaking education was related to some extent to dietary practices.

Taste Sensitivity and Food Preferences

Food preferences have been assumed to play a role in food practices. A number of workers have been interested in investigating physiological bases for differences in food preferences. It has been theorized that taste sensitivity is related to the number of taste buds. Since it has been demonstrated by anatomical studies that taste buds reach their maximum before birth and then gradually disappear throughout life, taste sensitivity may also change with age. If the number of taste buds were the only factor involved in sensitivity it might be expected that younger children would have much lower taste thresholds.

Richter and Campbell (46) determined taste thresholds on 186 subjects in three age groups: 56 children, 7 to 10 years; 45 adults, 18 to 21 years; and 85 older adults, 65 to 85 years of age. The results found are given as follows:

Difference in recognition of sweet taste Age in years	N	Mean threshold M/1
7-10	56	0.020
18-21	45	0.012
65-85	85	0.359

Contrary to expectations the children had slightly higher thresholds to sweet taste than did the young adults. The older adults, however, showed a decreased sensitivity to sweet

tastes. The authors suggested that the reason the children were rated as less sensitive might be that their attention was easily distracted; they also suggested that the higher thresholds of the elderly subjects were due to the atrophy of the papillae and taste buds.

It has been suggested that decreased sensitivity to tastes may affect food preferences. The possibility that decreased sensitivity to sweet taste would affect preference for sweets was investigated by Blindenbacher (33). First they investigated the differences in sensitivity to sweet taste among three age groups: 36 girls and 26 boys, 12 to 14 years; 24 women and 26 men, 20 to 40 years; and 25 women and 20 men, 60 to 80 years of age. Pineapple juice in five degrees of sweetness was offered to the subjects and the paired-comparison method of determining sensitivity was used. The subjects were also asked to indicate their preference for one of the five pairs of samples.

Comparisons were made between the sensitivity to sweet and level of preference for sweet. Sensitivity and preference curves for the 12- to 14-year-old group closely paralleled the curves for the 20- to 40-year-old group. In the oldest group, sensitivity and preference for sweet showed a sharp decline and preference for "fruity" tart tastes increased. These results would tend to support the theory that food preference may be at least partly related to sensitivity of

taste.

It has been suggested that from a nutritional standpoint food dislikes are important only if they seriously interfere with the adequacy of the diet. Young and LaFortune (63) investigated the effect of food preferences on nutrient intake of 81 Cornell University freshmen women. The girls kept a record of all food and drink consumed for one week. Information was also obtained pertaining to menus served to the girls together with information about recipes and size of servings. Food energy value and nutrient content of the dietary records were calculated. At the end of the seven-day period the girls were interviewed to determine factors other than food dislikes which might be restricting food intake; these included such influences as religion, health and "dieting" restriction. They were also asked what foods they especially disliked and would not eat under any circumstances; what foods they would eat occasionally if served but would not choose, and the influence of method of preparation on food preferences. The subjects were given a list of 186 food items to which they were asked to indicate their preference.

Actual food dislikes in this study seemed to have little influence on the adequacy of the diet because most intensely disliked foods were items not commonly served. The greatest effect on adequacy of nutrient intake seemed to lie in the lack of ingestion of sufficient quantities of foods such as

milk, bread and cereals and eggs. These items were rarely mentioned as strongly disliked by any of the subjects but obviously neither were they greatly preferred.

Monotony of Diet

In nutrition education learning to like and enjoy a variety of foods has been stressed. The assumption is made that a variety of foods increases enjoyment which is believed to be basic to good food practices.

Siegel (47) investigated monotony of the diet in relation to food acceptance. For a period of 12 days 70 college men subsisted on a repetitive diet consisting of two alternative daily menus. The number of times a food item was eaten was related to its initial acceptance level. Seigel found that when a food item was eaten repeatedly, its palatability rating declined. Following the decline in palatability there was no recovery of the original rating levels in a three-to-six-months period of time. The items which showed an initially high palatability rating declined less than those with a lower initial rating. The amount of food not eaten was significantly related to palatability rating.

The effect of repeated eating of a limited number of food items on preference ratings and rejection of items was investigated by Pilgrim and Schutz (45). Eighty army men maintaining a high activity level in a cold climate subsisted on a

fixed diet of four daily menus for six weeks. All foods consumed were measured. The subjects rated the foods on a preference scale during the second and sixth week.

With repetitive consumption some foods rose in preference, some remained unchanged and some declined. There was a significant but not high correlation between initial rating and change in rating. The better a food was liked initially, the less was its decline in preference. Most canned meats and vegetables declined in acceptance; dry cereals rose in preference; and fruits, desserts and staples showed little change.

From this review there appears to be some basis for believing that all of the factors investigated are related to eating behavior. Methodology used in many studies, however, was lacking in precision and samples were often limited in size. Specific instruments for measuring psychological adjustment and many personality characteristics are lacking for this age group. Difficulties also arise from the lack of generally accepted indices of eating behavior and dietary adequacy. There is need for the development of research procedures to ascertain factors related to eating behavior. The entire problem is very important from the standpoint of nutrition education and warrants further research.

METHOD OF PROCEDURE

Experimental Design

The purpose of this study was to investigate the relationship of certain selected physiological, psychological and sociological factors to eating behavior and dietary adequacy of girls 12, 13 and 14 years of age. A sample of girls in the three age groups was selected from Boone, Iowa, a town of approximately 14,000 population and was controlled for chronological age, social status and menarche. An effort was made to select approximately equal numbers of girls who had and had not reached menarche for each age group divided among the three social-status categories. This experimental design resulted in 18 groups. The independent variables of the experimental design, therefore, were chronological age, menarche and social status. The dependent variables of the study were the physiological, psychological and sociological factors selected for investigation, namely, rate of physiological development, taste sensitivity, sex-role identification, values considered important in food selection, food enjoyment, food experience, knowledge of nutrition, intelligence, psychological adjustment and home conditions.

Measurements were made between May, 1960 and March, 1961 using the following instruments:

May, 1960

Questionnaire

Food enjoyment and food experience scales

July-August, 1960

Subjects were brought to the University campus for the administration of the following:

Taste threshold tests

Records of height and weight

Hand x-rays for bone age estimations

Sex-role identification scales

Values inventory

Minnesota Counseling Inventory

Seven-day food intake records

Seven-day activity records

October, 1960

Test of nutrition knowledge

February, 1961

Three-day food intake records

Selection of Sample

On the basis of chronological age, social-status classification and menarcheal status each girl in Boone Junior High School was assigned to one of the 18 groups of the experimental design. It had been decided that 10 girls for each category would be a desirable number to give a reliable

picture of relationships and would provide an adequate number for the statistical procedures to be used in the treatment of the data. After the classification was completed, however, some categories did not contain 10 girls. The plan was revised, therefore, so that 10 girls would be selected in the categories where this could be done and as many as possible in the categories which had fewer than 10. Where there were more than 10 in a group, names were selected at random. The total sample included 140 girls.

Social status as used in this study included both the prestige rank of the father's occupation and the educational level of both parents. The method used for determining social status was that used by Calhoun (11) and the North-Hatt Scale (41) was used for assigning a prestige rank to the father's occupation. Information concerning both the occupation and the educational level was obtained from the school records. If the father was deceased, the occupation of the wage earner was used (see Appendix A, Social Status Classification, for details).

Information concerning the chronological age of the girls was obtained from the school records. In May, 1960 menarcheal status was obtained from the girls with the assistance of the school nurse. At the time of the girls' visit to the campus during the summer, the accuracy of this information was determined and some of the girls were

reclassified. The sample of girls was divided among the 18 categories as indicated in Table 1.

Collection of Data

Questionnaire

An understanding of the food pattern and habits of the adolescent requires a consideration of the whole individual in relation to his environment. In order to obtain these understandings the adolescent's past history, the habits and expectations of his family and the social pattern of his world must be considered (7). Such information was desired for this study. A questionnaire was constructed to collect data about family practices relating to food and daily living. In addition eight items were included which had been found by Burchinal (9) to be useful in assessing the desire for food of the adolescent girl. These items were related to the amounts and kinds of food eaten and frequency of eating.

Before revising the questionnaire and submitting it to the participants of the study, it was administered to approximately 50 seventh-grade pupils at Ames Central Junior High School to evaluate the reading level and the clarity of the questions. (See Appendix B, Questionnaire.)

Table 1. Classification of girls by age, social status and menarcheal status

Menarcheal status	Age											
	12 years				13 years				14 years			
	S.S.[a] I	S.S. II	S.S. III	Total	S.S. I	S.S. II	S.S. III	Total	S.S. I	S.S. II	S.S. III	Total
Pre-menarche	10	8	4	22	6	6	3	15	2	2	2	6
Post-menarche	5	9	8	22	12	15	13	40	13	11	11	35
Total	15	17	12	44	18	21	16	55	15	13	13	41

[a]Social status.

Food Enjoyment and Food Experience Scales

According to Breckenridge and Vincent (7) good food habits include among other factors, the customary enjoyment of the foods which furnish a well-balanced diet and a willingness to eat a wide variety of foods. Food enjoyment and food experience were two of the factors investigated in this study. Classical test-construction procedures were used for the development of two scales for food enjoyment and one for food experience.

Food Enjoyment Scales Food Enjoyment Scales were designed to place the subjects on a continuum from those who enjoy eating most foods to those who are relatively indifferent to food. The assumptions basic to this technique are: 1) a combination of scaling and item analysis procedures would enable one to select a relatively small number of foods from a larger number, which would give the same characteristic responses as would reactions to the larger group; 2) the degree of food enjoyment is related to the number of foods which a person enjoys eating.

In order to begin scale construction a list of appropriate food items must be selected. For this list of foods data from a survey (15) made in Iowa in 1947 were used. The degree of preference for various foods was reported as the percentage of the respondents who thought the food was very good, good, moderate, tolerated or who had not tried it. By

assigning a numerical value to each of the degrees of preference (e.g., very good, good) the median and interquartile range were determined for each food. The size of the interquartile range indicated the degree of agreement for a particular food among those surveyed. The median was plotted against the interquartile range and a group of foods was selected at all levels of preference excluding foods that had large interquartile ranges. The foods selected by this procedure were those for which Iowa subjects had been in close agreement concerning their degree of preference.

To this list other foods not included in the survey but known to be a part of the diets of Iowa adolescents were added. These included such foods as peanut butter, chili and hamburgers. The list of 65 items was submitted to 93 eighth-grade girls in Central Junior High School, Ames. They were asked to rate their preference for these foods according to the scale:

1. I like it very much. (delicious)
2. I like it if it is served occasionally. (good)
3. I will eat it but I do not enjoy it. (not too bad)
4. I dislike it and will never eat it. (awful)
5. I have not tasted it.

Those foods which more than 10 per cent of these girls had not tasted were deleted from the list.

A score was determined for each girl which indicated the

number of times the response, "I like it very much", was selected. The subjects were then divided into two groups on the basis of their scores. The proportion of both groups selecting the response, "I like it very much", for a food item and the phi coefficient of the item against the respondent's score were computed, using the phi coefficient as a measure of the degree to which the food item discriminated between girls in the high and low groups.

The phi coefficient was plotted against the proportion in both groups who reported liking the food very much. This proportion will be called its "difficulty". Most of the items had moderately high phi coefficients relative to their "difficulty". Some, however, had very high phi coefficients but unfortunately all of these items were low in "difficulty", i.e. most of the girls in both groups liked these foods. For example, roast beef was one of the best liked foods in both groups (78 per cent of all of the girls selected the response, "I like it very much"), but 50 per cent more girls in the high than in the low group selected it. Roast beef therefore had a relatively high phi coefficient as well as a low "difficulty". Since there were a number of items which had very high phi coefficients and low "difficulty", the decision was made to construct two food enjoyment scales. Scale I contained foods of all degrees of preference but the scale was only moderately reliable as indicated by lower phi coeffi-

cients. Scale II included only foods well liked by both groups but it was highly reliable as indicated by high phi coefficients.

From the questions and comments of the 93 girls it appeared to be difficult for them to respond to foods in general without considering the method of processing or, in some cases, the method of preparation. These variations in the foods were included, resulting in a list of 88 items, but the scales were not pretested after the changes were made. (See Appendix C, Food Enjoyment Scales I and II.)

Food Experience Scale Those foods which had been omitted from the original list of 89 foods because more than 10 per cent of the 93 eighth-grade girls in Ames Central Junior High School had not tried them were used for the Food Experience Scale. (See Appendix C, Food Experience Scale.)

Taste tests

The influence of age on food acceptability has been related to physiological changes in the taste buds. Richter and Campbell (48) found that elderly subjects had a decreased ability to taste sucrose and suggested that the atrophy of the taste buds which occurred with age might be the explanation for their findings. The decreased preference of elderly patients for sweets noted by Laird and Breen (53) was believed by these authors to be due, at least in part, to de-

creased taste sensitivity. Since children have more taste buds than adults they may be more sensitive to food taste. The question has been raised regarding the taste sensitivity of adolescents and whether it may be a factor in their food preferences. Information, therefore, concerning taste thresholds for the four basic tastes was obtained for the girls in this study.

The taste tests were administered in the morning approximately two hours after the subjects had eaten breakfast. The testing was done in a room in which the humidity was controlled and the temperature maintained at 70°F. There were four series of test solutions consisting of chemically pure sodium chloride, tartaric acid, caffeine and sucrose dissolved in distilled water in different concentrations. In each series there were 10 solutions except caffeine for which there were eight. The first in each series was distilled water. Beginning with the second each solution in a series was twice the concentration of the preceding. (See Appendix D, Concentrations of Solutions for Taste Tests.)

For each series approximately 15 milliliters of each solution were placed in one ounce medicine glasses numbered in order of increasing concentration. A glass of distilled water was provided each participant to rinse her mouth between tastes. Explanations and instructions were given verbally prior to the testing. The subjects were told that

they were being given four series of solutions of substances which were sweet, sour, bitter and salty and that for each series the solutions were arranged in order of increasing concentrations. They were not told the order in which the four series would be offered. The girls were asked to indicate the intensity of the taste of each numbered solution in the series according to the following scale:

0 No taste
1 Very faint
2 Faint
3 Easily noticeable
4 Strong
5 Very strong

They were also asked to identify the taste and to record the number of the solution in which the taste was first recognized. (See Appendix D, Taste Test Record Form.)

Information, therefore, was obtained concerning the ability to identify each of the tastes correctly, the concentration of the solution at which the identification was made and, if not identified correctly, the taste with which each was confused.

Values inventory

Since one's values are believed to determine to a great extent one's choices in life, information was desired con-

cerning the values which would influence the subjects' food choices. Coburn's Inventory (13) developed to assess values that influence food selection of twelfth-grade girls was modified to conform to the activities of the age group in the present study. Because of age differences some of the situations described in Coburn's Inventory were not applicable; hence three situations were deleted and others modified. Coburn's Inventory was designed to measure six values but since this investigation was not concerned with money as a value, statements relating to money were omitted. The values included were sociability, independence, health, enjoyment and status. To increase reliability of the instrument more statements for each value were added so that each value was involved 22 times; 11 statements indicate an acceptance of the value and 11 statements a rejection of the value. The respondents were asked to indicate the decision the girl in each situation should make. Using a five-point scale they were to decide how much each statement should influence her decision.

The revised Inventory was administered to ten 15-year-old girls to determine clarity of directions and situations. Some changes were made and the decision was reached to use verbal in addition to the written directions because the girls found it difficult to analyze the reasons for their decisions. (See Appendix E, Values Inventory.)

A separate score for each value was obtained by assigning numerical weights for each of the five responses. For those statements indicating acceptance of the value, the weights assigned to the degree of influence were:

Very greatly	5
Greatly	4
Uncertain	3
Little	2
Not at all	1

For those statements rejecting the value the weights were reversed. Scoring keys were made for each value.

Reliability of the instrument was determined by dividing the statements into two groups. A split-half correlation coefficient was obtained and the Spearman-Brown formula was applied to correct for length. The reliability coefficients for the values are as follows:

Health	.92
Independence	.80
Status	.66
Enjoyment	.60
Sociability	.60

Intelligence tests

Intelligence quotients for the subjects were obtained from the school records. All of the pupils who were in the

eighth grade had been given the Otis Quick Scoring Mental Ability Test. For approximately one-third of the girls who were not yet in the eighth grade, scores were used from the Kuhlmann-Anderson Intelligence Test given in the fifth grade.

Food intake records

In order to assess eating behavior information was needed concerning the kinds and amounts of food eaten by the subjects and when it was eaten. The most widely used method in the collection of data for dietary studies has been the dietary record which consists of a listing of all foods, weighed or measured, consumed by an individual over a given period. There is considerable uncertainty about the minimum number of days for which such a record needs to be kept to yield information which typifies the food habits. Chalmers et al. (12) studied this problem and concluded that the number of days the record should be kept depends on the precision or reproducibility of a result required. In general, the greater the number of days of intake, the more precise the estimate of intake. Women were found to be more precise than men in reporting their food intake. According to the findings of these authors food intake records for a 10-day period would give a true estimate of the mean intake ± 16 per cent for calories, protein, calcium, phosphorus, iron, thiamine, riboflavin and niacin. Because of the extreme fluctuations

in intake of vitamin A and ascorbic acid a longer period of intake would be necessary to obtain an estimate of the true intake of these vitamins with the same degree of precision as the other nutrients. While it is important to have the dietary record cover a sufficient period to furnish a true picture of food intake it is also necessary to avoid prolonging the period of record-keeping to the point where the interest and cooperation of the subjects are lost. Many research workers believe that an extended period of record keeping also decreases the subject's accuracy in reporting food intake. This might be especially true of the present age group.

The decision was made to ask the subjects to record their food intake for seven days during the summer and three days the following February to give a picture of seasonal variation. It was believed that the time of record keeping would not be so long as to decrease interest and accuracy and would give a fairly accurate estimate of dietary habits.

The dietary record was begun the day of the visit to the University campus. A demonstration of the use of standard measuring equipment and of the method of recording food was given by the author. The girls recorded under supervision the lunch they ate at the University. They were instructed to record all food eaten both at and between meals for the next seven days. (See Appendix F, Food Intake Record Forms.)

Eight days later the records were collected at their homes.

From the information obtained from the food intake records eating behavior was assessed according to the following indices:

Percentage of meals missed

Mean number of snacks per day

Number of meals repeated

Mean number of servings of food per day

Mean number of different items of food included each day

Mean number of servings per day of milk and equivalents

Mean number of servings per day of vitamin C-rich foods

Mean number of servings per day of carotenoid-rich fruits and vegetables

Mean daily energy intake from foods with few nutrients such as cakes and candy.

Dietary adequacy was estimated also from the food intake records. The method of Thomas et al. (56) was used in assigning numerical scores for nutritional adequacy of the dietaries. Excluding food energy and niacin the score approximates the mean percentage of the nutrients as given by the Recommended Dietary Allowances of the National Research Council, which were attained in a given diet. (See Appendix F, Scoring of Food Intake Records.)

In deriving the score, such foods as desserts or sweets which contributed little beside food energy were excluded. An estimate of the mean daily caloric intake from these foods

was made, however. Mean caloric values for a serving of foods such as cake, pie, candy, soft drinks were estimated. The number of servings of each type of food was tallied for each subject for the period and mean daily caloric intake was computed.

Height and weight records

During their visit to the University, the subjects were weighed and measured. The measurements were taken at mid-morning. The girls wore light summer clothing but removed their shoes. A meter stick fastened permanently at right angles to a platform was used to assess height. Each girl was directed to stand straight with the heels, hips, shoulders and back of the head touching the board and with the arms hanging loosely at her sides. By the use of a right-angle head piece the height was located on the scales. Using the Physical Growth Record for Girls prepared by the National Education Association and American Medical Association the girls were classified according to their height-age relationship.

A Howe platform balance was used to obtain the weights which were recorded to the nearest hundredth of a kilogram. A weight classification according to age was made using the Physical Growth Record of the National Education Association and American Medical Association.

Hand x-rays

X-rays of both hands of each girl were made and bone age was estimated by a radiologist. A ratio of bone-age to chronological-age was calculated.

Minnesota Counseling Inventory

Since there is some evidence that emotional adjustment (26, 38) and personality traits (42) may be related to food preferences, measures of personality factors and psychological adjustment were desired for this investigation. A suitable instrument to measure these factors for this age group was not available. The Minnesota Counseling Inventory (5) provides a measure of the desired factors but requires at least an eighth-grade reading ability. After conferring with one of the authors of the Inventory, it was decided to use the Inventory with a glossary which he provided. Every girl was instructed to decide whether each of the 355 statements was true or false as it applied to her.

Nine scores can be obtained from the Inventory. A question score (?) indicates the number of items omitted. If more than 26 items were not answered, the responses were not scored. The validity score (V) is used to identify pupils who are overanxious to display socially acceptable characteristics. If the V score was eight or higher, the scores were invalidated. Three of the nine scores were used in the

present study to identify areas in which these pupils were making satisfactory or unsatisfactory adjustments: family relationships (FR), social relationships (SR) and emotional stability (ES). Four scores provide information about the means students were using in making adjustments: conformity (C), adjustment to reality (R), mood (M) and leadership (L). In all of the areas better adjustment is indicated by a lower score.

Sex-role identification scales

In an attempt to determine the extent of each girl's identification with the female sex-role, two sex-role identification scales developed by Burchinal (8) were administered. The one, consisting of 10 items, measures the extent to which girls are beginning to use appearance symbols generally associated with female sexual attractiveness and the other, consisting of nine items, measures the extent to which girls are beginning to become interested in boys. (See Appendix G, Sex Role Identification Scales.) The participants responded to questions about the use of symbols and interest in boys according to a five-point scale. Both sets of responses, those which indicated the use of the symbols and those which related to an interest in boys, were weighted as follows:

Always or a great deal	5
Often or much	4
Sometimes or some	3
Seldom or a little	2
Never or none at all	1

For the two items which were phrased to indicate a lack of interest in boys the numerical weights were reversed.

Reliability for the two scales was determined for each of the three age groups by correlating the odd and even items and applying the Spearman-Brown formula to correct for length. The reliability coefficients were as follows:

12-year-old girls	.86
13-year-old girls	.90
14-year-old girls	.91

Test of nutrition knowledge

To determine the relation of knowledge of nutrition to eating behavior a nutrition test was developed. The test was designed to measure the ability of pupils to:

recognize nutritionally adequate meals
make substitutions within food groups
evaluate fallacies about food practices
plan good reducing or weight-gaining diets
identify nutrient content of basic foods
select best buys in foods.

The test was given to approximately 100 eighth-grade girls in Central Junior High School, Ames, to determine clarity, level of difficulty of the items and the time needed for administration. The test appeared to be too long and two items were omitted. When administered to the girls in the study the test consisted of 30 items with a possible score of 30. (See Appendix I, Test of Nutrition Knowledge.)

Reliability was determined for each of the three age groups by scoring the odd and even items separately, correlating the scores and applying the Spearman-Brown formula to correct for length. For the three age groups the reliability coefficients were found to be:

12-year-old girls	.74
13-year-old girls	.88
14-year-old girls	.82

Records of physical activity

The girls kept a record of their activities for seven days during the summer of 1960. (See Appendix I, Physical Activity Record Form.) On the basis of the energy expended the activities were classified into four categories: sleep, mild activity, moderate activity and vigorous activity. The method used was that employed by Pickenpaugh (44).

The number of minutes spent in each category of activity was determined and these figures were converted to hours.

Using the method of Pickenpaugh an activity index was determined. The energy expenditure for sleep was set at one. The energy spent for other activities was considered in relation to the energy spent for sleep and a ratio was obtained for each category of activity: sleep, 1:00; mild activity, 1:61; moderate activity, 2:40; and vigorous activity, 5:66. These ratios were then multiplied by the hours spent in that category of activity each day and the products were summed to obtain the activity index of a subject.

Analysis of Data

Analysis of variance and correlations were used for the analysis of data collected in this investigation.

FINDINGS

In the present investigation an attempt was made to ascertain the factors that may be related to eating behavior and the selection of an adequate diet for the sample studied. No attempt was made to select a sample which would be representative of 12-, 13- and 14-year-old girls in Iowa. In the first section of the findings, therefore, the characteristics of the sample of girls will be described in terms of family background which may be related to food practices, frequency of attendance at social occasions where food is served, weight-for-age status, level of activity, frequency of eating between meals, eating behavior and adequacy of diet.

The interrelationships of selected physiological, psychological and sociological factors to eating behavior and the selection of an adequate diet, as well as to the independent variables of age, social status and menarche, will be presented in the second part of the findings. These relationships were investigated using both intercorrelations and analysis of variance.

Characteristics of Sample

Family background

All of the girls in this investigation lived in Boone, Iowa, and were members of relatively stable families.

Eighty-one per cent had lived in this community for five years or longer and 71 per cent for more than nine years. Approximately 65 per cent had lived in their present home for at least five years. Almost all of their fathers, 98.4 per cent, and of their mothers, 97.9, were living. Most of their parents were living together, 90.7 per cent. Of the 32.2 per cent of mothers employed outside the home, 7.9 per cent were working part-time and 24.3 per cent full time.

The subjects came from families who had lived in the United States for at least two generations. At least 76 per cent of the grandparents had been born in the United States. The true percentage is probably higher than this because in 10 per cent or more of the cases the subjects did not know where their grandparents were born.

In response to questions concerning special occasion meals the family ate together, nearly 96 per cent of the girls indicated that their families did not follow this practice. Approximately four per cent said they had such meals at the following times: Sunday dinners; birthdays; national holidays such as Thanksgiving and New Years; Church holidays; and other days such as Halloween and Valentine's Day.

During the school year most of the 13- and 14-year olds ate their lunch at school since they were allowed only half an hour for lunch. Most of the 12-year-old girls were in grade school and many of them went home for lunch. Responses

to questions about persons with whom meals were usually eaten are given in Table 2. Breakfast was the meal most often eaten alone by the 13- and 14-year-old girls and lunch by the 12-year olds. Most of the girls had breakfast and the evening meal with their families.

Table 2. Persons with whom meals were eaten

Meals	Persons		
	Family members	Friends	Alone
	%	%	%
Breakfast			
14 year olds	83.7	2.7	13.6
13 year olds	93.7	0.0	6.3
12 year olds	97.3	2.7	0.0
Noon meal			
14 year olds	12.8	89.5	0.0
13 year olds	7.9	90.3	1.9
12 year olds	55.0	40.0	5.0
Evening meal			
14 year olds	95.0	2.5	2.5
13 year olds	98.2	0.0	3.8
12 year olds	92.3	7.7	0.0

Social activities

Responses to questions about frequency of attending parties at which food was served are given in Table 3. Nearly 72 per cent of the girls reported that they had parties in their homes at least once a week and 63 per cent attended parties at the homes of friends equally as often. About 79

Table 3. Frequency of attendance at social occasions

Social occasions	Frequency					
	None	Once a year	Twice a year	Once a month	Once a week	More often
	%	%	%	%	%	%
Own home	18.4	0.0	0.7	11.4	38.6	32.9
Homes of friends	3.6	0.7	3.6	28.3	47.1	15.7
School	10.0	0.0	0.7	10.7	68.6	10.0
Meetings with friends at public eating places	12.9	22.0	24.3	17.1	10.7	10.0

per cent of the subjects also attended school parties once a week. It appears that these girls had parties at homes much more frequently than they met friends at public eating places.

At these parties the foods most frequently served to all three age groups were soft drinks, potato chips, cake and ice cream. Punch and cookies appeared to be most frequently served as refreshments at school parties. At public eating places most girls of all three age groups ordered soft drinks and sandwiches, especially hamburgers.

Weight status

The subjects were classified according to weight for age into seven groups using the Physical Growth Record for Girls prepared by the Joint Committee on Health Problems in Educa-

tion of the National Education Association and the American Medical Association. The percentage distribution by age among the seven groups is given in Table 4.

A larger percentage of the 12-year-old girls were above average in weight-for-age classes than were the girls of the other two age groups. Of the 140 subjects 18.6 per cent were heavy or very heavy, 8.4 per cent were in the very light and light weight-for-age classes and 37.1 per cent were average in weight for age.

Table 4. Distribution of weight according to age

Age	N	Weight-for-age classification						
		Under-weight	Light	Mod. light	Average	Mod. heavy	Heavy	Very heavy
		%	%	%	%	%	%	%
14	41	4.9	4.9	12.2	43.9	24.4	7.3	2.4
13	55	0.0	7.3	20.0	31.0	16.3	20.0	5.4
12	44	0.0	2.3	11.4	38.6	29.5	9.1	9.1

Activity

An activity index, indicating comparative energy expenditure, was determined for each girl from continuous records of activity kept by the subject for seven consecutive days during the summer of 1960. The mean and range of the activity indices

Table 5. Range and mean of activity indices

Age	Activity indices	
	Mean	Range
14	42.25	34.80-57.63
13	41.54	34.54-56.23
12	40.91	32.19-54.97

are given in Table 5. Apparently the older the girls in this study the more active they were. The differences among the age groups, however, are not significant.

Enjoyment of meals

In the questionnaire the girls were asked to state whether they were hungry at meals. Approximately 44 per cent indicated that they were not hungry at breakfast as compared with seven and eight per cent who said they were not hungry at the noon and evening meals, respectively. When asked about enjoyment of meals, 83.6 per cent reported they enjoyed breakfast, 88.6 per cent enjoyed the noon meal and 85.7 per cent the evening meal. The reasons given for not enjoying meals are presented in Table 6.

Table 6. Frequency of reasons given for not enjoying meals

Reasons	Breakfast	Noon meal	Evening meal
	%	%	%
Snack too close to mealtime	0.0	0.7	1.4
Seldom hungry	11.4	1.4	1.4
Do not like foods usually served	2.9	2.1	0.0
Generally in too much of a hurry to enjoy eating	2.1	0.0	0.0
Are too tired to enjoy eating	3.6	0.0	0.0
Scolded too much at mealtime	0.0	0.0	0.0
Family argues too much at mealtime	0.7	0.0	0.7

Eating between meals

Frequency of eating snacks was also investigated at the time the questionnaire was filled out in May, 1960, and the results are presented in Table 7. Snacks were consumed most often in the afternoon and evening. Approximately three-fourths of the girls seldom or never ate snacks in the

Table 7. Frequency of eating between meals

Time	Never	Seldom	Sometimes	Often
	%	%	%	%
Morning	50.7	22.1	17.1	6.4
Afternoon	8.6	8.6	50.0	28.6
Evening	10.0	15.0	42.1	27.9

morning.

Foods consumed most frequently as snacks in descending frequency were candy, soft drinks, potato chips and cookies by the 14-year olds; soft drinks, ice cream, fruit and milk by the 15-year olds; and ice cream, cookies, cake, candy and soft drinks by the 16-year olds.

Eating behavior and dietary adequacy

Indices of eating behavior used in the present investigation include meals missed, the use of snacks, intake of different items of food, number of servings of food per day, intake of milk and equivalents, intake of carotenoid- and vitamin C-rich foods and food energy intake from foods of low nutritive value. Dietary adequacy was estimated from the percentage intake of the foods given in the basic food group plan for girls in this age group. (See Appendix F, Scoring of Food Intake Records.) The score obtained represents the mean of the percentages met of the Recommended Dietary Allowances of the National Research Council. Intake of food was recorded for seven consecutive days in the summer, 1960, and for three consecutive days during the following February. Findings for the two periods are given in Table 8.

The diets of this group of girls were similar to those observed in previous studies of Iowa girls (17). The intakes of milk, carotenoid- and vitamin C-rich foods were low. The

Table 8. Eating behavior indices and dietary adequacy scores for seven days in the summer, 1960, and three days in February, 1961

Dietary adequacy and indices of eating behavior	Summer Mean	Summer Range	Winter Mean	Winter Range
Dietary adequacy score	87.0	30-99	74.0	37-100
Meals missed per day, [a]	1.0	0-4.3	0.3	0-3.7
Snacks[a]	1.3	1-3.3	1.0	0-2.0
Snacks - low nutrient, [a]	40.3	0-90.0	45.0	0-100
Different food items[a]	8.9	4.6-14.4	9.3	3.0-16.0
Servings of food[a]	14.8	8.3-27.7	16.9	7.0-35.0
Reported meals per period - number	2.0	0-7.0	0.7	0-3.0
Carotenoid-rich foods[a]	0.1	0-3.0	0.4	0-2.0
Vitamin C-rich foods[a]	0.4	0-3.0	0.6	0-3.0
Milk and equivalents[a]	1.3	0-5.3	2.7	0-2.99
Food energy intake from foods of low nutritive value - mean calories	305.0	43-675	257.0	0-825

[a]Mean number per day.

girls did not miss many meals nor did they consume a large number of snacks.

The girls had better eating behavior and tended to select more adequate diets in the winter than during the summer. A "t" test of the means of the scores on dietary adequacy for

the two periods revealed that the diets for the winter period were significantly better (at the .001 level). Dietary adequacy was determined for the three age groups during both periods and the findings are presented in Table 9. The 14-year-old girls had the best diets and the 12-year-old girls had the poorest diets for both periods but the differences were not significant.

Table 9. Age differences in dietary adequacy scores for the summer and winter periods

Age	Dietary adequacy scores			
	Summer		Winter	
	Mean	Range	Mean	Range
14	70	50-96	75	50-100
13	67	42-87	74	38-100
12	68	39-94	72	40-98

A comparison of the relationship of individual eating behavior indices with dietary adequacy was made for each of the two seasons and the results are given in Table 10. With the exception of the intake of carotenoid- and vitamin C-rich foods the relationship of the eating behavior indices to dietary adequacy shows little seasonal variation. Both of these indices showed a higher correlation with dietary adequacy in the winter than in the summer period, the difference

Table 10. Relationships of eating behavior indices to dietary adequacy

Dietary adequacy and eating behavior indices	Correlation of dietary adequacy scores with indices of eating behavior		Correlations between the indices for summer and winter
	Summer	Winter	
	r	r	r
Dietary adequacy - score			.59**
Meals missed, %	-.59**	-.60**	.50**
Snacks[a]	.17*	.18*	.35**
Snacks - low nutrient, %	-.01	.02	.15
Different items of food[a]	.71**	.70**	.60**
Servings of food[a]	.77**	.85**	.60**
Milk and equivalents[a]	.60**	.63**	.68**
Carotenoid-rich foods[a]	.21**	.44**	.11
Vitamin C-rich foods[a]	.35**	.49**	.50**
Food energy intake from low nutritive foods - mean calories	.24**	.28**	.17*

[a]Mean number per day.

**Significant at the .01 level.

*Significant at the .05 level.

was even greater for the carotenoid-rich foods. In other words this means that it is more necessary to the adequacy of the diet that a carotenoid-rich fruit or vegetable be included in the winter than in the summer.

Of all the indices studied the highest correlations of dietary adequacy for both periods were found with the mean number of servings of food and different food items. Intake of milk and equivalents and percentage of meals missed were also highly related to dietary adequacy, the latter negatively. Mean number of snacks per day and mean number of calories from foods of low nutritive value were significantly related to dietary adequacy but the correlations were considerably lower.

The consumption of snacks of low nutritional value and mean daily food energy value of this intake from foods of low nutritive value were not significantly correlated for the two seasons. Fewer snacks were consumed in the winter period than in the summer. This appeared to be due, at least in part, to the fact that the girls were attending school during the winter period and had more regular eating habits.

Relationships of Factors Studied to Indices of Eating Behavior and Adequacy of Diet

By means of intercorrelations and analysis of variance eating behavior and dietary adequacy were investigated in relation to the following: physiological development, sex-role identification, values considered important in selecting foods, knowledge of nutrition, food enjoyment, food experience, psychological adjustment and the three independent variables of the study: chronological age, social status

and menarche. Data for analysis were obtained by questionnaire, food intake records, activity records, physiological measurements, taste threshold tests, food enjoyment and experience scales and inventories of values and psychological adjustment.

Intercorrelations among a selected number of these factors and indices of eating behavior and dietary adequacy are given in Table 11. The findings from the analyses of variance are given in Table 12. (For results of all of the relationships investigated see Appendix J, Figure 1, Correlation Matrix 3.)

A correlation of .17 is significant at the .05 level and .21, at the .01 level. Correlations of .17, though not high, indicate that between the two factors under consideration there is probably a true relationship that is worth consideration. The size of the correlation, however, as well as its level of statistical significance must be taken into consideration in the interpretation of results.

Two measures of eating behavior, percentage of meals missed and mean number of snacks per day, were selected for comparison. The other indices of eating behavior were either used in determining dietary adequacy or were so highly correlated with dietary adequacy that correlations of the various factors with these indices were not warranted.

Table 11. Intercorrelations among certain factors and indices of eating be

Factors and indices		1	2	3	4	5	6	7
Percentage of meals missed	1							
Mean no. snacks per day	2	-.11						
Dietary adequacy	3	-.55**	.07					
Social status	4	-.22**	.12	.32**				
Chronological age	5	-.08	-.07	.15	-.06			
Menarche	6	.17*	-.05	.00	-.07	.34**		
Bone age	7	.24**	-.12	.11	.02	-.15	.35**	
Height-age class	8	-.15	.12	.20	.19*	.00	.13	.15
Weight-age class	9	.17*	.05	-.22**	-.15	-.11	.28**	.39*
Sex-role identification	10	.05	.16	.03	.03	.42**	.17*	-.07
Health as a value	11	-.21**	.14	.18*	.17*	-.04	-.28**	-.33*
Sociability as a value	12	.09	.20*	-.22**	-.10	-.11	-.02	.08
Independence as a value	13	.08	-.06	-.15	-.30**	.12	.15	.10
Status as a value	14	.07	.17*	-.18*	-.17*	-.16	.13	.12
Enjoyment as a value	15	.18*	-.07	-.20*	-.25**	-.04	-.04	-.05
Food enjoyment	16	.16	-.06	.21**	.27**	-.03	-.11	-.09
Food experience	17	.09	.05	-.13	-.03	-.11	.05	.12
Knowledge of nutrition	18	-.25**	.06	.32**	.12	.34**	.00	-.06
Intelligence	19	-.18*	.12	.19*	.33**	-.15	-.17*	.09
Desire-for-food cluster	20	-.01	.22**	.05	.15	.19*	.00	.13
Concern-about-overweight cluster	21	.21**	.13	-.30**	-.19*	.02	.22**	.29**
Interpersonal-and-peer-relations cluster	22	-.20*	-.15	.14	.20*	.07	-.08	-.06
Personal-adjustment-and-family-relations cluster	23	-.19*	-.10	.23**	.41**	-.04	-.16	.06

**Significant at the .05 level.

*Significant at the .01 level.

and indices of eating behavior and dietary adequacy

4	5	6	7	8	9	10	11	12	13	14	15	16	17
.06													
.07	.34**												
.02	-.15	.35**											
.19*	.00	.13	.15										
.15	-.11	.28**	.39**	.42**									
.03	.42**	.17*	-.07	-.08	-.05								
.17*	-.04	-.28**	-.33**	-.01	-.17*	.01							
.10	-.11	-.02	.08	.05	.11	.01	-.08						
.30**	.12	.15	.10	-.05	.11	.06	-.51**	.14					
.17*	-.16	.13	.12	.01	.11	.04	-.24**	.41**	.06				
.25**	-.04	-.04	-.05	-.07	.02	-.07	-.29**	.44**	.37**	.32**			
.27**	-.03	-.11	-.09	.13	-.12	-.10	.24**	-.15	-.20*	-.14	-.18*		
03	-.11	.05	.12	.00	.14	.05	-.17*	.09	.00	.03	.00	-.07	
12	.34**	.00	-.08	.18*	.01	.25**	.15	-.06	-.03	-.25**	-.01	-.06	-.17*
33**	-.15	-.17*	.09	.29**	.12	.03	.15	-.04	-.11	-.23**	-.07	.10	-.04
15	.19*	.00	.13	.03	-.25**	.25**	.12	-.02	-.17*	.02	-.03	.16	-.02
19*	.02	.22**	.29**	.22**		.13	-.19*	.14	.15	.15	-.02	-.22**	.12
20*	.07	-.08	-.06	-.03	-.08	.20*	.14	.09	-.17*	-.06	-.10	-.02	.06
41**	-.04	-.16	.06	.04	-.01	-.17*	.05	-.07	-.11	-.12	-.13*	.07	.21**

adequacy

10	11	12	13	14	15	16	17	18	19	20	21	22
01												
01	-.08											
06	-.51**	.14										
04	-.24**	.41**	.06									
07	-.29**	.44**	.37**	.32**								
10	.24**	-.15	-.20*	-.14	-.18*							
05	-.17*	.09	.00	.03	.00	-.07						
25**	.15	-.06	-.03	-.25**	-.01	-.06	-.17*					
03	.15	-.04	-.11	-.23**	-.07	.10	-.04	.35**				
25**	.12	-.02	-.17*	.02	-.03	.16	-.02	.15	.08			
13	-.19*	.14	.15	.15	-.02	-.22**	.12	.11	.01	-.13		
20*	.14	.09	-.17*	-.06	-.10	-.02	.06	.21**	.20*	.02	-.16	
.7*	.05	-.07	-.11	-.12	-.15*	.07	.21**	.07	.14	.09	-.15	.51**

Percentage of meals missed

The data in Table 11 indicate that, as compared with girls who missed fewer meals, girls who missed many meals had poorer diets and tended to be in the lower social-status classification. The correlations with menarche and bone age show that these girls were inclined to be more physiologically advanced for their age than the girls who missed fewer meals. They also tended to be in the upper-weight-for-age classifications but not taller for their age than the other girls. To these girls enjoyment rather than health appeared to be an important value in food selection. Missing meals was related significantly to poor scores on the test of knowledge of nutrition. Girls who missed meals indicated a greater concern about overweight and tended to score lower on personal adjustment and family relationships than the others.

Mean number of snacks per day

Apparently girls who consumed a large number of snacks per day tended to place a higher value on sociability and status in selecting foods than did girls who consumed fewer snacks. They also indicated a greater desire for food than the other girls. There was no relationship between frequency of snacks and the adequacy of the diet, however.

Selection of an adequate diet

None of the correlations for the two indices of eating behavior, percentage of meals missed and mean number of snacks per day, with the factors studied are high except for their correlation with dietary adequacy.

Adequacy of diet appeared to be significantly and positively related to social status. Girls with more adequate diets also tended to be taller and lighter for their age than did the girls with less adequate diets. As compared with the other subjects the girls with more adequate diets were inclined to place a higher value on health in choosing food and to pay less attention to the other four values. Girls with more adequate diets tended to enjoy food more than the other girls and also scored higher in knowledge of nutrition. These girls seemed to be less concerned about overweight and tended to have better personal adjustment and family relationships.

Social status

Girls who belonged to the upper social-status class in the community represented in this study missed fewer meals and had more adequate diets than did the girls of the lower social-status class. These girls appeared to be taller but not heavier for their age group. In selection of food they placed a higher value on health than on the other four values investigated, especially independence and enjoyment of food.

As compared with the others these girls appeared to be better adjusted and more intelligent. They did not tend to express a concern about overweight and they seemed to relate better to their peers and have better family relationships than did the girls from the lower social-status class.

Chronological age

Among these 12-, 13- and 14-year-old girls more of the older than the younger girls had reached menarche and identified positively with their sex role. Although the older girls knew more about nutrition, they did not consistently select significantly better diets but there was a tendency in this direction ($r = .18$). They did, however, express a greater desire for food than the younger girls.

Menarche

Girls who had reached menarche tended to miss more meals than did those who had not. They tended to be older and more advanced physiologically, as determined by bone-age estimations, and to identify positively with their sex. They also were inclined to be in the upper weight-for-age categories and were concerned about overweight. In the indication of values which they thought important in food selection they did not appear to consider health as important as did the other girls.

Bone-age

Girls who were more advanced physiologically, as shown by bone-age, missed more meals than the other girls. More of them had reached menarche and more tended to be heavier for their age than the less physiologically advanced girls. As compared with the others these girls placed a lower value on health in selection of food and expressed a concern about overweight.

Height-age

As compared with shorter girls in the group the girls who were taller for their age tended to have better diets and to be in the upper social-status class. They were also inclined to be heavier for their age than the others. As compared with the girls who were shorter for their age, they tended to score higher on the nutrition test and to be more intelligent.

Weight-age

Girls who were heavier for their age as a group missed more meals and had poorer diets than the girls who weighed less. They also tended to be more advanced physiologically, to have reached menarche and to be taller for their age than the others. As compared with the lighter weight girls, in the selection of foods these heavier-for-their-age girls were

inclined to place a lower value on health and to express less desire for food.

Sex-role identification

As determined by an inventory to indicate the use of feminine symbols and interest in boys, identification with sex-role appeared to be related more closely to chronological than to physiological age although it did correlate significantly but to a low degree with menarche. With the greater tendency toward identification with sex-role came higher scores on the test of nutrition knowledge, but not in intelligence tests and also higher scores on the desire for food items. As compared with the other girls, the girls who scored high on sex-role identification tended to have fairly good relationships with their peers, but not with their families. No significant relationships were found for sex-role identification and eating behavior or adequacy of diet.

Taste threshold tests

When sensitivity to the four basic tastes was measured in this study, no significant relationships of sensitivity to eating behavior and selection of an adequate diet were found except for sensitivity to bitter. (See Appendix J, Figure 1, Correlation matrix 3.) This correlated significantly with dietary adequacy and social status. The girls there-

fore, who had lower taste threshold for bitter tended to have better diets. They were also more inclined to be in the upper social-status class than were those who had a higher threshold for bitter taste. Sensitivity to sweet taste correlated significantly with the mean number of snacks per day.

Activity indices

An activity index was computed for each girl from the record of activity kept for a week during the summer of 1960. (See Appendix J, Figure 1, Correlation matrix 3.) The range for the sample was 32.18 to 67.63 and the mean was 41.55. For the girls classified as above-the-average weight for their age, the range of activity indices was 34.80 to 64.60, and the mean was 39.81. Although the girls who were overweight for their age tended to be less active than the others, the difference was not significant.

No significant relationships were found between activity indices and adequacy of diet. Girls who were more active, however, appeared to consume more milk and milk equivalents and more vitamin C-rich foods than the girls who were less active.

Values important in the selection of food

By means of an inventory, scores were obtained to represent the importance attached to the values of health,

sociability, independence, status and enjoyment in the selection of food.

Health When health was considered important in selection of food, the girls tended to miss fewer meals, to select more adequate diets, to enjoy food more and to be less concerned about overweight than when health was not considered important. As compared with those who valued health less, they were less physiologically mature, were in the lower weight-for-age class and expressed less concern about overweight. These girls also belonged to the higher social-status class, and did not, in choosing food, consider the values of sociability, independence, status and enjoyment as important. They also appeared to understand that nutrition was related to health. (See Appendix J, Figure 1, Correlation matrix 3.)

Sociability Girls who placed a high value on sociability in selection of food tended also to value status and enjoyment highly. They were inclined to have more snacks per day and had poorer diets than did girls who did not consider sociability as an important value in selecting food.

Independence The subjects who indicated that they valued independence highly in the selection of food tended also to regard enjoyment but not health as important when they selected food. These girls were inclined to come from the lowest social-status group. As compared with the others they seemed to enjoy food less and to score lower in the

desire-for-foood items. They also showed a tendency to have poorer personal adjustment and family relations than the girls who did not value independence so highly in food selection.

Status Status as used here refers to social standing within peer groups. Girls who placed a high value on status tended to have more snacks per day, to have poorer diets and to belong to the lower social-status class than the other girls. They also appeared to be influenced less by considerations for health and more by the other values than girls who placed less value on status in their food selection. These girls scored lower on the test of nutrition knowledge and had lower intelligence quotients.

Enjoyment as a value When the girls felt enjoyment of food was of primary importance in the selection of food, they tended to miss more meals, have poorer diets and belong to the lowest social-status class. They also tended to value health less and the other values more in food selection than those who did not place a high value on enjoyment. These girls, however, did not indicate a high degree of enjoyment of food on the Food Enjoyment Scales. There was a tendency for them to have poorer personal adjustment and family relations than girls who did not place a high value on enjoyment of food.

Estimate of food enjoyment

Enjoyment of food as measured by the Scales denotes relish for food whereas enjoyment as a value indicates that enjoyment of food is an important consideration in selecting food. Scores on the Food Enjoyment Scale I related significantly to a number of the factors and correlated .70 with Food Enjoyment Scale II. No significant correlations were found for Scale II with any other factors except social status. Since the factors with which Scale I correlated significantly were those to which food enjoyment would logically be related, Scale I appears to be a better measure of food enjoyment than Scale II. The high intercorrelation between the two Scales, however, would indicate that both were measuring some of the same facets of food enjoyment.

As indicated by the correlations with scores for Food Enjoyment Scale I, girls with the greater enjoyment of food had better diets, tended to value health but not independence in the selection of food and were less concerned about overweight. These girls were more often than the others from the highest social-status class.

Food experience

Food experience was determined from a list of foods available in this area but not tasted by 10 per cent or more of the girls in Ames. No significant relationships were found

between food experience and eating behavior or dietary adequacy. Girls who had the most experience with a variety of foods were inclined to be influenced less by concern for health in the selection of food and to score lower on the test of knowledge of nutrition than the other girls. They tended, however, to have better personal adjustment and family relations.

Knowledge of nutrition

Knowledge of nutrition, as determined by a test measuring ability to apply information in selecting meals, was significantly related to dietary adequacy. The girls who scored higher on this test also tended to miss fewer meals than the others. They were inclined to be older, taller for their age and to identify more with their sex-role than those who scored lower. Girls who knew more about nutrition had higher intelligence quotients and had better interpersonal and peer-group relations than the others.

Intelligence

Girls who scored higher on a test of mental ability missed fewer meals, had better diets and knew more about nutrition than girls who scored lower. These girls were found more often to be classified in the upper social-status class and to be taller for their age. A low but significant negative correlation of intelligence scores with menarche indi-

cated a tendency for girls who scored high on intelligence tests to be average or late rather than early in their maturation. They tended to place little value on status in the selection of food and to have good interpersonal and peer-group relations.

Clusters of interrelated factors

Since some items proved to be highly intercorrelated and individually to correlate similarily with other factors, they were grouped and treated as clusters. Of the four clusters, two were made from the Minnesota Counseling Inventory. The four clusters are: desire-for-food; concern-about-overweight; interpersonal-and-peer-group-relations; and personal-adjustment-and-family-relations. These clusters were correlated with the two indices of eating behavior, percentage of meals missed and mean number of snacks per day, and dietary adequacy as well as the other factors investigated.

Desire-for-food cluster This cluster consisted of four items from the questionnaire. (See items 1, 2, 3 and 5 of Correlation matrix 3, Figure 1, Appendix J.) When girls scored high in this cluster they tended to report more snacks than the other girls. They also were as a group older, lighter in weight for their age and tended to identify more positively with their sex-role than the other girls. In the selection of food these girls tended to place a lower value

on independence than the others.

Concern-about-overweight cluster This cluster included information related to overeating and concern about overweight together with weight-for-age classification. (See items 4, 6, 7 and 26 of Correlation matrix 3, Figure 1, Appendix J.) Thirty-six of the 140 girls expressed a concern about overweight and of those, three-fourths were above average in weight for their age and only 8.5 per cent were below average weight for their age. Of those that were classified as above average in weight, 46.5 per cent expressed concern about their weight. When the girls were classified as heavy or very heavy for their age 66.4 per cent were concerned about overweight. The higher the weight-for-age classification of the girls, the more they indicated concern about overweight.

Girls who scored high in this cluster were more advanced physiologically, as determined by bone-age and menarche, and taller for their age than those who scored lower. They were inclined, however, to have poorer diets, to miss more meals, to enjoy food less and in the selection of food to value health less than the other girls. These girls were more frequently from the lowest social-status class.

Interpersonal-and-peer-group relations cluster This cluster consists of the scores for social relations, mood and leadership of the Minnesota Counseling Inventory. (See items 14, 18 and 19 of Correlation matrix 3, Figure 1, Appendix J.)

No significant relationship was observed among the interpersonal-and-peer-group relations and the eating behavior indices and dietary adequacy except that the higher the score in this cluster the fewer the meals missed. Girls who scored high in the cluster were more frequently from the higher social-status class, tended to identify positively with their sex-role and in food selection to value independence less than the other girls. These girls also tended to score higher on the nutrition test and to have higher scores on the mental ability test.

Personal-adjustment-and-family-relations cluster From the Minnesota Counseling Inventory the scores for adjustment to reality, emotional stability, family relations and conformity were used to make up this cluster. (See items 13, 15, 16 and 17 of Correlation matrix 3, Figure 1, Appendix J.) Girls who scored high in this cluster tended to miss fewer meals, to have better diets and to be from the highest social-status class than the others. They were inclined to identify less with their sex-role, to value enjoyment less in food selection and to have more experience with a variety of foods than girls who had lower scores on personal adjustment and family relations. As compared with the others, those with higher family relations scores tended also to have better peer-group relations scores.

Home conditions

Information was obtained by questionnaire concerning certain home conditions which might be related to food practices. These data were intercorrelated and correlated with measures of enjoyment of food, experience with a variety of foods, eating behavior indices, dietary adequacy scores and the independent variables of the study: age, social status and menarche. Those relationships which were found to be statistically significant are presented in Tables 12 to 18. (For all of the relationships investigated see Appendix J, Table 21, Correlation matrix 2.)

Indices of eating behavior used for the correlations include percentage of meals missed, mean number of snacks per day, mean number of different items of food and mean number of servings of food per day, number of meals repeated during the period and mean energy intake from foods of low nutritive value. The mean energy intake from foods of low nutritive value correlated significantly only with criticism for poor table manners ($r = -.17$). This measure of eating behavior, therefore, was omitted from the findings presented in the tables.

Employment and membership of mothers in organizations

It has been suggested that when the mother spends much time outside the home either in employment or participating in organizations the food practices of the family may be

affected. In the present study employment of the mother and membership in organizations were investigated in relation to eating behavior, adequacy of diet and responsibility of girls for family meals as well as to the independent variables of the study: age, menarche and social status. The findings are given in Tables 12, 13 and 14.

Table 12. Interrelationship among mothers' employment and membership in organizations

Organizations	Employed outside home	Belong to PTA	Belong to church organization	Belong to card club
	r	r	r	r
Belong to PTA	-.19*			
Belong to church organization	.04	.15		
Belong to card club	-.10	.17*	.24**	
Belong to other organization	.07	.22**	.19*	-.04

*Significant at the .05 level.

**Significant at the .01 level.

Mothers who were employed outside the home tended not to belong to organizations. Mothers who belonged to church organizations and card clubs were inclined to belong to a number of other organizations as well. It appeared that mothers who belonged to organizations other than those listed

Table 13. Relationship of mothers' employment and membership in organizations to responsibility of the girls for family meals

Occupation of mothers	Plan meals	Buy food	Prepare some food	Prepare family meals	Prepare own meals	Set table	Wash dishes
	r	r	r	r	r	r	r
Employed outside home	.16	-.06	.16	.22**	.14	-.04	.00
Belong to PTA	-.04	.07	.06	-.11	-.06	.16	.14
Belong to church organizations	.16	.19*	.16	.21**	.11	.01	-.05
Belong to card club	-.13*	-.09	-.17*	-.06	-.09	-.17*	-.01
Belong to other organizations	.14	.04	-.03	-.06	.04	.11	.11

*Significant at the .05 level.

**Significant at the .01 level.

Table 14. Relationship of mothers' employment and membership in organizations to age, social status, food enjoyment, food experience, eating behavior and dietary adequacy of the girls

Employment and membership of mothers	Age	Social status	Food enjoyment	Food experience	Eating behavior: Meals missed-	Snacks/ day- mean no.	Different items/ day- mean no.	Servings/ day- mean no.	Repeated meals- no.	Dietary adequacy
	r	r	r	r	r	r	r	r	r	r
Employed outside the home	-.01	-.06	-.04	-.07	.11	-.05	-.05	.00	-.09	-.07
Belong to PTA	-.25**	.14	-.04	.13	-.03	.21**	.17*	.19*	.09	-.06
Belong to church organization	.05	.36**	.07	-.04	-.14	.20*	.29**	.31**	.01	.17*
Belong to card club	-.09	.37**	-.06	.20*	-.03	.14	.04	.16	-.07	.03
Belong to other organizations	-.06	.14	-.19*	.13	-.11	.19*	.13	.21**	.08	.07

*Significant at the .05 level.

**Significant at the .01 level.

were inclined also to belong to PTA and church organizations as well but not to card clubs.

Girls whose mothers were employed outside the home or belonged to church organizations had more responsibility for preparation of family meals than the other girls. On the other hand girls whose mothers belonged to card clubs took less responsibility for meals than the girls whose mothers did not belong to card clubs. Neither the membership of mothers in PTA nor in organizations other than those listed was significantly related to any responsibilities studied.

The relationship of the employment of mothers and their membership in organizations to their daughters' eating behavior, dietary adequacy, age and social status are given in Table 14. None of the correlations with the variables investigated was significant in relation to menarche so these correlations were omitted.

Employment of mothers was not significantly related to any of the eating behaviors, to dietary adequacy or to the independent variables studied. Girls whose mothers belonged to PTA were younger than those whose mothers were not members. These girls also tended to have more snacks, a greater number of different items of food and more servings of food per day but not better diets than the other girls. Membership of mothers in church organizations was significantly related to social status. Girls whose mothers belonged to

church organizations tended to have more snacks, more different items per day, more servings of food per day and more adequate diets than girls whose mothers did not belong to church organizations. Mothers who belonged to card clubs tended to be in the highest social-status classification and provide more experience with a greater variety of foods for their daughters than did mothers who did not belong to card clubs. Girls whose mothers belonged to organizations other than those listed appeared to enjoy food less, have more snacks and have more servings of food per day than the other girls.

Responsibility for family meals Information concerning the types of responsibilities the girls had for family meals and their interrelationships was obtained and the findings are presented in Table 15. The relationship of the kind and amount of responsibility of the girls for family meals to eating behavior, to dietary adequacy and to the three independent variables was investigated. No significant correlations were found for age, menarche or social status so they are omitted from the table. The other results are given in Table 16.

Girls who had responsibility for planning meals usually had responsibility also for buying food and preparing meals but less often for setting the table or washing the dishes. On the other hand girls who set the table were more likely to wash dishes and less likely to plan meals, buy food or prepare

Table 15. Interrelationships among types of responsibility of girls for family meals

Responsibility for family meals	Plan meals	Buy food	Prepare some food	Prepare family meals	Prepare own meals	Set table
	r	r	r	r	r	r
Buy food	.39**					
Prepare some food	.45**	.20*				
Prepare family meals	.49**	.28**	.64**			
Prepare own meals	.39**	.15	.33**	.36**		
Set table	.17*	.07	.25**	.17*	.01	
Wash dishes	.18*	.06	.14**	.06	.03	.34**

*Significant at the .05 level.

**Significant at the .01 level.

family meals than the other girls.

Girls who planned meals tended to have less experience with a variety of foods and consumed fewer snacks each day than those girls who did not plan meals. Those who prepared family meals also were less familiar with a large variety of foods than the other girls. When they prepared their own meals the girls consumed a smaller number of snacks, fewer servings of food per day and tended to have poorer diets. Those girls who washed dishes apparently missed fewer meals than those girls who did not wash dishes. Purchase of food,

Table 16. Relationship of responsibility for family meals to food experience, eating behavior and dietary adequacy

Responsibility for family meals	Food experience	Eating behavior: Meals missed- %	Snacks/ day- mean no.	Different items/day- mean no.	Servings/ day- mean no.	Repeated meals- no.	Dietary adequacy
	r	r	r	r	r	r	r
Plan meals	-.21**	.00	-.18*	-.06	-.15	-.01	-.02
Buy food	-.15	.02	.06	.03	-.00	-.01	.03
Prepare some food	-.15	-.08	.02	.10	.03	-.04	-.07
Prepare family meals	-.21**	-.06	-.05	-.01	-.05	-.06	-.05
Prepare own meals	.13	.12	-.20*	-.07	-.19*	-.05	-.17*
Set table	-.12	-.02	.08	-.02	.09	-.07	-.02
Wash dishes	-.06	-.24**	.08	.12	.15	.03	.14

*Significant at the .05 level.

**Significant at the .01 level.

preparation of some food, or setting the table do not appear to be related to food experience, eating behavior or dietary adequacy. The average number of different items of food consumed per day and the number of meals repeated in the seven day period were not related to any of the kinds of responsibilities for family meals.

Family criticism. The possible relationship of family criticism about eating habits to eating behavior, adequacy of diet and the independent variables was studied. No significant relationships were found for social status with any of the factors measured so it is omitted from the table. The other findings are given in Table 17.

Girls who were criticized for not eating the right foods tended to have poorer diets and to enjoy foods less than girls not so criticized. Girls who were criticized for eating too much tended to be those who were advanced physiologically as evidenced by their menarcheal status. These girls also enjoyed food less, missed more meals, had fewer servings of foods and poorer diets than the girls who were not criticized for eating too much. They did tend, however, to have more experience with a variety of foods than the other girls. No significant relationships were found between criticism for eating too little and any of the indices of eating behavior or adequacy of diet. Contrary to what might be expected girls who were criticized for eating too often did not have more

Table 17. Relationship of family criticism to age, social status, menarcheal status, food enjoyment, food experience, eating behavior and dietary adequacy

Family criticism	Age	Menarche	Food enjoyment	Food experience	Eating behavior: Meals missed-mean no.	Eating behavior: Snacks/day-mean no.	Eating behavior: Different items/day-mean no.	Eating behavior: Servings/day-mean no.	Eating behavior: Reported meals-no.	Dietary adequacy
	r	r	r	r	r	r	r	r	r	r
Not eating right foods	-.02	-.13	-.23**	.01	.05	-.13	-.13	-.12	-.04	-.21**
Eating too much	.06	.20*	-.17*	.17*	.20*	-.09	-.08	-.28**	-.01	-.27**
Eating too little	-.02	-.10	-.07	-.06	.01	.09	.09	.10	.01	.09
Eating too often	.06	.11	.02	.00	.19*	-.09	-.09	-.15	.10	-.19*
Eating too fast	-.22**	.05	.14	.15	-.02	.09	.09	.13	-.07	.01
Eating too slowly	-.07	-.03	-.15	.02	.17*	.07	.07	-.09	-.09	-.18*
Poor table manners	-.23**	-.01	.12	-.12	-.02	-.09	-.09	.01	.07	.00
Other criticisms	.19*	-.11	.15	-.13	-.14	-.04	-.04	-.04	.03	.03

*Significant at the .05 level.

**Significant at the .01 level.

snacks per day. They missed more meals and had poorer diets than the other girls. Girls criticized for eating too slowly also missed more meals and had poorer diets than other girls. The younger girls in the study appeared to be those who were criticized for eating too fast and for having poor table manners.

Some significant relationships were found for various types of family criticism and responsibility of the girls for family meals. Criticism for eating too often correlated -.19 with both planning meals and the buying of food by the girls, while criticism for eating too much correlated .21 with preparation of some food. (See Appendix J, Table 21, Correlation matrix 2.) Apparently girls who planned meals and bought food tended not to be criticized for eating too often while those that prepared some food were more often criticized for eating too much.

Reactions to new foods Information was obtained concerning the relationship of the reaction of the girls to new foods and their eating behavior, dietary adequacy, the three independent variables. No significant correlations for menarche, age, mean number of snacks per day or food experience were found with the other variables so they are omitted from the table. The other results are given in Table 18.

Girls who refused to taste new foods were inclined to

Table 18. Relationship of reactions to new foods to age, social status, food enjoyment, food experience, eating behavior and dietary adequacy

Reactions to new foods	Social status	Food enjoyment	Eating behavior: Meals missed-%	Eating behavior: Different items/day-mean no.	Eating behavior: Servings/day-mean no.	Eating behavior: Repeated meals-no.	Dietary adequacy
	r	r	r	r	r	r	r
Refuse to taste	-.02	-.06	.26**	-.17*	-.17*	-.05	-.19*
Taste for curiosity	-.19*	.01	-.05	-.09	-.02	.20*	-.01
Required to taste	-.02	-.10	.03	-.17*	-.15	.16	.01
Taste for experience	.21**	.18*	-.02	.25**	.17*	-.28**	.08

*Significant at the .05 level.

**Significant at the .01 level.

miss more meals, to eat fewer different items of food, to eat more servings of food each day and to have poorer diets than girls who did not refuse to taste new foods. When the girls indicated that they tasted new foods because they were curious about the taste, they tended to come from the lowest social-status class and have more monotonous diets (more repeated meals) than the other girls. Those girls who tasted new foods because they were required to do so ate fewer different items of food each day. On the other hand girls who tasted new foods for the experience tended to be in the highest social-status class, to enjoy food more, to eat more different items and servings of food each day and to have fewer meals repeated during the period of food intake than the other girls.

Some of the reactions to new foods correlated significantly with criticism for poor diets. Girls who were criticized for not eating the right foods tended to refuse to taste new foods ($r = .20$) and to lack curiosity about new foods ($r = -.17$).

Interrelationships of factors and independent variables

Group differences and interactions among the three independent variables of the study and the factors investigated for relationship to eating behavior as well as the indices of eating behavior and dietary adequacy were determined by analysis of variance. The variables for which significant F

ratios were found are given in Table 19. The relationships for age, menarche and social status to the factors investigated are the same as those found by correlations and will not be discussed again. Only the significant interactions will be mentioned.

Dietary adequacy and eating behavior Significant F ratios were found for age and menarche interaction with dietary adequacy and eating behavior indices. By plotting the data it was found that the younger post-menarcheal and older pre-menarcheal girls or in other words, the earlier- and later-maturing girls, missed the most meals, had the smallest number of different food items and servings of food each day and selected the poorest diets.

Family relationships A very significant interaction between age, menarche and social status was observed for family relationships. When the younger post-menarcheal and older pre-menarcheal girls were of the lowest social-status class, they had significantly poorer family relations than other girls.

Adjustment to reality The earlier- and later-maturing girls were also least well adjusted to reality. Social status, however, did not enter into the interaction.

Sex-role identification A very significant interaction of menarche and social status was found. The pre-menarcheal girls of the lowest social-status class and the post-menarcheal girls of the highest social-status class

Table 19. Significant F ratios of the dependent variables with the three independent variables: age, menarche and social status

Source[a]	df	Dependent variables: Dietary adequacy	Meals missed- %	Different items/ day- mean no.	Servings food/ day- mean no.	Counseling Inv. Family relations	Counseling Inv. Adj. to reality	Sex-role identification	Knowledge of nutrition	Values food Health	influencing selection Independence	Enjoyment
Within	109											
A	1	-	*	-	-	*	*	**	**	-	-	-
P	1	-	*	-	-	-	-	-	-	**	-	-
S	2	*	-	**	*	*	**	-	-	-	**	*
AP	1	**	**	*	**	-	*	-	-	-	-	*
AS	2	-	-	-	-	-	-	-	-	-	-	*
PS	2	-	-	-	-	*	-	**	-	-	-	-
APS	2	-	-	-	-	**	-	-	-	-	-	**

[a]A = age; P = pre- or post-menarche; S = social status; AP = age - pre- or post-menarche interaction; AS = age - social status interaction; PS = pre- or post-menarche - social status interaction.

*Significant at .05 level.

**Significant at .01 level.

identified most positively with their sex-role.

Enjoyment as a value in selection of food Those girls who placed a very high value on enjoyment in the selection of food were primarily the older pre-menarcheal girls from the upper social-status class. There were small differences among the younger girls but the younger post-menarcheal girls appeared to be inclined to value enjoyment in the selection of food more than the younger pre-menarcheal girls.

Apparently the earlier- and later-maturing girls were similar in their eating behavior, adequacy of diet and family relationships.

DISCUSSION

Factors Related to Selection of an Adequate Diet

Physiological maturation

Maturation appeared to be highly related to the food practices of the girls in this study. Both earlier- and later-maturing girls were conspicuous for their poorer eating behavior. For the earlier-maturing girls the picture was further complicated by the tendency towards overweight. On the other hand the later-maturing girls although similar to the early-maturing girls in their food practices were not overweight for their age group.

A number of investigators have observed the tendency for maturation to occur earlier in girls who were overweight (10, 22, 23). Garn and Haskell (23) observed that children who were overweight at 8.5 to 9.5 years of age reached menarche and tidal union earlier than children of average weight for their age. The authors stated that the extent to which these children were advanced physiologically and therefore heavier for their chronological age (or were overfat) is not known. Garn (22) states that weight is an excessively complicated body measurement. There are fat underweight children and lean overweight children. Fatness instead of weight should be measured in order to determine how many of these children are really fat or obese.

Overweight

Stuart (54) states that overweight of adolescence can be looked upon as an exaggeration of a normal tendency, possibly complicated by the particular emotional factors, food habits or lack of activity usual at this time. In the present study no significant relationships were noted between weight-for-age classification and psychological adjustment as measured by the Minnesota Counseling Inventory (5).

About half of the girls classified as overweight for their age expressed concern about overeating and overweight. The greater the degree of overweight the larger the proportion of girls who expressed concern. According to the findings of Frazier and Lisonbee (21) some children have difficulty accepting the physical changes that occur at adolescence. They may be average or light in weight for their age and yet be concerned about overweight. In the study of these investigators 55 per cent of the adolescents expressed concern about becoming overweight while only 30 per cent described themselves as being overweight. In the present investigation, however, the girls who were concerned about overweight usually were overweight. Only 8.5 per cent of those expressing concern about overweight were light in weight for their age.

Girls who were overweight had poor eating behavior and poor diets. This finding is in accord with the observations of Eppright and Roderuck (17), Eppright et al. (16) and

Hampton et al. (27). Eppright et al. (16) observed that diets were not poor because of the excess intake of energy foods. Heavy teen-age girls had lower food energy intake than had the medium weight girls at breakfast by eight per cent, at lunch by 10 per cent and in snacks by 23 per cent. The present observations are in accord with the findings that the overweight adolescent girls consumed diets which furnished less food energy than did girls of normal weight.

The activity indices of the overweight girls indicated a slightly lower mean-energy-expenditure for them than for the other girls but the difference was not significant. This is in contrast to the observations of Johnson et al. (30) who found significantly less participation in active sports and other strenuous activities by the obese girls than by their controls.

It would appear that within the limitations of the measurements used in this study overweight among the young adolescent girls was not associated with emotional problems, with excessive energy intake from food or with significantly lower energy expenditure in activities. These findings are contrary to what would be expected. A possible explanation may be that during childhood these girls consumed diets excessive in energy value and became overweight as suggested by Pickenpaugh (44). Upon reaching or nearing adolescence and becoming aware of relation of size to social acceptance, these

girls may have been following fad or self-imposed starvation diets in an attempt to be more like their leaner peers. This could account for their diets being low both in nutrients and energy value during the study. Possibly dieting was followed by periods of gorging which would result in a higher food energy intake over a period of time than would be indicated from the records of food intake during the sample period.

Research with adolescents (25) suggests that some obese children may have an "inborn" error which impairs the ability of the body to mobilize stored body fat. This may explain why some overweight adolescent girls continue to be heavy even though the present energy intake from food is low. Whatever the cause of overweight in adolescent girls it appears to be related adversely to the quality of the diet.

Psychological adjustment and family relations

Emotional stability, conformity, good adjustment to reality and good family relationships appeared to be characteristics of girls with the better food habits. These findings are in accord with observations of several investigators: Hallersberg (26), Baldwin (3, 4) and McCarthy (38).

Hallersberg (26) found that the type and degree of maturity of the adolescents were expressed in their attitude toward family and food. Baldwin (3) also observed that children who had good appetites, good growth patterns and

were well-adjusted tended to come from democratic homes; those in which there was an accepting attitude towards the children and where children were assured of the love of their parents, even if punished. It was assumed that this type of home would foster good parent-child relationships. A significant relationship between emotional adjustment of the adolescents and the kind of relationships within the family was found by Landis (34).

Conformity as measured in the present study relates to a willingness to accept guidance and is another aspect of psychological adjustment. In accord with the present findings, Baldwin (3) and Ohls (42) observed that conformity is related to the quality of the diet. Apparently a girl who tends to accept guidance in other aspects of behavior is likely to accept it also in relation to eating behavior.

A number of investigations have shown that poor psychological adjustment is related to poor food practices. Wallen (58, 59), Gough (25) and Smith et al. (48, 49) found that subjects who had a large number of food aversions had marked neurotic tendencies. Smith et al. (49) suggested that rejecting foods may be a socially acceptable way of expressing fear and anxiety. The high relationship between degree of emotional adjustment and food aversion scores led Wallen (59) to suggest that such scores could be used as a screening device for emotional adjustment.

Since adolescence is a period in which girls and boys need to make many adjustments to changes in their physical, emotional and social life, the dynamic relationships between physical and emotional development are intensified (39). It is understandable that children who deviate greatly in physical maturity may find adolescence a very emotionally disturbing period and one in which psychological problems often arise.

In accord with the present findings Jones and Mussen (31) observed that girls whose maturational status was at one extreme or the other had feelings of inadequacy and isolation. These authors believed that early maturation created a hazard to the girl's social adjustment while late maturation was characterized by less adequate self-concepts and slightly poorer parent-child relationships. Moore (39) reports similar findings. He states that rate of maturing is an important factor in determining behavior and psychological security during the adolescent years.

A possible explanation of the relationship between eating behavior and maturation is based on the assumption that eating is only one aspect of behavior and it, like all behavior, is affected by emotional adjustment. Since deviation in age of maturation may be accompanied by emotional problems, this deviation may in turn be related to poor eating behavior.

Social status

The girls with the better diets tended to come from the highest of the three social-status classifications. Conversely, girls with the poorer diets tended to come from the lowest social-status class. As measured in this study, social-status classification includes two components: the prestige rating of the father's occupation, which is related to income, and the educational level of both parents. A number of investigations have shown a relationship between family income and adequacy of the diet: Wilhelmy et al. (61), Covan et al. (14) and Boek (6). It is only when the income is very inadequate, however, that it has its greatest detrimental effect on the quality of the diet. Wilhelmy et al. (61) found no relationship between family income and quality of diet in their survey of nutritional status made in Groton Township, New York. These authors suggested that family income was at a sufficiently high level so that it was not a limiting factor. Lollis (37) also found no relationship between family income and the quality of diets of adolescent girls. Since the girls in the present study largely came from middle class families, income would not seem to be an important factor in limiting the quality of the diet. It would appear, therefore, that the second component, namely, educational level of parents, may be more closely related than income to the adequacy of the diets. This suggestion would agree with the

findings of Lollis (37) that the quality of the diet provided for the family was significantly related to the education of the mother.

Values considered important in the selection of food

Values function psychologically in directing behavior or they provide a basis for making choices (28). Since better diets were found among girls who indicated that health was an important value in directing their selection of food, it appears that selection of diet may have a rational basis, at least to some degree. When health was recognized as related to food chosen, a course of action was adopted which helped to influence choice. If this theory is sound, the girls would need to understand that nutrition is related to health and also have enough knowledge of nutrition to select an adequate diet. Since a significant correlation was found between the consideration of health as a value and the understanding that nutrition is important to good health and the correlation of the value of health with knowledge of nutrition approached significance, there appeared to be a tendency for girls who valued health in food selection also to know more about nutrition.

Knowledge of nutrition

The finding that knowledge of nutrition, as measured by a test of ability to apply nutrition principles in selecting

an adequate diet, was positively related to good food practices is in accord with the findings of Stone (53) and Covan et al. (14). The latter found that adolescents with excellent information about nutritional needs ate the most adequate diets. Stone noted that when there was improvement in knowledge of nutrition there was also improvement in food habits. Ohls (42), however, found no relationship between knowledge of nutrition and quality of diet in an investigation of factors related to diets of college freshmen women. The difference in findings might have been due to a difference in type of knowledge tested. In the present study the knowledge test assessed mainly the ability to select an adequate diet while the test used in the Ohls study required more technical knowledge.

Food enjoyment

Enjoyment of food, as measured by scales designed to assess degree of liking of food, appeared to characterize girls who tended to select better diets. Although there was no significant relationship found between the enjoyment of food and psychological adjustment as measured by the Minnesota Counseling Inventory (5), a number of other investigations have shown that more food aversions are found among persons with neurotic tendencies when among the well adjusted (25, 48, 49, 58, 59). In studying food likes and dislikes of young children McCarthy (38) found that children classified as

feeding problems liked fewer foods and refused to eat more foods than did the non-problem group.

There are many facets of food enjoyment which are as yet poorly understood. It is known that good appetites accompany good health in growing children and adolescents. On this basis children with fewer worries and anxieties would be expected to enjoy food more than those with neurotic tendencies. On the other hand cases have been reported in the literature where individuals have used food as a means of relieving tensions and frustrations. It is possible, however, that the satisfaction these tense or frustrated individuals receive is not enjoyment. Psychological adjustment may not be an important factor involved in the enjoyment of food.

Factors Not Significantly Related to Eating Behavior

Employment of mother

Employment of mothers outside the home has been suggested as an important cause for the poor eating behavior and inadequate diets of children. The findings of this study, however, indicate that at least for this sample of girls employment of mothers was not significantly related to eating behavior or to the selection of an adequate diet.

Responsibility for family meals

In nutrition educational programs an assumption is sometimes made that girls who prepare meals become more interested in food and tend to enjoy it more. It is believed also that this enjoyment would accompany good food habits. In the present study the girls who had the most responsibility for family meals did not indicate a greater enjoyment of food as measured by the Food Enjoyment Scales nor did they have better eating behavior or tend to select an adequate diet.

Taste sensitivity

Taste sensitivity has been suggested as being related to the enjoyment and selection of food. For the girls in this investigation it was not a significant factor in their selection of an adequate diet. Sensitivity to bitter taste, however, was positively related to good eating behavior and the quality of the diet. This finding may be characteristic just of this sample.

When the taste solutions were identified incorrectly, they were confused most often with bitter. It appeared, therefore, to take more discrimination to identify bitter taste than sweet, salty or sour taste. Possibly correct identification of bitter taste is a function of intelligence as acuity of other senses such as hearing has been shown to be. Intelligence which was found to be related to social

status and quality of diet correlated .12 with identification of bitter taste. While a correlation coefficient of .12 is below the 5 per cent level of significance, the finding suggests that there is a tendency towards such a relationship.

A significant relationship was found between sensitivity to sweet taste and the mean number of snacks per day. A correlation of .15 was found between sensitivity to sweet taste and percentage of snacks furnishing little nutrition besides energy. While this correlation is below the 5 per cent level of significance, it may indicate a tendency toward the consumption of high energy foods, many of which are concentrated sweets. These findings suggest that a sensitivity to sweet taste may account for the predilection of people to sweet foods as snacks.

Food experience

Although the mean number of different items included in the diet per day was highly correlated with the adequacy of diet, food experience as measured by a scale designed to indicate degree of familiarity with a variety of food, was not significantly related to the quality of the diet. Apparently the foods included in the Food Experience Scale were not widely known in this community. These items, therefore, did not differentiate between families whose diets were varied and those who had monotonous diets.

Activity

Activity as measured in this study was not significantly related to selection of an adequate diet (r = .13) but did show a significant relationship to intake of milk equivalents and vitamin C-rich foods. The findings may suggest that the more active children were somewhat more inclined to select a more adequate diet but not significantly so.

Sex-role identification

Contrary to the findings of Stone and Barker (52) and Frank et al. (20) that the more physiologically mature girls, as determined by menarcheal status, had more heterosexual interests and identified more with the feminine role, the findings of the present study indicated that identification with sex-role for this sample of girls was more closely related to chronological age than to physiological development. Perhaps peer-group pressure, a chronological-age related factor, played a more important role than physiological development in heterosexual interests of these girls.

In accord with the observations of Frank et al. (20) girls from the lowest social-status class identified with the feminine role earlier in their physiological development than did girls in the middle and highest social-status classes. These authors suggested that their findings may be due to the continual pressures of ambitious or intelligent

parents for their daughters to achieve intellectually which the authors believed had a tendency to block acceptance of the feminine role.

Sex-role identification in the present study did not appear to be related to eating behavior.

Relationship of Eating Behavior Indices to Dietary Adequacy

The amount of food eaten, number of servings per day; variety in the diet, number of different items of food consumed per day; and the percentage of meals missed were significantly related to the quality of the diet but consumption of snacks had no relationship to dietary adequacy. As many girls with good diets as with poor diets had snacks. The consumption of high-energy low-nutritive-value foods was significantly related to adequacy of diet. Apparently girls who consumed the most food tended to have the best diets and the quality of the snacks did not relate adversely to the diet.

Of the three kinds of foods studied as eating behavior indices, only the intake of milk and milk equivalents correlated higher than .60 with the adequacy of the diet for both seasons. As compared with the correlation of dietary adequacy with milk consumption, correlations with intakes of carotenoid-rich and vitamin C-rich foods were much lower, though still highly significant. The intake of vitamin C-

rich foods, however, was more highly correlated with the selection of an adequate diet than was the intake of carotenoid-rich foods. These findings are in accord with those of the earlier study of Iowa children (19) in which it was found that the greatest differences between diets that met or exceeded the Recommended Dietary Allowances of the National Research Council for girls and those considered inadequate were in the use of milk, ascorbic acid-rich and carotenoid-rich fruits and vegetables. The very highly consistent relationship of milk intake to dietary adequacy in the two samples suggests that the intake of milk may be a fairly reliable index of the adequacy of diet for this age group. This is of practical importance because information about milk intake may be more easily and reliably obtained than information on the diet as a whole.

Seasonal Variation of Eating Behavior and Dietary Adequacy

Food practices were studied during the summer when school was not in session and the following February during the school week. Diets were significantly more nutritious in February than during the summer; as compared with the summer all of the indices of eating behavior improved during the winter. The mean number of different items and servings of food per day were higher; the intake of carotenoid-rich foods increased from 0.1 to 0.4 serving per day; the intake of vitamin C-rich

foods increased from 0.4 to 0.6 serving per day; and milk servings from 1.9 to 2.7 per day. Correlations of the mean number of servings of vitamin C-rich and carotenoid-rich fruits and vegetables with dietary adequacy were higher in the winter than in the summer. The intakes of these foods, therefore, were more important to the quality of the diet in the winter. Apparently foods other than those high in ascorbic acid and carotene made more of a contribution to the adequacy of the diet in the summer than in the winter.

In their study of 270 children from four to 15 years of age Young et al. (34) found no significant differences between intake of nutrients in the fall and spring. In the present study it is questionable whether the finding of better diets in the winter is due to a true seasonal difference or a difference brought about by changes in habits of living and perhaps participation in the school lunch program. The girls tended to eat more regular morning and evening meals with their families during the school year than during the summer. Only half an hour was allowed for lunch at school and nearly all of the girls ate the school lunch.

Implications for Educational Programs

From the present investigation it would appear that eating practices of girls are interrelated with their maturation, knowledge, values, social status, personal adjustment and

family relations. To be effective nutrition education must consider these complex interrelationships.

Knowledge of nutrition

Scores on knowledge of nutrition test were found to be favorably related to the selection of an adequate diet by the girls in this study. The finding suggests that eating behavior may have, at least in part, a rational basis. It should be possible, therefore, to improve eating behavior of girls this age through nutrition education. Information is needed, however, concerning the type of an educational program which will be effective in bringing about good food habits. Some research has been done in this area but more is needed (35).

Health as an important value in selection of food

In the present study health as a value in the selection of food appeared to accompany a more adequate diet while the values of status, sociability, independence and enjoyment in food selection were related to poorer food habits. Personal values provide a basis for making choices and, therefore, they should not be overlooked in an educational program in nutrition. Since childhood and adolescence are very important periods of value formation, it is important during these formative years that emphasis be given to the value of health in nutrition education.

Once values have been adopted, they are difficult but not impossible to change. According to Turner (57) major changes in values are more difficult to make unless the individual is convinced that such changes will contribute to his state of well-being. This author found that under such circumstances individuals made a conscious change in their values even when opposition stood in their way.

It appears, therefore, that educational programs should be planned to convince children that health is important to their well-being, that nutrition affects health and, therefore, health should be considered in selection of food. More information than is now available is needed as to the kinds of learning experiences which will result in health being held as an important value.

Overweight and concern about overweight

Adolescent girls appear to be very conscious of their weight. This is a period of development in which there is some tendency to gain weight that may be more evident in early maturing girls than others and may cause them undue concern. Girls who are overweight for their age may be more acutely aware of their size during adolescence when they are becoming more interested in heterosexual experiences.

Schools and family physicians should be encouraged to use better methods of determining obesity than the use of scales

alone. Perhaps the possibility of having skinfold measurements taken by a trained technician should be investigated for inclusion in school health programs. The girl may be physiologically advanced and, therefore, her weight should be compared with girls of her physiological rather than her chronological age in determining whether she is overweight.

Girls who are overweight need to have information on good nutrition and sound methods of weight reduction. More information is needed about the effect of the very low intake of energy necessary for reducing the weight of adolescents if it proves that the overweight can be traced to a metabolic defect.

For successful weight reduction there is reason to believe that considerable emotional support and understanding of the problem is needed by the overweight person. By making weight a moral issue and by impossible expectations of weight loss, psychological problems can be precipitated. Successful weight loss may also be related to emotional adjustment. Summerskill and Darling (35), finding that emotional adjustment was related to dieting performance, suggested the use of a psychosomatic inventory to determine those persons emotionally able to participate in rigorous dieting. Those eliminated by such an inventory may need psychiatric therapy before or during dieting in order to lose weight successfully.

Overweight is a complex condition and all facets of the

problem must be taken into consideration in planning for its correction. Teachers and counselors may need some assistance from specialists in guiding overweight adolescents, especially the earlier-maturing girls. Even though overweight is a complicated problem, consideration needs to be given to it in planning a successful educational program in nutrition for adolescents.

Physiological maturation

Since considerable deviation from the average in age of maturation is accompanied by poor nutritional practice, an effective educational program in nutrition must give consideration to maturation. Adolescents need to understand the process of growth and development, the meaning of variation from the average and the part played by nutrition in attaining their genetic potential. Possibly girls whose maturation differs markedly from the average should be observed carefully and given counseling as needed by an adequately trained counselor.

Psychological adjustment

Poor psychological adjustment adversely affects all behavior, including eating behavior. Helping children to understand and accept themselves and to make a satisfactory adjustment to society is a very important aspect of any educational

program in a democratic setting. Teachers and parents can help children learn to respect themselves as individuals and to assess their own worth. This would require capable teachers who themselves could accept children as they are without trying to impose their own standards of behavior on them and who are sensitive to the opportunities to help children. Trained guidance counselors might work with both teachers and pupils in the area of psychological adjustment.

Family relationships

Since good family relationships are related to good food habits, a program for nutrition education should consider the home environment of the adolescents. Some means of reaching the parents should be devised to help them understand the problems of adolescents and to provide a more relaxed wholesome and healthy home environment. Programs of education for adults should also include information on menu planning to meet nutritional needs of family members and on weight control.

Social status

The fact that social status was found to be positively related to good food habits has implications for nutrition education. While the objectives of an educational program may not be to upgrade the social status of the children, it can provide knowledge and guidance for making better food

selections within the limitation of family income. To what degree the adolescents will be able to apply their knowledge of nutrition will depend somewhat on their relationships with their mothers and the amount of responsibility the girls have for planning family meals.

SUMMARY AND CONCLUSIONS

A sample of 140 girls 12 to 14 years of age was selected from Boone, Iowa, for a study of physiological, psychological and sociological factors which may be related to eating behavior and selection of an adequate diet. The sample was controlled for chronological age, social status and menarche. An effort was made to select approximately equal numbers of girls who had and had not reached menarche for each age group divided among three social-status categories. This experimental design resulted in 18 groups. Social-status classification was determined from the father's occupation and the educational level of both parents.

Information was obtained by means of questionnaire, food intake records taken in summer and winter, activity records, certain physiological measurements, taste threshold tests, food enjoyment scales, a test of nutrition knowledge and inventories of values and psychological adjustment. Analyses of variance and intercorrelations were employed in the treatment of the data.

The girls in the study came from relatively stable, largely middle-class families. All lived in a town of approximately 14,000 and the majority had lived there most of their lives. About one-third of the mothers were employed outside the home, but only approximately eight per cent were employed full time.

The subjects were classified according to their weight and age into seven groups using the Physical Growth Record for Girls, namely: very light, light, moderately light, average, moderately heavy, heavy and very heavy. Of the 140 subjects 18.6 per cent were heavy or very heavy and 6.4 per cent were light or very light.

Each girl kept a record of her activity for a week during the summer from which an activity index was computed. The 14-year-old girls tended to be more active than the younger ones, but not significantly so.

Eating behavior indices used in the study include percentage of meals missed, snacks, intake of different items of food, number of servings of food per day, repetition of meals, intake of fruits and vegetables rich in carotene and vitamin C and of milk and equivalents and the caloric value of the nutrient-poor foods. Dietary adequacy was given as a score which represents the percentage of the recommended number of servings of foods in the basic food group plan which were eaten each day representing the average of the percentages of the nutrients of the Recommended Dietary Allowances of the National Research Council which were being met.

Intake of food was recorded for seven consecutive days in the summer of 1960 and for three consecutive days during the following February. The intake of milk, carotene- and citamin-C-rich fruits and vegetables was low. The group

neither tended to miss a large number of meals nor to consume a large number of snacks. The diets and eating behavior were significantly better during the winter than during the summer period.

Relationships were investigated of eating behavior and dietary adequacy to physiological development and rate of maturation, sex-role identification, values considered important in selecting foods, knowledge of nutrition, food enjoyment, food experience, psychological adjustment and the three independent variables of the study: age, social status and menarche.

Physiological maturity was estimated from bone-age-to-chronological-age ratios and menarcheal status. As compared with the less mature, the more mature girls were inclined to be heavier for their age group, to be more concerned about overweight, to miss more meals and to place a lower value on health in selection of food. Girls who were taller for their age tended to have better diets than those who were shorter. They also performed better on the nutrition knowledge test. On the other hand, when girls were heavier for their age they tended to miss more meals and to have poorer diets than the lighter girls.

Thresholds were determined for the detection of the four basic tastes: sweet, sour, bitter and salty. No relationships of taste sensitivity to eating behavior and dietary

adequacy were observed except that sensitivity to sweet taste was significantly related to the mean number of snacks per day.

No significant relationships were noted between activity indices and eating behavior or adequacy of diet.

By means of an inventory, scores were obtained to represent the importance attached to the values of health, sociability, independence, status and enjoyment in selection of food. Girls who placed a high value on health in selecting food tended to have better diets, to miss fewer meals, to enjoy food and to be less concerned about overweight than the others. They belonged to the higher social-status groups, and, in choosing food, considered less important than health the values of sociability, independence, status and enjoyment. On the other hand those who scored high on the four values of sociability, independence, status and enjoyment tended to select poorer diets. These values were found more often among the girls of the lower social-status class than among the higher.

As compared with girls who rated low on the Food Enjoyment Scales, girls who enjoyed food more tended to have better diets, to be less concerned about overweight, to be in the lower or medium weight-for-age classifications and to be in the highest of the three social-status classes in this community.

Knowledge of nutrition, as determined by a test measuring ability to apply information in selecting meals, was significantly related to dietary adequacy. The girls who scored higher on this "knowledge" test also tended to miss fewer meals.

In the analyses some measures proved to be highly intercorrelated and individually correlated similarly with others. Such measures were grouped and treated statistically as clusters. These clusters were correlated with dietary adequacy and such indices of eating behavior as number of meals missed and number of snacks per day.

One cluster included data indicating overeating and concern about overweight together with weight-for-age classification. In this sample, the girls who were concerned about overweight tended to be in the upper weight-for-age classification and were more advanced physiologically than those who did not score high in this cluster. They were inclined to have poorer diets, to miss more meals, to enjoy food less and to value health in food selection less than the other girls.

Two clusters for psychological adjustment were made from the seven scales of the Minnesota Counseling Inventory. One cluster consisted of the scales for Social Relations, Mood and Leadership and was designated as Interpersonal-and-Peer-Group Relations. The other contained the scales for Adjustment to Reality, Emotional Stability, Family Relations and

Conformity and was called Personal-Adjustment-and-Family-Relations. No significant relationships were found between the cluster for peer-group relations and dietary adequacy or eating behavior indices except that the higher the score in this cluster the fewer the meals missed. In contrast those girls who had better personal adjustment and family relations had better diets, missed fewer meals, had more experience with a variety of foods than those who did not score high in this cluster. Family relations and emotional stability, therefore, appeared to be more closely associated with eating behavior than leadership and peer-group relations.

Daughters of employed mothers tended to have more responsibility for family meals than daughters of mothers who were not employed. Neither employment of mothers nor the responsibility of girls for meals was significantly related to eating behavior, enjoyment of foods and dietary adequacy.

A significant interaction was found between age and menarche for dietary adequacy and all indices of eating behavior. The young post-menarcheal or the early-maturing girl, and the older pre-menarcheal or late-maturing girl, had poorer diets than the others. These girls also had a poorer adjustment to reality and valued enjoyment very highly when selecting food. When these groups, the early-maturing and late-maturing girls, were in the lowest social-status class they had the poorest family relationships. Apparently

the early-maturing and late-maturing girls in this study were somewhat alike in their eating behavior as well as in some of their other behavior patterns.

From the findings of this study it appears that the young adolescent girl with a good diet can be characterized as one who is average in physical development and weight, has good personal adjustment and family relations, values health in food selection, has some knowledge of nutrition and comes from the highest of the three social-status classes.

Some of the observed significant relationships that seem especially pertinent for consideration in nutrition education are as follows:

1. Knowledge of nutrition as indicated by a test designed to ascertain ability to apply principles to selection of an adequate diet was favorably related to nutrition practices.
2. When health was considered an important value in selecting food, diets tended to be adequate but when status, sociability, independence and enjoyment rated high in food selection poor food practices resulted.
3. Overweight and concern about overweight were found concurrently with poor eating behavior and inadequate diets.

4. Early maturation was positively related to poor eating behavior and overweight; late maturation was also positively related to poor eating behavior but not to overweight.
5. Good family relations and personal adjustment seemed to accompany good eating behavior and selection of an adequate diet.
6. Social status was positively related to good eating behavior.

The findings of this study indicate that the eating practices of girls are interrelated with their maturation, knowledge, values, social status, personal adjustment and family relations. To be effective nutrition education must consider these complex interrelationships.

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APPENDIX A

Social Status Classification

The North-Hatt Scale which was developed to give a rank order of the prestige of 90 occupations was expanded by sociologists at the State University of Iowa and was used to assign a numerical value to the occupations of the girls' fathers. These values ranged from 40 to 93. The occupations ranked between these numbers were divided into 11 approximately equal groups and assigned a numerical value from 1-11.

The educational level of each parent was ascribed a value as follows:

1. Elementary school through the ninth grade.
2. Tenth-eleventh grade.
3. High school graduate.
4. Some college eudcation or advanced academic training such as business.
5. College graduate.
6. Some post college education.

A score for each girl was obtained by the following formula:

Social Status = 2X + Y + Z
X = numerical value of father's occupation
Y = numerical value of father's educational level
Z = numerical value of mother's educational level

The scores ranged from 4 to 30. On the basis of their rank in the group the girls were separated into three approximately equal groups. The scores of the lowest social-status group ranged from 4 to 14, the middle group from 15 to 18 and the

highest group from 19 to 30. There were 71, 73 and 71 girls, respectively, in the three categories.

APPENDIX B

Questionnaire

Name_____Grade___Date of birth_____
Month Year

Address_____

1. Is your father living? Yes__No__
   Is your mother living? Yes__No__

2. Are your parents living together? Yes__No__

3. Is your mother employed outside the home? Yes__No__

4. If so, what hours during the day does she work? _____

5. What organizations does your mother attend? PTA_____,
   Church organizations__, Card club__, Others (name)_____

6. How many older brothers and sisters do you have?____

7. How many younger brothers and sisters do you have?____

8. Have any of your grandparents ever lived in the United States? Yes__No__ If yes,

	Were they born in the U.S.? Check for each grandparent below.		If they were not born in the U.S. from what country did they come?	About how long ago did they come to the U.S.?		
	Yes	No		1/2-4 1/2 hrs.	5-9 1/2 yrs.	over 10 yrs.
Father's mother						
Father's father						
Mother's mother						
Mother's father						

9. How long have you lived in this town?_____;
   in your present home?_____

10. If you have lived in other places, list the places below and tell about how long you lived there

In or near what town	Town	Farm	About how long

11. Do you have a health condition which affects what you eat?
Yes__No__ If so, what?_____

12. Are you often hungry? Very often___Often___Sometimes___
Seldom___Never___

13. Do you wish you could have more snacks between meals?
A great deal___Much___Some___A little___Not at all___

14. Do you feel you just can't wait until mealtime?
Very often___Often___Sometimes___Seldom___Never___

15. Are you worried about eating too much?
A great deal___Much___Sometimes___Seldom___Never___

16. Do you wish you could eat more?
A great deal___Much___Sometimes___Seldom___Never___

17. Do you wish you could keep yourself from eating sweets as often as you do?
A great deal___Much___Sometimes___Seldom___Never___

18. Do you have to be careful not to eat so much because it will make you fat?
A great deal___Much___Sometimes___Seldom___Never___

19. Do you think the kind of food you eat has anything to do with your health?
A great deal___Much___Some___A little___Not at all___

20. What responsibility do you usually have at home for family meals?
I plan meals Often___Sometimes___Seldom___Never___
I help buy food Often___Sometimes___Seldom___Never___
I prepare some of the food for one or more meals
Often___Sometimes___Seldom___Never___
I prepare all of the food for one or more meals
Often___Sometimes___Seldom___Never___
I repare one or more of my own meals
Often___Sometimes___Seldom___Never___
I set the table Often___Sometimes___Seldom___Never___
I wash the dishes Often___Sometimes___Seldom___Never___

21. In some families certain meals are considered special. All of the family members try to get together, and mother fixes special foods which the family particularly enjoys.

Do you have such meals in your family? Yes__No__

If so, check which ones from the list below:

Sunday dinner____
Birthdays____
National holidays____
(4th of July, Washington's Birthday, New Years)
Church holidays____
(Easter, Christmas, etc.)
Others____
(Halloween, Valentines Day)

22. If a food you had never tasted was served to you, which of the following would you usually do?

1. Refuse to taste it____
2. Take a bite
   a. To see if it tastes good____
   b. Because this is what you are expected to do____
   c. Because it is interesting to eat new foods____

23. Do your parents or other members of your family often criticize you for how and what you eat?
Very often____Often____Sometimes____Seldom____Never____

Check the reasons for which you are criticized

Eating too much____	Eating too fast____
Eating too little____	Eating too slowly____
Eating too often____	Not using good table manners____
Not eating the right foods____	Other (describe)_____

24. Below are some questions about social occasions at which food is usually served. Check how often you take part in such activities and list the foods usually eaten:

Social occasions	Foods usually eaten
1. How often do you have parties for your friends at your own home? About once a year____ About twice a year____ About once a month____ About once a week____ More than once a week____ Never____	

Social occasions

2. How often do you go to parties in the home of your friends?
   About once a year____
   About twice a year____
   About once a month____
   About once a week____
   More than once a week____
   Never____

3. How often do you attend school parties?
   About once a year____
   About twice a year____
   About once a month____
   About once a week____
   More than once a week____
   Never____

4. Do you get together with your friends after school in public eating places?
   About once a year____
   About twice a year____
   About once a month____
   About once a week____
   More often than once a week____
   Never____

Foods usually eaten

25. What were your last meals like? Indicate on the form below

	List foods eaten. Tell how they were cooked or fixed.	With whom eaten	*Place eaten	Are you usually hungry at this meal Yes	Are you usually hungry at this meal No	Do you usually enjoy this meal? Yes	Do you usually enjoy this meal? If not give the numbers of the reasons which best apply from list below No
Breakfast This morning							
Noon meal Yesterday or today							
Evening meal Yesterday							

Reasons

1. I usually have a snack close to mealtime so I'm not hungry.
2. I'm seldom hungry.
3. I don't like the foods usually served at the meal.
4. I'm generally in too big a hurry to enjoy it.
5. I'm too tired to enjoy eating.
6. I'm scolded too much at mealtime to enjoy eating.
7. My family argues too much at mealtimes.

*Home, school, restaurant, drug store, drive-in, etc.

26. What are your snacks like? Indicate on form below including both foods and beverages in the column labeled "Foods usually eaten."

When eaten	List foods usually eaten	Place eaten	With whom
Morning Often__Sometimes__ Seldom__Never__			
Afternoon Often__Sometimes__ Seldom__Never__			
Evening Often__Sometimes__ Seldom__Never__			

Why do you wish to eat at this time. Mark (x) the numbers of the reasons from the list below which best apply.

Reasons	Morning	Afternoon	Evening
1. I'm hungry at this time even though I eat regular meals			
2. I'm hungry at this time because I ate little at or skipped the previous meal			
3. This is the time my friends and I get together to eat and talk			
4. I enjoy snack foods more than foods served at meals			
5. I'm tired at this time and a snack gives me energy			
6. I eat because my friends are having a snack			

APPENDIX C

Check List of Foods

Directions

Below is a list of foods which are commonly served in our part of the country. You are asked to indicate your preference for each of the foods according to the 5 statements given below. Blacken the space on the answer sheet which corresponds to the number before the statement which describes your feeling about the food.

For example if you like the first food on the list very much, then opposite no. 1 on the answer sheet you would blacken the first space.

1. I like it very much (Delicious).
2. I like it if it is served occasionally (Good).
3. I will eat it but I do not enjoy it. (Not too bad).
4. I dislike it and will never eat it. (Awful).
5. I have not tasted it.

1. Baked beans
2. Broccoli
3. Cabbage slaw
4. Cooked cabbage
5. Carrot sticks
6. Cooked carrots
7. Corn on the cob
8. Canned corn
9. Lettuce (raw)
10. Fresh peas
11. Canned peas
12. French fried potatoes

13. Baked potatoes
14. Mashed potatoes
15. Baked yellow squash
16. Summer squash
17. Fresh tomatoes
18. Stewed tomatoes
19. Tomato juice
20. Turnips
21. Raw apple
22. Apple sauce
23. Avocado
24. Bananas
25. Oranges
26. Fresh peaches
27. Canned peaches
28. Fresh strawberries
29. Cornbread
30. White bread
31. Soda crackers
32. Cornflakes
33. Puffed rice
34. Spaghetti
35. Baked custard
36. Ice cream
37. Puddings
38. Pie
39. Cake
40. Cookies
41. Candy bars
42. Milk
43. Chocolate milk
44. Buttermilk
45. Cottage cheese
46. Yellow cheese (American)
47. Scrambled eggs
48. Fried eggs
49. Hard boiled eggs
50. Soft boiled eggs
51. Poached eggs
52. Peanut butter
53. Hamburger
54. Beef steak
55. Beef roast
56. Lamb chops
57. Lamb roast
58. Pork chops
59. Pork roast
60. Fried fresh fish
61. Oyster stew
62. Canned salmon

63. Fried chicken
64. Roast chicken
65. Vegetable soup
66. Chili

Food Enjoyment Scale I

Score was determined from the total number of these following items on the Check List of Foods for which the response, "I like it very much" was given.

Items		
1	21	43
2	22	46
5	24	47
6	25	49
7	28	50
8	31	52
12	32	54
13	33	58
14	34	60
17	38	62
19	42	65

Food Enjoyment Scale II

Score was determined from the total number of the following items on the Check List of Foods for which the response, "I like it very much" was given.

Items		
36	40	63
37	41	64
38	53	66
39	55	

Food Experience Scale

Score was determined from the total number of the following items on the Check List of Foods for which the response, "I have not tasted it" was given.

Items		
15	43	58
13	38	57
20	44	61

APPENDIX D

Taste Test Record Form

Name of Judge_____Date_____Time_____

Substance_____

Procedure: Rinse the mouth thoroughly with distilled water, discarding the water. Taste Solution No. 1. Swish the solution around so that it reaches the back part of the tongue. Discard. Record score. Rinse the mouth with distilled water again. Wait one minute then taste Solution No. 2. Continue through the series with the same procedure.

Insert number designating the intensity of taste of the numbered solutions, using the following key:

0 - No taste
1 - Very faint
2 - Faint
3 - Easily noticeable
4 - Strong
5 - Very strong

Solution No.	1	2	3	4	5	6	7	8	9	10
Intensity										

What was the taste?_____

Number of solution at which taste was first identified_____

Concentrations of Solutions for Taste Tests

Solution number	Sodium chloride		Sucrose	
	M/L	gm/L	M/L	gm/L
1	0	0	0	0
2	.000313	.0183	.000625	.2138
3	.000625	.0366	.00125	.4279
4	.00125	.0731	.00250	.8559
5	.00250	.1463	.00500	1.712
6	.00500	.2925	.01000	3.424
7	.01000	.5850	.02000	6.848
8	.02000	1.170	.04000	13.696
9	.0400	2.340	.08000	27.392
10	.0800	4.680	.16000	54.784

Solution number	Tartaric acid		Caffeine	
	M/L	gm/L	M/L	gm/L
1	0	0	0	0
2	.0000163	.0037	.000065	.0126
3	.0000325	.0047	.000130	.0252
4	.0000650	.0094	.000250	.0486
5	.0001300	.0188	.000500	.0971
6	.000250	.0375	.001000	.1942
7	.000500	.0750	.002000	.3884
8	.001000	.1501	.004000	.7768
9	.002000	.3002		
10	.004000	.6004		

APPENDIX E: VALUES INVENTORY

Name_____ Date of birth

This is not an examination because all answers are right answers. In the following situations you are asked to decide what you think it would be best for junior high school girls to do. Try to imagine what you would do if you had such a decision to make.

After deciding what each girl should do, check each statement according to how much you feel it should influence her decision.

When you have checked each statement on the page, go on to the next page until you have finished all of the situations.

Situation I

Ellen is 12 years old and loves candy. She likes to have candy to share with her friends between classes and after school. The dentist has told her that her teeth are decaying badly and has suggested that Ellen drink more milk and eat more fruits and vegtables and fewer sweet foods. Her parents think it is not wise for her to spend so much of her allowance on candy when it isn't good for her. Do you think she should stop eating candy between meals? Yes____ No ____.

Check each reason listed below as to whether it should make a difference in Ellen's decision to stop or continue eating candy between meals.

If you think the reason should influence her decision very greatly then place an X in the box marked V.G.
If you think the reason should influence her decision greatly, then place an X in box marked G.
If you are uncertain how much the reason should influence her decision then place an X in the box marked U.
If you think the reason should influence her very little in making a decision then place an X in the box marked L.
If you think the reason should not influence her at all then place an X in the box marked V.L.

	VG	G	U	L	VL
1. Ellen should be allowed to have the candy since she enjoys it so much					
2. Ellen should have candy to share with her friends so she will be popular.					
3. It is Ellen's allowance and she should be permitted to spend it the way she wants without her parents telling her what to do.					
4. Lots of people eat candy so Ellen should eat it and not worry about her teeth.					
5. Ellen should do what her parents think best.					
6. Even if Ellen does enjoy the candy she ought to give it up.					
7. Even if Ellen does enjoy sharing her candy with her friends she should stop it.					
8. Ellen should do what she can to have healthy teeth.					
9. Sharing candy is a good way for Ellen to be friendly.					
10. Ellen should not think about being popular in deciding what to do.					

Situation 2

Ruth is fourteen. Her friends like to go to a restaurant on their way home from school for a snack of candy or a sweet roll and bottled drink. They meet other boys and girls there and have lots of fun. Ruth likes to be with the crowd, but she thinks it is a waste of time and money to go there every-day. Then, too, when the evening meal comes she is not hungry for the meat and vegetables which she needs for good health. Her parents tell her she should go with the others because they feel she spends too much time by her-self. Do you think she should go with the crowd? Yes___ No___

Check each reason listed below as to whether it should make a difference in Ruth's decision to go or not go with the crowd.

If you think the reason should influence her decision very greatly then place and X in the box marked V.G.
If you think the reason should influence her decision greatly, then place an X in the box marked G.
If you are uncertain how much the reason should influence her decision then place an X in the box marked U.
If you think the reason should influence her very little in making a decision then place an X in the box marked L.
If you think the reason should not influence her at all then place an X in the box marked V.L.

		VG	G	U	L	VL
11.	Ruth should go with others so she will be popular with the crowd.					
12.	Being friendly is not important in deciding whether she should stop at the restaurant.					
13.	Ruth should be the one to decide whether she should go with the girls, not her parents.					
14.	Ruth should be trying to eat the foods she needs for good health.					
15.	If her parents want her to go with the others she should go.					
16.	Ruth should not worry about her health.					
17.	Because eating together makes people feel friendly, Ruth should go with the crowd.					
18.	Ruth should not think about being popular.					

Situation 3

Marilyn and Kay go bowling regularly. They usually play with a group of boys and girls and the whole crowd goes back to someone's home to have a lunch. They have a good time over the food and look forward to this part of the evening. Kay feels that they all eat more at that time of night than is good for their health. She has suggested to Marilyn that they should play a little longer and then go to a restaurant for a coke. Marilyn disagrees with her. She thinks they wouldn't have as good a time at the restaurant. She says "Anyway, I think the fun we have getting the food ready and eating it is important." Do you think they should go to a restaurant for a coke instead of to someone's house for a lunch? Yes___ No___

Check each reason listed below as to whether it should make a difference to Marilyn and Kay in deciding to go to a restaurant for a coke or to someone's home for a lunch.

If you think the reason should influence their decision very greatly then place an X in the box marked V.G.
If you think the reason should influence their decision greatly, then place an X in the box marked G.
If you are uncertain how much the reason should influence their decision then place an X in the box marked U.
If you think the reason should influence them very little in making a decision then place an X in the box marked L.
If you think the reason should not influence them at all then place an X in the box marked V.L.

		VG	G	U	L	VL
19.	If the crowd likes to have a lunch at someone's home, they should continue to do it.					
20.	Kay is right; it isn't good for their teeth to eat so much at night.					
21.	Marilyn and Kay should go along with what the crowd wants in order to be popular.					
22.	It is not important for them to enjoy the food, they can have fun other ways.					
23.	Health should not be worried about in making this decision.					
24.	Marilyn and Kay should not be concerned about being popular with the group.					
25.	In order to get better acquainted the crowd should continue to fix and eat lunch together.					
26.	The girls should decide where to eat without thinking about the fun of eating together.					

Situation 4

Carol is just thirteen and is slightly overweight. Her mother often makes a chocolate cake with a rich icing which Carol enjoys very much. Her sister is disgusted and says Carol always thinks of food and never knows when to stop eating. Carol's friends enjoy cake too and she likes to ask them over after school to have some. Carol gets as much fun out of having them enjoy it as she does from eating it herself. Her mother, however, is concerned because it is not good for Carol's health to be overweight. Should she stop baking the cake? Yes___ No___.

Check each reason listed below as to whether it should make a difference to Carol's mother in deciding to continue baking the cake.

If you think the reason should influence her decision very greatly then place an X in the box marked V.G.
If you think the reason should influence her decision greatly, then place an X in box marked G.
If you are uncertain how much the reason should influence her decision them place an X in the box marked U.
If you think the reason should influence her very little in making a decision then place an X in the box marked L.
If you think the reason should not influence her at all then place an X in the box marked V.L.

		VG	G	U	L	VL
27.	Even though the girls have a good time being together, they should stop eating the cake.					
28.	If Carol enjoys the cake, she should go ahead and eat it.					
29.	Her mother should stop baking the cake if Carol is unable to control her eating by herself.					
30.	Even though Carol enjoys the cake, she should be willing to stop eating it.					
31.	Carol should think about her health and try to control her weight.					
32.	Carol should decide things for herself without her mother's forcing her to eat less.					
33.	It is all right for Carol to eat the cake because she and her friends have such a good time eating together.					
34.	Being overweight is not important and Carol should not worry about it.					

Situation 5

Eileen goes to the restaurant everyday after school with four of her best friends to order double rich malted milks. All of them are fond of these and Eileen thinks they just hit the spot after school. She especially enjoys being with her friends but Eileen has a lot of things to buy with her money and feels that sometimes she should order something less expensive than the malts. She thinks, though, that the other girls would not like it if she ordered anything else. Her mother tells her that she is healthy and gets plenty of milk so that she does not need the malted milk for good health. She advises Eileen to save her money and order something less expensive. Should she continue to go with the girls and have a malted milk? Yes___ No___.

Check each reason listed below as to whether it should make a difference to Eileen in deciding to go or not go with the girls to have a malted milk.

If you think the reason should influence her decision very greatly then place an X in the box marked V.G.
If you think the reason should influence her decision greatly, then place an X in the box marked G.
If you are uncertain how much the reason should influence her decision then place an X in the box marked U.
If you think the reason should influence her very little in making a decision then place an X in the box marked L.
If you think the reason should not influence her at all then place an X in the box marked V.L.

		VG	G	U	L	VL
35.	Eileen should think less about being with her friends when she eats.					
36.	Eileen ought to order something else and not worry about being popular with the crowd.					
37.	She should make up her own mind and not let her mother influence her.					
38.	In order to be friendly Eileen should continue to eat with the girls.					
39.	In deciding whether to have malted milks Eileen should not be influenced by how much she enjoys them.					
40.	Eileen should follow her mother's advice and not order the malted milks.					
41.	Eileen ought to do as the crowd does in order to be popular.					
42.	If Eileen enjoys the malted milks so much, she should get them.					

Situation 6

Pat loves to skate and she goes as often as she can in the winter time. She skates with a group of boys and girls and afterwards they usually go to the home of one of the girls for a lunch. They all go out to the kitchen and make their own sandwiches and have a marvelous time. Pat likes this crowd and wants to be included in the good times. However, she is becoming overweight which isn't healthy and it is interfering with her ability to do figure skating. She is trying to decide whether she should stop going with the crowd for the lunches. Her older sister thinks she should have a good time with the crowd at the rink but should not go with them to eat. Pat thinks they have fun eating together amd hates to miss being with the group but she cannot keep from eating too much if she goes. Do you think she ought to keep on going with the crowd for lunch? Yes___ No___.

Check each reason listed below as to whether it should make a difference to Pat in deciding to go or not go with the crowd for lunch.

If you think the reason should influence her decision very greatly then place an X in the box marked V.G.
If you think the reason should influence her decision greatly, then place an X in the box marked G.
If you are uncertain how much the reason should influence her decision then place an X in the box marked U.
If you think the reason should influence her very little in making a decision then place an X in the box marked L.
If you think the reason should not influence her at all then place an X in the box marked V.L.

		VG	G	U	L	VL
43.	Being friendly is not important in deciding whether she should go with the crowd to eat.					
44.	Pat should have the lunches without worrying about her health.					
45.	Enjoyment of food should not be important in Pat's decision.					
46.	Pat ought to go with the crowd because eating with a group helps everyone feel more friendly.					
47.	Pat should make up her own mind and not let her older sister tell her what to do.					
48.	In making this decision Pat should think of her health.					
49.	Pat should not worry about being popular in deciding if she should with the crowd.					
50.	Pat should listen to her older sister's advice because she is older and knows better what is good for her to do.					
51.	If Pat enjoys the sandwiches, she should have them.					
52.	Pat should go along with the crowd so she will be popular.					

Situation 7

Kathy is trying to gain weight so she can try out for the basketball team. Most of Kathy's friends play basketball and several of her group are sure to be chosen for the team. The girls on the team have a lot of fun together and Kathy wants to be included in the fun. Kathy's mother knowing that she needs to gain weight because of her health, goes to a lot of trouble to have sandwiches and cocoa for her and insists she should have them even when they have company. Kathy hates to be fussed over, so she sometimes refuses the extra food. Should she eat the food when she doesn't want it? Yes___ No___.

Check each reason listed below as to whether it should make a difference to Kathy in deciding to eat or not eat the food.

If you think the reason should influence her decision very greatly then place an X in the box marked V.G.
If you think the reason should influence her decision greatly, then place an X in the box marked G.
If you are uncertain how much the reason should influence her decision then place an X in the box marked U.
If you think the reason should influence her very little in making a decision then place an X in the box marked L.
If you think the reason should not influence her at all then place an X in the box marked V.L.

		VG	G	U	L	VL
53.	If her mother tells her to eat the food, Kathy should do it.					
54.	If she does not enjoy the food, she should not eat it.					
55.	Kathy should not try to get on the team just so others will like her.					
56.	Because it is not healthy to be under weight, Kathy should try to eat more to gain weight.					
57.	Kathy should make up her own mind about eating the extra food no matter what her mother says.					
58.	Whether Kathy enjoys the food is not important in making a decision in this situation.					
59.	Kathy should make an effort to get on the team so she will be popular with her school friends.					
60.	Kathy does not need to think about her health in deciding whether to eat the extra food.					

Situation 8

Joyce, twelve years old, has just come into Junior High School and is making friends with a group of girls she likes very much. In the evenings they get together in a restaurant for a lunch and Joyce finds that although she enjoys French fries, pies, cakes and ice cream they order they cause her face to break out in pimples. Her mother tells her that she gets enough food to eat at home and that the kinds of food she is eating at the restaurant are bad for her health. Joyce doesn't know what she should do but is afraid that if she doesn't go with the girls that they will stop asking her to do things with them. Do you think she should continue going to the restaurant with her friends? Yes___ No___.

Check each reason listed below as to whether it should make a difference to Joyce in deciding to go or not go to the restaurant with her friends.

If you think the reason should influence her decision very greatly then place an X in the box marked V.G.
If you think the reason should influence her decision greatly, then place an X in box marked G.
If you are uncertain how much the reason should influence her decision then place an X in the box marked U.
If you think the reason should influence her very little in making a decision then place an X in the box marked L.
If you think the reason should not influence her at all then place an X in the box marked V.L.

		VG	G	U	L	VL
61.	Joyce should eat what and where the other girls do, so she will be popular.					
62.	Joyce needs to consider health in deciding what to eat.					
63.	Since Joyce's mother thinks she should stop eating at the restaurant at night, she should not go.					
64.	She should not worry about her health in deciding whether to eat these foods at night.					
65.	Since eating together is a way to be friendly, the girls should eat together at night.					
66.	If Joyce enjoys the food she eats with the group, she should continue to have them.					
67.	Joyce ought to decide for herself about eating at the restaurant and not have her mother tell her what to do.					
68.	Joyce should decide what is best for her to do in this situation and not worry about being popular.					
69.	Although eating together is a way of being friendly, Joyce should not go to the restaurant.					
70.	Even though Joyce does enjoy the foods she should give them up.					

Situation 9

Pauline is at a girls' summer camp at the lake and is making friends with the girls in her cabin. The camp is in a section where fruits and vegetables are hard to get and often the only vegetables are carrots, cabbage or canned peas. They have oranges twice a week and the rest of the time prunes or apricots. Pauline doesn't like cabbage or carrots very well and won't eat prunes or apricots. She does not eat very much at meals and is often hungry. She complains about the food and the other girls often tell her to quit griping and not to be so finicky. The camp nurse tells her she needs to eat more to gain weight. Do you think Pauline should eat the fruits and vegetables even though she doesn't like them? Yes___ No___.

Check each reason listed below as to whether it should make a difference to Pauline in deciding to eat or not eat the fruits and vegetables.

If you think the reason should influence her decision very greatly then place an X in the box marked V.G.
If you think the reason should influence her decision greatly, then place an X in the box marked G.
If you are uncertain how much the reason should influence her decision then place an X in the box marked U.
If you think the reason should influence her very little in making a decision then place an X in the box marked L.
If you think the reason should not influence her at all then place an X in the box marked V.L.

		VG	G	U	L	VL
71.	Pauline should eat what the others so without complaining so she will be popular.					
72.	Pauline ought to eat the vegetables and fruits so she will be healthy.					
73.	Whether Pauline enjoys the food or not, she should try to eat it.					
74.	Being sociable is not important in deciding whether to eat the fruits and vegetables.					
75.	What the group thinks of Pauline is not important in deciding what to eat.					
76.	It is all right for Pauline to complain about the food because enjoying food should be part of the fun of camp.					
77.	Health is not important in making this decision.					
78.	It is much more friendly and considerate of her fellow campers for Pauline to eat the foods served and not "gripe".					

Situation 10

Phyllis is fourteen. She often goes skating with some of the boys and girls in her room at school. Afterwards they usually go to Phyllis' home for something to eat. Phyllis' parents like to have them come and her mother goes to some trouble to have things they like. The crowd enjoys being at Phyllis' because everyone feels in a friendly mood and ready to talk. Recently a new boy has come to the school and has been asked to go skating with the group. Phyllis wants to impress the new boy by treating the group at a restaurant instead of her home. Her parents want the crowd to come home and they point out that the only convenient restaurant is expensive. Do you think Phyllis should insist on going to a restaurant? Yes___ No___.

Check each reason listed below as to whether it should make a difference to Phyllis in deciding to go or not go to the restaurant.

If you think the reason should influence her decision very greatly then place an X in the box marked V.G.
If you think the reason should influence her decision greatly, then place an X in the box marked G.
If you are uncertain how much the reason should influence her decision then place an X in the box marked U.
If you think the reason should influence her very little in making a decision then place and X in the box marked L.
If you think the reason should not influence her at all then place an X in the box marked V.L.

		VG	G	U	L	VL
79.	Phyllis is old enough to decide for herself without her parents trying to influence her.					
80.	Since eating together at Phyllis' house makes everyone feel friendly, the crowd should go there.					
81.	Phyllis ought to go to the restaurant because people will be impressed.					
82.	If the crowd enjoys their food more at Phyllis' they should go to her home.					
83.	Phyllis should bring her friends home because her parents want her to bring them.					
84.	Friendliness is not important in deciding where to eat.					
85.	Phyllis should go to her home without thinking about impressing her friends.					
86.	Whether the crowd enjoys the food shouldn't be considered in making a decision about this situation.					

Situation 11

Mildred and Norma with two of their best friends go to a restaurant every-day for cokes or ice cream after school. They live too far from each other to get together very often in the evenings and they enjoy talking while having their cokes. Norma doesn't have very much of an allowance and she tells Mildred that she can't afford to have cokes or ice cream every day. Mildred says that they have so much fun talking that Norma could have just milk or ice cream instead of the regular meal at the school lunch and then spend the money she saves on cokes and ice cream with the girls. Her parents want Norma to have a good lunch so they give her money each week to pay for her lunches at school. Do you think Norma should not eat the regular lunch at school and spend her money on cokes and ice cream with her friends? Yes___ No___.

Check each reason listed below as to whether it should make a difference to Norma in deciding to eat or not eat the regular lunch at school.

If you think the reason should influence her decision very greatly then place an X in the box marked V.G.
If you think the reason should influence her decision greatly, then place an X in the box marked G.
If you are uncertain how much the reason should influence her decision then place an X in the box marked U.
If you think the reason should influence her very little in making a decision then place an X in the box marked L.
If you think the reason should not influence her at all in making a decision place an X in the box marked V.L.

		VG	G	U	L	VL
87.	Norma needs the meat and vegetables served at the school lunch in order to be healthy.					
88.	Eating and drinking cokes with friends makes everyone feel friendly so Norma should eat with the girls.					
89.	Mildred should forget about what her friend will think.					
90.	Norma's parents want her to use the money to buy lunch at school so she should do it.					
91.	Norma should do as the other girls do so they will like her.					
92.	The girls can have a good time without eating together.					
93.	Skipping her noon meal won't affect Norma's health.					
94.	Norma should decide what is best for her without her parents telling her what to do.					

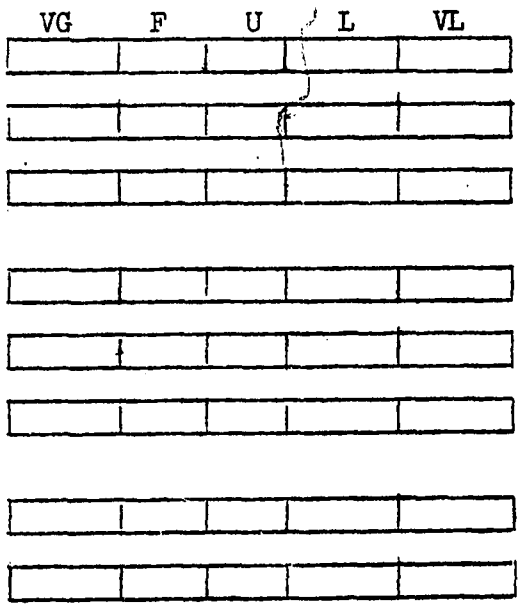
Situation 12

Amelia is five feet, two inches tall and weighs 115 pounds. She is trying to lose weight before the school dance, which is two months away. The girls in her crowd encourage her to lose weight because most of them are trying to lose weight, too, and Amelia wants to be like them. Amelia enjoys food so much that she finds it very difficult to cut down on her eating, and her parents are anxious because she eats so little meat and whole grain ceral that she is losing pep. Do you think Amelia should continue trying to lose weight? Yes___ No___.

Check each reason listed below as to whether it should make a difference to Amelia in deciding to stop or continue trying to lose weight.

If you think the reason should influence her decision very greatly then place an X in the box marked V.G.
If you think the reason should influence her decision greatly, then place an X in the box marked G.
If you are uncertain how much the reason should influence her decision then place an X in the box marked U.
If you think the reason should influence her very little in making a decision then place an X in the box marked L.
If you think the reason should not influence her at all then place an X in the box marked V.L.

95. Enjoying food is not important if you are trying to lose weight.
96. Amelia's health needs to be considered in her decision.
97. Amelia should do as the others do in order to be popular.
98. Because Amelia's parents are concerned about her, she should do as they suggest.
99. Amelia should forget about how the dieting would affect her health.
100. Amelia should choose foods without her parents' deciding for her.
101. Following the crowd is unnecessary if there is a reason for doing something different.
102. Amelia should eat the foods she enjoys and forget about dieting.



Situation 13

Mary is in the eighth grade. She is underweight and doesn't have much pep. Mary dislikes a great many foods especially vegetables and many kinds of meat. She does not like the foods served at the school lunch and often skips her noon meal. On her way home from school she usually stops at a restaurant for a sweet roll and pop. At dinner time she eats very little unless her mother has fixed fried chicken or chocolate cake which she likes very much. Mary's mother tells her she should eat more vegetables and meats. Do you feel Mary should learn to eat more foods? Yes____ No___.

Check each reason listed below as to whether it should make a difference to Mary in deciding to learn or not learn to eat more foods.

If you think the reason should influence her decision very greatly then place an X in the box marked V.G.
If you think the reason should influence her decision greatly, then place an X in the box marked G.
If you are uncertain how much the reason should influence her decision then place an X in the box marked U.
If you think the reason should influence her very little in making a decision then place an X in the box marked L.
If you think the reason should not influence her at all then place an X in the box marked V.L.

		VG	G	U	L	VL
103.	Mary should eat more meat and vegetables so she will be healthy.					
104.	Because Mary's mother knows more about what is best, she should do as her mother tells her.					
105.	Mary should eat with the others at school lunch because eating together is a way of being friendly.					
106.	If Mary does not enjoy the foods she should not have to eat them.					
107.	Instead of letting her mother decide for her, Mary should make up her own mind.					
108.	It is not important for Mary to enjoy the food; she should eat it. anyway.					
109.	Mary should eat the foods she wants without worrying about her health.					
110.	It is not important to eat with the others at the school lunch; Mary can be friendly at other times.					

APPENDIX F

Food Intake Records

1. Eat as you do ordinarily. Don't change your food habits.

2. Write down everything you eat and drink.

3. Be sure to write the kind of food you eat - like this:

   Soups - cream of tomato, navy beans, split pea, vegetable
   Meat - roast beef, pork chops, hamburger
   Salads - apple, celery and nut; tuna and celery; cabbage (if known, tell the kind of salad dressing used)
   Desserts - chocolate cake, apple pie, vanilla pudding, jello with banana slices

4. When you eat two or more foods combined write down each food included such as:

Cheese sandwich:	bread - white	2 slices
	American cheese	1 slice
	Lettuce	1 leaf
	Mayonnaise	2 teaspoons

5. When you eat other combination foods such as casserole dishes, soups and stews write down what is contained in the recipe, such as:

Beef stew -	carrots	1/4 cup
	potatoes	1/4 cup
	beef cubes	2 ounces

6. Tell how the food is cooked under "Method of preparation". For example,

   Potato - mashed, baked, creamed
   Egg - fried, scrambled

   If the food is not cooked but eaten raw, write "RAW" after it.

7. Write down the exact amount you eat of each food - use a standard measuring cup, level teaspoon and tablespoon and a ruler to measure your food.

   Potatoes, mashed - 1 cup
   Bread, white - 2 slices
   Orange - 1
   Milk - 1 cup
   Cake - chocolate 2" x 2" x 1 1/2"

8. If you miss a meal, write "Nothing".

9. Be sure and write down what you eat between meals.

10. If you take any vitamin or mineral pills at home, tell us what kind you take, and how often you take them.

Thank you!!

This is a sample of how the record will look when it is properly completed:

BREAKFAST

FOOD	KIND	METHOD OF PREPARATION	APPROX. MEASURE
Egg	-	Fried	1
Bread	White	Toasted	1 slice
Butter	-	On toast	1/2 tsp.
Orange juice	Frozen	-	1/2 cup
Cocoa	-	Made with milk	1 cup

BETWEEN BREAKFAST AND NOON MEAL

Candy bar	Chocolate with almonds	1

BREAKFAST FOOD RECORD

NAME_____GRADE_____

SCHOOL_____DATE_____

REMINDERS!!!

1. If you had bread or toast, under "kind" did you put down white, whole wheat, etc.?
2. If you had margarine or butter or jelly, did you record it?
3. If you had cereal, did you tell the kind? If you had milk or cream or sugar with the cereal did you tell how much?
4. If you had fruit juice, was it orange, grapefruit, grape, etc.? Was it canned, fresh or frozen?
5. If you didn't have the meal, did you write down "nothing"?

FOOD	KIND	METHOD OF PREPARATION	APPROX. MEASURE

BETWEEN BREAKFAST AND NOON MEAL

NOON MEAL FOOD RECORD

NAME_____GRADE_____

SCHOOL_____DATE_____

REMINDERS!!!

1. Did you put down the "kind" of food? If you had cake, was it chocolate, spice, etc. Did the cake have frosting?
2. If you had a salad, did you tell what was in the salad under "kind"?
3. Did you include the bread and butter you may eat?
4. Did you write down all candy, soft drinks, ice cream sodas, malts, etc.?
5. If you had nothing to eat, did you write "nothing"?
6. If you had a combination food, did you tell what it contained?

FOOD	KIND	METHOD OF PREPARATION	APPROX. MEASURE

BETWEEN NOON MEAL AND NIGHT MEAL

_____

_____

_____

NIGHT MEAL FOOD RECORD

NAME_____GRADE_____

SCHOOL_____DATE_____

REMINDERS!!!

1. Did you put down the "kind" of food? If you had cake, was it chocolate, spice, etc. Did the cake have frosting?
2. If you had a combination food, did you tell what it contained?
3. If you had a salad, did you tell what was in the salad under "kind"?
4. Did you include the bread and butter you may eat?
5. Did you write down all candy, soft drinks, ice cream sodas, malts, etc.?
6. If you had nothing to eat, did you write "nothing"?

FOOD	KIND	METHOD OF PREPARATION	APPROX. MEASURE

SNACKS AFTER NIGHT MEAL

_____

_____

_____

NAME_____ DAY_____ DATE_____

	FOODS	AMOUNT	METHOD OF PREPARATION
Breakfast			
Between breakfast and noon meal			
Noon meal			
Between noon and evening meal			
Evening meal			
After evening meal			
Vitamin supplement			

Scoring of Food Intake Records

A numerical score was determined for each subject by using the following values for servings of foods.

Food group	Value per serving	Maximum values allowed for 7 days	Maximum values allowed for 3 days
Milk and equivalents	1	28	12
Eggs	1	7	3
Legumes	1	7	3
Beef, veal, fowl, lamb, fish*	2		3
Pork*	2	4	2
Liver*	2	4	2
High vit. C foods**	1	7	3
High vit. A foods***	1	7	3
Other fruits	1	14	6
Other cooked vegetables	1	7	3
Raw vegetables	1	7	3
White potatoes	1	7	3
Wh. gr. and enriched bread and cereals	1	28	12
Butter and margarine	1	4	2
		139	60

*A serving = 2 ounces.

**Contains at least 40 mg. of vit. C per serving.

***Contains at least 2500 I.U. of vit. A per serving.

Substitutions

1. Extra servings of meat can be substituted for eggs and legumes.

2. Extra servings of high vitamin A and C fruits and vegetables can be substituted for other fruits and other cooked vegetables.

3. Extra servings of potatoes can be substituted for bread and cereals.

This score, converted into the percentage of the maximum score, is designated as the nutritional adequacy score. The maximum allowance is based on the number of servings of foods from the various food groups needed to meet the Recommended Dietary Allowances of the National Research Council for a girl 12 to 14 years of age.

APPENDIX G

Sex-role Identification Scales

NAME_____DATE_____

Age_____ Birth date_____
(month) (year)

Below are listed some questions about how you take care of your looks. After each question are listed some answers. Put a check after the answer that is nearest the truth for you. There are no right or wrong answers, just check whatever seems right for you. Unless the question says otherwise, think of these as if you were not on summer vacation from school.

1. Do you wear lipstick to school? Always___often___ sometimes___seldom___never___

2. Do you wear lipstick when you are all dressed up to go somewhere? Always___often___sometimes___seldom___never___

3. Do you finger nail polish when you are dressed up to go somewhere? Always___often___sometimes___seldom___never___

4. How often do you brush or comb your hair a day? Just once___several times___often___many times

5. Do you wear high heels when you are all dressed up to go somewhere? Always___often___sometimes___seldom___never___

6. Do you often look in a mirror during the day? Very often___often___sometimes___seldom___never___

7. Do you wear perfume to school? Always___often___ sometimes___seldom___never___

8. When you are all dressed up do you wear perfume? Always___often___sometimes___seldom___never___

9. Do you wear face powder or other make-up to school? Always___often___sometimes___seldom___never___

10. Do you wear face powder or other make-up when you are all dressed up to go somewhere? Always___often___seldom___ never___

Listed below are questions about your feelings about boys. After each question are five answers. Put a check after the answer which you think is right for you. There are no right or wrong answers. Answer each one as truthfully as you can.

1. Do you think boys like you? A great deal___much___some___ a little___none at all___

2. Do you like to talk with the other girls about boys? A great deal___much___some___a little___none at all___

3. Do you like to have boys pay attention to you? A great deal___much___some___a little___none at all___

4. Do you and your best girl friends talk about boys much? A great deal___much___some___a little___none at all___

5. Do you like to go to parties where there are boys? A great deal___much___some___a little___none at all___

6. Do you like being kidded or teased by boys? A great deal___much___some___a little___none at all___

7. Do you often wish there were no boys in your classes at school? Very often___often___sometimes___seldom___never___

8. Are some games more fun when boys are also taking part? Much more___more___the same___less___much less___

9. Do you think boys are rough necks? All the time___ most of the time___sometimes___seldom___not at all___

APPENDIX H

Test of Nutrition Knowledge

Name_____
Grade_____
Age_____

Directions. Blacken the space or spaces on the answer sheet which corresponds to the number before the statements you think are correct. There may be more than one right answer to a question.

1. Joan, aged 12, doesn't like milk very well but knows she needs it for good health. Which one or ones of the following foods could she substitute for part of her milk?

   1. Butter
   2. Ice cream
   3. Solid yellow cheese
   4. Eggs
   5. Oranges
   6. Meat

2. Mary has been told by her doctor not to eat oranges since they make her skin break out but she can have all other kinds of fruit. Which one or ones of these fruits may be substituted for oranges and provide similar nutrients?

   1. Pineapple
   2. Apples
   3. Grapefruit
   4. Prunes
   5. Bananas
   6. Apricots

3. Which one or ones of the following could be classified as citrus fruits?

   1. Apples
   2. Oranges
   3. Plums
   4. Peaches
   5. Grapefruit
   6. Apricots

4. Which one or ones of these five foods could be the best substitutes for the meat in the meal?

   1. Macaroni salad
   2. French fried potatoes
   3. Baked beans
   4. Poached eggs
   5. Noodles in cream

   Roast beef
   Broccoli with cheese sauce
   Tossed green salad
   Canned peaches
   Cooky
   Milk

5. When Pamela checked her diet in school, she found that she didn't have enough foods from the green leafy and yellow vegetable group of the Basic 7. Which one or ones of the following foods would be the best ones to add to her diet to make her diet adequate?

1. Celery	6. Wax beans
2. Spinach	7. Cabbage
3. Head lettuce	8. Turnips
4. Carrots	9. Corn
5. Yellow squash	10. Broccoli

6. Which of the following statements about the nutritional value of food are true?

1. Fish is a brain food.

2. It is harmful to eat an acid fruit and milk at the same meal.

3. Acid fruits produce an acid condition in the body.

4. Fortified margarine has nearly the same nutritional value as butter.

5. Eating carrots will give one good eyesight.

6. Beets build red blood.

7. Cutting the fat off meat reduces the calories.

8. Vitamins may be lost if cooking water is discarded.

9. Foods that have to be shipped long distances lose most of their food value before they are eaten.

10. A person who eats enough food will always be healthy.

11. A person needs to eat only if he is hungry.

12. Margarine is harder to digest than butter.

13. A person who wants to gain weight should avoid exercise.

14. Milk is a good food for most people of all ages.

7. Which member of this family should have the largest serving of meat?

   1. The father does hard work and needs more meat because of his activity.

   2. The mother needs more meat to replace the losses due to menstruation.

   3. The 15-year-old boy needs more meat to maintain his nearly adult body and provide for growth.

   4. The 4-year-old girl is growing so rapidly she needs the greatest share of meat.

   5. The grandmother's body doesn't use food as efficiently as it did when she was younger so she needs an oversize serving of meat.

8. Pat is thirteen years old and wants to lose some weight before the school dance which is nearly a month away. Indicate which if any of the following reducing plans would help her lose weight and not effect her health.

   1. Plan a diet which is adequate in all nutrients but low in foods which are mainly sweet, starchy, or fatty.

   2. Go on a citrus fruit diet.

   3. Go on a liquid diet.

   4. Follow the diet recommended by a movie star.

   5. Eat everything she is now eating, but take smaller servings.

9. Jane is 12 years old and had the following two meals at home:

Breakfast	Evening meal
Tomato juice	Pork chops
Oatmeal with 1/2 cup milk	Baked potato - butter
Enriched toast - 2 slices	Apple - celery salad
Milk - glass (1)	Whole wheat roll - butter
	Vanilla ice cream
	Iced tea

Which one of the three school lunches would give her the foods she needs which are lacking in the other two meals?

School lunches

1.	2.	3.
Creamed potatoes and peas	Macaroni and cheese*	Meat loaf sandwich (Rye bread)
Pineapple ring salad	Cabbage salad	Buttered cabbage
Whole wheat bread - butter	Carrot sticks	Deviled egg salad
Milk	Enriched bread - butter	Baked apple
	Baked cup custard (egg, milk)	Milk
	Milk	

*Macaroni, milk, cheese

Which of the following reasons describe why you think the meal you chose is best. (There may be more than one)

4. Two additional servings of butter or margarine substitute are needed.

5. Jane should have four cups of milk or equivalent each day.

6. Two servings of whole grain or enriched cereals or breads are needed.

7. Pineapple is a good source of citrus fruit.

8. A green or yellow vegetable should be included often.

10. Eleanor, 14 years old, did not connect her food intake with her health. She chose meals similar to the following each day.

Breakfast	Dinner
(2) Pancakes (made with enriched flour)	Pork chop
Butter and sirup	Baked potatoes with butter
Sausage patty	Bran muffin - butter
One glass of milk	Chocolate pudding
	One glass of milk

Lunch

Cold meat sandwich
(with enriched bread)
Peach - Celery sticks - Pickles
Coke

Which ones of the foods listed below would be best to add to this day's meals to make her intake nutritionally adequate?

1. One glass of milk
2. Half grapefruit
3. Buttered corn
4. Raw apple
5. Buttered carrots
6. Two slices of whole wheat bread
7. Pear - cottage cheese salad
8. Lettuce salad

11. Judy is about 10 pounds underweight and is trying to gain. She is often tired and nervous and can't eat a great quantity of food at a meal. Which of these practices might help her gain?

1. Eat candy before meals.

2. Get plenty of rest and sleep.

3. Give her extra large servings of all foods at meals.

4. Drink lots of milk at meals.

5. Include all of the Basic 7 foods.

6. Have 4 or 5 small meals a day.

12. Which one or ones of the five breakfasts would you recommend for Judy to help her gain weight?

1. Orange juice
Sweet rolls (2)-butter
Coffee with cream and sugar

2. Sliced orange
Oatmeal with cream and sugar
Muffin with butter
Milk

3. Pineapple juice
Cornflakes with cream and sugar
Ham slice
Scrambled eggs
Coffee cake - butter
Milk

4. Prunes
Hotcakes with butter and sirup
Crisp bacon
Cocoa

5. 1/2 grapefruit
   Poached egg on toast
   Whole wheat toast with
     butter and jam
   Milk

13. Sally is overweight and wants to lose. She goes without breakfast and takes small servings at the other meals. This is what she ate one day.

Breakfast	Lunch	Before dinner
None	Chili Lettuce salad Whole wheat bread - 1/2 pat butter Milk	Cokes (2)

Dinner	At bedtime
Roast beef Small baked potato - 1/2 pat butter Green beans Shredded carrot salad Fresh peach Milk	Ginger cookies (5)

If she really wanted to reduce her weight and still keep healthy which of these foods should she have omitted?

1. Potatoes
2. Cookies
3. Butter
4. Cokes
5. Milk

14. Which ones of the reasons listed below explain why you think she should or should not omit the foods listed in question 14?

1. Potatoes are high in starch so she should avoid eating them when she is on a diet.

2. Potatoes provide valuable vitamins and minerals and may be included in moderate amounts on a reduction diet.

3. Ginger cookies provide little other than calories.

4. Cokes and cookies provide quick energy which Sally needs.

5. Cokes are largely water so they aren't fattening.

6. The only nutrient cokes contain is sugar.

7. A small amount of fat is desirable in a reducing diet.

8. Butter adds many unnecessary calories.

9. Milk provides so many important food materials it should not be omitted.

10. The cream in milk makes it a fattening food.

11. Fat included in a reducing diet should be rich in vitamin A.

The Jones family has to be very careful when choosing food at the grocery store because their income is low and they want to buy foods that are the most nutritious. Which one of the pairs of foods should they choose to get the most food value for their money. Select one of each pair which is the better buy. In questions 16, 18, 20, 22, and 24, you are asked to indicate which of the reasons listed at the right explain your choice. There may be more than one reason.

15. 1. head lettuce
    2. cabbage

16. Which of the reasons at the right explain your choice in no. 15? (one or more)

17. 1. cornflakes
    2. oatmeal

18. Which of the reasons listed at the right explain your choice in no. 17? (one or more)

19. 1. round steak
    2. hamburger

20. Which of the reasons listed at the right explain your choice in no. 19? (one or more)

1. Food is low in cost and you get more (quantity) for the money.

2. There is little waste (bone and fat) and therefore you get more edible food for the money.

3. Food gives more nutrients for the money spent.

21. 1. Fresh peas (in the pod)
    2. Carrots

22. Which of the reasons listed at the right explain your choice in no. 21? (one or more)

23. 1. Potatoes
    2. Macaroni

24. Which of the reasons listed at the right explain your choice in no. 23? (one or more)

Select from the list at the right the nutrients which the following foods furnish in important amount. There may be more than one nutrient for each food.

25. Beef
26. Milk
27. Oranges
28. Carrots
29. Butter
30. Eggs

NUTRIENTS

1. Vitamin A
2. Vitamin C
3. Iron
4. Protein
5. Calcium

APPENDIX I

Physical Activity Record Form

Name_____Age____Birth date_____
(month) (year)

Date_____

I got up at _____ o'clock.

It took me _____ minutes to get dressed.

I ate the morning meal at _____ o'clock.

It took me _____ minutes to eat.

After I ate, this is what I did during the morning:

What_____How long_____

What_____How long_____

What_____How long_____

What_____How long_____

What_____How long_____

What_____How long_____

What_____How long_____

This is what I did at noon:

I did not eat lunch____. I ate lunch at _____o'clock.

I ate at home_____. How many minutes_____.

I ate some other place. How many minutes_____.

I rode my bicycle___ I rode in a car___ I walked there___

(Check one) How far?___ blocks. How many minutes _____.

This is what I did in the afternoon:

What_____ How long_____

What_____ How long_____

What_____ How long_____

What_____ How long_____

What_____ How long_____

What_____ How long_____

What_____ How long_____

What_____ How long_____

I ate the evening meal at _____ o'clock.

It took me _____ minutes.

This is what I did after supper and before I went to bed.

What_____ How long_____

What_____ How long_____

What_____ How long_____

What_____ How long_____

What_____ How long_____

I went to bed at _____ o'clock.

APPENDIX J: CORRELATION MATRICES

Table 20. Correlation matrix 1[a]

Items		1	2	3	4	5	6	7	8
7-day food intake									
Diet adequacy - score	1								
Meals missed - %	2	-59							
Snacks[b]	3	17	-20						
Snacks - low nutrient %	4	-01	-05	27					
Milk as a beverage[b]	5	54	-36	07	-02				
Different items of food[b]	6	71	-63	45	001	37			
Servings of food	7	77	-39	15	-16	30	58		
Vit.A-rich foods[b]	8	21	-09	05	-09	07	29	31	
Vit.C-rich foods[b]	9	35	-29	07	-06	18	31	20	-01
Milk equivalents[b]	10	60	-31	09	-11	92	40	40	06
Low nutrient foods-cal.	11	24	-21	44	27	10	36	16	-06
3-day food intake									
Diet adequacy - score	12	59	-46	-14	-18	48	56	51	23
Meals missed - %	13	-38	50	-15	02	-36	-34	-31	-07
Snacks[b]	14	08	-19	35	04	23	22	10	05
Snacks - low nutrient %	15	16	-11	02	15	07	13	16	03
Milk as a beverage[b]	16	44	-35	16	-09	66	41	32	15
Different items of food[b]	17	59	-45	09	-18	32	60	51	18
Servings of food	18	60	-37	12	-19	42	45	60	23
Vit.A-rich foods[b]	19	19	-11	05	-19	04	13	20	11
Vit.C-rich foods[b]	20	49	-37	03	-16	33	53	35	19
Milk equivalents[b]	21	38	-24	24	-10	69	31	26	08
Low nutrient foods-cal.	22	45	-23	12	-14	32	30	47	-01
Chronological age	23	17	-11	04	-03	12	02	14	08
Social status	24	-34	21	-04	-16	-26	-36	-27	-26
Menarche	25	-02	20	-09	-16	-04	-18	07	03
Mean		67.18	11.02	12.93	40.57	14.05	87.53	147.08	1.07	4
Standard deviation		12.47	11.32	5.75	19.71	9.78	22.11	42.65	1.75	5

[a] r = .17 significant at the .05 level; r = .21 significant at the .01 leve

[b] Mean number per day.

4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	2
-02																	
001	37																
-16	30	58															
-09	07	29	31														
-06	18	31	20	-01													
-11	92	40	40	06	24												
27	10	36	16	-06	22	11											
-18	48	56	51	23	23	49	08										
02	-36	-34	-31	-07	-07	-38	-06	-60									
04	23	22	10	05	17	23	15	18	-25								
15	07	13	16	03	02	07	03	02	-15	13							
-09	66	41	32	15	17	67	04	64	-53	-24	-06						
-18	32	60	51	18	36	38	16	70	-48	18	07	45					
-19	42	45	60	23	20	48	11	85	-53	07	01	56	59				
-19	04	13	20	11	09	11	-07	44	-25	001	-17	23	37	44			
-16	33	53	35	19	50	35	01	49	-28	17	-49	23	56	41	19		
-10	69	31	26	08	07	68	07	63	-45	25	-12	83	31	61	18	16	
-14	32	30	47	-01	18	39	17	28	-23	32	31	23	39	29	01	22	1
-03	12	02	14	08	21	11	05	07	06	06	-04	09	09	-001	06	12	0
-16	-26	-36	-27	-26	-30	-25	-02	-20	09	-08	-04	-12	-20	-18	10	-30	-1
-16	-04	-18	07	03	12	-02	-16	-14	11	05	-05	-11	-21	-15	13	02	-1
0.57	14.05	87.53	147.08	1.07	4.26	18.78	306.99	73.47	0.84	0.97	44.93	1.99	9.39	17.05	0.35	0.55	2.7
9.71	9.78	22.11	42.65	1.75	5.29	11.56	133.06	14.82	0.14	0.58	36.23	0.92	2.60	5.24	0.44	0.65	1.4

.21 significant at the .01 level. Decimal points have been omitted in matrix.

12	13	14	15	16	17	18	19	20	21	22	23	24	25
-60													
18	-25												
02	-15	13											
64	-53	-24	-06										
70	-48	18	07	45									
85	-53	07	01	56	59								
44	-25	001	-17	23	37	44							
49	-28	17	-49	23	56	41	19						
63	-45	25	-12	83	31	61	18	16					
28	-23	32	31	23	39	29	01	22	16				
07	06	06	-04	09	09	-001	06	12	02	11			
-20	09	-08	-04	-12	-20	-18	10	-30	-12	-12	-13		
-14	11	05	-05	-11	-21	-15	13	02	-18	-02	38	14	
73.47	0.84	0.97	44.93	1.99	9.39	17.05	0.35	0.55	2.78	288.58	160.55	.98	.68
14.82	0.14	0.58	36.23	0.92	2.60	5.24	0.44	0.65	1.49	162.98	9.31	.81	.47

;s have been omitted in matrix.

Table 21. Correlation matrix 2[a]

Items		1	2	3	4	5	6	7	8	9	10	11	12	13	14	
No. employed[b]	1															
No. member PTA[b]	2	-19														
No. member ch.org.[b]	3	04	15													
No. member card club[b]	4	10	17	24												
No. member other org.[b]	5	07	22	19	-04											
Plan meals	6	16	-04	16	-18	14										
Buy food	7	05	07	19	-09	04	39									
Prepare some food	8	16	08	15	-17	-03	45	20								
Prepare meals	9	22	-11	21	-03	-06	49	26	64							
Prepare own meals	10	14	-06	11	-09	04	39	15	33	36						
Set table	11	-04	16	01	-17	11	17	07	25	17	01					
Wash dishes	12	00	14	-05	-01	11	18	06	24	06	03	34				
Refuse new food	13	02	02	-02	-02	06	-16	-17	-17	-04	-04	03	-17			
Taste for flavor	14	10	-01	-12	-14	02	24	04	21	00	08	04	17	-37		
Taste-compulsory	15	00	-12	11	03	08	08	09	-11	-03	05	-16	02	08	-20	
Taste for experience	16	-15	09	17	13	01	-01	12	06	10	-02	-13	-16	-21	-39	-0
Family criticism	17	22	04	03	08	--	05	-13	12	05	09	02	-01	14	-05	1
Eating too much	18	23	01	-10	-09	-01	03	-06	21	16	07	-14	-04	10	02	1
Eating too little	19	02	-17	-04	03	14	03	-05	-02	-02	-06	01	-03	01	03	-0
Eating too often	20	00	-05	00	10	-17	-19	-19	-06	-05	-15	-09	-21	17	-05	-0
Not eating right food	21	-09	16	10	10	15	-04	02	-02	-07	14	11	-02	20	-17	0
Eating too fast	22	-06	32	-01	-04	-08	-06	16	03	-12	-08	06	09	02	-01	-0
Eating too slowly	23	07	10	-05	03	-02	-12	-10	-03	03	-01	10	-19	15	-11	0
Poor manners	24	22	17	-10	-02	-04	02	-12	08	03	07	04	-01	-02	25	-0
Other reasons	25	00	-11	-06	-10	-12	-02	12	-04	08	05	04	07	-07	-01	1
Food Enj. Scale I	26	-04	-04	07	-06	-19	03	14	-05	-10	-14	-05	-02	-06	01	-1
Food Enj. Scale II	27	-14	10	02	01	-13	05	09	-05	-08	-12	08	05	-08	02	-0
Food Exp. Scale	28	-07	13	-04	20	13	-21	-15	-15	-21	-13	-12	-06	06	-02	1
Chronological age	29	-01	-25	05	-09	-06	00	-07	-03	-04	00	-13	00	04	-04	0
Social status	30	06	-14	-36	-37	-14	02	-12	08	00	-04	05	-03	02	19	0
Menarche	31	04	-12	-08	-14	-03	03	-11	01	-08	-08	-08	-12	01	05	0
Diet adequacy - score	32	-07	-06	17	03	07	-02	03	-07	-05	-17	-02	14	-19	-01	0
Meals missed	33	11	-09	-14	-03	-11	00	02	-08	-06	12	-02	-24	26	-05	0
Snacks[c]	34	-05	21	20	14	19	-18	06	02	-05	-20	08	08	03	-10	-0
Different items of food[c]	35	-05	17	29	04	15	-06	03	10	-01	-07	-02	12	-17	-09	-1
Servings of food[c]	36	00	19	31	16	21	-15	00	03	-05	-19	09	15	-17	-02	-1
Repeated meals - no.	37	-09	09	01	-07	06	-01	-01	-04	-06	-05	-07	03	-05	20	1
Low nutritive food-cal.[c]	38	-15	15	-02	14	09	-09	-01	-05	-08	-06	05	07	13	-07	-0
Mean		.61	.48	.53	.19	.25	1.67	1.87	2.73	1.46	2.02	2.70	2.58	.10	.62	.1
Standard deviation		.86	.50	.50	.40	.43	.85	.91	.74	.95	.78	.53	.64	.30	.49	.3

[a] r = .17 at the .05 level; r = .21 at the .01 level. Decimal points have been omitted.

[b] Mother.

[c] Mean number per day.

10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
01																				
03	34																			
04	03	-17																		
08	04	17	-37																	
05	-16	02	08	-20																
02	-13	-16	-21	-39	-05															
09	02	-01	14	-05	13	-07														
07	-14	-04	10	02	13	-03	37													
06	01	-03	01	03	-01	00	01	-23												
15	-09	-21	17	-05	-01	-11	29	32	-19											
14	11	-02	20	-17	06	-13	33	03	02	17										
08	06	09	02	-01	-02	03	02	02	-15	-05	-02									
01	10	-19	15	-11	00	-01	14	02	00	03	12	-23								
07	04	-01	-02	25	-09	-17	06	01	-17	-04	-16	05	03							
05	04	07	-07	-01	15	-08	-01	00	-12	-06	01	-14	-07	-10						
14	-05	-02	-06	01	-10	18	-06	-17	-07	02	-23	14	-15	12	15					
12	08	05	-08	02	-04	09	-07	-18	-08	-11	-11	20	-16	08	10	70				
13	-12	-06	06	-02	13	08	04	17	-06	00	01	15	02	-12	-13	-10	-11			
00	-13	00	04	-04	05	-05	-14	06	-02	06	-02	-22	-07	-23	19	01	-07	-09		
04	05	-03	02	19	02	-21	-04	13	10	-01	-09	-06	05	-03	-09	-29	-20	04	-08	
08	-08	-12	01	05	06	-03	-05	20	-10	11	-13	05	-03	-01	-11	-08	-12	07	35	07
17	-02	14	-19	-01	01	08	-23	-27	09	-19	-21	01	-18	00	03	22	05	-14	15	-29
12	-02	-24	26	-05	03	-02	18	20	01	19	05	-02	17	-02	-14	-14	03	12	-12	17
20	08	08	03	-10	-04	16	12	02	08	05	00	15	-14	-20	-07	-08	-03	09	-05	-11
07	-02	12	-17	-09	-17	25	-02	-08	09	-09	-13	09	07	-09	-04	31	20	-07	-02	-29
19	09	15	-17	-02	-15	17	-10	-26	10	-15	-12	13	-09	01	-04	23	09	-11	-04	-39
05	-07	03	-05	20	16	-28	-03	-01	01	10	-04	-07	-09	07	03	-02	-07	-02	09	17
06	05	07	13	-07	-04	-09	-07	-06	10	09	08	05	-05	-17	-10	-10	-06	04	01	00
02	2.70	2.58	.10	.62	.15	.39	1.83	.21	.23	.34	.38	.30	.11	.19	.04	18.23	7.97	3.35	160.58	1.96
18	.53	.64	.30	.49	.36	.49	1.01	.41	.42	.48	.49	.46	.31	.40	.20	5.93	2.45	2.13	9.28	.80

ve been omitted.

23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
03														
-07	-10													
-15	12	15												
-16	08	10	70											
02	-12	-13	-10	-11										
-07	-23	19	01	-07	-09									
05	-03	-09	-29	-20	04	-08								
-03	-01	-11	-08	-12	07	35	07							
-18	00	03	22	05	-14	15	-29	00						
17	-02	-14	-14	03	12	-12	17	18	-56					
-14	-20	-07	-08	-03	09	-05	-11	-02	10	-11				
07	-09	-04	31	20	-07	-02	-29	-14	48	-38	39			
-09	01	-04	23	09	-11	-04	-39	-12	65	-60	46	75		
-09	07	03	-02	-07	-02	09	17	10	05	-25	-05	-16	-04	
-05	-17	-10	-10	-06	04	01	00	-08	18	-13	43	23	27	-07
.11	.19	.04	18.23	7.97	3.35	160.58	1.96	.66	66.95	1.03	1.29	3.23	8.91	2.00
.31	.40	.20	5.93	2.45	2.13	9.28	.80	.48	12.01	1.11	0.61	0.83	2.19	1.57

Figure 1. Correlation matrix 3

Items		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
Ever hungry	1																																																
Want more snacks	2	37																																															
Can't wait for meals	3	47	41																																														
Worried about eating too much	4	-05	-15	-04																																													
Wish could eat more	5	-27	[illegible]	38	-13																																												
Wish could resist sweets	6	15	[illegible]	09	24	06																																											
Concern about weight	7	[illegible]	-19	-04	56	-07	40																																										
Think food related to health	8	[illegible]	-11	01	22	-03	12	14																																									
Taste threshold - salty	9	-17	-10	[illegible]	33	-18	-01	04	-05																																								
Taste threshold - sweet	10	-06	-04	06	-16	-09	-04	-14	-17	24																																							
Taste threshold - sour	11	-06	-11	-11	-13	-06	05	32	-04	02	14																																						
Taste threshold - bitter	12	-03	-02	04	05	07	-09	07	-11	14	39	40																																					
MCI-Family relations*	13	03	07	15	21	02	02	11	02	06	02	-01	09																																				
MCI-Social relations*	14	01	-15	12	15	-02	13	15	04	09	10	-04	28	36																																			
MCI-Emotional stability*	15	10	-09	09	28	32	07	19	12	11	-00	-12	06	57	47																																		
MCI-Conformity*	16	11	18	07	02	10	08	03	00	13	03	-14	-21	52	10	44																																	
MCI-Adj. to reality*	17	-02	01	11	27	32	09	19	10	05	02	-11	11	72	54	72	60																																
MCI-Mood*	18	07	-02	03	10	05	71	12	05	04	05	-14	06	34	58	48	74	44																															
MCI-Leadership*	19	[illegible]	-13	12	15	04	15	19	00	00	03	-05	04	36	73	47	71	52	50																													
Sex-role identification	20	14	19	12	14	24	21	10	03	-21	00	06	-06	22	-17	13	14	28	-18	-18																													
Knowledge test	21	15	14	05	-07	11	-17	-11	14	-10	06	14	11	-04	-16	-05	-07	-07	-24	-15	25																												
Food Inj. scale I	22	13	12	17	-22	05	-08	-28	09	-11	-03	-08	04	-13	-02	-06	-04	-04	02	02	-10	-06																											
Food Inj. scale II	23	05	14	22	-17	09	-02	-17	08	-09	-14	-12	-03	-14	-05	-12	-12	-09	-02	-02	-08	-18	70																										
Food Exp. scale	24	30	-21	[illegible]	11	[illegible]	[illegible]	06	[illegible]	12	-21	00	-04	-27	-25	-14	-17	-11	21	-12	-05	-17	-07	[illegible]																									
Weight classification	25	16	-09	-22	08	03	07	11	09	-03	-05	-08	03	-04	01	01	-16	-03	09	00	-08	17	13	-02	20																								
Height classification	26	-06	-29	-19	42	-20	22	51	12	-04	-10	07	34	01	-09	08	-10	02	10	21	-05	01	-12	-09	14	47																							
Value-sociability	27	-13	-01	04	01	-35	07	17	-14	05	08	04	07	03	-05	03	13	06	-16	-13	12	-26	-15	00	[illegible]	-05	11																						
Value-health	28	13	15	00	-14	07	-06	-17	19	-05	-13	-02	-06	-11	-15	05	05	-11	-12	-10	21	15	24	17	-17	-01	-17	-08																					
Value-independence	29	-14	-15	-04	13	-16	06	16	-19	01	-13	[illegible]	10	22	27	07	-04	13	21	17	03	-03	-23	-13	00	-05	11	14	-51																				
Value-status	30	13	01	-01	04	03	18	15	-18	09	01	05	07	14	07	55	18	05	14	01	06	-25	-14	-04	03	01	11	41	-24	16																			
Value-enjoyment	31	-10	04	05	-04	-09	-09	14	-21	04	10	04	18	24	14	11	05	20	27	05	04	-12	-07	-02	00	-37	32	44	-13	37	38																		
Bone age; chronological age	32	-05	-29	-01	21	-04	13	16	05	04	-07	15	05	-09	04	04	-10	-05	11	00	-07	-09	-09	02	12	15	39	05	-33	10	12	-05																	
Intelligence test	33	16	02	-02	-02	07	-02	-05	11	-24	10	-02	-12	-18	-21	-11	-05	-13	-12	-20	03	35	10	13	-04	29	12	-04	15	-11	-23	-07	09																
Diet adequacy - score	34	07	04	-08	-24	11	-20	-29	11	-01	-06	-08	-20	-23	-11	-12	-17	-14	-14	11	03	32	21	03	-13	20	-22	-22	18	-15	-18	-20	-11	19															
Meals missed - %	35	-05	-02	37	17	-03	19	14	-05	12	13	07	21	18	15	14	12	21	24	13	05	-25	-15	03	-9	-15	17	09	-21	05	07	19	24	13	-55														
Snacks**	36	19	24	07	07	15	22	06	-03	-11	-21	-05	04	-16	-17	10	-03	-16	-04	-19	16	09	-04	00	05	12	05	20	14	-06	17	-07	-02	12	07	-11													
Snacks - low nutrient %	37	-11	14	-08	12	09	02	06	-08	-09	-15	00	[illegible]	-18	-15	-07	-04	-07	-03	-12	14	[illegible]	-15	02	14	-03	02	14	-09	-03	22	02	-01	06	-04	-02	27												
Milk - average**	38	-03	03	-12	-15	11	-19	-08	17	06	-06	-02	-05	-16	01	-10	-07	-13	02	-01	-01	14	[illegible]	12	-04	15	-11	-27	21	-17	-11	-25	-16	09	51	-36	03	-04											
Different items of food**	39	14	07	00	-18	04	-07	-14	09	10	-04	-09	-21	-29	-16	-15	-18	-29	-12	-20	-01	20	22	08	-13	24	-06	-04	24	21	01	-19	-07	26	64	-60	45	-05	39										
Servings of food	40	17	05	-04	-21	00	-11	-27	08	-13	-14	-02	-21	-18	-04	-04	-09	-13	-02	-05	07	18	29	12	-12	16	-13	-16	09	-11	-14	-06	-10	13	74	-39	12	-21	30	54									
Vit. A-rich foods**	41	16	14	10	-12	06	-19	-17	06	08	[illegible]	-17	-13	-11	-02	-02	-19	-06	24	-04	04	16	17	03	-05	14	-10	00	06	-15	-05	09	-05	16	30	-12	03	-06	12	30	37								
Vit. C-rich foods**	42	01	09	-01	-20	11	-02	-14	02	03	06	06	-13	-18	-11	-14	-12	-19	-15	-11	14	22	07	-01	-07	15	-16	-02	14	-11	-10	-17	06	07	60	-24	09	00	17	29	21	16							
Milk equivalents**	43	02	05	-14	-16	12	-13	-12	18	05	-07	-02	-05	-09	-02	-05	-02	-09	04	-05	05	16	23	37	-07	16	-15	-24	25	-20	-13	-25	-16	10	57	-33	04	-14	91	44	47	16	21						
Vitamin supplements**	44	06	03	07	-03	00	-03	05	-02	00	-03	02	06	02	07	03	-24	06	15	10	02	-05	17	39	06	09	10	-08	-03	30	07	08	04	-09	-16	28	02	-07	-01	-09	-02	00	-02	-02					
Activity index	45	-12	09	-14	01	-07	-03	-07	03	07	-03	-21	-04	16	-07	-01	24	07	06	-07	14	14	08	06	-18	-03	-14	-05	03	-10	03	-15	-17	06	13	01	-02	-01	19	01	09	-07	23	29	02				
Chronological age	46	16	14	14	09	11	02	01	-01	03	-01	17	03	18	[illegible]	-02	-04	03	-17	00	42	34	-03	-09	-11	00	-07	-11	-04	12	-16	-44	-15	-15	15	-08	-07	-04	09	-05	15	07	17	10	-08	11			
Social status	47	-13	-11	-11	23	-10	01	19	-15	10	-01	05	21	39	22	34	74	40	14	18	-03	-12	-27	-19	03	-13	15	10	-17	30	17	25	-02	-13	-37	22	-12	-15	-13	-41	-20	-19	-31	-29	13	-03	06		
Menarche	48	09	-13	03	17	03	12	10	01	-02	-24	15	-07	21	09	13	06	14	07	05	17	00	-11	-14	05	13	28	-02	[illegible]	15	13	-44	35	-17	00	17	-05	-14	02	-13	09	02	10	06	16	03	36	07	
Mean		2.50	1.36	2.01	1.41	1.29	2.58	1.46	2.51	2.91	2.69	2.90	2.46	9.58	24.24	19.69	12.92	17.65	14.09	15.10	57.05	29.51	19.15	7.02	3.31	3.13	3.38	63.95	99.75	54.29	53.55	56.63	103.14	110.32	67.06	10.61	13.17	39.91	14.72	49.60	149.48	1.45	4.73	19.91	.08	417.46	161.49	1.43	
Standard deviation		.79	.95	[illegible]	1.39	1.03	1.79	1.46	1.58	.72	.74	1.01	.97	6.79	11.03	7.49	4.03	5.69	4.05	4.95	10.54	7.20	5.97	2.4[illegible]	2.11	1.20	1.25	7.42	12.64	10.40	9.26	9.23	7.35	13.07	11.94	11.06	6.04	20.62	9.39	21.95	40.74	3.17	5.75	11.15	.35	41.99	9.24	.90	

r = .17 at .05 level
r = .21 at .01 level

Decimal points have been omitted

*MCI - Minnesota Counseling Inventory
**Mean number per day