

Chapter Four

Factors Influencing Eating Behavior

BASIC TO SUCCESS in teaching people to change their food habits is an understanding of *why* they eat as they do. The common idea is that eating behavior is dominated by food habits, although the meaning of "food habits" is not entirely clear. To what extent do people habitually eat the same foods or combinations of foods repeatedly at similar time intervals? Because little is known about variation of an individual's eating behavior from day to day and year to year, we need longitudinal studies of eating behavior as well as of growth and other forms of biological and psychological development.

One of the main obstacles faced by nutrition educators is the general impression that "food habits," like most habits, are inflexible and unchanging. Perhaps we need to divorce the two words separating "food" from "habits." Together, they imply an idea which may operate as a handicap to progress in nutrition education. Despite the efforts of nutritionists to establish the connotation of "good" to habits relating to food, "bad" seems most likely to be the popular association with the idea of "food habits."

The first step toward the development of these habits, whether good or bad, is food acceptance, which is primarily an act of the individual. The two essential elements are the individual and the food. Even so, this situation is not simple because of countless variations within the individual — physical and psychological — that may influence his behavior toward food. The act of acceptance may be further complicated by many secondary elements belonging to the environment.

Food habits, therefore, are a much more complicated form of eating behavior than food acceptance because from the first reaction to tasting a food it is a long step to the later incorporation of that food into the regular diet.

Although research in eating behavior is fragmentary, it is sufficient to give us some important insights into teaching nutrition. Fortunately, too, expanding knowledge regarding eating behavior presents a truly interdisciplinary challenge. Information has been supplied through research in many areas, such as the biological sciences, psychology, cultural anthropology, sociology, economics, history, and also philosophy and literature.

What people believe and have written about food in the past have strong implications for nutrition education. In addition, our knowledge of eating behavior has widened with the great expansion of our international interests and endeavors in the realm of nutrition. Developments in the area of human ecology — the interrelationship of man with his environment — offer broad bases for increasing our understanding of eating behavior.

Eating behavior will be discussed from two standpoints: (a) what we have learned from various disciplines or approaches, and (b) what we know about certain age groups. This is not an attempt at an exhaustive study, but a summary of some observations which may help nutrition educators better to understand eating behavior.

THE BIOLOGICAL SCIENCES

The taste of food is probably the most important factor in its acceptance. People say they like a food because it “tastes good.” It is reasonable to believe that eating behavior must be closely related to taste sensitivity, although the exact relationship has not been established. Literature on this subject was reviewed in 1962 by Korslund (1).

The individual is endowed, probably at birth, with taste receptors or sense organs. Sensitivity to the basic tastes of sweet, sour, bitter, and salty has been measured for many subjects, and wide individual differences are indicated. Identical foods may even taste different to the same person on different days. Some people are known to have a “taste blindness” to certain substances; this trait is perhaps genetically controlled.

Age differences in taste sensitivity have been studied, but there is no general agreement on the significance of such differences. Sweetness has been observed always to be acceptable to infants, while sour and salty tastes are acceptable only in dilute concentrations. Bitter flavors are rejected by infants, but may later become acceptable through training.

Sex differences in taste sensitivity do seem to exist. Most results indicate that women have lower taste thresholds (that is, are more sensitive to taste) than men. However, one study showed that women, in comparison with men, were more sensitive only to sweetness and saltiness, not to sourness in taste. The reaction of subjects toward bitterness is different from the reaction to the other three basic tastes. People tend to rate either high or low in sensitivity to it, not inter-

mediately. The relationship of taste sensitivity to food likes and dislikes and to other types of eating behavior has been studied, but with inconclusive results. Evidence may favor the idea that taste-acute individuals have more food dislikes than those people who are less sensitive to taste.

Indications that vitamin A may be related to taste sensitivity have been produced from laboratory work with rats. In vitamin A depletion experiments, taste sensitivity of the rats decreased. Upon repletion with vitamin A, sensitivity returned. A logical explanation rests upon the fact that vitamin A is needed for maintenance of epithelial tissues and that taste buds consist largely of epithelial cells.

TEXTURE AND FOOD PREFERENCES

The accent in much of our food advertising is on textures which are bland, smooth, creamy, or soft. Food choppers, blenders, mixers, and grinders for home use have become increasingly popular.

It is true that objectionable textures can affect food preferences, for we know that outer peelings of some fruits and vegetables are unpleasant to many people. Yet removing skins — such as on apples — may also remove much of the chewing pleasure and taste appeal and some of the nutritive value.

Therefore, while it seems appropriate to widen food acceptance by removing objectionable textures, it is important to remind individuals that complete absence of texture may be depriving them of important nutrients as well as chewing exercise.

The question of “built-in” tendencies for people to select appropriate food has been the subject of much conjecture and of some study. Animals seem to have drives or urges to seek nutrients they need. This characteristic has been observed with range cattle, and in the laboratory with small animals.

People with certain metabolic diseases have been reported to crave substances they lack, such as salt in the case of Addison's disease, liver in conditions of pernicious anemia, and sweets in cases of hypoglycemia. How universally these tendencies may exist in people with deranged metabolism is not known, but the probable existence of these tendencies is nevertheless interesting. For example, why do some pregnant women eat clay, and what, if anything, is the advantage?

A classical example of the theory that people originally have some protection against the selection of a poor diet lies in the well-known account of the study of babies by Davis (2). When offered a variety of foods, largely in their natural form, the babies she observed made selections which apparently sustained them fairly well. Today, however, we would want to know much more about the outcome of the experiment than was possible then. We would like a control group, and also we might wish to know the concentration of blood constituents, and the body composition. It has been largely conceded that if

such a mechanism ever exists in the individual as an infant, it soon becomes ineffective in the environment in which he finds himself.

The inability of individuals to regulate food energy intake to their needs has been cited as the root of most crucial nutrition problems in the United States. The extent to which the problem has a psychological, physiological, or biochemical basis is not known.

Certain mechanisms do exist within the body that influence the urge to eat. How these are mediated has not been established, but we recognize them in the form of hunger pangs, feelings of satiety, and appetite. Blood chemistry, metabolic rate, temperature regulation, and nerve impulses, along with glucoreceptors possibly situated in the hypothalamus, may all play a role in the complicated regulation of intake of food energy to output. Mayer (3) has described the situation as follows:

. . . in all higher animals and particularly in man, the basic physiologic regulation is topped by complicated, partly conscious, cerebral integration. While the basic mechanism "sets the stage" for feeding behavior, it does not necessarily lead to it; conversely, in some cases, feeding will take place or be continued while there is no longer any physiologic basis for it.

While the search continues for the truth about body mechanisms involved in energy intake regulation, the nutrition educator is challenged to supply information and motivation needed to enable the individual to exercise the so-called "conscious integration."

The interrelationship between periodicity of eating and body chemistry is also of interest. To what extent have physiological needs dictated the evolution of our regular meal-eating pattern? Is casual eating of well-planned food more compatible with our physiological well-being than regularly spaced meals?

PSYCHOLOGY AND EATING BEHAVIOR

The classical contribution of psychology to our knowledge of eating behavior was the discovery of the ease by which behavior of an animal could be changed through the use of food as the primary stimulus. The principle has been applied over and over again, and because of its potency as a factor in behavior, food acquires many meanings other than those related to health.

Babcock (4) has described symbolism of food as follows:

Food is, from the day of birth, associated with intimacy. Buttressed by other life essentials, it carries not only the feelings of security, protection, love, and developing strength, but also sense of pain, rejection, deprivation, and the potential terror of starvation.

She also adds that it carries the projection of power, ". . . power for the mother who feeds; power of nations to starve those they perceive as their enemies into a rebellious and implacably hungry submission."

Kaufman (5) has classified food likes and dislikes by common, emotionally determined reactions to symbolic or sensory values of specific foods. This useful classification is shown in Table 4.1.

TABLE 4.1*
SOME MEANINGS OF FOOD

Food Likes	Food Dislikes
Security Foods Reward Foods Fetish Foods Show-off Foods Grown-up Foods Advertised Foods	Cultural Taboo Foods Religious Taboo Foods Familial Taboo Foods Individual Taboo Foods
Pleasurable Association Foods Familiar foods prepared in familiar ways Easy-to-prepare foods	Unpleasurable Association Foods Familiar foods prepared in unfamiliar ways Hard-to-prepare foods Foods with built-in anxiety Foods from filthy sources Unfamiliar foods
Foods With Agreeable Sensory Properties Unspoiled foods Proper color foods Proper odor foods Proper taste foods Proper texture foods Proper temperature foods	Foods With Disagreeable Sensory Properties Spoiled foods Off-color foods Off-odor foods Off-taste foods Off-texture foods Off-temperature foods

An individual's attitudes toward foods are constantly changing in accordance with his current emotional needs as these can be expressed or satisfied through the use or avoidance of specific foods.

Any food may belong to more than one category in this formulation at any one time or at different times. For example, for a given person milk may be both a security and a reward food. At picnics, for exhibitionistic purposes, he may drink huge quantities of milk, thus using milk as a show-off food. If he then gets sick from drinking too much milk, he may develop an aversion to it, and eliminate it from his diet.

*Source: Wm. Kaufman, "Some Psychosomatic Aspects of Food Allergy," *Psychosomatic Medicine*, XVI (No. 1), p. 11, 1954.

This tendency for foods to acquire a specific "reputation" is often a problem in nutrition education. For example, it is not infrequent to encounter adults who avoid the use of milk because they regard it as a food "only for children." Some men regard salads as "foods fit only for women" or will label fresh vegetables as "rabbit food."

Such attitudes toward food items—and there are countless examples which may come to mind—create obstacles and offer challenges for the nutrition educator, who must encourage students to evaluate foods in terms of what they actually *are*, not what they are *reputed to be*. The "image" of a food is a factor to be reckoned with in nutrition education.

VARIETY AND MONOTONY IN THE DIET

Variety in choice of foods has been shown in studies to bear a high correlation to adequacy of diet for all ages. Among teen-age girls, the number of different food items eaten in a day correlated positively with adequacy of diet. The relationship was highly significant (6). Among a sample of aged people, higher "variety scores" in foods have been observed for those who are working, married and living with their spouses, and who have higher incomes (7).

Monotony in selection of food seems to characterize the diets of many people. Countless examples could be supplied from many dietary studies. To a certain extent, self-imposed monotony is a way of life for many people. Self-imposed monotony in eating may have far different effects on the individual than enforced monotony, however. The enforced limitation of variety is of special interest to the armed forces, possibly to the civil defense program, and to space scientists who deal with the problems of suitable diet for astronauts who must subsist for long periods in space vehicles.

The effect of repeated eating upon the rejection of a limited number of food items in preference ratings was investigated by Pilgrim and associates in their work with the armed forces (8). Eighty army men, maintaining a high activity level in a cold climate, subsisted for six weeks on a fixed diet of four daily menus. With repetitive consumption, some foods rose in preference, some remained unchanged, and some declined. The more a food was liked initially, the less was its decline in preference. Most canned meats and vegetables declined in acceptance, while dry cereals rose in preference, and fruits, desserts, and staples showed little change.

Further reports from the study with the armed forces have shown that a combination dish, consisting of both a "liked" and a "disliked" food, will probably be unpopular. Moreover, these investigators noted that the more complex the dish, the less it will be liked.

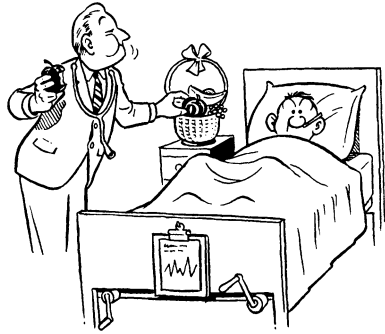
Pilgrim has also reported observations regarding the effect of participation of men in selecting their food. He concluded that men who designed their own menus from a fixed and limited supply of items were more satisfied with their meals than were those men for whom menus had been planned by others.

FOOD MISINFORMATION

Allusions have been made to various tonics and food and nutrient supplements in the realm of quackery. Of similar interest are the myths, fallacies, and misinformation about *food* items which often influence food preferences and have been variously classified.

1. Attaching special virtues to foods at the expense of others which are equally nourishing. The yoghurt, blackstrap molasses, and wheat germ fads undoubtedly led some of the public into believing

*An apple a day
doesn't necessarily keep
the doctor away.*



all these items possessed nutritional virtues far beyond their actual values. Similarly, advocating an apple a day to keep the doctor away or eating carrots to improve eyesight are examples of overemphasizing values of foods which may be nutritionally beneficial, but which cannot work miracles.

2. Distorting the value of vitamins and minerals (which often occurs in advertising) by implying that they may ensure adequate nutrition without regard to dietary habits.
3. Classifying foods or combinations of them as harmful: "tomatoes cause cancer" or "oranges cause ulcers."
4. Overemphasizing "natural foods" grown on special soils, with "natural fertilizers," implying that foods grown otherwise do not contain the same nutrients.
5. Special devices designed for appetite control or weight loss, such as cellulose crackers which "fill the stomach."
6. Special "disease diets" which advocate foods as cures for ulcers, arthritis, or cancer.

Many of these myths and fallacies regarding food values are the result of honest but misguided efforts. But probably the larger share of them are the result of deliberate deception through advertising and promotion of specific "brands" of foods. Such deception must be countered by legal action in cases where there are clear-cut infractions of laws, but many of them can be dealt with only through nutrition education. Thus it is up to educators to be alert for food misinformation and to convert it into a tool for teaching established food facts.

Emotional entanglements with food greatly complicate nutrition education. The nonpsychiatric-trained educator cannot probe far into the reasons why neurotic aversions or eating patterns exist, but it is nevertheless necessary to be aware of their existence. It is well to remember that people who are reasonably secure, constructive, and open minded in their outlook on life may be expected to accept a wide range of changes and limitations in their eating habits. Deep-seated emotional problems which result in neurotic food preferences usually cannot be treated on the same plane as the normal likes and dislikes of fairly well-adjusted people.

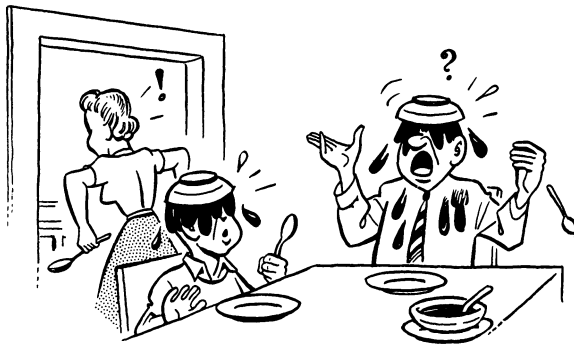
WHAT WE HAVE LEARNED FROM THE SOCIOLOGISTS

Family situations may influence attitudes toward food. One may expect children to have different attitudes toward food and different eating behavior in households with varying family situations or conditions such as these (9):

1. Economically-deprived households, where food has great survival or social value.
2. Immigrant families, where food may reflect strong emotional ties to the native land.
3. Families in which illness may put the main emphasis upon food for the sick person.
4. Very religious families, where food rituals or taboos are strictly observed.
5. Broken homes or families with conflicts resulting in unhappy mealtimes.

The possibility of changing a family's use of a food is influenced by the extent to which the food is firmly placed in the "core" diet (10). "Core" items are the staple foods universally and regularly used by a population. This would mean, for example, the combination of meat, bread, and potatoes favored by most people in a community. Foods termed as "secondary," which are widely but not universally used, are more easy to change than "core" foods. A third group — "peripheral" foods — includes those that are characteristic of groups but not of individuals in a population. Such foods are the most easily changed of the three categories.

The degree of urbanization in relation to economic conditions may also affect the difficulty of changing food patterns. Where urbanization is *high* and economic conditions are *favorable*, people are more ready to accept change. Where urbanization is *high* but economic conditions are *poor*, the desire for change may be present, but the actual diet depends on what can be bought with the money



... families with
conflicts resulting in
unhappy mealtimes.

available. When urbanization is *low* and economic conditions *favorable*, diets tend to be traditional and people are resistant to change. Our prosperous, midwestern rural areas would fit the description of this group; i.e., low urbanization and good economic conditions. Perhaps as a group they do tend to retain the traditional, but to add new foods. This situation might account for a seemingly high percentage of overweight in such areas. There is, however, a fairly ample supply of additional items in the so-called secondary core and in the peripheral group of foods. Thus the possibility exists of changing foods in the latter two categories for purposes of weight reduction.

When urbanization is *low* and economic conditions *poor*, diets are resistant to change. They are meager, described as virtually without innovation, and notably like the historic core diet for the community. These are trends which may be significant for nutrition educators who work in rural communities.

The social status of people, which usually includes their economic situation, has been shown to be closely related to eating behavior in a number of studies. Analyzing the various aspects which may be involved and deciding how to deal effectively with them presents a perplexing problem for nutrition educators. One sociologist posed this question: "How can you change the food habits of a southern sharecropper whose diet is tied into a one-crop method of production and the type of credit allowed by the stores, along with habits of catering to individual preferences, assigning ill health to particular foods, and rejecting any food that may be identified as animal food?"

CONTRIBUTIONS OF THE CULTURAL ANTHROPOLOGIST

Dorothy Lee (11) has summarized the following ways in which cultural influences affect food habits. In her book, *Freedom and Culture*, she gives many interesting examples.

Cultural influences determine:

1. The way of feeding the baby.
2. The emphasis on family meals.
3. The kinds of foods people will eat, or what they consider as food.
4. The whole attitude toward eating, whether it is to still hunger, to acquire health, to perform a duty, or to be sociable.
5. The form in which food can be consumed.
6. The morning appetite.
7. The amount of foods eaten and the attitude toward getting fat.
8. The part of a plant or animal that will be eaten.
9. Values placed on monotony or variety.
10. Appropriateness of foods for different occasions.
11. Food taboos.
12. Symbolic values of food.

In the American culture, Dr. Lee has observed tendencies to place a *high value on newness, change, and variety*. In some other societies, sameness is valued — monotony is sought. *Speed and efficiency* are also highly valued in the United States. Thus we find our preference is for juice rather than the whole fruit, and for sandwich lunches.

Remoteness from sources of food has been cited by anthropologist Margaret Lantis (12) as another factor in our culture that may affect nutrition education. Developments in our society are such that the businesses of food production, processing, and marketing have become far removed from the consumer's experience. Most of us cannot watch the strawberries ripening on the vine or the watermelon growing; nor can we collect the fresh eggs from the henhouse.

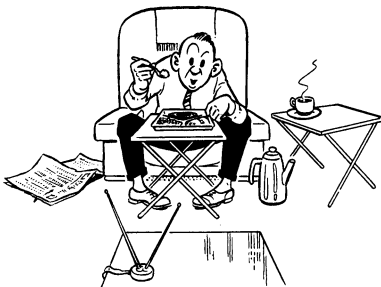
Dr. Lantis points out that many city and even farm children have no knowledge of the labor and organization required to bring food to them. Hence they do not appreciate the intrinsic value of food, unless they happen to have been deprived and hungry, either physically or psychologically:

They do not know in their own bones and nerves the physical danger of fishermen, the agonizing "stoop labor" of vegetable pickers, the anxiety of citrus fruit growers when a freeze threatens. . . . We seem also to have a decrease in appreciation of the work and skill involved in good cooking. If a child does not feel — I do not mean "know cognitively," but "feel emotionally" — that food is precious, one wonders whether the child can readily understand that any specific food, or food element, is vital to him.

Such developments as the vending machine, the coffee break, TV meals, and convenience foods may make major changes in our eating behavior. These changes may come so gradually that we may fail to take note of their full effect. Constant vigilance, therefore, is needed on the part of nutrition educators, who must be alert to the impact of such changes on the nutritive value of the diet.

We have had some valuable lessons from anthropologists on the general problem of changing food habits. The following is a partial summary:

1. Food habits are deeply rooted in a culture. Because their origins may be completely unknown, they may have become intertwined with superstition, tradition, and custom.



TV meals may make major changes in our eating habits.

2. Time and patience are usually required to change food habits, especially by means of education. Through technology, however, a change may occur at a rapid rate if a new product appeals to some major desire of the people.
3. Changing a single food habit may involve many other changes; the net result may be less desirable than the original state. Therefore, a careful analysis of the total impact of a contemplated change should be made.
4. The fact that people do not possess the nutrition educator's knowledge does not mean that they have no knowledge of their own.
5. The world over, there are many ways to obtain a good diet; judging the adequacy of diets in other cultures requires a careful look at methods used in processing and preparing food. Efforts to effect an improvement sometimes have resulted in a change in practice which, in turn, has led to deterioration of the nutrient supply.
6. As the cultural and educational gap between the teacher and learner widens, the process of education becomes more difficult.

EATING BEHAVIOR OF AGE GROUPS

The nature of foods described as "liked" or "disliked" from preschool age through later years shows a surprising similarity. Table 4.2 shows foods preferred by various age groups, as noted by several researchers. Foods *least* liked or most often rejected by preschool children in the nursery school at Iowa State University, as observed by Korslund (1), were mustard, sour and dill pickles, olives, fresh grapefruit, fresh tomatoes, broccoli, cooked carrots, sweet potatoes, liver, spinach, and grapefruit juice. Somewhat similar are the food likes and dislikes as reported by Pilgrim (8) for men in the army. He observed in studies of army men that foods least liked were, in order mentioned, mashed turnips, broccoli, baked hubbard squash, fried parsnips, cabbage baked with cheese, asparagus with hollandaise sauce, iced coffee, cauliflower with cheese sauce, and candied parsnips.

In general, the most acceptable foods—beginning at an early age—are mild flavored and colorless. Some may have a textural quality of crispness, such as cereals and potato chips, but more of the favorites are soft, perhaps even mushy.

Throughout the age range, among the most generally disliked common foods listed are the flavorful, colorful vegetables including the green and leafy variety. *The roots of food dislikes are, therefore, apparently planted at an early age.* Pilgrim has stated that if we wish to increase the consumption of this group of foods, we must have something more than a nutrition campaign.

Although the attitudes toward specific food groups show a fair degree of constancy from one age to another, an interesting difference in attitude toward specific meals has been observed between preschoolers and teen-age girls. Preschool children were described by

TABLE 4.2
COMPARISON OF FOOD LIKES OF DIFFERENT AGE GROUPS

Investigator	Date of Study	Age of Subjects	Foods with Largest Percentage Described as Liked
Korslund	1962	4-5 yrs.	Dry cereals Potato chips Milk Ice cream Apples Candy Hamburgers Peanut butter White bread and butter
Breckenridge	1959	5½-11½ yrs.	Meat Ice cream Potatoes Bread and crackers Raw fruits Cereals
Adams	1949	Grades 4-12	Meat Milk Eggs Bread Cereals Fruits, esp. fresh Vegetables, a few
Pilgrim	1960	Army men	Fresh milk Hot rolls Hot biscuits Strawberry shortcake Grilled steak Ice cream Ice cream sundae Fried chicken French fried potatoes Roast turkey
Eppright	1950	Adults in Iowa	Butter Beef steak Potatoes Ground beef Fruits Eggs Citrus fruits and tomatoes Pastry

their mothers as always being hungry for breakfast and as enjoying this meal perhaps most of all. In the same locality 44 per cent of a sample of teen-age girls said they were not hungry for breakfast, and 37 per cent said they did not enjoy it, whereas only 12 and 15 per cent said they did not enjoy the other two meals of the day.

For 181 Iowa girls, age 8 to 15 or 16 years, foods listed as disliked by the highest percentage were the following in the order mentioned: dark green leafy vegetables, 45 per cent; winter squash, 45 per cent;

liver, 41 per cent; cottage cheese, 28 per cent; sweet potatoes, 28 per cent; canned tomatoes, 27 per cent; tea and coffee, 26 per cent; tomato juice, 20 per cent. Of the 181 girls, only 18 were reported as having no food dislikes. The mean number of food dislikes for the girls in each of the four schools in which the study was conducted were: 3.1, 4.8, 3.8, and 3.5. The range in number of food dislikes for individual girls was from 0 to 16.

Because nutrition educators often work with individuals by age groups, it may be well to consider some of the information available from studies of people of various ages. Since most studies of eating behavior involve small numbers of subjects, not selected to be representative of populations, the results cannot be considered as typical of specific groups. Moreover, there are usually more variations within a specific age group than between ages. For example, differences among teen-agers may be greater than differences between teen-agers and adults.

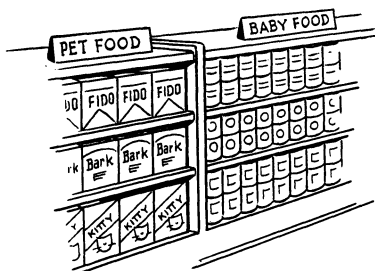
Although consideration of the individual is of paramount importance in nutrition education, some degree of understanding of differences among age groups may serve as useful guideposts.

Infants

Our knowledge of the nutrient needs of infants has reached a high stage of development. In the beautiful, healthy, and well-developed babies of the United States we have a good example of what can be accomplished through the application of the science of nutrition and related health fields.

Despite the scientific excellence of infant feeding, there is some concern about the fact that in the United States feeding the infant seems to be tending toward a highly impersonalized experience. The prevalence of breast feeding appears to be rapidly declining. Prepared formulas — even boiled water — may be easily purchased. These preparations undoubtedly are sometimes given to infants without the warmth and the personal attention which quite naturally accompany the breast feeding experience. The outcome of such impersonal, routinized feeding in regard to the emotional well-being of both mother and child would be difficult to evaluate.

*Prepared formulas
may be easily purchased.*



Many facts argue for a concern about the influence that early feeding experiences may have on the reactions a child may develop toward food and eating. Food is the first link for the child with the outside world. The early eating situation has great potential in shaping later eating behavior; even in lower animals, conditioned behavior is readily established through the use of food and the power of association between emotions and feeding.

Paul György (13) estimates that in the United States at least 90 per cent of infants are receiving supplemental food below the age of three months, often during the first weeks of life. The manner in which food is presented may be significant. György states that early spoon feeding elicits the atavistic "thrust" or "extrusion" reflex which is innate to normal infants. He continues to say that through conditioning—in the form of protracted spoon feeding—this reflex, which is probably the expression of a natural defense reaction, may be suppressed. This, he says, might lead to frustrations and mental insult, the later effects of which might manifest themselves in neurotic reactions.

To the adult, the potential shock of thrusting a hard spoon into the infant's mouth is incomprehensible. Primitive peoples tend to be extremely gentle in their infant feeding practices, even to the extent of masticating food and using the fingers as a means of conveying food into the mouths of infants.

The life-long significance of social and emotional factors in infant feeding was recognized at the Fifth International Nutrition Conference, when F. W. Clements (14) stated that the dominance of the stomach in early infancy as a sensory organ makes infant feeding the primary variable in child rearing practices which affect nutrition.

Each feeding occasion should be, in its entirety, pleasant and satisfying for the infant and mother. Not only must the supply of food be adequate, easily obtained, and fully digestible, but, as advocated by Clements, the mother must have the time and opportunity to give the baby the satisfying human contact which gratifies his need for clinging and support. This is a note of warning to our increasingly time-conscious people, particularly those who are tempted to seek the most convenient, rapid methods for feeding infants.

The far-reaching effects of two opposite kinds of mothering were described by Clements in examples drawn from the Okinawans and the Alorese. The Okinawan infants are described as "well-mothered." Directly after birth, these infants are offered "well-nippled breasts that are copiously filled with milk." They are offered the breast whenever they are hungry and disturbed, thus their anxieties are allayed and they are afforded a sense of protection and security. The Okinawan mother does everything in her power to prevent early frustrations, so that the outcome is observed to be an

"unspoiled child, capable of self-discipline and harmonious social co-operation." Physical and emotional breakdown rates in later years have been extremely low. As a group these people were observed to withstand the stress of World War II extremely well.

The young Alorese, in contrast, are cared for exclusively by mothers for only the first four to six days. From that time on, the infant is given premasticated foods in addition to human milk. When the mother returns to work on about the 14th day after birth, the infant is left during the day in the care of an older child or a relative. Thus there is great variation in the amounts of attention children receive. The infants have been described often as "nourished but not nurtured." During the period of infantile helplessness and similarly throughout childhood and adolescence, maternal care is said to fall short for the Alorese; and the basic personality of these people, according to the observer, is characterized by anxiety, suspicion, and distrust.

Preschool Age

A high degree of individuality in nutrient intake has been stressed by Beal (15) as a result of her observations of children who served as subjects in the long-time investigations of the Child Research Council at the University of Colorado School of Medicine. Most children, according to Beal, show a characteristic pattern of intake for each nutrient and remain within their own channels with remarkable constancy. A few shifts from one channel to another have been observed. These may be associated with marked change in diet due to illness or simply to an unexplainable change in appetite. It is significant that in the latter observation the appetite changes occurred some time before the actual shift in intake.

In general, a smooth curve of increase in intake was noted in the first months of life and also between 4 and 8 years of age, but there were irregularities in intake between late infancy and the early pre-school years. Almost from birth, the intakes of boys exceeded those of girls. Apparently boys are innately prepared to provide for a larger organic structure than are girls.

Beal observed a decrease in milk consumption for both boys and girls beginning at approximately 6 months. Boys, however, maintained a higher intake to 18 months, with an abrupt decrease during the next year. Beal further observed that girls never reached as high or low a level of milk consumption as boys, on the average, but the decrease extended over a longer period of time and it was not until the age of 7 or 8 years that the median for girls approximated that for boys. Meat intake for boys and girls was alike during the first year, but thereafter boys maintained a higher level than girls. Egg intakes were similar for boys and girls, except between ages 1 and 3, when girls tended to consume more eggs than did boys.

Beal's observations suggest that some kind of relationship may exist during this period between changes in children's nutrient intake and their growth patterns. Because the preschool period is a time of relatively slow growth, smaller increments are noted in stature and weight than in any other time during childhood. There was also a strong suggestion of a relationship between the decrease in milk consumption and the timing of certain psychological and emotional changes in the child's development. Mothers commented that the decrease in milk consumption came at a time when the child was showing independence from the mother in other areas of behavior, at a time when toilet training was being conducted, or when there was other evidence of emotional turmoil.

Beal also showed the wide difference in food intake of siblings. It is erroneous to assume that within a single family group the individual members will have similar intakes.

The influence of family members on the food consumption of young children has been studied. Bryan and Lowenberg (16) noted a significant relationship between the attitudes of the father and the preschool child toward vegetables. The greatest influence of the father on the food eaten by the child was indirect, because the limitations of his likes and dislikes had an effect on the food served in the home.

Research conducted at the Ohio State University (17) showed that with few exceptions, foods disliked by both parents were either disliked by the child or unfamiliar to him. The social influence of peers is also an important factor in food selection; the greatest influence is exerted upon a younger child by a close friend or older child.

Dudley (18) studied the acceptance by preschool children of four vegetables: green beans, asparagus, carrots, and rutabaga. Frozen asparagus and green beans were prepared four different ways: au gratin, creamed, buttered whole, and buttered pieces. Fresh carrots and rutabagas were prepared as raw sticks, buttered and grated, buttered julienne, and creamed. The children preferred raw preparations of carrots and rutabagas more than any other style. They ate larger amounts and left smaller portions uneaten for the raw than for any other preparation of these vegetables. Of the green vegetables served, the au gratin preparation was preferred to the creamed, which differed only by the addition of crumbs on top. Some children had definite preferences, choosing either of two or three preparations almost every time they were offered. Because the children did vary widely in their choices, the conclusion was that one should be cautious in making general statements about preferences of children for certain types of preparations, and perhaps even for certain foods.

Studies on taste sensitivity of preschool children indicate that while the levels for recognition of basic tastes of sweet, sour, bitter, and salty are similar to those of adults, in this characteristic preschool

children also differ widely among themselves. Some indications were obtained of relationships of keenness of taste to food likes and dislikes and to enthusiasm about eating. If any differences existed, it was that the *keen*-sensed children had more food dislikes than others and were less enthusiastic about meals (1).

School-age Children

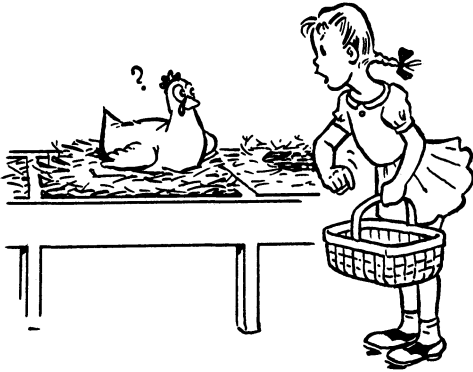
Since the late 1940's, repeated studies of the diets of Iowa school children have indicated that the general type of eating behavior has not changed. Food groups most often below the recommendations are the dark green leafy and yellow vegetables, milk or its equivalent in other dairy products, and the fruits and vegetables rich in vitamin C. Fluctuations in intakes for the latter group have been more evident than in the other two food groups. The major physiological finding is a persistent tendency, on the part of girls, toward heavier weights for height, probably accompanied by an increasing tendency toward earlier maturation. Concern about overweight or generally increasing heaviness among Iowa girls is therefore entirely justified.

Over a 2-year period, observations were made intermittently of the acceptance by Iowa girls 8 to 13 years old of foods included in two types of supplements, one rich in nutrients and the other poor (19). Menus for the nutrient-rich supplement were selected from orange or tangerine juice, limeade, apricot nectar, grapefruit sections, canned and dried apricots, carrot sticks, a cracker, and a milk drink — one serving equivalent to a pint of fluid whole milk — made from frozen milk concentrate and flavored with chocolate, vanilla, strawberry, or peanut butter. The snack-type menu usually consisted of a serving of juice, piece of fruit or vegetable, and a cracker; the milk was given as a separate feeding.

Menus from the less nutritious foods were similar in type but were chosen from pineapple juice, grape juice, lemonade, pear and peach nectar, apple juice, dried prunes, fruit cocktail, canned pears, fresh apples, applesauce, and celery.

Although both types of snacks were well accepted, foods which included the less nutritious items were much better accepted than were the highly nutritious snacks. Of the foods offered in the nutrient-rich category, the acceptance was highest for orange juice, chocolate malted milk, and tangerine juice. Most poorly accepted were tomato juice, grapefruit sections, and milk flavored with peanut butter.

These supplements were administered to girls in four neighboring schools in one county. Acceptance of both supplements was much higher in one school than in the other three. In the school where acceptance was highest, girls were youngest and they ranked lowest in sex-role identification. This school also ranked highest in percentage of fathers who were farmers. No other significant differences were



*To increase use of
eggs in diets
of growing girls . . .*

noted among the girls when they were divided into three groups according to food refusal rates: low, medium, and high.

The nutrient-rich supplement was effective in decreasing the number of girls who had diets rating low in calcium, vitamin A, and ascorbic acid. However, the supplement did not alleviate dietary inadequacies in iron, a nutrient often short in diets of teen-age girls. It is well to note that the over-all general recommendation of increasing intake of milk, fruits, and vegetables will not automatically solve the dietary problems of girls. Attention must be given to the *kinds* of fruits and vegetables. Increasing the use of eggs in the diets of growing girls might be a good measure to promote. In the selection from the group of colorful vegetables, special attention should be given to the dark green and leafy as well as the yellow.

It was found that some adjustments were made in the basic self-selected diets of the girls in order to accommodate the food offered in the nutrient-rich snack, which furnished food energy to the extent of about 500 Calories. Nevertheless, the rich supplement did increase the total intake of the girls by 200 Calories or more a day. The result was a slight tendency toward increase in body weight even though the supplement was administered on school days only. Nutrition education of girls, therefore, should *place emphasis on readjustment of diet in order to attain nutrient standards, rather than addition of foods.*

It must be kept in mind that dietary excesses may be as much a matter of concern as are deficits. We are oriented in our thinking toward deficiencies, but trends in statistics of body size — at least in Iowa — plus increasingly earlier maturation suggest that the scope of nutrition education should include both excesses and deficits. Much emphasis should be placed on adjustments to meet changes in nutrient needs.

Focus on Teen-age Girls

Observations of the eating behavior of teen-age girls have brought to light certain relationships significant to nutrition education.

Though these findings are not of sufficient scope to apply with certainty to the entire population of teen-age girls, they pinpoint some of the problems involved in nutrition work with girls in their early teens, and they suggest some directions of efforts which may prove fruitful.

PHYSIOLOGICAL MATURATION

In the study of Iowa girls conducted by Iowa State University (6), girls who matured either early or late were conspicuous for their poor eating behavior, as shown by such factors as meals missed and low scores in dietary adequacy. For earlier maturing girls, the picture was further complicated by a tendency toward overweight. Later maturing girls were not overweight for their age group, although their food practices were similar to those of early maturing girls. It is logical that both extremes of maturation should affect eating behavior similarly if one accepts the possibility of interrelationships between emotional state and eating. Jones and Mussen (20) have observed that girls whose maturational status is at one extreme or the other may have feelings of inadequacy and isolation. These authors postulated that early maturation created a hazard to social adjustment, while late maturation was characterized by less adequate self-concepts and slightly poorer parent-child relationships.

VALUES CONSIDERED IMPORTANT IN FOOD SELECTION

When health was considered important in the selection of food, girls in the Iowa studies (6) tended to miss fewer meals, to select more adequate diets, and to enjoy food more. Fewer of the girls who valued health highly were overweight. The values held by all these girls appeared to influence their eating behavior. Convincing girls that health is an important value in their lives should be a fundamental effort in nutrition education.

Use of food to enhance social occasions is not to be discouraged, but the educational problem is to accomplish this goal without sacrificing health. Girls whose eating is highly motivated toward being sociable, asserting their independence, or acquiring status have been shown to have poor diets. It is highly probable that the same observation would apply to all segments of the population.

KNOWLEDGE OF NUTRITION

Girls who scored higher on tests of nutrition knowledge (which were set up particularly to ascertain choices in certain situations) missed fewer meals and selected more adequate diets than others. This observation, in connection with the relationship of the value of health to the selection of a good diet, indicates that nutrition educa-

tion for teen-age girls should have a sound, rational basis. Appeals to emotions may improve the effectiveness of education, but they should not replace the basic appeal to reason (6).

PERSONAL RELATIONSHIPS

In the Iowa study, peer-group relationships seemed less important in eating behavior than did family relationships. Girls who scored high in a cluster of items in personal adjustment and family relationships missed fewer meals and selected better diets than those who scored lower. Their social status was higher.

Conditions favoring good family relationships seem to bring better eating practices on the part of teen-age girls, at least as shown in this sample of Iowa girls. An important deduction is that nutrition education can best be pursued in a framework which considers more than just diet *per se*.

It may be of interest to note that in the personality traits investigated, conformity was included. Results of one study (21) have suggested that this is a personality trait associated with the selection of an adequate diet. Emotional stability and good adjustment to reality seem to characterize girls with better food habits. Similar observations have been made by others who have viewed poor psychological adjustment to be related to poor food habits; in fact, the number of food aversions has been postulated as one way to measure neurotic tendencies of an individual (22).

SOCIAL STATUS

In the Iowa study there was a strong interaction between eating behavior and social status of teen-age girls. Social status rating was shown by factors related to the father's occupation and the education of parents. The range of income was more narrow than the range in education. Problems were more evident among the girls in the lower than in the upper social status segment. This factor needs to be considered in nutrition education. Burgess (23) has pointed out that difficulties in nutrition education increase as the social and cultural gap between the teacher and the learner widens.

CONCERN ABOUT OVERWEIGHT

Iowa girls classified as overweight were inclined to have poorer diets than others, to miss more meals, to enjoy food less, and to value health less than others in selecting foods. Three-fourths of the girls who were concerned about overweight actually were overweight; 65 per cent of heavy- or very-heavy-for-age groups were concerned about overweight. Contrary to popular opinion, few girls not actually overweight were concerned about overweight.

*Different amounts of energy
often are required
to accomplish the same task.*



No significant relationships were observed between weight status and gross activity, but the latter may be extremely misleading as to the actual energy expenditure of the individual. Tension, drive, and mannerisms may result in differences between energy required by two people to accomplish the same task. Also, in the total energy consumed to accomplish the same task, the steady worker may differ from the one who works in spurts.

Both overeating and undereating have been related to the emotional state of the individual. Undoubtedly such relationships exist, but as yet they are too complex and ill-defined to permit general statements. In a study of heavy, medium, and thin girls in four Iowa schools, no differences were noted in the psychological characteristics of the three groups (24). The only significant difference was in the weight of the parents. It may add to the anxiety of parents, and of the girls themselves, if they accept indiscriminately the idea that obesity invariably has a psychological basis and, to make matters worse, if they too often regard overweight and obesity as identical.

Observations in California (25) of 25 girls who were 16, 17, and 18 years of age are in striking agreement with the findings of the Iowa study. Over a fourth of the girls (29 per cent) were in the obese classification. These had poorer diets than the others. They showed a preference for less active types of leisure activities. Like the Iowa girls, the obese girls in the California sample were aware of their obesity and would like to correct it. Many of the California girls in the normal group had unrealistic ideas about a desirable weight for themselves.

Dealing with overweight in all segments of the population is one of the most difficult problems faced by nutrition educators in the United States. Effectively checking the trend toward heaviness throughout childhood, which is apparent from data in a long-time study of body measurements of Iowa children, presents a challenge. Iowa girls are apparently becoming heavier for their age and height as shown in Figures 4.1A and 4.1B. If this is not a desirable situation, then we must find ways to alter it. Indications are that the heavy girls become heavy adults.

Eating Behavior of Boys

Sex differences in eating behavior have been noted, according to Beal (15), to start almost at birth. In children of preschool age, boys have been shown to be less sensitive than girls to the tastes of sweet, sour, bitter, and salty. In general, boys seem to have fewer food dislikes than girls, although there are undoubtedly exceptions to this.

As a rule, boys eat more than girls. Consequently, their diets usually show fewer nutrient inadequacies than do those of girls. Boys tend to use less fruit, especially of the citrus variety, than do girls. Hence their diets may be more often inadequate in ascorbic acid than those of girls. Their more rapid growth rate, particularly at the time of the adolescent spurt, may be a factor related to the differences in eating as compared to girls.

However, in view of the shorter life span of men than of women in the United States and the greater incidence of coronary heart disease among middle-aged men than middle-aged women, one must not ignore the possibility that food habits of boys need close scrutiny. Although overweight among teen-age boys seems less frequent than among girls, Hundley (26) has presented data to show that overweight is becoming more frequent in white men and less frequent in white women.

Adults

Extensive studies have been made of food preferences among men in the armed forces (8). Results are perhaps typical for much of our adult population. Food preferences are said to account for a large proportion of the plate waste in army mess halls. These preferences follow certain trends reflecting influences of region, education, and urban or rural living. Investigators noted that food preferences are "not capricious," but that they fall into distinct patterns, so that persons with similar backgrounds have similar reactions to food.

A study of food habits and preferences of two groups of Iowa people, male and female, in the age groups of 17-19 and 46-58, showed food habits and preferences to be closely related (27). Preferred menus, i.e., menus given as those desired if there were no restrictions of any kind, did not differ markedly from the actual. In general, the backbone of diets was meat, bread, potatoes, dessert, and beverage — other than milk — and this was the plan preferred at the time of the study, in 1948. Such preferences seem to continue to exist.

What the family *likes* to eat — more than the cost, health value, or "convenience" — dominated the diets of California people as shown by foods purchased by homemakers in the Berkeley area (28).

Food preferences of the father in the family play a dominant role in food prepared for the entire family. The homemaker herself and the teen-age girl are usually considered to have the poorest diets of

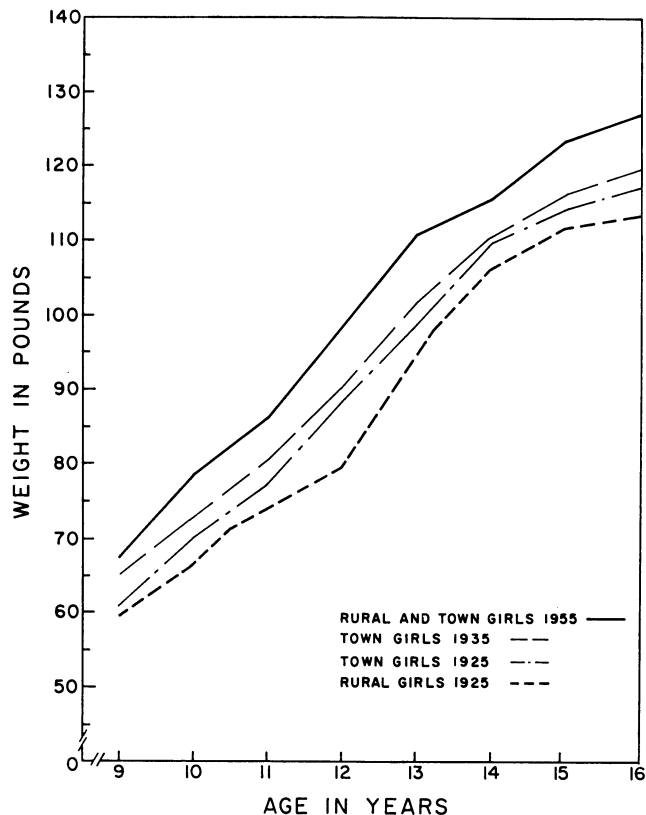


Fig. 4.1A — Records of Iowa schoolgirls over a 30-year period show a marked increase in average weight at each age.

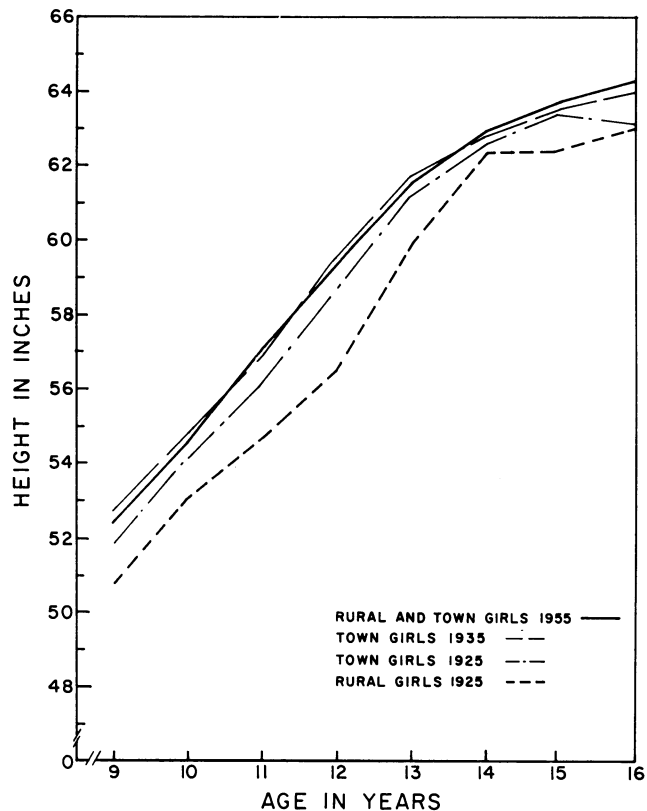


Fig. 4.1B — The 30-year record of Iowa schoolgirls shows less increase in average height than in weight at each age.



*Casual eating
may partly account
for poor dietary habits
of homemakers.*

all family members. Casual eating while the family is away at work or school may partly account for poor dietary habits of homemakers.

Eating behavior of women during pregnancy is another matter of special concern in nutrition education. Stearns (29) has shown particularly poor practices to exist among young pregnant women on low economic levels. She has stated that the young woman is considerably influenced by food preferences of her husband, although during pregnancy she may try to follow carefully the dietary directions of a physician. Lapses between pregnancies should be considered in the total educational program of women during the reproductive period. If the woman is to benefit fully from the science of nutrition, a high level of nutriture should be maintained throughout the period of reproduction, not just during pregnancies. The lack of interest which is prevalent regarding breast feeding is questionable. Should women in the United States desire this method of feeding infants, they need considerable help in understanding dietary adjustments necessary for successful breast feeding. It is probable that few women embarking on the period of lactation have diets that conform to the recommendations for that period.

Eating Behavior of the Aged

Eating behavior of older persons is a complex result of lifelong habits, pronounced physiological changes, income changes, and profound alterations in their ways of life. Some changes are gradual; others may come precipitously.

Types and amounts of foods eaten have been shown to differ for women in the two different areas in three successive decades: 50–59 years, 60–69 years, and age 70 and above (30) as shown in Table 4.3. For all food groups except milk and cereals, the number of pounds used per person per week was smaller in the group over age 70 than in the two preceding decades. The decrease was especially marked in the consumption of protein-rich foods: meat, poultry, fish, eggs, cheese, and legumes.

The decreased food consumption is reflected in a generally decreased nutrient intake of women over seventy in the North Central Region as shown in Figure 4.2.

TABLE 4.3
SUMMARY OF AVERAGE AMOUNTS OF FOODS CONSUMED BY WOMEN AGED 50 YEARS OR OLDER *
(Pounds per Week)

Region	Age	Number of Die- taries	Meat, Fish, Poul- try	Eggs, Cheese, Le- gumes	Milk	Cereal Prod- ucts	Fats	White Pota- toes	Vita- min- rich Fruits and Veg.	Other Fruits and Veg.	Sweets and Desserts	Total Fruits and Veg.
	<i>years</i>	<i>lbs.</i>	<i>lbs.</i>	<i>lbs.</i>	<i>lbs.</i>	<i>lbs.</i>	<i>lbs.</i>	<i>lbs.</i>	<i>lbs.</i>	<i>lbs.</i>	<i>lbs.</i>	<i>lbs.</i>
North Central.	50-59	406	1.63	0.74	2.10	2.04	0.84	1.98	4.39	2.34	1.49	8.71
	60-69	271	1.32	0.72	2.24	2.22	0.87	1.97	4.40	2.43	1.31	8.80
	70 plus	193	0.93	0.51	2.11	2.10	0.73	1.78	3.71	1.78	1.10	7.27
California	50-59	95	1.80	0.80	2.86	1.62	0.47	0.71	4.05	3.07	2.09	7.83
	60-69	106	1.78	0.81	3.56	1.69	0.59	0.76	4.21	2.90	1.95	7.87
	70 plus	73	1.48	0.72	3.99	1.60	0.45	0.67	3.53	2.71	1.75	6.91

*Source: *Nutritional Status, U.S.A.*, Calif. Agr. Exp. Sta. Bul. 764, p. 25.

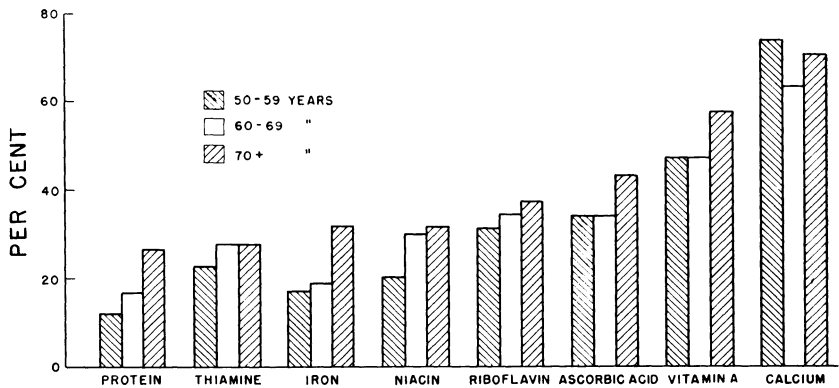


Fig. 4.2 — Percentage of women in six North Central states who ate less than two-thirds the recommended amounts of mentioned nutrients. (Source: **Nutritional Status, USA**, Calif. Exp. Sta. Bul. 764, p. 44.)

A survey of aging persons in one Iowa county (31) revealed that they liked to eat and that most of them regarded their diets as “good” or “very good,” although nutritionists rated a majority of the diets poor in quality. This comparison is shown in Figure 4.3. Ninety-three per cent of these elderly people ate three regular meals a day, but a high proportion of single persons living alone ate only two meals a day.

More than 40 per cent of people in their early 60’s included snacks in their diets, compared with 27 per cent of those over 75. Many snacks included calorie-rich foods, such as cake and cookies, or breads. Beverages, including tea, coffee, or Postum, were used often as snacks. Milk was more popular as a snack for people living in cities than it was for those who lived in towns or open country.

Older people who did not enjoy their meals usually were in the upper age grouping. Enjoyment of meals by most of the elderly people suggest that they may afford a receptive audience for nutri-

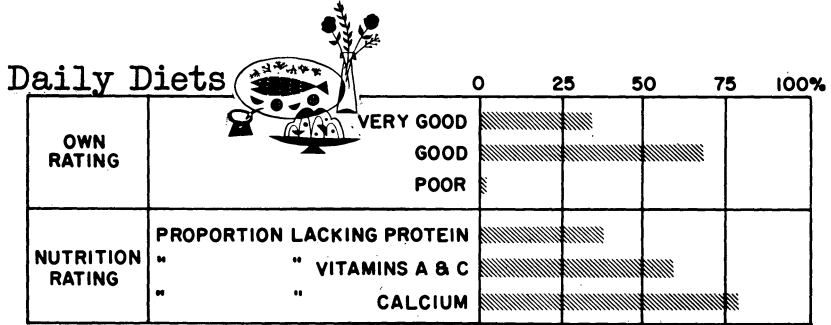


Fig. 4.3 — Elderly people of one Iowa county gave a higher rating to their diets than did the nutritionists who made the study. (Source: **The Aging Persons**, Iowa Home Econ. and Agr. Exp. Sta. Bul. RS-355, p. 17.)

tion education. However, the attitude of food enjoyment may not characterize all groups of elderly people.

In a study of a number of elderly people at the Age Center of New England (7), appetites were generally good or excellent, but many subjects thought of eating as a necessary activity rather than as a pleasure.

Nutrient intake of oldsters has been shown to be influenced not only by social and economic factors, but by difficulties in obtaining food, preparing it, and storing it. Variety of foods used by older subjects was studied. For both sexes, those who were working, married and living with their spouses, and who had higher incomes showed higher variety scores than those who were retired, living alone, and who had lower incomes.

Food habits of more isolated members — those living alone — were compared with those described as “gregarious” or “social.” The more isolated members ate far less a variety of foods than the more gregarious. For all nutrients except iron, the mean daily intake was lower for the isolated than for the social group.

Food faddism among older subjects in the New England Age Center was also observed. Diets of the 10 members most addicted to faddism were compared with the 10 least interested. Food faddism was not associated with a reduced nutrient intake; in fact, it appeared to augment it. This observation was not interpreted to mean that food faddism for oldsters is good, but that it apparently represented an interest in food that did not reduce nutrient intake, at least for this group or subjects. Many old people reduce their usual intake of milk, eggs, meat, and fish, but this usually occurs because of changed circumstances of living which were related to aging.

Oral status, function, and chewing efficiency have a decided effect upon the eating behavior of older people; consequently, such difficulties affect the nutritive value of the diet. Twice as many of the subjects of the study at the Age Center who had “poor” oral function had low protein intakes, compared with those who had “good” function. Only those who had “good to excellent” chewing efficiency had a high protein intake.

Income undoubtedly places a limitation upon foods used by older people. It was estimated in 1962 that the median income of couples

*... chewing efficiency
has a decided effect
upon the eating habits
of older people.*



past 65 in the United States was \$2,530 per year. At the same time, based on costs in 20 cities of the United States, an income of \$2,600 to \$3,200 was considered necessary for older couples to maintain minimum standards of living (32).

Babcock (33) has observed that because aging is associated with loss, it is one of the stress periods in life, in which internal tension and conflict are heightened. Both the anxieties and emotional needs of an older person are frequently demonstrated by changes in his attitudes and habits regarding food. Anxiety and stress may be expressed in terms of loss of appetite, overeating, or highly selective eating. The older person may speak fondly of dishes that are primarily associated with his earlier life.

Decreased perception, hearing, and seeing may also have a definite impact upon the eating situation of oldsters. Brighter, more attractive dining rooms may contribute to a greater enjoyment of meal-times than quiet, drab places which are dimmed even more by decreased powers of perception. Babcock reminds us that when perception is decreased, the world becomes quite dull.

The health and happiness of the older person is closely allied with his ability to change food habits, not only after old age has arrived, but during the earlier decades. Ailing and aging need not be synonymous, for it is possible to be healthy in old age. Important to the attainment of this goal is the prevention of obesity in earlier years, coupled with proper dietary management of such handicaps as diabetes, hypertension, or other chronic diseases. Knowledge of nutrition is not enough to ensure a lifetime state of good nutrition. The ability to change food habits in accordance with changing physiological needs throughout the life span is indeed the crux of the problem.

Dietary habits may be tools for good nutrition, but they may also be obstacles preventing needed dietary changes for people of all ages. Nutrition knowledge can transform habits from liabilities to assets, if such knowledge is applied.

Concern for the welfare of our older population has focused attention on the philosophy that sensible preparation for old age does not begin in the later years; it is a lifelong process. In no area is this more true than it is in nutrition. Griffith (34) has said:



Certainly, better education in nutritional know-how is a necessity, and renewed efforts must be made to improve knowledge of foods in the home and in the school. Especially it is important that parents use the "family table" as a means of furthering family unity, family strength, and family motivations, including the interest in nutritional fitness. Trite as it may be, it is still true: today's children are tomorrow's senior citizens.

... today's children
are tomorrow's senior
citizens.



REFERENCES

1. Korslund, M. K., "Taste Sensitivity and Eating Behavior of Nursery School Children." Unpubl. M.S. thesis, Iowa State University Library, Ames, 1962.
2. Davis, C. M., "Self Selection of Diet by Newly Weaned Infants." *Amer. Jour. Diseases of Children*, 36:651, 1928.
3. Mayer, J., "Regulation of Food Intake and the Multiple Etiology of Obesity." *Weight Control*, p. 34. E. S. Eppright, P. Swanson, and C. A. Iverson, eds. Iowa State University Press, Ames, 1955.
4. Babcock, C. G., "Attitudes and the Use of Food." *Jour. Amer. Diet. Assn.*, 38:546-51, 1961.
5. Kaufman, W., "Some Psychosomatic Aspects of Food Allergy." *Psychosomatic Medicine*, 16(No. 1):10-40, 1954.
6. Hinton, M. A., "Factors Related to the Eating Behavior and Dietary Adequacy of Girls 12 to 14 Years of Age." Unpubl. Ph.D. dissertation, Iowa State University Library, Ames, 1962.
7. Davidson, C. S., Livermore, J., Anderson, P., and Kaufman, S., "The Nutrition of a Group of Apparently Healthy Aging Persons." *Amer. Jour. Clin. Nutr.*, 10:181-99, March 1962.
8. Pilgrim, F. J., "What Foods Do People Accept and Reject?" *Jour. Amer. Diet. Assn.*, 38:439-43, 1961.
9. Hamburger, W. W., "The Psychology of Dietary Change." *Amer. Jour. Public Health*, 48:1342-48, Oct. 1958.
10. Passin, H., and Bennett, J. W., "Social Process and Dietary Change," pp. 113-23, in: "The Problem of Changing Food Habits." Natl. Res. Council Bul. 108, Oct. 1943.
11. Lee, D., *Freedom and Culture*. Prentice-Hall, 1959.
12. Lantis, M., "The Child Consumer." *Jour. Home Econ.*, 54:370-75, May 1962.
13. György, P., "Orientation in Infant Feeding." Fifth International Congress on Nutrition, *Federation Proceedings*, 20(No. 1): Part III, March 1961.
14. Clements, F. W., "Nutrition in Maternal and Infant Feeding." Fifth International Congress on Nutrition, *Federation Proceedings*, 20(No. 1): Part III, March 1961.

15. Beal, V., "Dietary Intake of Individuals Followed Through Infancy and Childhood." *Amer. Jour. Public Health*, 51:1107-17, Aug. 1961.
16. Bryan, M. S., and Lowenberg, M. E., "The Father's Influence on Young Children's Food Preferences." *Jour. Amer. Diet. Assn.*, 34:30-35, 1958.
17. Metheny, N. Y., Hunt, F. E., Patton, M. B., and Heye, H., "The Diets of Pre-school Children." *Jour. Home Econ.*, 54:297-310, May 1962.
18. Dudley, D. T., Moore, M. E., and Sunderlin, E. M., "Children's Attitudes Toward Food." *Jour. Home Econ.*, 52:678-81, Oct. 1960.
19. Unpubl. research, Iowa State University.
20. Jones, M. C., and Mussen, P. H., "Self-conceptions, Motivations, and Interpersonal Attitudes of Early- and Late-maturing Girls." *Child Development*, 29:491-501, 1958.
21. Ohls, G. I., "Factors Related to Diet of Freshman Women at Iowa State University." Unpubl. M.S. thesis, Iowa State University Library, Ames.
22. Wallen, R., "Food Aversions of Normal and Neurotic Males." *Jour. Abnormal and Social Psychology*, 40:77-81, 1945.
23. Burgess, A., "Nutrition Education in Public Health Programs . . . What We Have Learned." *Jour. Amer. Public Health*, 51:1715-26, 1961.
24. Burchinal, L. G., and Eppright, E. S., "Test of the Psychogenic Theory of Obesity for a Sample of Rural Girls." *Amer. Jour. Clin. Nutr.*, 7:288-94, 1959.
25. Hampton, M. C., Shapiro, L. R., and Huenemann, R., "Helping Teen-age Girls Improve Their Diets." *Jour. Home Econ.*, 53:835-38, 1961.
26. Hundley, J. M., "Need for Weight Control Programs." *Weight Control*, pp. 1-15. E. S. Eppright, P. Swanson, and C. A. Iverson, eds. Iowa State University Press, Ames, 1955.
27. Eppright, E. S., "Food Habits and Preferences; A Study of Iowa People of Two Age Groups." Iowa State Exp. Sta. Bul. 376, 1950.
28. Shapiro, L., Huenemann, R., and Hampton, M. S., "Dietary Survey for a Local Nutrition Program." U.S. Dep't. HEW, *Public Health Reports*, 77:257-68, March 1962.
29. Stearns, G., "Dietary Habits of Pregnant Women of Low Income in a Rural State." *Jour. Amer. Diet. Assn.*, 28:27-34, 1952.
30. "Nutritional Status, U.S.A." Agnes Fay Morgan, ed. Calif. Agr. Exp. Sta. Bul. 769, pp. 25, 44, Oct. 1959.
31. "The Aging Persons of Linn County, Iowa . . . A Study of the Characteristics, Situations, Problems of Persons 60 Years of Age and Over." Agr. and Home Econ. Exp. Sta. Bul. RS-355, Iowa State University, Ames, Aug. 1960.
32. Tibbits, C., "Economic and Social Adequacy of Older People." Amer. Home Econ. Assn., Workshop on Aging, Apr. 29-May 2, 1962, *Proceedings*, pp. 26-35.
33. Babcock, C. G., "What Is the Older Person Saying?" Unpubl. paper presented at Second Public Health Nutrition Inst., University of Pittsburgh, June 5-10, 1960.
34. Griffith, W. H., "Senior Citizens." Borden Centennial Symposium on Nutrition, *Proceedings*, pp. 85-97, 1958.