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VEGETABLE PREFERENCES AND DISLIKES OF
PRESCHOOL CHILDREN IN DAY CARE

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VEGETABLE PREFERENCES AND DISLIKES OF
PRESCHOOL CHILDREN IN DAY CARE

By

Beverly Kay Phillips

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ABSTRACT

VEGETABLE PREFERENCES AND DISLIKES OF
PRESCHOOL CHILDREN IN DAY CARE

By

Beverly Kay Phillips

The vegetable preferences and dislikes of 36 children who were in attendance at a day care center and aged 41 to 65 months were studied. Each child rated 12 vegetables on a three-point facial hedonic scale. Vegetables were represented by three types of stimuli for rating by the children: the names, photographs and tastes of the vegetables. The children gave consistent vegetable ratings over time. The vegetable photographs were the most satisfactory stimuli for the ratings. The children preferred and were best able to identify the vegetables frequently served in their homes and at the day care center. Unfamiliar vegetables were disliked by the children and rarely identified by them. The mothers used the hedonic scale to express the vegetable attitudes of the children. For most of the vegetables, the mothers were unable to give ratings which were similar to those given by their children.

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CHAPTER I

INTRODUCTION

The food behaviors of preschool children have been well documented. In general, the food behaviors of preschoolers tend to be similar to those of their parents (Burt and Hertzler, 1978; Sanjur and Scoma, 1971). This is not surprising in light of the fact that the home traditionally has been the primary environment for the developing child (Caliendo et al., 1977; Sims and Morris, 1974). It is also widely accepted that a child's eating behaviors, preferences and dislikes are beginning to develop during the preschool years.

The role of the home and family as the only important environment for the preschool child is no longer universal. American preschoolers in the 1970s are subject to many outside influences and the result is a decrease in the power and prominence of the family in the lives of its children (Bronfenbrenner, 1970). Several social changes have contributed to these changes in the lives of our children. Two of the most widespread changes have been the dramatic increase in the numbers of working mothers and single-parent families during the decade of the 1970s. Between 1970 and 1976 there was a 17 percent increase in the number of women in the nation's labor force who were also mothers of children under six years of age. In 1974 more than 15 percent of all children under the age of six lived in a single-parent family, usually headed by a woman. Both of these phenomena

show indications of increasing in prevalence in American society (NCOCY, 1976).

As the numbers of working women and single-parent homes increase, the number of children who are cared-for outside the home also increases. In many of these cases the child is cared for by non-family members while the parent(s) work. The number of day care centers has risen substantially since 1967 (NCOCY, 1976). The influences of these day care systems on the food behaviors of children is a virtually unexplored area of research.

The majority of the research documenting preschoolers' eating behaviors have been based on two assumptions. Preschool children have been assumed to be unreliable sources of information about their food preferences and dislikes (Sims and Morris, 1974). Also, the mothers of preschoolers have been assumed to be knowledgeable about their children's eating behaviors. The fact that preschoolers are increasingly fed and cared for by adults other than the mother causes one to question the validity of the second assumption.

The objectives of this research were: (1) to investigate the ability of preschool children to report their attitudes toward specific foods and (2) to investigate the ability of mothers of preschoolers who are cared-for outside the home to report the attitudes of their children toward specific foods.

CHAPTER II

INFLUENCES ON THE FOOD PREFERENCES AND DISLIKES OF PRESCHOOL CHILDREN

The preschool child can be viewed as a system in interaction with its environments. The inputs to the child system can be separated into two categories: those from the child's family and home, and those from the child's larger social and physical environments (Sims and Morris, 1974). The child's outputs which are pertinent in this review are his/her food preferences and dislikes.

There has been some recent interest in an ecological approach to the study of the food behaviors of preschoolers (Sims and Morris, 1974; Caliendo et al., 1977). Previous to the recent ecological research, the food behaviors of preschoolers had been studied extensively during the period 1930 to 1960. Most of the older research projects were investigations of specific influences on the food preferences and dislikes of preschool children. Many of the research projects during the 1930s, 40s and 50s were unique and will be included in this review.

The Home and Family

The family is the primary environment for the preschool child. The family environment is the source of the materials and nurturing required by the child during his/her development (Sims and Morris,

1974). The primary influences of the home and family on the food preferences of the child are of two types: influences by the family members, and influences due to frequency of service of the foods in the home.

Influences of Family Members

The members of the nuclear family can influence the food behavior of the preschool child. The role of the mother or principal caretaker has been particularly important in the development of food habits of the child. The principal caretaker has been described as a gatekeeper whose choices determine the types of foods which are eaten by, or available to, the family (Lewin, 1943). The role of the principal caretaker in the nutrition of the preschool child has been documented by various researchers (Sims and Morris, 1974; Caliendo et al., 1977).

Specific influences of family members on the food preferences and dislikes of preschoolers have been documented by various researchers. In the report of her study, McCarthy (1935) concluded that 35 percent of young children's (2 to 7½ years of age) food dislikes could be attributed to the food dislikes of another member of the family. The conclusion was based on reports by the mothers of preschoolers as to the food preferences and dislikes of all of the family members.

Sanjur and Scoma (1971) interviewed mothers about their own and their preschoolers' food preferences. They found that the preferences of the mothers and children were closely related for the meats, breads and cereals groups; but great variation was noted between the mothers'

and children's preferences for the milk and fruit and vegetable groups.

The father of the preschool child agreed with his child on ratings for food in the vegetable group (Bryan and Lowenberg, 1958). A more recent study (Burt and Hertzler, 1978) assessed the relationship between both the mothers' and the fathers' food ratings and those given by their five-year old children. The investigators concluded that the mother and father exerted essentially the same amount of influence on the child's food preferences and dislikes.

The influence of siblings on the food habits of preschoolers is suggested by data from the study by McCarthy (1935). She concluded that a child's siblings have more food aversions in common with the child than do either the father or the mother. Eppright and her coworkers (1969) reported findings similar to those reported by McCarthy (1935).

Familiarity as an Influence on Food Preference

There is convincing evidence that people prefer familiar objects to unfamiliar objects (Maslow, 1937). The familiarity of an object is expressed in terms of the amount of exposure the subject has had to the object. Frequency of service of a food to a subject is the measure of familiarity most commonly used in studies of food behavior. Pilgrim (1957) commented that people often dislike unfamiliar foods.

Preschool children have been found to have a greater preference for foods with which they are familiar than for those with which they are unfamiliar (Baird, 1958; Vance and Temple, 1933; Birch, 1978).

Birch (1978) analyzed rankings for fruits given by three- and four-year old children. Birch was able to conclude that approximately 30 percent of the variance in the preference data is due to the children's familiarity with the fruits.

Foods which are disliked by a member of the family are rarely served in the home; hence preschool children are unfamiliar with those foods (Methany et al., 1962b; Bryan and Lowenberg, 1958; Sanjur and Scoma, 1971). The major influence of the father on his child's food preferences may be that his dislikes limit the variety of food served in the home (Bryan and Lowenberg, 1958).

Some mothers have reported that they plan meals to include foods which are liked by their preschoolers (Methany et al., 1962a; Eppright et al., 1969).

The Day Care Center

Children are spending more time and eating a greater number of meals outside their homes than did preschoolers of past decades (NCOCY, 1976). The family influence on the developing child is decreasing as children are increasingly influenced by adults and children from outside the home (Bronfenbrenner, 1970). A major antecedent to the recent surge of outside influences on the child may be the increase in the number of working mothers. A survey by the United States Labor Department in 1976 revealed that 37 percent of the preschool children had working mothers (Coalition for Children and Youth, 1977).

The preschool children of working mothers are usually cared-for by others--either in the home, in family day care or in group day care. Group day care is the focus of the current review. The prevalence of group day care as a major caretaker of preschoolers in the United States is a fairly recent phenomenon. There was a twofold increase in the number of licensed day care centers from 1967 to 1972 (NCOCY, 1976). Extensive research has not been conducted during the past decade on the food behaviors of day care center populations. During the period from 1930 to 1960 a considerable amount of research was conducted on preschoolers in nursery schools. The research reports from this era will be included in this review, as the era is a source of a substantial portion of the relevant research.

Food Served to Children in Day Care

The goal of the food service in day care programs is to supplement the child's home food intake and thus ensure an adequate total food intake (Juhas, 1970). The U.S. Department of Agriculture (USDA) established the Child Care Food Program in 1975, in order to assist the local day care programs in meeting this goal. The program is administered through the states providing financial assistance to non-profit child care programs serving low-income populations. Families qualify to receive free or reduced priced meals and snacks for their child in day care on the basis of their income and family size.

Day care centers which participate in the USDA program must meet minimum requirements in terms of types and amounts of foods served. It has been recommended that children who spend ten or more hours a day at

a day care center receive 80 percent of their nutrients needed for the day (White House Conference on Food, Nutrition and Health, 1970).

Day care programs which are participating in the USDA reimbursement program are required to serve two servings of fruits and/or vegetables for lunch and supper meals. The service of a vegetable as part of the morning or afternoon supplement is optional (Food and Nutrition Service, 1976). A day care center could still meet the requirements by serving fruits rather than vegetables at the meals and snacks. White potatoes are classified as a vegetable. A serving of a vegetable is defined as a half cup. There are no requirements as to the types of vegetables which must be served by a day care center.

Modeling Behavior--Implications for Day Care Centers

Modeling has been defined as the adoption of behaviors which are the symbolic equivalents of those being modeled (Bronfenbrenner, 1970). Children will model the behaviors of a contagious model even without benefit of external reward (Waxler and Yarrow, 1970). The most contagious models for a child are people who play an important role in his/her life; namely, peers, parents and teachers (Bronfenbrenner, 1970).

An example of the use of modeling behavior is the observation that it may be easier to successfully introduce a new food to a preschooler in a day care group situation where he/she sees adults and peers enjoying themselves and the food, as opposed to the home situation where the child usually eats with fewer people (McWilliams, 1975).

It may also be true that if a new food is refused by teachers and peers at a day care center, a child may also refuse to accept the food. Bertcher (1973) commented that teachers of preschoolers are continuously modeling behaviors for the children in their charge.

Changing the Food Behaviors of Children in Day Care

It has been recommended that teachers eat with the children and model appropriate eating behaviors for the children at the day care center (Bettelheim, 1970). Several day care programs and nursery schools have followed this advice and have attempted to use their knowledge of modeling behavior to change the eating behaviors or food preferences of preschool children (Hall and Holmberg, 1974; Highberger and Carothers, 1977; Dunshee, 1931).

Dunshee (1931) used methods such as praise, criticism and reward for the children as well as examples by the teachers in attempts to increase amounts of food eaten by nursery school children. None of the methods had a significant effect on the amount of food eaten by the preschoolers.

More recently Highberger and Carothers (1977) reported success in their attempts to increase the amount of food eaten by 14 toddlers, aged 24 to 31 months. The researchers had used the techniques of positive reinforcement and modeling of desired eating behaviors by the teachers at a day care center.

Glaser (1964) reported that by serving previously unfamiliar vegetables to children in a nursery school setting, the number of

children expressing a dislike for the food decreased over time as their familiarity with the food increased. This finding is consistent with research discussed in a previous section on the influence of familiarity on food preferences.

Summary

The food preferences and dislikes of preschool children are influenced by the persons around them. Preschoolers tend to prefer those foods which are served to him/her frequently over those foods which are seldom served. The day care center system may be a powerful influence on the food behaviors of enrolled children.

CHAPTER III

DETERMINATION OF THE FOOD PREFERENCES AND DISLIKES OF PRESCHOOL CHILDREN

This chapter will consist of two major sections. The first section will be a discussion of available information on the vegetable preferences and dislikes of preschoolers. The second section is a review of the methods which have been used to determine the opinions of young children about specific foods.

Preschoolers' Opinions of Vegetables

The vegetable preferences and dislikes of preschool children have been well documented over the past half century. Vance and Temple (1933) used reports of quantities of vegetables eaten by a group of Iowa preschoolers to determine which were preferred and disliked by the children. They concluded that the most preferred vegetables among their sample preschoolers were carrots, peas and beans. The vegetables which were most disliked by the children were brussel sprouts, squash, turnips and cauliflower.

In a more recent study of the food habits of Black low-income preschoolers in northern New York the mothers reported the vegetable preferences and dislikes for their children (Sanjur and Scoma, 1971). The vegetables which were most preferred by the children were collard

greens, sweet potatoes and spinach. The vegetables which were most frequently disliked by the children were squash, green pepper and raw cabbage.

Eppright and her coworkers (1969) reported the results of the North Central Regional Study of the diets of preschoolers. The sample consisted of 2,000 households of preschool children in 12 North Central states. The sample was clustered for five urbanization categories; all income, racial and ethnic groups were represented. The mothers of the 3,444 sample children reported that spinach, carrots, green beans and peas were the vegetables which were most often refused by the children.

During a study of the eating behaviors of 16 Kansas children, Twardosz and her coworkers (1975) observed that of the vegetables served, the children ate the largest quantities of the creamed corn, green beans, peas and corn. The vegetables which were eaten in the smallest amounts were okra, cauliflower, broccoli and sweet potatoes.

Bryan and Lowenberg (1958) asked the mothers of 61 preschoolers at a university nursery school to express the food preferences and dislikes for their children. Raw carrots, white potatoes, raw tomatoes and green beans were most often categorized as liked. The vegetables which were least often liked were spinach, peas and sweet potatoes.

There is a great variability in the vegetable preferences and dislikes of preschoolers as reported in the literature cited above. For instance, in three of the studies (Twardosz et al., 1975; Bryan and Lowenberg, 1958; Vance and Temple, 1933) green beans are described as a preferred vegetable for the children; in a fourth study (Eppright

et al., 1969) green beans were noted as frequently refused by the children.

The inconsistency in the vegetables described as preferred and disliked by the children may be partially due to the differences in the lists of vegetables which were investigated by each group of researchers. Each research project described above was conducted using a different set of vegetables--varying in the forms of the vegetables as well as number of vegetables investigated. Comparisons of the relative ratings of the vegetables among the studies are difficult to make if the same vegetables are not used in the investigations. Another possible source of the differences among the studies may be the variation in the methods used to determine the food preferences and dislikes of the children. This subject will be discussed in a later section.

Several researchers have been in agreement that the vegetable group is the food group most disliked by preschool children in general (Beyer and Morris, 1974; Bryan and Lowenberg, 1958; Dunshee, 1931; Lamb and Ling, 1946; Owen et al., 1974; McCarthy, 1935). Lamb and Ling (1946) found that green and yellow vegetables as a group was the least liked of all food groups by preschoolers. Other studies (Beyer and Morris, 1974; Baird, 1958; Bryan and Lowenberg, 1958; Vance and Temple, 1933) have led the investigators to conclude that the children disliked many vegetables, but they tended to like raw vegetables as a group better than cooked vegetables.

Food Preference Testing

The most common methods of measuring preference are ranking, paired comparisons and rating scales (Ellis, 1968). The paired comparison involves the selection by the subject of one of two objects on the basis of a previously defined dimension, in this case, preference. Ranking or the rank order method is a procedure whereby the subject arrange a group of objects according to the degree of his liking or disliking for the objects (American Society for Testing and Materials, 1968).

Rating Scales

The rating scale method involves the use of a defined scale along the dimension to be tested. The scale may be verbal, numeric or graphic in nature. The subject chooses a point on the rating scale to indicate his/her assessment of the object along the dimension of evaluation. Rating scales which specifically test preference values are called hedonic scales. It is recommended that rating scales have at least five categories (American Society for Testing and Materials, 1968).

A recent study with nine- to eleven-year old children was conducted using a five-point verbal hedonic scale (Head et al., 1977). The investigators compared the ratings given by the children for the foods with the actual amounts of foods eaten and they concluded that the results of the rating scale were reliable based on this comparison. The scale used was composed of the following categories: great, good,

ok, bad and terrible. The researchers concluded that a three-point scale, the result of eliminating the two end categories, would have been just as effective for use in the study because the children often did not discriminate between the "great" and "good" or the "bad" and "terrible" categories.

Facial hedonic scales are those where faces depict the degree of pleasure or displeasure experienced by the subject when the stimulus is experienced or more specifically, when the food is tasted. A neutral face is usually included as the median interval (Ellis, 1968). While there are little data to prove the reliability of facial hedonic scales, widespread use of these scales indicates that the method is considered to be a reliable and sensitive tool for determination of the food preferences and dislikes of individuals (Ellis, 1968).

Special Considerations When Preschool Children Are the Subjects

Preschoolers have difficulty answering open-ended questions (Wells, 1965). Yarrow (1960) commented that preschool children can be interviewed effectively, if appropriate procedures are used. She suggested using procedures which use a picture-choice technique for the children's responses to questions. Wells (1965) recommended the use of facial hedonic scales for interviewing children. He cautioned that preschool children may tend to give false negative answers or give no answer at all when a question is not easily understood. Wells contended that interviewers of preschool children may have to be more persistent and use more probes to elicit answers than do interviewers of older subjects.

Quigley (1977) observed that three-year olds were often unable to answer an open-ended question about their favorite foods.

Methods Used to Determine the Food Preferences and Dislikes of Young Children

Preschool children have been assumed to be unreliable sources of information regarding their opinions of foods (Sims and Morris, 1974; Bryan and Lowenberg, 1958). Based on this assumption, the determinations of preschoolers' food preferences and dislikes have been based on one of three methods: (1) observations of the eating behaviors of the children, (2) mothers' reports of the preferences and dislikes of their children, and (3) determinations of the amounts of foods eaten by the children. A discussion of the research using one or more of these methods for determining food preferences and dislikes will be followed by a review of studies in which the children's reports were the source of the data.

Report by Observer

Some of the earliest published investigations of the eating behaviors of preschool children were based on the reports of individuals who watched the children as they ate. The observers were the investigators, teachers or student helpers at the nursery schools which were the sites for the research (Vance and Temple, 1933; Dunshee, 1931; Lamb and Ling, 1946). Two of the research groups also enlisted the aid of the children's mothers to record their observations of the children's eating behaviors at home (Lamb and Ling, 1946; Vance and Temple, 1933).

The studies conducted by Dunshee (1931) and Lamb and Ling (1946) included records of the approximate amounts of foods eaten by each child in addition to the other observations. Vance and Temple (1933) recorded only if second helpings were served, as an indication of the amounts of foods eaten.

Researchers who used observer reports to determine preschoolers' food preferences and dislikes based their conclusions on verbal and nonverbal expressions by the children while eating (Dunshee, 1931; Lamb and Ling, 1946), the order in which the foods were tasted and finished (Vance and Temple, 1933), the encouragement required to urge the children to eat a food (Dunshee, 1931) and the approximate amounts of the foods eaten by the children (Dunshee, 1931; Lamb and Ling, 1946; Vance and Temple, 1933).

Report by Mother

Many studies of the food behaviors of preschoolers have been conducted based on interview with the mothers of the target children. As mentioned earlier, these studies varied in the number and form of the foods chosen for investigation. Another source of variation among the studies was the type of rating scale used by the mothers to express the children's opinions of the foods. The rating scales were verbal in all of the studies. A mother was asked to assign each food to a category on the scale to indicate how her child felt about the food or how the child usually acted when the food was served to him or her.

The number of categories or points on the rating scales used ranged from two (Methany et al., 1962b) to five (Lamb and Ling, 1946).

Most investigators used rating scales of three (Sanjur and Scoma, 1971; Eppright et al., 1969; Baird, 1958; Bryan and Lowenberg, 1958) or four categories (McCarthy, 1935; Vance and Temple, 1933). All of the scales included categories which were the equivalent of like and dislike ratings for the foods.

Amounts of Foods Eaten

Two groups of investigators assessed children's food preferences and dislikes based on their determinations of the amounts of the foods eaten by the children (Twardosz et al., 1975; Harrill et al., 1972). All foods served, including second helpings, and all leftovers were weighed by the researchers. Conclusions as to which were the most preferred and most disliked foods were based solely on amounts of the foods eaten by the children.

Report by the Child

There are few available reports of research projects which have used young children as the source of data for determination of food preferences and dislikes. Two investigators interviewed preschool children (Birch, 1978; Phillips et al., 1978); others have used similar methods when interviewing children of kindergarten age (Breckenridge, 1959; Burt and Hertzler, 1978). Unlike the researchers whose work was discussed in the previous sections, Birch (1978), Phillips and coworkers (1978), Breckenridge (1959) and Burt and Hertzler (1978) assumed that children aged three to six years were capable of supplying adequate information about their food preferences and dislikes.

Phillips and coworkers (1978) used a five-point facial hedonic scale to interview four to five-year old children about presweetened breakfast cereals. The children were asked to taste the cereals one at a time, then indicate a face to express their opinion of the cereal. The children were also asked to rank the cereals from most to least liked. A high correlation between the two methods for determination of their preferences, was interpreted as an indication that the children were able to express their opinions of the cereals.

Burt and Hertzler (1978) used a three-point facial hedonic scale to interview 46 kindergarten children about 32 foods. The procedures were similar to those used by Phillips and coworkers (1978). The investigators were of the opinion that the children were able to understand and respond well to the tool.

Kindergarten children were among the children interviewed by Breckenridge (1959) in her investigation of children's dietary habits. The children were asked to rate foods on a verbal scale of three categories: like, indifferent and dislike. Breckenridge did not mention any difficulties experienced in working with the young children and the rating scale.

Birch (1978) developed a procedure whereby the children ranked foods according to how much they liked or disliked each one. The 60 children who were involved in the study were three to four years of age. The interviewer presented samples of eight fruits to the children for tasting and identification. If a child was unable to name a fruit, the name was provided by the interviewer. The child was then asked to

indicate which fruit he/she "liked the most"; the designated fruit was removed from view. The procedure continued with the child indicating a second most-liked fruit, and so on until all the fruits were ranked. Birch repeated the ranking procedure with the children at a later date and found the rankings to be stable. She concluded that the children were a consistent and reliable source of information about their fruit likes and dislikes.

Summary

Much research has been conducted to document the food preferences and dislikes of preschool children. Researchers have reported various vegetable preferences for the children. The majority of the investigators of preschoolers' eating behaviors have relied on the mothers' reports or an observer's report to determine food likes and dislikes of preschoolers. Other researchers have determined preferences from amounts of the foods eaten by the children. Recent research has been conducted using the child himself as the source of information. The results of the recent investigations indicate that preschool children give reliable preference ratings or ranking for foods.

CHAPTER IV

METHODS AND PROCEDURES

The data were collected by two methods: interview and participant observation. There were several preliminary steps which were completed before most of the data were collected. These steps and the procedures for interviewing the children, mothers and staff members will be described in this chapter.

Preliminary Work

There were several essential steps which were completed before the interviewing stage of the research. Some of the preliminary procedures involved were: the development and pretest of the interview schedules, the selection of the vegetables, the selection of the research site and participant observation at the research site.

Development of the Interview Schedules

Original interview schedules were developed for use with three groups of subjects. The subjects were: the children attending the day care program at the research site, the children's principal caretakers and the children's teachers at the day care center. These instruments, along with appropriate consent forms for the participants, were approved by the University Committee for Research Involving Human Subjects. The administrator at the day care center which was the research site

approved the interview schedules and consent forms. Approval of other agencies was not required.

Pretesting of the Interview Schedules

The interview schedules for the teachers, the principal caretakers, and the children were pretested at a day care center other than the actual research site. Appropriate minor changes were made in the wording and order of some of the questions in the interview schedules for the teachers and principal caretakers. During the pretest of the children's interview schedule it was noted that some children had an inadequate understanding of the meaning and use of the faces of the hedonic scale. Further testing with the children convinced the researchers that most children were able to use the scale if the faces were first explained by the interviewer.

The final form of the children's interview schedule was in five parts, with each portion of the interview schedule to be conducted on a different day with an individual child. The children's interview schedule is more fully described later in this chapter. The interview schedules for use with the principal caretakers and staff members are also described in later sections. All three interview schedules can be found in Appendix A.

Selection of the Vegetables for the Research

Twelve vegetables were selected for use in this research project. Several factors were considered in the selection of the vegetables. The vegetables which were chosen were: beets, broccoli,

carrots, raw carrots, raw cauliflower, corn, green beans, green pepper, greens, lima beans, mashed potatoes and spinach. The specific form of each which was used will be discussed later.

The literature pertaining to the vegetable preferences and dislikes of young children was reviewed. Raw carrots, corn and green beans were frequently mentioned in the literature as vegetables which are preferred by preschoolers (Bryan and Lowenberg, 1958; Eppright et al., 1969; Vance and Temple, 1933). Cauliflower, broccoli and spinach have been reported as disliked vegetables for preschoolers (Bryan and Lowenberg, 1958; Eppright et al., 1969; Twardosz et al., 1975). These particular vegetables were selected so the preferred as well as disliked vegetables would be included in the group of vegetables being investigated.

The administrator of the day care center at which the research was to take place, was interviewed to determine the frequency most vegetables were served, and the form of each most often used at the center. Corn, raw carrots, green beans and beets were chosen because they were served at the site. The other selected vegetables were rarely or never served at the day care center.

Selection of the Research Site and Subjects

The target population was children aged three and one-half to five years (or 42 to 65 months) who were attending a day care center at least 20 hours per week. The administrator at the selected day care center expressed a willingness to have the research conducted at the site.

The administrator of the day care center provided the researchers with a list of the children who met the requirements for participation in the study.

Participant Observation at the Research Site

Before the data collection began, the principal investigator spent several days at the day care center as a participant observer. In this way the researcher was able to learn the routine of the day care center, become acquainted with the teachers and many of the children, and allow the children to accept the new adult as part of the routine.

The investigator developed a rapport with the children, thus facilitating the ability of the investigator to effectively interview the children in later weeks.

Field notes were kept by the researcher for observations made while at the site. The field notes were used to describe the research site.

Information Obtained From the Day Care Center Administrator

The researcher had several informal contacts with the day care center administrator. The researcher was provided past menus from the day care center food service to determine frequency of service of the selected vegetables at the site.

Nutrient Analysis of a Two-Week Menu

The menus for food served during two weeks at the day care center were analyzed for calories, protein, ascorbic acid, vitamin A, thiamin, niacin, riboflavin, calcium and iron. Standard tables of food composition were used (Agricultural Research Service, 1977; Church and Church 1975).

Consent of Parents for Participation of the Children

A parent of each eligible child was contacted by the researchers in an attempt to secure consent for the participation of the child. Thirty-three parents were introduced to the researcher by a teacher at the day care center when they arrived to pick up their children. At this time the researcher briefly explained the project. Each parent was given a letter further describing the research along with a consent form to be returned to allow the participation of the child in the study. Six letters and accompanying consent forms were delivered by the day care center's bus driver to the parents of children who usually rode the bus.

Four parents who did not return signed consent forms within two weeks were contacted again by the researcher--either at the center or by telephone. Thirty-six completed forms were returned.

Parents were asked to list on the consent form any foods to which their child had an allergy or any foods the child was not to taste.

Heights and Weights of the Children

Heights and weights of participating children were obtained. Standing heights minus shoes were measured by means of a measuring board consisting of a metal tape measure permanently attached to an upright board, and a movable head board through which the measurement is read to the nearest 1/10 centimeter. The children were weighed on a Detecto balance to the nearest 1/10 kilogram. Each child's height and weight were plotted on growth charts which were adapted from standards from the National Center for Health Statistics. Each mother was given her child's chart at the time of her interview with the researcher.

Interviews of the Children

Each child was interviewed five times. There were specific tools developed for use during the interviews. There was some variation in the questions asked during the five interviews.

Interview Setting

The researcher interviewed the children in the hall area of the day care center. The area was familiar to the children, yet far enough from the classrooms to reduce distractions from activities going on there. The hall was usually an off-limits area for the children during the day.

The interviewer approached a participating child in his/her classroom and asked the child to accompany her to the hallway to talk. A reluctant child was allowed to refuse and was asked to talk with the

interviewer on another day. Occasionally a teacher encouraged cooperation of a child.

Interview Tools

The facial hedonic scale. The three faces were drawn on a piece of blue poster cardboard, four by fifteen inches (Figure 1).

Vegetable photographs. The selected vegetables were photographed in the form in which they were to be served to the children. The color photographs were enlarged to five by seven inches, mounted to cardboard and laminated with clear plastic.

Interview I

During Interview I the children rated the vegetables after hearing the names of the vegetables. Interview I will be referred to as Interview I-N to indicate the procedure used. Interview I-N lasted five to seven minutes for most children.

Favorite and disliked vegetables. The child was first asked to name a favorite and a disliked vegetable. If the child was unable to name a vegetable in either case, he/she was asked to name a favorite and/or a disliked food.

The hedonic scale. The child was asked to explain what each of the three faces of the scale means. The answers were recorded. Acceptable responses were those which indicated to the interviewer that the child understood the meanings and use of the faces on the scale. If any of the child's explanations were unacceptable, the interviewer explained the faces to the child as follows. While

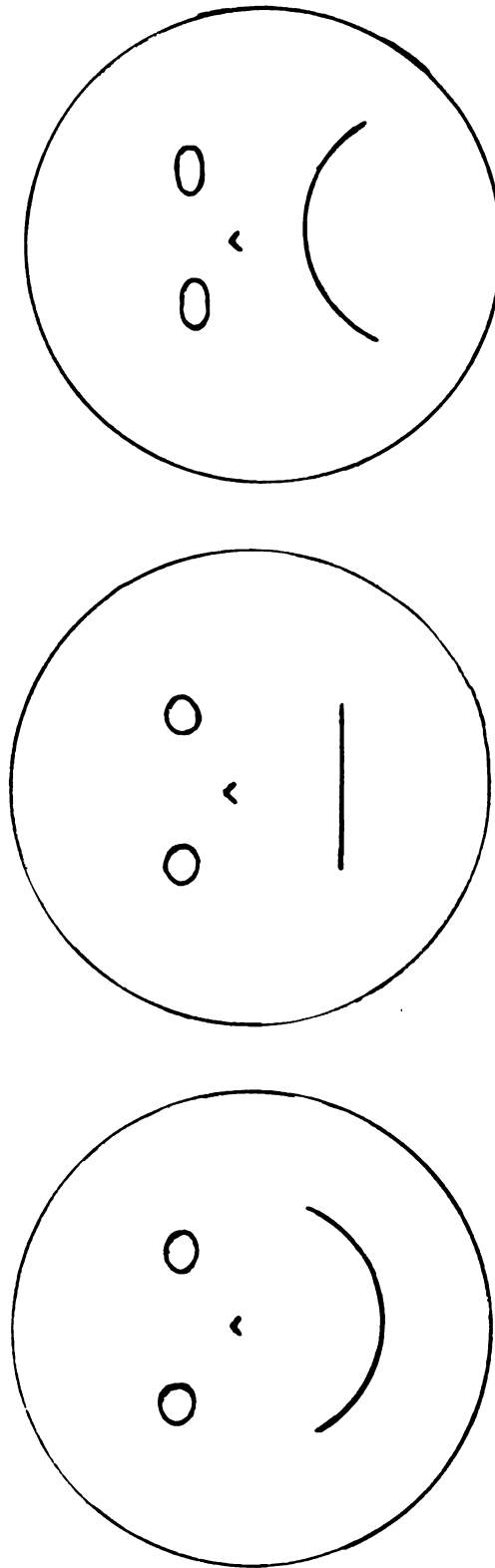


Figure 1. Facial Hedonic Scale.

pointing to the smiling face, the interviewer said, "this face means that you like it." While pointing to the middle face, "this face means that you sort of like it and sort of don't." While pointing to the frowning face the interviewer said, "this face means that you don't like it."

Rating the vegetables. The twelve selected vegetables were named for the child in a predetermined random order. If the form of the vegetable was such that it might influence the rating by a child, the form was specified, for example, cooked carrots and raw carrots were named as such. After each vegetable was named, the child was asked to point to a face to show how he/she felt when he/she ate the vegetable.

Interview II

During Interview II the children rated the vegetables after seeing photographs of the vegetables. Interview II will be referred to as Interview II-P to indicate the procedure used.

The second interview of each child was conducted approximately seven to ten days after Interview I-N. Interview II-P took about five minutes with each child.

The hedonic scale. The child was asked to explain the faces as in Interview I-N. Again the faces were explained to the child if necessary.

Rating the vegetables. The twelve vegetables photographs were shown to the child one at a time in a random order. The child was asked to name the vegetable, then indicate a face to show how he/she felt when he/she ate the vegetable.

Interview III

The children were asked to taste each of the selected vegetables during Interview III. Interview III will be referred to as Interview III-T to indicate the procedure used.

In order to minimize problems of fatigue during the tasting portion of the interview, the vegetables were divided into three groups, four vegetables in each group. The first group of vegetables included: broccoli, raw carrots, beets and green beans. The second group was: mashed potatoes, carrots, raw green pepper, and spinach. The third group included: greens, raw cauliflower, corn and lima beans. The vegetables in the first group were tasted by the children approximately three to five days after Interview II-P. The second and third groups of vegetables were tasted on subsequent days.

The hedonic scale. The child was asked to explain the faces before tasting each group of vegetables. As necessary, the interviewer explained the faces to the child.

Rating the vegetables. The procedures for the tasting and rating of each of the three groups of vegetables were the same. The vegetables were prepared by the standard methods (Figure 2). Small portions of each of the four vegetables in a group were put on separate white seven-inch paper plates. The child was given one vegetable at a time, in random order. The child was provided with a plastic fork, when necessary, and encouraged to taste the food. After tasting, the child was asked to identify the vegetable, then indicate a face to rate it. In the instances when a child refused to taste a vegetable, this was noted and the rating of the vegetable recorded.

Vegetable	Preparation Method
Beets	Canned diced "Stokely" brand red beets were purchased for use in the study.
Broccoli	A head of fresh broccoli was purchased from the produce department of a local supermarket. The broccoli was washed then cut into small (1 to 2 inch) flowerets. The flowerets were cooked 8 to 10 minutes in boiling water.
Carrots, cooked	"Stokely" brand canned sliced carrots were purchased. Before heating, the slices were cut into cubes of approximately $\frac{1}{2}$ inch dimension.
Carrots, raw	Fresh carrots were purchased at a local supermarket. The carrots were washed, peeled and cut into lengths of approximately 4 inches. The 4-inch sections were then cut into quarters, lengthwise.
Cauliflower	Fresh cauliflower was purchased at a local supermarket. The head was washed then cut into small (1 to 2 inch) flowerets.
Corn	"Del Monte" brand canned whole kernel yellow corn was used.
Green beans	"Del Monte" brand canned cut green beans were used.
Green pepper	Fresh green bell peppers were purchased at a local supermarket. The peppers were washed, the seeds removed, and the peppers were cut into $\frac{1}{2}$ inch strips lengthwise.
Greens	Fresh collard leaves were purchased at a local supermarket. The leaves were washed and torn into three or four pieces. Stems were discarded. A quantity of greens sufficient to serve four or five children was cooked in approximately three cups of boiling water with one teaspoon of salt pork. The cooking time was 15 to 20 minutes--until the leaves were very tender.
Lima beans	"Del Monte" canned green lima beans were used.
Mashed potatoes	"Betty Crocker Potato Buds" were prepared according to the directions on the box. As the directions state, the instant potato flakes were mixed with milk, water, margarine and salt.
Spinach	"Del Monte" canned whole spinach leaves were used.

Figure 2. Methods Used for the Preparation of the Vegetables.

Preparation of the vegetables. All vegetables for tasting by the children were prepared by the investigator. Hot plate burners were used on a table at the day care center to heat vegetables which were served hot. Two-quart "t-fal"-on-aluminum sauce pans were used to heat the vegetables. Canned vegetables were heated to boiling and boiled for ten minutes for safety. The vegetables were held at 65 to 70°C. This temperature allowed for a 5 to 10 degree cooling during the time required for service of the vegetables, and preparation of the child for the vegetable tasting portion of the interview. The fresh vegetables were held refrigerated until they were needed. The vegetables which were cooked from fresh were prepared as described in Figure 2. With the exceptions of the greens and the mashed potatoes, no seasonings were used on the vegetables.

Time required. Each of the three portions of Interview III-T lasted five to ten minutes per child.

Interview IV

The questions of Interview I-N were repeated in Interview IV-N, after the completion of Interview III-T with the children. The questions were repeated as a test of the consistency of the children in their responses to the questions.

Interview V

The questions of Interview II-P were repeated in Interview V-P. The questions were asked in Interviews II-P and V-P to test the consistency of the children's responses.

Number of Completed Interviews

Thirty-two children completed all of Interviews I through V. Three children were withdrawn from the day care center before they were involved in Interviews III, IV and V. One child did not participate in Interviews IV and V.

Interview of Principal Caretakers

The mothers of 34 of the participating children were interviewed. The investigator contacted the mothers either at the day care center or by telephone to arrange the interviews. Three mothers were interviewed in their homes, three mothers were interviewed by telephone; all others were interviewed at the day care center.

Each mother was asked to use the facial hedonic scale to indicate how her child would feel if served each of the selected vegetables. The mothers were asked the frequency the vegetables were served in the home. Other questions asked of each mother included the usual meal pattern for her child, her assessment of the child's eating habits, and limited demographic data.

Interview of Staff Members

Six teachers and teacher's aides, those who usually ate with the children, plus the cook, were interviewed by the researcher. The teachers were asked to rate the selected vegetables using the facial hedonic scale--once based on their observation of how the children as a group respond to the vegetables, and secondly expressing their own

rating of the vegetables. The teachers were asked to report how they encouraged the children to eat vegetables when the children were reluctant to do so. The teachers were also asked to describe how they react when a vegetable which they dislike was served at the day care center.

Data Analysis

The data were analyzed using the Statistical Package for the Social Sciences (Nie et al., 1975) and the Michigan State University CDC 6500 computer. SPSS subprograms used were Frequencies, Crosstabs, and T-test.

For purposes of analysis the faces of the hedonic scale were assigned numerical values. The happy face was given the value one; the middle face, two; and the sad face, three.

CHAPTER V

DESCRIPTION OF THE RESEARCH SITE AND SAMPLE

The day care center which was the site for the research project will be described. The operations of the day care center, especially for the food service will be documented. Finally, a description of the groups of subjects for the research project will be included.

The Day Care Center

This research was conducted at the Michigan Young World Child Care Center in Lansing, Michigan. The day care center was located in Lansing Township. The neighbors of the day care center were small office buildings and residential areas.

The day care center was licensed by the State of Michigan to serve as a non-residential care facility for up to 100 children aged one and one-half to eight years. At the time of this research project, the enrollment at the day care center was near capacity.

Operation of the Day Care Center

The day care center was open from 6:30 a.m. to 6:00 p.m. Monday through Friday. The day care center owned and operated a twelve passenger van for transportation of children. About one-sixth of the children rode the van to and/or from the day care center.

Classrooms

The day care center was divided into three groups of children by age. Each age group was housed in a separate room at the site. The three groups were named and defined as follows: (1) "Toddlers" were enrolled when they are able to walk and were housed in this section of the day care center until they are toilet trained; (2) "Hive" included the children from age they were toilet trained until they were about three and one-half years old; and (3) "Pooh" classroom included all enrolled children over three and one-half years of age. The Toddler unit is essentially separate from the other activities of the day care center and will not be discussed further in this section. The "Pooh" and "Hive" classrooms each accommodated between 30 and 40 children each day.

Teachers and Teacher Aides

The number of teachers and teachers aides on the staff (excluding the Toddler unit) was about eight during the time of this study. Each of the two classrooms had a full-time head teacher, another full-time teacher, and two part-time teachers or aides. The head teachers planned the lessons for their respective classrooms. The teachers and teacher aides all helped the head teachers and functioned in the classrooms as was necessary.

Administration of the Day Care Center

The day care center was owned by the Association for Child Development. The Association for Child Development (ACD) is a non-profit organization which owns several day care centers and acts as

the sponsor for family day care homes. As a non-profit organization, the ACD can sponsor day care centers and homes so they can qualify for reimbursement for foods served to low income children through the USDA Child Care Feeding Program.

The Association for Child Development formulated the policies for the day care center which will be discussed in a later section. Other functions of the ACD included: record keeping for the day care center finances, purchasing of food and supplies and filing forms which are necessary for reimbursement through the Child Care Feeding Program.

The administrator at the day care center was a former teacher at the site. She had a Master's degree in child development.

The fee for registration at the day care center was \$20.00 per year per child. The daily fee was \$7.50 per day per child. The daily rate was based on attendance by the child for five or more hours at the center and breakfast, lunch and two snacks, during that period of time. A child who attended less than five hours on a single day was assessed a charge of \$6.00. This half-day rate included breakfast, lunch and one snack for a child attending in the morning, or lunch and one snack for children attending in the afternoon. The charge for transportation of a child in the day care center's van was \$2.00 per day. All charges were discounted for persons who paid in advance.

The Population Served

Approximately 25 percent of the enrolled children were receiving free meals and snacks through the USDA Child Care Feeding Program. Another 15 percent of the children received their meals and snacks

at reduced prices. Many of the families who qualified to receive free or reduced food for their children were also receiving financial support through the Aid to Dependent Children Program.

Some of the children enrolled at the day care center were Black (about 15%). A few of the children were Mexican-American; the remainder were Caucasian.

The Day Care Center Food Service

All of the food which was served at the day care center was prepared on site. The specifics of the food service will be described.

Menu planning. The administrator of the day care center planned the menus. She was using a four-week cycle menu at the time of this project. All menus are planned to conform to requirements for participation in the USDA Child Care Feeding Program. The menus were reviewed before their use by a nutritionist at the Association for Child Development. The menus were usually posted on the kitchen door within easy view of parents entering or leaving the building.

Food purchasing. Some of the food was ordered or purchased directly by the administrator at the day care center; other food stuffs were made available to the center through the Association for Child Development. Milk was delivered to the site by a wholesaler twice each week. Canned goods, dry products such as pasta and paper goods were purchased from Gordon Food Service, an institutional supplier. Deliveries from Gordon Food Service arrived at the site once every four weeks. Fresh fruits and vegetables were purchased weekly by the administrator at the local supermarket. All payments for the food were made by the ACD business office.

Food storage. All food and paper goods were stored in the kitchen area. The kitchen was equipped with two refrigerators and a large walk-in pantry in addition to kitchen cabinets. Frozen foods were not extensively in the menus and the only freezer storage was in the freezer compartments of the refrigerators.

Food preparation. The day care center employed one cook who worked from 8:00 a.m. to about 1:30 p.m. daily. The cook prepared the foods, put the prepared foods into serving dishes and sent carts of food to the classrooms for the meals and snacks throughout the day. Recipes used were not calculated for the exact number of servings and serving sizes required. The cook and administrator decided the amounts to prepare of each food.

Meals served. The day care center served breakfast, lunch and two snacks on the following schedule: breakfast at 8:15 a.m., morning supplement at 10:30 a.m., lunch at 12:00 noon and an afternoon supplement at 3:30 p.m. The children were usually asked to put away their toys or suspend their activities about ten minutes before the meals and snacks were served.

Seating arrangements. The children ate their food while seated at the tables and chairs in their classrooms. The tables and chairs were of appropriate height and size for preschool children. About 10 to 12 children and one teacher or aide was seated at each table.

Use of plates and utensils. All plates and utensils used by the children and teachers were disposable. Paper napkins were used, as were flat 12-inch paper plates. Six ounce styrofoam cups were used

for beverages and four-ounce styrofoam cups were used for canned fruits, jello and soup. Plastic spoons were the only utensils for the children. Sometimes snack foods such as toast or crackers were served on just a napkin.

Service of food. When the children were seated and quiet to the satisfaction of the teacher, she would take the napkins and spoons from the cart and give each to the children. The teacher then put portions of each of the foods on the plates and distributed them among the children. Second helpings were usually available for children who completed their portion of the desired food.

Clean-up after eating. When all the children had eaten, the teacher would instruct the children to discard their plates, cups and napkins and return their spoons to the cart. The teacher returned the carts containing the serving dishes and the children's spoons to the kitchen. The cook discarded most leftovers and washed the spoons and serving utensils.

Food Service Policies of the Day Care Center

The day care center policy was to encourage the children to taste all foods served. The teachers were instructed to serve portions of all foods to each of the children as well as to themselves (except in the case of food allergies). Children who refused to taste particular foods were to be verbally encouraged to do so; no foods, such as dessert, were withheld as punishment for refusal to eat. All teachers were expected to at least taste all foods while eating with the children.

The day care center did not allow parents or children to bring food from home to be eaten at the center. Exceptions were made in cases of allergies to a wide variety of foods.

Nutrition Education at the Day Care Center

The teachers had not taught any lessons on food or nutrition during the six months previous to this research project. During the last few weeks of this study, one of the classrooms did have some lessons related to food and health. The children colored mimeographed pages of pictures of foods. Carrots, one of the vegetables investigated during the research project was one of the foods colored by the children. A few days later, the children made vegetable soup in their classroom. This project involved cooking condensed canned vegetable soup with a few added canned green beans and peas and water in a slow-cooker for several hours. The soup was eaten for lunch on the day it was prepared.

Frequency the Selected Vegetables Were Served at the Day Care Center

The menus for the food served at the day care center during the three months prior to the research project and the three months during the project were reviewed. The frequencies the twelve selected vegetables were served during those months were tabulated (Table 1).

Table 1

Frequencies of Service of Selected Vegetables at the Day Care Center

Vegetable	Frequency of Service
Carrots, raw	1 or 2 times each week
Corn	1 time each week
Green beans	1 time each week
Beets	1 time each 2 weeks
Carrots	1 time each month
Broccoli	never
Cauliflower, raw	never
Green pepper, raw	never
Greens	never
Lima beans	never
Mashed potatoes	never
Spinach	never

Nutrients Supplied by Menus Served
During a Two-Week Interval at the
Day Care Center

The food served at the day care center for breakfast, lunch and two snacks supplied various amounts of calories and nutrients each day. The calories supplied by the daily menus ranged from 37 to 62 percent of the RDA for calories for four- to six-year old children. A child who attended the day care center ten hours each day would not have received amounts of some nutrients in accordance with what has been recommended-- 80 percent per day (White House Conference on Food, Nutrition and Health, 1970). A child would have been served less than 80 percent of his/her RDA's for calories, iron and niacin each day of the two-week period. A child would have been served less than 80 percent of his/her RDA's for thiamin and ascorbic acid on three days during the period. The amounts of protein, calcium, vitamin A and riboflavin supplied by

the menus were at or near the RDA's for those nutrients during all days of the two-week period.

Summary

The day care center which served as the research site had an enrollment of up to 100 children in three separate classroom areas. The center provided the children with two meals and two snacks each day; all of which was prepared on-site. The children ate in their classrooms with their teachers.

The Sample

The subjects included 36 children, their mothers and their teachers at Michigan Young World Child Care Center. Some characteristics of each group of subjects will be described.

The Children

The children ranged in age from 41 to 65 months with a mean age of 52.4 months; the median age was 51.5 months. There were 19 boys and 17 girls in the group. Five of the children were Black, two were Mexican-American, and 29 were Caucasian.

The children in the group had been attending the day care center for a mean of 10 months at the time data collection began. The minimum length of time in attendance at the center by a child in the study was one month, the maximum was 25 months. The children spent between six and ten hours per day at the center. Most of the children (56%) were at the center between eight and nine and one-half hours per

day. Thirty-three of the children attended five days each week, one child attended four days, and two attended three days each week.

The Mothers

Thirty-four mothers were interviewed ranging in age from 20 to 44 years. All of the mothers worked outside the home. Seven of the mothers worked between 30 and 39 hours per week; 23 mothers worked 40 hours per week; and four mothers worked more than 40 hours each week. The occupations of the mothers and the number of mothers in each category were: secretarial (11x), bookkeeping or clerical (13x), food service or housekeeping (4x), laboratory or computer operations (2x), professional (2x), and managerial (2x).

The mean number of years of formal education completed by the mothers was 13.3. Sixteen of the mothers had attended college for one to four years. Sixteen mothers had not pursued further education after high school graduation. One mother had not completed her high school degree and one mother had a Master's degree.

The family structure. The number of persons in the families of the sample mother/child pairs ranged from two to six. The mean family size was 3.3 persons. Eight of the families (24%) consisted of only the mother and the sample child. Twenty of the 34 families (59%) were single-parent families. Persons in the home other than the mother and the sample child were: the father (14x), sibling(s) (16x), grandparent(s) (2x), and an unrelated man (1x).

Participation in the Child Care Feeding Program. On the basis of income and family size, nine of the families had qualified for free meals and snacks for the preschoolers at the day care center. Six families were qualified to receive the meals and snacks for their preschoolers at a reduced price. Twenty-one families (62%) paid the full price for their child's meals and snacks at the day care center.

The Teachers and the Cook

Six day care center teachers and teacher aides were interviewed. At the time data collection began, one teacher aide had been employed at the day care center for only four months. The other teachers and aides had been employed at the center for longer periods of time, up to three years and seven months. Three of the teachers had teaching certificates. Two of the certified teachers held baccalaureate degrees, the third had a two year teaching degree. The fourth teacher had taken several college courses on child development. The two teacher aides had high school diplomas.

Five of the teachers and aides reported having had experience working with preschoolers prior to their current employment.

The cook had been employed at the center for seven months at the time of the study. The position was her first as a cook, and her first working with preschool children.

Summary

The participants in the research project were 36 children, 34 of the children's mothers and 7 staff members at the day care center. The children were from a variety of economic groups. Twenty of the children were living in single-parent homes. All of the mothers worked outside the homes.

CHAPTER VI

RESULTS

The data were collected by interview with the children, their mothers and their teachers. The data from each group of subjects will be discussed. The responses of the interviews to several open-ended questions will be discussed to begin this chapter. The identifications of the selected vegetables by the children, the ratings for the vegetables by the mothers and teachers for the children and the ratings for the vegetables by the children will be presented.

Mother's Assessments of the Children's Appetites

Most of the mothers (59%) described their children's appetites as good or excellent. Some mothers (32%) described their children's appetites as fair or poor. Two mothers said their children's appetites were variable or increasing.

Mothers' Reports of the Effects of the Day Care Center on the Children's Eating Behaviors

Some mothers (38%) reported having noticed a change in their children's eating behaviors which they attributed to the day care center. The changes mentioned by the mothers were: an increased

willingness to try new foods (5x), an increase in the child's appetite (3x) and an increase in the number of foods accepted by the child (5x).

Children's Opinions of the Food Served at the Day Care Center

Most of the children (89%) said they liked the food served at the day care center. One child said he didn't like the food and one child said he sometimes liked the food served.

During Interview IV, most of the children (85%) again said that they liked the food, three said they disliked the food and two replied that they sometimes liked the food.

Teachers' Reports of Methods Used to Encourage the Children to Eat Vegetables

All of the teachers reported that they used verbal encouragements in their efforts to have the children eat their vegetables when they were served at the day care center. All of the teachers said that tasting one bite of the vegetable was their requirement for the children. One teacher mentioned that a reluctant child who agreed to taste a disliked vegetable was allowed to discard the remainder of his/her portion immediately after tasting.

Teachers' Vegetable Eating Behaviors

Five of the six teachers reported that they served themselves portions of vegetables which they disliked when they were served at the day care center. The sixth teacher said she did not serve herself a

disliked vegetable. One of the teachers reported that she would taste a vegetable which she disliked only if she thought the children would notice if she didn't do so.

Teachers' Ratings of the Vegetables Based on
Their Own Opinions of the Vegetables

The staff members rated mashed potatoes and corn as their most preferred vegetables (Table 2). Most of the staff members (47%) reported that they either disliked or were indifferent toward greens, lima beans, spinach and cooked carrots.

Table 2

Hedonic Ratings for Selected Vegetables by the Staff Members

Vegetable	Percent of Staff Members (n = 7)			
	Like	Indifferent	Dislike	Don't Know
Corn	85.7	14.3	0	0
Mashed potatoes	85.7	14.3	0	0
Carrots, raw	71.4	28.6	0	0
Broccoli	71.4	28.6	0	0
Green pepper, raw	71.4	28.6	0	0
Cauliflower, raw	71.4	14.3	14.3	0
Green beans	57.1	42.9	0	0
Beets	57.1	28.6	14.3	0
Greens	28.6	57.1	0	14.3
Lima beans	28.6	57.1	14.3	0
Spinach	28.6	57.1	14.3	0
Carrots	14.3	57.1	28.6	0

Vegetables Served in the Homes

Most of the mothers (88%) said that they usually served a vegetable at the family evening meal.

The frequency the selected vegetables were served to the children at home varied greatly (Table 3). Corn was served most often; all of the mothers served corn to their families. Greens were served in only four (12%) of the homes.

Table 3

Frequencies of Service of Selected Vegetables in the Homes

Vegetable	Percent of Homes Where Vegetable Is Served (n = 34)			
	1x/wk. or More	1-3x/mo.	6x/yr. or Less	Never Serve
Corn	91.2	8.8	0	0
Green beans	76.5	20.6	0	3.0
Mashed potatoes	73.4	20.6	3.0	3.0
Carrots, raw	64.7	26.5	8.8	0
Carrots	32.4	29.4	11.8	26.5
Broccoli	26.5	29.4	11.8	32.4
Green pepper, raw	20.6	32.4	14.7	32.4
Beets	20.6	26.5	11.8	41.2
Spinach	11.8	20.6	8.8	58.9
Lima beans	8.8	17.6	14.7	58.9
Cauliflower, raw	5.9	23.5	3.0	67.6
Greens	0	8.8	3.0	88.2

Children's Favorite and Disliked Vegetables

The responses by the children when they were asked to name favorite and disliked vegetables varied from Interview I to IV. The associations between the child's age and sex and his/her ability to answer these questions will be discussed.

Favorite Vegetables

Some of the children (39%) were able to name a favorite vegetable during Interview I. Most of the children (57%) were able to do so during Interview IV. The difference in the number of children who were able to name favorite vegetables from Interview I to IV was not statistically significant.

The most frequent responses given by the children when they were asked to name a favorite vegetable during Interview I were: carrots (6x), soup (3x), corn and cereal (2x each). Four children named a non-food item and five gave no response. Thirty-three of the children were asked the same question during Interview IV. The most frequent responses to the question were: corn (5x), carrots (4x), soup (4x), green beans (3x) and mashed potatoes (2x). One child named a non-food item and three gave no response.

Disliked Vegetables

Some children (33%) were able to name a disliked vegetable when they were asked to do so during Interview I. More children (52%) were able to answer the question with the name of a vegetable during

Interview IV. The difference between the proportions of children able to name a disliked vegetable was not statistically significant.

When the children were asked during Interview I to name a disliked vegetable, the most frequent responses were: tomatoes (3x), beets (2x), soup (2x) and macaroni and cheese (2x). One child named a non-food item and seven gave no response. When the children were asked the same question during Interview IV the most frequent responses were: peas (4x), beets (3x), corn (2x), green beans (2x) and spinach (2x). Three children named a non-food item and nine gave no response.

Differences in Responses for Children's Age and Sex Groups

Chi square analysis was used to explore differences between types of answers given by the children when they were asked to name favorite or disliked vegetables and the age and sex of the respondents. The chi square for the relationship between the type of answer given to the favorite vegetable question during Interview I and the age of the child (Table 4) is approaching significance ($p \leq .08$). More of the older children than younger children were able to give the name of a vegetable as the answer to the question. This relationship between the type of answer given and the age of the child was not significant for the results obtained during Interview IV. There were no significant differences between the answer given and the age of the child for the question about a disliked vegetable during Interviews I and IV.

There was no relationship between the type of answer given to the favorite vegetable question and the sex of the child during

Table 4

Differences^a for Child's Age and Response Given When Asked to Name
a Favorite Vegetable During Interview I

Type of Response	Number of Children (n = 36)	
	41 to 51 mos. of age	52 to 65 mos. of age
Named a vegetable	6	8
Named a non-vegetable food	4	9
Named a non-food item	3	1
No response	4	0
"Don't know"	1	0

^aSignificant at $p \leq .08$.

Interview I. There was however a significant ($p \leq .05$) difference between these two variables during Interview IV (Table 5). More girls than boys were able to name a vegetable in response to the question. The boys more often than the girls named a food, a non-food or gave no response. There were no significant differences between the type of response and the sex of the child for the questions about disliked vegetables during Interviews I and IV.

Table 5

Differences^a for Child's Sex and Response Given When Asked to Name a Favorite Vegetable During Interview IV

Type of Response	Number of Children	
	Males (n = 16)	Females (n = 17)
Named a vegetable	5	14
Named a non-vegetable food	8	2
Named a non-food item	1	0
No response	2	0
"Don't know"	0	1

^aSignificant at $p \leq .05$.

Children's Ability to Identify the Vegetables

The percentages of the children who were able to correctly identify the selected vegetables varied from interview to interview (Table 6). The vegetables which were correctly identified by the greatest number of children were corn, raw carrots, mashed potatoes and green beans. Greens, lima beans and cauliflower were identified correctly by the fewest children.

Green pepper and raw carrots were identified by more ($p \leq .05$) of the children during Interview V-P than during Interview II-P. Cooked carrots and raw carrots were identified by more ($p \leq .05$) children after tasting the foods than after seeing the photographs of them during Interview II-P.

Table 6
Percentages^a of Children Able to Correctly Identify the Selected
Vegetables During Interviews II, III and V

Vegetable	Interview II (photograph) (n = 36)	Interview III (tastes) (n = 33)	Interview V (photograph) (n = 32)
Corn	100.0	96.9	100.0
Mashed potatoes	88.9	93.7	84.4
Carrots, raw	86.1 ^{xy}	100.0 ^x	100.0 ^y
Green beans	86.1	82.4	90.6
Beets	50.0	52.9	59.4
Broccoli	27.8	26.5	31.3
Carrots	25.0 ^x	48.5 ^x	34.4
Spinach	19.4	15.2	21.9
Green pepper, raw	13.9 ^x	18.2	34.4 ^x
Cauliflower, raw	2.8	6.1	9.4
Lima beans	2.8	6.1	6.3
Greens	2.8	0	0

^aFigures with like superscripts on the same line are different at $p \leq .05$.

Children's Ratings of the Vegetables

It was assumed that the ratings of the vegetables after tasting would be the most accurate reflection of the children's opinions of the food. On this basis, green beans, corn, raw carrots and mashed potatoes were preferred by the children (Table 7). The children as a group were indifferent towards cooked carrots, broccoli, lima beans, green pepper and beets. The vegetables which were least often rated as liked by the children were spinach, raw cauliflower and greens.

The means of the ratings given for the vegetables by the children during each of the five interviews were compared using Student's T-test. The values are listed in Appendix B. There were six instances when there were significant differences ($p \leq .05$) between ratings given a vegetable during two separate interviews of the children (Table 8).

Only one vegetable was rated differently ($p \leq .01$) during Interview V-P than during Interview I-N. Raw carrots were rated as more preferred by the children during their last than during their first interviews.

When the ratings for a particular method of interviewing are compared over time we find that the children were consistent for all but one vegetable. Corn was rated as more preferred ($p \leq .01$) when the children responded to the name during Interview IV-N than when the same method was used during Interview I-N. The children were consistent in their ratings for all selected vegetables from Interviews II-P to V-P when the photographs of the vegetables were used.

Table 7

Hedonic Ratings by the Children for the Selected Vegetables
After Tasting During Interview III-T

Vegetable	Percent of Children (n = 34)		
	Like	Indifferent	Dislike
Green beans	70.6	5.9	20.6
Carrots, raw	64.7	17.6	17.6
Corn	61.8	14.7	17.6
Mashed potatoes	58.8	17.6	17.6
Carrots	41.2	23.5	32.4
Beets	41.2	11.8	47.1
Green pepper, raw	35.3	17.6	44.1
Broccoli	32.4	26.5	38.2
Cauliflower, raw	32.4	11.8	52.9
Lima beans	32.4	20.6	44.1
Greens	19.4	17.6	50.0
Spinach	20.6	20.6	55.9

Table 8
Significant Differences in Children's Mean Ratings for
Vegetables by Interview Method Used

Vegetable	Interview Methods	Difference of Means	T Value	p
Carrots, raw	Name--Interview I Taste--Interview III ^a	.412	2.60	.05
Carrots, raw	Name--Interview I Photo--Interview V ^a	.500	2.78	.01
Carrots, raw	Name--Interview IV Photo--Interview V ^a	.406	2.08	.05
Corn	Name--Interview I Name--Interview IV ^a	.364	2.81	.01
Green pepper, raw	Photo--Interview II Taste--Interview III ^a	.364	2.04	.05
Green pepper, raw	Taste--Interview III ^a Name--Interview V	.344	2.08	.05

^aIndicates the method of each pair of interviews which elicited the most favorable rating for the vegetable.

There were four instances when the mean of the ratings given a vegetable after hearing the name and the mean of the ratings given the same vegetable after seeing a photograph or tasting it were different ($p \leq .05$). In each of the four instances, the ratings were lower when the name of the vegetable was used than when the photograph or a taste of the vegetable was the stimulus for the rating.

The ratings given 11 of the 12 vegetables were consistent whether the method used involved the use of photographs or a taste of the vegetables. Raw green pepper was the only vegetable which was rated differently when these two methods were used; the mean of the ratings was higher after the children tasted green pepper than when they saw a photograph of the vegetable.

Mothers' Ratings of the Vegetables for Their Children

The mothers said that corn, raw carrots and green beans were the children's more preferred vegetables (Table 9). According to their mothers, the children most disliked spinach, lima beans and greens.

Staff Members' Ratings of the Vegetables for the Children

The staff members at the day care center said that mashed potatoes, corn, green beans and raw carrots were most preferred by the children (Table 10). Most (over 57%) of the staff members said that spinach, greens, lima beans, raw cauliflower and beets were disliked by the children.

Table 9

Hedonic Ratings for the Selected Vegetables as Reported
by the Mothers for Their Children

Vegetable	Percent of Mothers (n = 34)			
	Liked	Indifferent	Disliked	Don't Know
Corn	98.5	3.0	0	0
Carrots, raw	80.3	15.2	4.5	0
Green beans	68.2	22.7	9.1	0
Mashed potatoes	62.1	24.2	12.1	1.5
Carrots	37.9	36.4	21.2	4.5
Beets	34.8	13.6	43.9	7.6
Broccoli	33.3	21.2	30.3	15.2
Green pepper, raw	25.8	25.8	39.4	9.1
Cauliflower, raw	16.7	30.3	28.8	22.7
Spinach	10.6	10.6	60.6	18.2
Lima beans	6.1	30.3	51.5	12.1
Greens	1.5	15.2	45.5	37.9

Table 10

Hedonic Ratings for the Selected Vegetables as Reported
by the Teachers for the Children

Vegetable	Percent of Teachers (n = 7)			
	Liked	Indifferent	Disliked	Don't Know
Corn	100.0	0	0	0
Mashed potatoes	100.0	0	0	0
Carrots, raw	85.7	14.3	0	0
Green beans	85.7	0	14.3	0
Carrots	57.1	28.6	14.3	0
Lima beans	28.6	14.3	57.1	0
Green pepper, raw	14.3	42.9	28.6	14.3
Beets	14.3	28.6	57.1	0
Broccoli	0	42.9	42.9	14.3
Cauliflower, raw	0	42.9	57.1	0
Greens	0	0	71.4	28.6
Spinach	0	0	100.0	0

Ratings of the Vegetables for the Children
as Reported by the Mothers vs. Ratings
as Reported by the Children

Statistical tests were performed to compare reports by the mothers of the children's ratings for the vegetables with the actual ratings for the vegetables reported by the children. The ratings by the mothers were different than those by the children for some vegetables.

Differences Between Vegetables Rated
as Liked

More mothers ($p \leq .05$) than children said corn was liked by the children (Table 11). More children than mothers ($p \leq .05$) said the children liked greens and lima beans. The difference between the percentage of mothers who rated raw cauliflower as liked by the children and the percentage of the children who said they liked the cauliflower was approaching significance ($p \leq .07$). More children than mothers reported that the children liked raw cauliflower.

Relationships Between Mothers' and
Children's Ratings

For several vegetables the mothers' ratings of the vegetables for their children were correlated with the children's ratings of the vegetables (Table 12). The ratings by the mothers and their children for lima beans ($r = 0.656$, $p \leq .001$) and broccoli ($r = 0.866$, $p \leq .001$) were highly correlated. The mothers were able to predict how their children would rate lima beans and broccoli. The mothers' ratings for their children and the children's ratings for raw carrots

Table 11

Comparisons^a of Percentages of the Children and Mothers Who Said
Selected Vegetables Were "Liked" by the Children

Vegetable	Percent of Children (Interview III) (n = 34)	Percent of Mothers (n = 34)
Green beans	70.6	68.2
Carrots, raw	64.7	80.3
Corn	61.8 ^x	98.5 ^x
Mashed potatoes	58.8	62.1
Beets	41.2	34.8
Carrots	41.2	37.9
Green pepper, raw	35.3	25.8
Lima beans	32.4 ^x	6.1 ^x
Broccoli	32.4	33.3
Cauliflower, raw	32.4	16.7
Greens	29.4 ^x	1.5 ^x
Spinach	20.6	10.6

^aFigures with like superscripts on the same line are different at
 $p \leq .05$.

Table 12
 Relationships^a Between Mothers' Ratings of Selected
 Vegetables for Their Children and the Children's
 Ratings of the Vegetables

Vegetable	r Value	p
Broccoli	0.866	.001
Lima beans	0.656	.001
Carrots, raw	0.442	.01
Beets	0.411	.05
Cauliflower, raw	0.363	ns
Greens	0.361	ns
Spinach	0.348	ns
Mashed potatoes	0.178	ns
Green pepper, raw	0.149	ns
Green beans	0.024	ns
Carrots	0.023	ns
Corn	0.008	ns

^aPearson product-moment correlation.

($r = 0.442$, $p \leq .01$) and beets ($r = 0.411$, $p \leq .05$) were also correlated, indicating that the mothers were successful in their predictions of the children's ratings for these two vegetables.

Ratings of the Vegetables for the Children as
Reported by the Staff Members vs. Ratings
as Reported by the Children

The percentage of the staff members who said the children liked corn and mashed potatoes and the percentage of the children who gave that response were different ($p \leq .05$) (Table 13). All of the staff members said the children liked corn and mashed potatoes, but only slightly more than half of the children said they liked these vegetables. The differences between the ratings by the staff members and the children were not significant for the other vegetables.

Summary

The vegetables which were most frequently served to the children in their homes were corn, green beans and mashed potatoes. These three vegetables were also easily identified by most of the children, were rated as "liked" by most of the children by the children, their mothers and their teachers. There were significant ($p \leq .05$) relationships between the mothers' ratings for the children and the children's ratings for broccoli, lima beans, raw carrots and beets.

Table 13

Comparisons^a of Percentages of the Children and Teachers Who Said Selected Vegetables Were "Liked" by the Children

Vegetable	Percent of Children (Interview III) (n = 34)	Percent of Teachers (n = 7)
Green beans	70.6	85.7
Carrots, raw	64.7	85.7
Corn	61.8 ^x	100.0 ^x
Mashed potatoes	58.8 ^x	100.0 ^x
Beets	41.2	14.3
Carrots	41.2	57.1
Green pepper, raw	35.3	14.3
Lima beans	32.4	28.6
Broccoli	32.4	0
Cauliflower, raw	32.4	0
Greens	29.4	0
Spinach	20.6	0

^aFigures with like superscripts on the same line are different at $p \leq .05$.

CHAPTER VII

DISCUSSION

The following discussion will focus on the responses obtained during interviews of the children, their mothers and their teachers. Information obtained by participant observation at the day care center will also be discussed when appropriate.

Mothers' Assessments of the Children's Appetites

Most of the mothers described their children's appetites as good or excellent. Sanjur and Scoma (1971) reported that 65 percent of the mothers they interviewed believed that their preschoolers needed to eat vegetables to have a good diet and good health. The fact that most of the mothers in this study had no concerns about their child's eating habits may be an indication that the children were eating sufficient vegetables to satisfy their mothers.

Mothers' Reports of the Effects of the Day Care Center on the Children's Eating Behaviors

The changes in the children's eating behaviors which were reported by the mothers were similar to those mentioned by Glaser (1957). The changes in the children's eating behaviors which were noticed by the mothers and mentioned to Glaser and to this researcher as well, were an increased willingness by the child to try new foods

and an increase in the number of foods which the child would readily eat. Glaser attributed the changes to the children's increased familiarity with new foods which were served at the nursery school.

Children's Opinions of the Food Served at the Day Care Center

Nearly all of the children said they liked the food served at the day care center. If this is true, the attitudes of the children with regard to the day care center food service may be such that the children would be willing to try unfamiliar foods in this setting that they might refuse at home, as was suggested by McWilliams (1975).

The validity of the children's responses when asked about the day care center food must be questioned in light of a possible problem with the wording of the question. The question was phrased, "Do you like the food served here at the day care center?" The wording of the question is suggestive of liking rather than disliking the food served and hence may have prompted some children to respond with a false positive answer (Wells, 1965).

Teachers' Reports of Methods Used to Encourage the Children to Eat Vegetables

The methods used by the teachers to encourage the children to taste or eat their vegetables were consistent with the policy of the day care center. The children were asked to taste the vegetables. No types of force or punishment were employed to ensure compliance by the children. The policy of verbal encouragement to taste the foods is

consistent with what is recommended in the literature for day care centers (McWilliams, 1975; Bettelheim, 1970). Methods similar to those used by the teachers at the research site have been used successfully to change eating behaviors of preschoolers (Hall and Holmberg, 1974).

Teachers' Vegetable Eating Behaviors

Most of the teachers reported that they tasted vegetables which they disliked as an example for the children. This was also the policy of the day care center. Two of the teachers did mention behaviors to the investigator which indicated that they were not always in adherence with the policy. Current knowledge about the modeling behavior of preschoolers suggests that teachers who refuse to eat or taste foods on the menu, may be contributing to the problem of the children's refusals to eat or taste foods.

Teachers' Ratings of the Vegetables Based on Their Own Opinions of the Vegetables

Corn and raw carrots were rated by most of the teachers as a preferred vegetable. These two vegetables were frequently served at the day care center. Most of the teachers also said they liked mashed potatoes, broccoli and raw green pepper; these three foods were never served at the day care center. If the administration of the day care center wished to include new vegetables on the menu, mashed potatoes, broccoli and green pepper would be wise choices. The facts that none of the teachers said they disliked these foods suggests that the

teachers would model desired eating behaviors for the children when these foods were served.

Vegetables Served in the Homes

The vegetables which were served most often in the homes were also the vegetables which the mothers said were most preferred by the children: corn and raw carrots. Likewise, lima beans and spinach which were never served in most homes were each rated as disliked by the children by over half of the mothers. There is some evidence that the mothers of preschool children plan meals and purchase foods which they think their children will like (Methany et al., 1962a; Eppright et al., 1969). The results of this study are in agreement with the literature which support this observation.

Children's Favorite and Disliked Vegetables

The most frequent responses when the children were asked to name favorite vegetables were corn and carrots. Carrots, both raw and cooked, and corn, were served at least once a month at the research site. Raw carrots and corn were also the most frequently served vegetables in the homes. When asked to name a favorite vegetable, the children who were able to understand the question tended to name vegetables with which they were familiar.

The most frequent responses when the children were asked to name a disliked vegetable were peas, tomatoes and beets. Peas and tomatoes were not among the vegetables selected for investigation in

the present research; therefore the exact frequency of service of these two vegetables in the homes and at the day care center is unknown. Beets were served occasionally at the day care center and in fewer than half of the homes. No conclusions can be drawn as to the ability of the preschoolers to name a disliked vegetable.

The children over 52 months of age tended to be better able to name a favorite vegetable than were the younger children ($p \leq .08$), the first time they were asked to do so. This is consistent with the observation by Quigley (1977) that children under four years of age were unable to name a favorite food. There was no difference between the responses of the two age groups when the children were asked to name a favorite vegetable during Interview IV. This suggests that exposure to vegetables during the second and third interviews limited the influence of the child's age as a factor in the ability to name a favorite.

The girls in the sample were better able ($p \leq .05$) to name a favorite vegetable during Interview I than were the boys. This difference can not be explained.

Children's Ability to Identify the Vegetables

Corn, raw carrots, mashed potatoes and green beans were correctly identified by the most children. These four vegetables were served frequently in most of the children's homes. Corn, raw carrots and green beans were also served frequently at the day care center. Greens, lima beans and raw cauliflower were identified by

few children. These vegetables were never served in most of the children's homes; and were never served at the research site. The children as a group were able to correctly identify the vegetables with which they were familiar and were rarely able to correctly identify vegetables with which they were unfamiliar.

Cooked carrots and raw carrots were correctly identified by more ($p \leq .05$) children after tasting the foods than after seeing the photographs of them during the previous interview. In both cases, most of the children who incorrectly named the carrots were misled by the appearance of the carrots in the photographs. The children could identify both types of carrots more easily during Interview III-T than during Interview II-P because of the familiar tastes of these foods.

Raw carrots and raw green pepper were correctly identified by more children ($p \leq .05$) the second time they saw the photographs than the first time the photographs were used. The children may have learned the names of these two foods during Interviews III-T and IV-N when they were asked to rate the vegetables based on the tastes and the names of the vegetables, respectively.

Children's Ratings of the Vegetables

After tasting the selected vegetables, the children said that green beans, raw carrots and corn were the more preferred. The mothers in other studies have reported that green beans and raw carrots were liked by their preschoolers (Bryan and Lowenberg, 1958; Vance and

Temple, 1933). Twardosz and coworkers (1975) also concluded that corn and green beans were preferred by preschoolers on the basis of amounts eaten by their subjects.

The children's most disliked vegetables during Interview III-T were spinach, raw cauliflower and greens. The mothers who were interviewed in two other research projects also reported that spinach was a disliked vegetable among their preschoolers. The percentage of children who said that they disliked raw cauliflower (53%) was similar to the percentage of parents who said their children disliked raw cauliflower (41%) in a study by Glaser (1964).

Sanjur and Scoma (1971) reported that the mothers of Black preschoolers said that their children liked greens. The sample of this research was predominantly Caucasian and half of the children reported that they disliked greens. Only 12 percent of the children had been served greens at home. Since greens are also never served at the day care center, we can assume that most of the participating children were unfamiliar with greens. Service of greens appears to be related to Black ethnicity. The finding that only 28 percent of the sample children said they liked greens supports the conclusion that people often dislike foods that are different or unfamiliar to them (Pilgrim, 1957).

There are no reports in the literature of the vegetable preferences and dislikes of preschool children as reported by the children themselves. This lack of relevant literature makes it impossible to validate or invalidate the ratings given by the children in this research project with the ratings by another group of children.

There were some differences between the ratings given the vegetables by the children for the three interviewing methods used. When the children rated the vegetables on the basis of the vegetable names, they tended to rate some vegetables as less preferred than when the ratings were based on the appearance or taste of the vegetables. Raw carrots and raw green pepper were rated as more preferred ($p \leq .05$) by the children after tasting than after hearing the names of the vegetables. Glaser (1957) reported similar observations for green pepper. She found that the children in a nursery school associated the name of this vegetable with a hot taste, but after they tasted the green pepper they ate it readily. Results such as these cause one to conclude that a child may be biased against a vegetable by its name or may be unable to associate the vegetable with its name and hence, the ratings given a named food may be different than ratings obtained when the child is not told the name of the food.

Ratings given for the vegetables after seeing photographs and after tasting were essentially the same. The vegetables in the photographs used in this research were very similar in appearance to the vegetables tasted by the children. The most satisfactory way to determine food preferences may be to allow the subject to taste the foods (American Society for Testing and Materials, 1968). The results of this research indicate, however, that the photographs were a satisfactory substitute for the tasting procedure.

The use of the photograph of the vegetables had several advantages over the tasting procedure. The major advantage was the

saving of time; the children could rate all of the photographs during one five minute interview while the tasting procedure required three interview sessions with each child. The use of the photograph was also less expensive in terms of costs for equipment and the food required for testing. Also, in view of safety, the photographs were advantageous in that food allergies were not a concern as they must be prior to any tasting procedure.

Mothers' Ratings of the Vegetables for Their Children

The mothers said that corn and raw carrots were most preferred by their children. As mentioned previously in this discussion, carrots have been reported by mothers in other studies as preferred by their children (Eppright et al., 1969; Bryan and Lowenberg, 1958; Vance and Temple, 1933). Corn was mentioned by mothers as a preferred vegetable of their children in one study (Methany et al., 1962b). The mothers in this research project reported that spinach was disliked by the children; this was consistent with the literature (Bryan and Lowenberg, 1958; Eppright et al., 1969). Lima beans and greens were reported by mothers in this study as disliked by the children. There are no reports in the literature of comparable ratings for these two vegetables.

Teachers' Ratings of the Vegetables for the Children

The teachers said that mashed potatoes, corn, raw carrots and green beans were liked by the children. The latter three vegetables

are served frequently at the day care center. It is interesting to note that all of the teachers reported that the children liked mashed potatoes even though mashed potatoes had not been served at the day care center in the past several years. Mashed potatoes were not included on the menus for the day care center because of an opinion held by the day care center administrator. The administrator was required by USDA guidelines to include a bread or cereal food in the lunch menu; she was of the opinion that simultaneously serving potatoes as a vegetable would make the meal too high in starch.

Ratings of the Vegetables for the Children
as Reported by the Mothers vs. Ratings
as Reported by the Children

The ratings by the mothers and the ratings by the children were different for some vegetables. These differences will be examined for the selected vegetables as they are divided into three groups: the vegetables which were disliked by the children, the vegetables to which the children were indifferent, and the vegetables which were liked by the children as a group.

Vegetables Which Were Disliked by
the Children

The vegetables which were least often rated as liked by the children were spinach, raw cauliflower and greens. The ratings by the mothers and the ratings by the children were moderately correlated for spinach ($r = 0.348$), greens ($r = 0.361$) and raw cauliflower ($r = 0.363$); however, the correlation coefficients were not statistically significant.

The proportions of mothers and children who rated these vegetables as liked by the children were different ($p \leq .05$) only for greens. The mothers were aware of which vegetables were disliked by the children but were unable to predict their children's ratings for the disliked vegetables.

Vegetables to Which the Children Were Indifferent

The children as a group were indifferent towards cooked carrots, broccoli, lima beans, green pepper and beets. The ratings by the mothers for their children and the ratings by the children were highly correlated ($r = 0.866$, $p \leq .001$), for broccoli and lima beans ($r = 0.656$, $p \leq .001$) and moderately correlated ($r = 0.411$, $p \leq .05$) for beets. These two variables were not related for cooked carrots and green pepper. The proportions of children and mothers who rated these vegetables as liked by the children were not different, except for lima beans ($p < .05$). These five vegetables were each occasionally served in most of the homes and were rarely or never served at the day care center.

It appears that the mothers as a group had served beets, broccoli and lima beans to their children often enough to know how well each was liked or disliked by the children. The lack of correlation between the mothers' and children's ratings for the green pepper and cooked carrots cannot be explained given available information.

Vegetables Which Were Liked by the Children

The four vegetables which were liked by over half of the children were green beans, corn, raw carrots and mashed potatoes. The mothers as a group overestimated the number of children who liked corn ($p < .01$). The other three vegetables were rated as liked for the children by similar numbers of children and mothers. The mothers were able to correctly rate these four vegetables as most preferred by their children but there were no high correlations between the ratings of the mothers and their children for these vegetables. There was a moderate significant correlation ($r = 0.442$, $p < .01$) between the children's and mothers' ratings for raw carrots. The absence of high correlations may be explained by the observation that the mothers' ratings for these four vegetables were skewed toward the "like" end of the scale, while the children's ratings were more evenly distributed along the points of the rating scale.

The mothers as a group were not able to accurately report how their children felt about green beans, corn and mashed potatoes even though these vegetables were served often in the homes. The mothers did know that the green beans, corn, raw carrots and mashed potatoes were well liked by the children; however, the mothers tended to think that the children liked these vegetables better than was actually expressed by the children.

Conclusions

For the vegetables which were rated as either liked or disliked by most of the children (green beans, corn, raw carrots, mashed potatoes, spinach, raw cauliflower and greens) the ratings given by the mothers for their children and the ratings given by the children were different.

For the vegetables to which the children were indifferent (broccoli, lima beans, raw green pepper and beets) the ratings given by the mothers for their children and the ratings given by the children were similar.

Ratings of the Vegetables for the Children as Reported by the Staff Members vs. Ratings as Reported by the Children

The vegetable ratings given by the staff members for the children and the ratings given by the children were significantly different ($p \leq .05$) for corn and mashed potatoes. Both of these vegetables were rated as preferred by the children, but the children were not unanimous in their ratings of these vegetables as "liked" as were the staff members when they reported the preferences for the children. The fact that mashed potatoes were not served at the day care center prompts one to suggest that the staff members at the day care center may have had preconceived ideas as to which vegetables would be liked by the children.

Discussion of Hypotheses

Most of the data obtained during this research project were collected for the purpose of testing three hypotheses.

The first hypothesis was that preschool children would be able to use a facial hedonic scale to rate selected vegetables. This hypothesis was supported by the data obtained during repeated use of the hedonic scale with the children. The children rated some vegetables differently after hearing the vegetable names than after seeing photographs and tasting the vegetables. In general, however, the children's ratings for the vegetables were consistent over time from Interview I-N through Interview V-P.

The second hypothesis was concerned with the mothers of preschoolers who attended the day care center. The mothers were assumed to be unable to accurately report the vegetable preferences and dislikes of their children. This hypothesis was partially supported. The mothers were able to say which were the more preferred and more disliked vegetables of their children as a group. However, the mothers were able to give vegetable ratings for their children which were similar to those given by the children for only 4 of 12 vegetables. The mothers thought they knew more than they actually did about the attitudes of their children toward consumption of vegetables. The mothers served those vegetables to their children which they thought were preferred by the children. It appears that the preferences and dislikes of their children is one factor considered by the mothers when family menus were planned.

The third hypothesis was that the children would say they liked, and would be able to correctly identify, the vegetables which were served frequently at the day care center. Most of the children said that they liked corn, raw carrots and green beans. These three vegetables were each served at least once a week at the day care center; and were also correctly identified by over 80 percent of the children.

The three hypotheses were each at least partially supported by the results of this research project. The children were able to report their attitudes toward vegetables. The mothers were a less reliable source of information than were their children for data on vegetable preferences and dislikes of the preschoolers.

CHAPTER VIII

SUMMARY AND IMPLICATIONS

The vegetable preferences and dislikes of 36 children aged 41 to 65 months were studied. The children were in attendance at a day care center at least 20 hours each week. The mothers of 34 of the participating children were also interviewed. All of the mothers were employed outside their homes. Each mother was asked to express ratings for twelve vegetables based on how her child would feel if he/she were served the vegetables. The mothers also reported the frequencies the 12 vegetables were served in their homes. Teachers, teacher aides and the cook at the day care center were interviewed to determine their attitudes toward the 12 vegetables as well as their perceptions of how the children at the day care center felt about the vegetables.

The children, their mothers and the staff members used a three-point facial hedonic scale to rate the vegetables. The vegetables which rated as preferred by the children were similar to those which the teachers and the mothers predicted would be preferred by the children. The children as a group rated as preferred, and were best able to correctly identify, the vegetables which were frequently served in the homes and at the day care center.

The first objective of this study was to investigate the ability of preschool children to express their ratings for vegetables on a facial hedonic scale. The participating children were each asked to perform the task of using the facial hedonic scale to rate 12 vegetables, five separate times. The children were able to give consistent ratings to indicate their preference or dislike for the vegetables. The ratings were especially consistent when photographs or tastes of the vegetables were used as the stimuli for the ratings. The ability of the children to effectively use the vegetable photographs and the facial hedonic scale was documented. Similar tools could be used with preschool children to determine their attitudes toward other foods. The mothers of preschool children need not be the primary source of information about the eating behaviors of children in this age group; the children are able to answer questions about their food preferences and dislikes.

The mothers of the children were also asked to use the facial hedonic scale to express what they perceived to be the attitudes of their children toward the vegetables. The ratings by the mothers were compared with those of their children in order to complete the second objective of this study. The second objective was to test the abilities of mothers who were employed outside their homes to predict the vegetable attitudes of their children. The mothers of the children were able to express ratings for four of the vegetables which were similar to those reported by the children. However, for most of the vegetables, the mothers were unable to accurately report preference ratings for

their children. The mothers of preschoolers may not be an adequate source of information about the eating behaviors of their children when the children are fed and cared-for at a day care center.

The vegetable ratings by the teachers as a group were similar to the vegetable ratings by the children as a group. For a group of children, their teachers may be an adequate source of information about the attitudes of children toward the foods served at the day care center.

The children expressed positive attitudes toward the food served at the day care center. The teachers reported that they usually modeled appropriate vegetable eating behaviors while at the day care center. These two findings suggest that the day care center may have been an environment in which the children would accept and eat unfamiliar vegetables. A vegetable which was not disliked by most of the teachers would have been a wise choice for addition to the day care center menu.

The results of this study allow no conclusions to be drawn as to the specific influences of the day care center on the vegetable preferences and dislikes of the children. The frequencies of service of the selected vegetables were similar in the homes and at the day care center. There are no vegetables which were served more often at the day care center than in the homes, therefore the effects of increasing the children's familiarity by serving unfamiliar vegetables at the day care center could not be assessed.

The power of familiarity as a determinant of preference of vegetables was documented by this research. Children who are familiar with vegetables which are served at a day care center may express a preference for those vegetables even though they are not served in their homes. There is a need for further research to determine if the vegetable preferences and dislikes of preschoolers can be influenced by the frequency of service of vegetables at their day care center.

APPENDICES

APPENDIX A

INTERVIEW SCHEDULES AND CONSENT FORMS

MICHIGAN STATE UNIVERSITY

DEPARTMENT OF FOOD SCIENCE AND HUMAN NUTRITION
HUMAN ECOLOGY BUILDING

EAST LANSING · MICHIGAN · 48824

April 1, 1978

Dear

The Department of Food Science and Human Nutrition of Michigan State University is interested in studying how food habits, likes and dislikes, are formed and expressed during the preschool years. The Michigan Young World Day Care Center has kindly given us permission to conduct a study of preschooler's food habits in their center. We also need the permission of the children's parents before we can begin the study.

We will be talking to the children about some vegetables to find out which ones they like and dislike. The children will be asked to rate each vegetable after looking at a picture of the vegetable and after tasting a sample of the vegetable. We will talk to each child several times for about five minutes each time, over several weeks.

Each child will be asked to taste 12 different fresh or canned vegetables. For this reason we ask that you write on the enclosed Consent Form any foods which you know or suspect your child is allergic to. You may also write down any foods which you do not want your child to eat for any other reason. This study is being conducted under the direction of Dr. Kathryn Kolasa, Assistant Professor, who also is a Registered Dietitian. We will not ask your child to taste any food which may endanger his or her health. In fact, your child will not be forced to taste any vegetable.

We will measure the height and weight of each child in the study. These measurements will indicate to us and to you how your child's size compares to that of other children of the same age.

A second part of the study requires the participation of the mother or another adult in the child's family who has the primary responsibility for feeding and caring for the child. There are some things which your child can't tell us. We would like to talk about each child's eating habits with his or her mother, or with the adult who usually prepares and serves the meals to the child at home. We will not ask you any personal or embarrassing questions. This interview would take only 15 minutes of your time and would be scheduled at your convenience, in your home, at the center, or at a place you designate.

April 1, 1978
Page 2

The final part of the study will involve the teachers at your child's day care center. We will ask the teachers to tell us which vegetables seem to be liked and disliked by many of the children.

Attached to this letter is a Consent Form. Please sign and return it if you are willing to participate in the study. If you sign the Consent Form you may change your mind and withdraw from the study at any time. If you decide not to participate in the study, that decision will in no way affect your child's or your relationship with the day care center or its staff.

All information from you and your child will be held in strict confidence. No one will know your identity or any of your answers.

If you would like to know the results of this study, we will be happy to send you a summary, at your request. If you have any questions, please call or write either of the researchers.

We look forward to talking with you and your child.

Sincerely,

Beverly Phillips
Graduate Research Assistant
Dept. of Food Science and
Human Nutrition
Room 1 Human Ecology
East Lansing, MI 48824
Phone: 353-4357

Kathryn Kolasa, Ph.D., R.D.
Assistant Professor
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Phone: 353-1669

Enclosure: Consent Form

BP/lek

CONSENT FORM

Preschool Children's Food Preferences

I, the undersigned, as parent or guardian of _____
 a child in attendance at the Michigan Young World Day Care Center, by my
 signature state:

- (1) that I have read the attached letter that fully explains the research project on children's attitudes toward vegetables;
- (2) that I am willing to participate and I give my permission for my child to participate in the study of children's food preferences being conducted by the Michigan State University Department of Food Science and Human Nutrition;
- (3) that I understand that I am under no obligation to participate or have my child participate, and may withdraw from the study at anytime;
- (4) that I understand that my child will not be asked to taste any foods which I have listed below whether they be foods to which my child is allergic, or foods which I don't want my child to eat for health or other reasons;
- (5) that I have been assured that all results will be treated with strict confidence; and I understand that names and family information will not be released to anyone but the two researchers;
- (6) that I understand that my child's height and weight will be measured by the researchers, that I will receive a copy of the measurements, and that I give my permission for these measurements to be taken.

By my signature, I indicate that the benefits and risks of this study have been explained to me. I know that any questions I may have will be answered by the researchers. And, that if I request, I may have a summary of the results of the study.

Signed: _____

Date: _____

(Address, if results are requested) _____

Please use this space to list any foods which you don't want your child to taste.

CONSENT FORM FOR MOTHER OR PRINCIPAL CARETAKER

I, _____ the undersigned, willingly consent to be interviewed about my preschool child's eating habits.

The research project has been explained to me. I have had the opportunity to ask questions. I understand that I am under no obligation to stay in the study. I have been assured that all my answers and my identity will be held in strict confidence. I also understand that a report of the findings of the study will be available to me if I so request.

(participant)

(interviewer)

(date)

(address, if results are requested)

INTERVIEW OF PRINCIPAL CARETAKERS

- As you look at each picture, name the vegetable, then point to the face which shows how _____ would feel about eating the vegetable in the picture.

(show pictures)

[illegible]

Interview of principal caretakers--page 2

4. How would you describe _____'s appetite in the past 3 months?

5. Have you noticed any effects of the day care center on what or how _____ eats?

_____ no

_____ yes; What changes have you noticed? _____

6. Some nutritionists have set up standards so we will know how much of some of the nutrients we should eat each day. These standards are called Recommended Dietary Allowances or RDA's. A person should eat nearly 100% of his or her RDA's each day. We can eat part of the total amount at home and part at work, school or other places.

What percentage, or how much, of his/her RDA's for nutrients do you think _____ eats while he/she is at the day care center on a typical day?

How much of his/her RDA's for nutrients do you think _____ SHOULD be eating at the day care center?

7. Does _____ bring food or nutrition information or other materials about nutrition, home from the day care center?

_____ no

_____ yes, What kind of material? _____

Interview of principal caretakers--page 3

8. Does _____ like the food he/she gets at the day care center?

____ yes

____ no;

____ sometimes;

Why doesn't he/she like the food? _____

9. Have you ever consulted a doctor about feeding problems with _____?

____ no

____ yes; at what age? _____

10. How many hours per day does _____ spend at the day care center?

11. How many days per week does _____ spend at the day care center?

12. How many months has _____ been attending the day care center?

13. What types of foods do you think your child should eat everyday?

14. How would you describe _____'s attitude toward food and meals?

Interview of principal caretakers--page 4

15. How important do you think it is that _____ eat everything put on his/her plate?

16. Did your family have a vegetable garden last summer?

____ no (skip to item #18)

____ yes

17. What vegetables did you grow which were eaten by the family?

18. Did you freeze any vegetables during the past year?

____ no

____ yes; Which?

19. Did you can any vegetables during the past year?

____ no

____ yes; Which?

20. What do you do if _____ doesn't want to eat his/her vegetables?

(PROBE: Have you discovered any good ways to . . .?)

- I'm going to name some vegetables. If you serve the vegetable at home, I would like you to point to the face which shows how _____ feels about eating it, when you serve it to him/her.

How does _____ feel about eating (named Vegetable)?

[illegible]

Interview of principal caretakers- page 6

22. Do you give _____ a vitamin or mineral supplement?

____ no (skip to item #25)

____ yes

23. What type (and/or brand) of supplement do you give _____?

24. Why do you give _____ the vitamin or mineral supplement?

25. Let's talk about a normal day for _____. I would like you to tell me what he/she usually eats during a typical day--from the time he/she wakes up until bedtime.

What is the first thing that _____ usually eats in the morning?

What does _____ usually eat during the day at the day care center?

Interview of principal caretakers--page 7

(during the day at center--cont.) _____

What does _____ usually eat at home (or with your family)
between the time he/she gets home from the day care center and
his/her bedtime?

Does _____ usually eat anything after you put him/her to bed,
or during the night? What?

Interview of principal caretaker--page 8

26. How many hours per week do you work outside your home?

27. What kind of work do you do?

28. How many persons live in your household? (including self)

29. I would like to know a little information about the people in your household.

Household Member	Relationship to Subject Child	Age	Sex	No. of school years completed or grade

30. Which other people in your household work outside the home?

Household Member	no. hours worked per week

Interview of principal caretakers--page 9

31. I would like to know how often you serve certain vegetables in your home. After I name each vegetable will you please approximate how often you usually serve each one?

(describe and name vegetaule)

How often do you serve (named Veg.) to _____?

Do you serve (named Veg.) any other way?

In what form do you usually buy (named Veg.)?

[illegible]

Code No. _____
 Date _____
 Time _____

ATTITUDES OF PRESCHOOLERS TOWARD VEGETABLES

INTERVIEW OF CHILDREN PART I

1. What is your favorite vegetable? (if able to answer, skip to item #3)
 - a) _____
 - b) _____
2. What is your favorite food? (skip to item #5)
 - a) _____
 - b) _____
3. Do you get (veg. named in #1) at home?

a) <u> </u> yes	b) <u> </u> yes
<u> </u> no	<u> </u> no
4. Do you get (veg. named in #1) here at the school?

a) <u> </u> yes	b) <u> </u> yes
<u> </u> no	<u> </u> no
5. Which vegetable don't you like? (if able to answer, skip to item #7)
 - a) _____
 - b) _____
6. Which food don't you like? (skip to item #9)
 - a) _____
 - b) _____

Interview of children--part I

7. Do you get (veg. named in #5) at home?

a) ☐ yes

b) ☐ yes

☐ no

☐ no

8. Do you get (veg. named in #5) here at the school?

a) ☐ yes

b) ☐ yes

☐ no

☐ no

9. Do you like the food you get here at the school?

☐ yes

☐ no

☐ sometimes

Why don't you like the food?

Code No. _____
Date _____
Time _____

ATTITUDES OF PRESCHOOLERS TOWARD VEGETABLES

INTERVIEW OF CHILDREN
PART II

Face Meaning Responses:

1. _____
2. _____
3. _____

[illegible]

Code No. _____
 Date _____
 Time _____

ATTITUDES OF PRESCHOOLERS TOWARD VEGETABLES

INTERVIEW OF CHILDREN PART III

Meaning responses:



veg. code	ID response	do you eat?		yes	no	yes	no	refusal
		yes	no					
pre-taste comments		post-taste comments						
pre-taste comments		post-taste comments						
pre-taste comments		post-taste comments						
pre-taste comments		post-taste comments						

CONSENT FORM FOR STAFF

I, _____ the undersigned, willingly consent to be interviewed about my vegetable preferences and my observations of vegetable-eating by the children at Michigan Young World Day Care Center.

The research project has been explained to me. I have had the opportunity to ask questions. I understand that I am under no obligation to stay in the study. I have been assured that all my answers will be held in strict confidence. I also understand that a report of the findings of the study will be available to me if I so request.

(participant)

(interviewer)

(date)

(address, if results are
requested)

Code No. _____
 Date _____
 Time _____

ATTITUDES OF PRESCHOOLERS TOWARD VEGETABLES

INTERVIEW OF TEACHERS AND STAFF

1. Do you encourage the children to eat the foods which they are served?

____ no (skip to item #2)

____ yes

Are there foods which you especially encourage the children to eat?

2. What do you do with your portion when a meal at the center includes a food which you greatly dislike?

(if necessary) How do you explain (answer given above) to the children?

3. What do you do with your portion when a meal at the center includes a vegetable which you greatly dislike?

(if necessary) How do you explain (answer given above) to the children?

Code No. _____

Interview of teachers and staff--page 2

4. What do you do if a child doesn't want to eat his or her vegetables? (PROBE: Have you discovered any good ways to . . . ?)

5. Do you use the same methods with all of the children? (PROBE: Do some children require more encouragement than others?)

Code No. _____

Interview of teachers and staff--page 3

I would like to know how you feel about eating some vegetables. Here are some pictures of the vegetables I am interested in.

As you look at each picture, name the vegetable, then point to the face which shows how you feel about eating the vegetable in the picture.

[illegible]

Code No. _____

Interview of teachers and staff--page 4

Since you usually sit with the children while they eat their meals and snacks, you probably know which vegetables the children like and dislike.

I am going to show you again the pictures of the vegetables. This time I would like you to point to the face which shows how most children feel about eating each vegetable.

(show picture)

How do the children feel about eating this vegetable?

[illegible]

APPENDIX B

T VALUES FOR COMPARISONS OF CHILDREN'S MEAN RATINGS
FOR VEGETABLES BY INTERVIEW METHOD USED

T VALUES FOR COMPARISONS OF CHILDREN'S MEAN RATINGS FOR VEGETABLES
BY INTERVIEW METHOD USED

	Interview I-P with	Interview I-N with	Interview I-P with	Interview I-N with	Interview I-P with	Interview I-N with	Interview I-P with	Interview I-N with	Interview I-P with	Interview I-N with	Interview I-P with	Interview I-N with
Beets	1.11	.92	1.03	1.07	.64	.81	.17	.18	.75	.33		
Broccoli	.37	.50	.14	1.10	.65	.31	1.54	.87	.78	1.96		
Carrots	.17	.41	.90	.27	.39	.68	.27	.52	0	.61		
Carrots, raw	1.87	2.60 ^x	.52	2.78 ^y	.20	1.33	1.18	1.50	.47	2.08 ^x		
Cauliflower, raw	.66	.18	.90	.39	1.14	1.98	1.14	1.49	.23	1.29		
Corn	.78	.39	2.81 ^y	.93	.16	1.49	.33	1.86	.62	1.04		
Green Beans	.36	.72	.30	.55	.59	.17	0	1.29	.57	.34		
Green Pepper, raw	.93	.37	.66	.33	2.04 ^x	.16	1.54	2.08 ^x	.83	1.14		
Greens	1.19	0	1.07	.70	1.10	0	1.22	1.06	.82	1.88		
Lima Beans	.63	.45	.76	0	.27	1.48	1.16	1.10	1.22	.60		
Mashed Potatoes	.39	.84	.31	.65	0	.27	.20	.32	.21	.21		
Spinach	.60	1.10	.14	.30	.52	.16	0	.36	0	.19		

^xSignificant at $p \leq .05$

^ySignificant at $p \leq .01$

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