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INFLUENCE OF OFFERING CHOICES IN VEGETABLE  
MENU ITEMS ON FOOD ACCEPTABILITY IN  
THE SCHOOL FOODSERVICE PROGRAM

by

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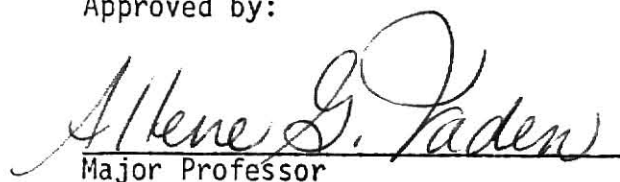
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## INTRODUCTION

The National School Lunch Act was passed by Congress in 1946 (1). Since that time, many children have benefited from the school lunch program. Approximately 50 per cent of the 51 million children enrolled in school participated in school lunch in 1975. The school lunch program is a huge business, costing a total of \$3.8 billion in 1975 (2); federal subsidies totaled over one billion dollars in 1974 (3). However, more children could be participating. Several approaches and programs have been designed to increase participation and to decrease the amount of food left uneaten on the plate by children who do participate. Offering choices in the menu items is one of the methods suggested.

The overall objective of this research was to study the influence of offering choices in vegetable menu items on acceptability of the school foodservice program. Vegetables were chosen because they are generally among the least liked items offered in the school lunch. More specifically the objectives were:

- (a) to compare the amount of vegetables left uneaten on the plate during a period when no vegetable choices were offered and during a period when vegetable choices were offered.
- (b) to study participation in the school lunch program during periods with and without vegetable choices.
- (c) to study students' attitudes toward the school foodservice both before and after the choices in vegetable menu items were offered.

It was hypothesized that offering choices in vegetable menu items would increase acceptability of the school foodservice program. It also

was assumed that if the food that is offered is acceptable, it will be eaten more often by more students.

The review of literature includes the historical background and legislative development of school foodservice, food attitudes and preferences, nutritional contribution of the school lunch, and student participation in school lunch programs.

## REVIEW OF LITERATURE

### Historical Background of the School Lunch Program

School foodservice programs began in the late eighteenth century. In 1790 a combined program of teaching and feeding hungry, vagrant children was begun in Munich, Germany by Count Rumford. His objective was to develop meals which would provide the best nutrition at the lowest cost. The food served to children and adults consisted mainly of soup made from potatoes, barley, and peas (4). France opened canteens in 1849 with surplus National Guards funds, receiving official recognition by the Ministry of Public Education a year later (5).

With a Royal Decree in 1900, Holland became the first country to adopt national legislation specifically to provide school lunches (6). Switzerland's National Order in 1903 made it an obligation on the part of municipalities to furnish food and clothing to children in need. This program grew rapidly and in 1906 the use of state funds was authorized for this purpose (4).

In England the passage in 1905 of the Education (Provision of Meals) Act was the culmination of the efforts of 365 private, charitable organizations in attempting to provide meals at school for needy children, and a reflection of national concern over the physical condition of the populace (4). School feeding programs spread through Europe where highly developed programs were under way in Italy, Austria, Belgium, Denmark, Finland, Norway, and Sweden before World War I (5).

School lunches on a mass scale began later in the United States where, as in Europe, the roots of school lunch were private charity. Parent-teacher associations, civic clubs, and volunteer fire departments were among the early sponsors (5). The Children's Aid Society of New York City is given credit for beginning the first school feeding program in the United States. In 1853, this organization served meals free of charge to all children who attended vocational schools for the poor (7).

Late in the nineteenth century in other cities, meals were sold at extremely low prices, hence the term "penny lunches." By the turn of the century, educators were beginning to realize that malnutrition contributed to learning problems among needy children. City-wide school lunch programs began to appear as early as 1911, followed in 1921 by the passage of the first state school lunch laws (8). By 1918, lunch of some type was being provided in schools in approximately one-quarter of the larger cities; most often it was a cold lunch (9).

The first federal funds came from the Reconstruction Finance Corporation in 1932 and 1933. These funds paid for labor costs for preparing school lunches in several towns in southwest Missouri. In 1935, as a result of the New Deal programs, surplus foods were purchased for use in school lunch (9).

By 1944, the supply of surplus commodities for the schools was nearly exhausted. A system of cash reimbursement was instituted by the United States Department of Agriculture (USDA) whereby participating schools received federal repayments for some of their food purchases (8).

## Legislative Developments

The end of World War II did much to spur the school lunch program. Because of malnutrition among the armed forces, possibly causing the national security to be in jeopardy, the Congress began to realize the importance of good nutrition. In June 1946, the National School Lunch Act, or Public Law 396, as legislated by the 79th Congress, was signed into law (1). The philosophy and purposes behind the law were stated in Section 2 as follows:

It is hereby declared to be the policy of Congress, as a measure of national security to safeguard the health and well-being of the Nation's children and to encourage the domestic consumption of nutritious agricultural commodities and other food, by assisting the States, through grants-in-aid and other means, in providing an adequate supply of foods and other facilities for the establishment, maintenance, operation, and expansion of nonprofit school lunch programs (1).

The following universally accepted school lunch policies or standards were developed: the program should be non-profit, the lunch served should meet good dietary standards; and children unable to pay the full price of the lunch should be served free or reduced price meals (10).

The school lunch program has expanded since it was first enacted in 1946. Focus was placed upon needy children in the middle 1960's, bringing new legislation and new interest in child nutrition. The Child Nutrition Act of 1966 provided for a pilot breakfast program, and for funds to purchase school foodservice equipment in low-income areas (11). Also, the Special Milk Program which had been functioning since 1954 was made a part of the Child Nutrition Act (4).

In 1968 an amendment of the National School Lunch Act provided for the Special Food Service Program for Children (12). This made Federal cash-and-food assistance available to private and public institutions,



such as day care centers, settlement houses, or recreation centers (13). In 1970 Public Law 91-148 again amended the National School Lunch and Child Nutrition Act by providing special assistance to the States on the basis of family income (14). Discrimination against children receiving free and reduced price meals was declared unlawful (9).

Additional federal financial assistance was provided by the school lunch program with the enactment of Public Law 93-150 (15). In this amendment reimbursement was increased from eight cents per lunch to ten cents per lunch. An escalator clause was included to require the USDA periodically to review rising food costs and to assign reimbursement as indicated by the change in food costs.

To help decrease food waste in school lunch programs Public Law 94-105 was enacted in October, 1975 (16). In the regulations for the legislation senior high students were not required to accept offered foods that they did not intend to consume, but were required to accept at least three of the five food items comprising the Type A lunch. Even though all five components were not taken, the student was required to pay the regular price for a Type A meal. As a result of current nutrition knowledge indicating possible undesirable effects of excess fat in the diet, the requirement of offering butter or fortified margarine also was eliminated by Public Law 94-105 (17).

### Food Attitudes and Preferences

Latini (18) stated that food attitudes and preferences depend on the individual's values and goals. The more people learn, the more their acceptance for certain foods change. There is much evidence that people like what they have been in the habit of eating. The emotional climate in

which the food is served gives pleasure, annoyances, or frustration with respect to food.

According to Brown (19) the factors which seem to be the most important in the development of eating habits of students were: parental influence, especially the mother's, parental policies concerning foods served at mealtime, and the variety and appearance of foods served. The National Dairy Council (20) found that adolescents' food habits usually reflect those to which they have been exposed from early childhood. Furthermore, adolescents may have acquired a knowledge of nutrition and may have favorable attitudes concerning good food habits without having established desirable food intake practices in their daily lives. From questionnaires completed by adolescents in western New York state, Schorr et al. (21) theorized that the complexity of an adolescent's diet increased significantly with an increase in the father's and mother's occupational level, the mother's educational level, the extent of social participation, and with employment but was not related to age, sex, family size, or the number of nutrition information channels.

McElroy and Taylor (22) studied the values which influence tenth-grade boys in situations involving food choices. The values identified, in order of importance, included: health, money, sociability, enjoyment, independence, and status.

Teenagers expressed their attitudes in a study conducted by Spindler and Acker (23). Teenagers were often in such a hurry that they sometimes did not have time to eat. Leverton (24) asserted that food was only one component of the busy lives of teenagers and could receive only a fraction of their attention. Teenagers in Spindler and Acker's study (23) indicated that parents and adults should accept responsibility for seeing that

their children eat more adequate diets. Most of the students believed that teens knew what to eat but that they did not care. Both sexes were critical of the way teenage girls eat, and believed that boys eat better than girls because boys on the whole are not weight conscious and physical fitness is important to them. While only 4 per cent of the boys did not eat breakfast, about 21 per cent of the girls ate none.

Leverton (24) expressed that little relationship has been found between frequency of teenage eating and overall nutritive quality of diet except that when fewer than three meals a day were consumed, nutritive intake usually suffered. Leverton also asserted that teenage snacking had become acceptable, but did not give a license for overeating or for ignoring total daily nutritional needs.

#### Food Preferences

Many studies involving students of all ages have been done to determine food likes and dislikes. A sample of freshmen at Fresno State College were given a questionnaire regarding 152 food items commonly served in the college cafeteria (25). Food items liked very much by 60 per cent or more of the male students, in order of preference, were: whole milk, fresh fruit salad, orange juice, ice cream, chocolate milk, fried chicken, lemonade, baked potato, pepsi-cola, chicken barbecue, and hot chocolate. Positive food preferences of the women were fresh fruit salad, ice cream, orange juice, chocolate chip cookies, whole milk, chocolate cake, brownies, corn on the cob, tossed green salad, lemonade, pepsi-cola, baked potato, fried chicken, and hot chocolate. Foods disliked by 50 per cent of the men, in order of rejection, were: kidney beans, buttermilk, beets, cabbage roll, yellow wax beans, brussel sprouts, and

hominy; and for women: franks and sauerkraut, kidney beans, beets, cole-slaw, and hominy.

In his study of college students' food likes and dislikes Warren (26) found a strong dislike for vegetables, organ meats, and combination menu items (mixtures). Pilgrim (27) reported that in the Army, men preferred fresh milk, grilled steak, ice cream, French fried potatoes, and hot biscuits. Among the least liked items were mashed turnips, broccoli, asparagus, iced coffee, and cauliflower. Pilgrim concurred that the more one does to an item by adding vegetables or cream sauces, the less liked the item may be. Positive vegetable preferences do increase with age according to Pilgrim. Hall (28) concluded that the most frequent reason for disliking a given food is that "it does not taste good" and that women college students have more food aversions than men college students, but are familiar with more foods than men.

Bott (29) used questionnaires to study teenage food habits of Anglo and Spanish-American girls in New Mexico. Using the basic four food groups as a guideline, she found a low consumption of milk, fruits, and vegetables. Adequate amounts of foods from the meat and cereal groups were consumed. Some of the main foods in the Anglo girls' diets were potatoes, milk, meat, vegetables, and bread. These foods were eaten for health reasons, with the exception of potatoes which were eaten because they were liked. The main foods of the Spanish-American diet were milk, meat, potatoes, beans, tortillas, and chile. These foods were consumed because they were liked, with the exception of meat and milk which were consumed for health reasons.

Schorr et al. (21) investigated the nutrient intake of teenagers and found that the percentages of subjects consuming less than two-thirds of

their ascorbic acid, calcium, vitamin A, and iron allowances were 21, 44, 51, and 69, respectively. The nutrient intake of the adolescent males was considerably superior to that of the girls. The subjects liked many good sources of all the nutrients reported except vitamin A.

Food intake records were kept by 1,242 rural and urban Connecticut school children in grades five through eight (30). The diets of the rural children scored slightly higher than those of the urban children, particularly in fruit and vegetable consumption. This study revealed that the diets of the girls were somewhat better than those of the boys. The eleven-year old children had slightly better diets than those of the twelve- to fourteen-year olds. The foods most often lacking in the diets were green and yellow vegetables and the ascorbic acid-rich foods.

Leverton and Coggs (31) studied food choices of Nebraska children by obtaining information from a questionnaire given to 1,882 boys and girls who were members of the 4-H Club, Future Homemakers of America, and Girls' State. The most popular foods were white potatoes, apples, oranges, and whole-wheat bread. Buttermilk, green peppers, greens, brains, parsnips, and turnips were foods the greatest number of children were unwilling to eat.

Questionnaires were given to fourth, fifth, and sixth grade students in California to determine their food preferences (32). Among the vegetables, the most disliked items were peas, green beans, tomato wedges, celery sticks, mixed vegetables, carrot and raisin cup, lettuce wedge, and buttered corn. In Litman's et al. (33) study in Minnesota, they found carrots, corn, peas, and beans were among the vegetables rated comparatively well. The green and yellow vegetables, such as spinach, cabbage, lettuce, and celery were rated low by the children. After studying the

effect of food preferences on nutrient intake, Young and Lafortune (34) commented that contrary to common belief, food dislikes seemed to have little influence on the adequacy of the diet because most intensely disliked foods are commonly seldom served food items.

#### School Lunch Studies

Attitudes of students toward school lunch have been investigated by Doucette (35). The results of a questionnaire presented to Honolulu, Hawaii high school students revealed that most students thought school lunch was a bargain. Sixty-five per cent agreed that the school lunch is nutritious; while 78 per cent believed that schools do not use high quality foods. Students in general, and particularly boys, said that portion sizes were too small. Only 31 per cent believed that school lunch introduced them to new foods that they now eat and enjoy. Seventy-seven per cent agreed that students and faculty should eat together.

Spindler and Acker's study (23) found that having to eat too early or too late or in too short a time because of congested lunch room conditions were reasons for skipping the noon meal. Both Garrett (36) and Gargano (37) found in their studies of students' attitudes toward school lunch that attitude scores were significantly higher for frequent participants of the school lunch program compared to infrequent participants.

Kilroy (38) studied acceptance of specific foods in the school lunch program in two high schools and one elementary school. Among the cooked vegetables, potatoes were accepted better than any other vegetables; while the green, leafy, strong-flavored vegetables were poorly accepted. Foods that students could pick up with their fingers, such as celery sticks, carrot sticks, and bell pepper strips, were accepted fairly well. The

elementary school children scored higher in their acceptance of raw vegetables than did the students in the two senior high schools.

Main dishes, sandwiches, potatoes, rolls, desserts, and milk were among the foods that were found to be especially well-liked in Bachemin's (39) study. Foods served in school lunch reported to be disliked were vegetables and salads.

#### Food Left Uneaten on Students' Plates

Checking the amount of food left uneaten is another way of determining food acceptability. Hunt et al. (40) studied children in Ohio to determine what foods they left uneaten. They summarized that vegetables contributed a larger percentage to the total amount left uneaten than either protein-rich foods or desserts, including fruits. From studying school children in Louisiana, Green (41) reported the highest percentage of food left uneaten in the school lunch occurred in the vegetable group, with the greatest amount occurring with tossed salad, cabbage slaw, and spinach. Doucette (35) concurred that more fruits and vegetables were left uneaten than any other groups of foods. According to Grant's research (42) food was not eaten because students disliked the preparation and the food. Tabulation of foods disliked disclosed that many foods, especially vegetables, were disliked whether served at home or at school (43).

#### Nutritional Contribution of the School Lunch Program

The National School Lunch Act authorized the Type A lunch which was designed to meet one-third to one-half of the recommended dietary allowances (RDA) of a child ten to twelve years of age (44).



Several studies have evaluated the nutritional contribution of the Type A Lunch. A national study in 1969 (45) of lunches from 300 schools indicated that, on the average, the lunches reached the nutritional goal of one-third the RDA for children ten to twelve years of age, except for food energy, iron, and magnesium. The nutrient values for this study were determined by laboratory analyses on lunches served to sixth graders in the 300 schools. For each school, the lunch sample consisted of a composite of twenty lunches, collected four per day for five consecutive school days. In this nation-wide study, Murphy et al. (46) found that the values for vitamin A, thiamine, riboflavin, vitamin D, niacin, and vitamin B<sub>12</sub> exceeded the nutritional goal. Vitamin B<sub>6</sub>, vitamin A, vitamin D, and thiamine were most often short of the goal. Total fat, fatty acids, and total sterols also were evaluated by Murphy et al. (47). The lunches contained an average of 31.8 gm fat, which provided 39 per cent of the calories. For major mineral elements, Murphy et al. (48) found that lunches on the average were adequate in calcium, phosphorus, sodium, potassium, and iron for boys, though not for girls. Magnesium was found to be less than the goal. Trace minerals from the lunches also were determined by Murphy et al. (49). They found marginal or low values for chromium and copper. Adequate or probably adequate values were found for manganese and zinc. Lunches low in calories tended to be low in several minerals and vitamins.

Meyer et al. (50) collected seventy lunches from fifteen schools in seven localities to determine their nutritive value. For calories, fat, protein, riboflavin, and calcium, the majority of the schools met at least one-third of the RDA. For ascorbic acid, slightly more than one-half of the schools met at least one-third of the RDA. Only one-third met this



goal for thiamine. Head et al. (51) analyzed meals from twenty-three Type A lunch lines for the major nutrients. Relative to the Type A goal of one-third of the RDA, all meals were inadequate in calories and a high proportion were low in ascorbic acid and iron. Calories from fat averaged 43 per cent.

In a study of elementary school children in rural New York by Emmons (52), it was determined that when the nutritive content of school and bag lunches were compared, school lunches provided significantly higher levels of all nutrients except calories and niacin equivalents. School breakfasts were compared to snacks for breakfast brought from home by the students. Children in one school district were provided with a free breakfast while children in another district were provided with free milk and could bring snacks from home. School breakfasts provided significantly higher levels of all nutrients.

Callahan (53) surveyed children's food intakes in Massachusetts from grades four through twelve on one day of the week. The results indicated that slightly more than half consumed a satisfactory or good lunch. As age increased, the number not eating lunch increased. Almost three-fourths of the children who bought the Type A lunch ate a satisfactory or good lunch that day. Of the children buying a la carte items in school, bringing lunch from home, buying lunch in a neighborhood store, or going home for lunch, almost two-thirds ate an inadequate meal. One-third of the children eating the Type A lunch received a source of vitamin A compared to an average of only 5 per cent for other methods. Twenty-eight per cent of the children eating the Type A lunch ate a food rich in vitamin C compared to an average of only 11 per cent for all other methods.

## Nutrient Standard Menus

Since the Type A menu pattern approximates but does not accurately assure that the nutritional goal will be met, the nutrient standard menu (NSM), which would require minimum levels of nutrients to be present in the meal, was designed as an alternative to the Type A lunch. Frey et al. (54) stated that the nutrient standard menus would offer the following advantages over the Type A pattern: (a) greater menu planning flexibility, (b) increased menu acceptability and less waste, (c) crediting nutrient content in both regular and fortified foods, (d) greater assurance that menus meet nutritional requirements, and (e) reduced costs. Harper et al. (55) compared school lunches planned to meet a specific nutrient standard with those planned according to the Type A pattern. Twenty-nine menu planners endorsed the method as a viable alternative to the Type A pattern. Many thought NSM increased nutrient assurance, flexibility, and potential for nutrition education. Rutgers University food scientists (56) stated that the single most outstanding benefit of nutrient standard menus is the direct concern a food manufacturer must have for the nutritional value of products.

## Student Participation in School Lunch Programs

The number of students participating in the school lunch program is dependent on many variables. Identification of the variables is essential in the management of an effective school lunch program. Low participation is often related to extensive a la carte programs with little effort to promote the Type A lunch, indifferent or negative attitudes by the faculty and administration, and poor scheduling causing long lines and little time for eating (57-59). In some cases, low participation may be

due to lack of building space for a kitchen or dining area or lack of equipment (60). The Food and Nutrition Service, in cooperation with state and local school lunch directors, studied the factors that influence participation (61, 62). The study encompassed ten high participation schools (over 80 per cent of the average daily attendance) and ten low participation schools (under 20 per cent of the average daily attendance). Their findings corroborate the factors mentioned above. The importance of the attitude of the school administrators, of efforts to merchandise the Type A lunch through information and education, and of student involvement in planning were demonstrated to be components of a successful program.

Student involvement at the local level in planning the program has been identified as a vehicle for increasing understanding and awareness of the scope and goals of the National School Lunch Program (62). Student involvement may include participation in writing menus, deciding on the type of service, plus improving the cafeteria atmosphere (63). Students have suggested a more intimate atmosphere like that of a regular restaurant. Other methods of improving the cafeteria atmosphere included holiday decorations, interesting food garnishes, and colorful bulletin board displays. In some schools the art students have been given the opportunity to redecorate the cafeteria in the way they choose. School administrators have installed stereo sound systems in the dining room (64-66).

The USDA study also suggested that merchandising or "selling" the school lunch program may increase participation by making its benefits known to the school children and their parents (62). The community newspaper has been identified as one media that can contribute by printing the menus and participation rates or articles about the lunch program itself.

Contests held within the school can have a variety of themes concerning nutrition and participation in the school lunch program. Elementary children may take field trips to the cafeteria. All classes may involve the students in nutrition awareness. Parents may be presented with a booklet explaining the school lunch program. Teachers' understanding of the lunch program also has been listed as an important factor (64, 65, 67).

USDA guidelines recommended that regional, cultural, and personal food preferences of children should be considered in menu planning; however new or less popular foods should be included along with the well-liked or familiar foods (44). Also, the use of recipes and proper food production techniques to insure high quality food should be encouraged in the school lunch program (62).

Size of the portions may affect participation. The University of Washington researchers compared elementary students' appetites (amounts of foods that students desired) with portion sizes contained in a packaged Type A lunch (68). Among the third, fourth, and fifth grade students, the researchers found they would have liked more food in almost three-fourths of the 933 lunch evaluations made. Increasing age, grade, and height were related to small but consistent increases in portion sizes desired by the students. Boys consistently wanted larger food portions than girls.

#### Choices in the School Lunch Program

Offering choices in the food items served in the school lunch has been reported to increase participation (42, 59, 61, 69). Alternatives gave children the challenge and independence they desired. In the study

conducted by the Food and Nutrition Service of the USDA, one significant finding was that three-fourths of the students in both high and low participation schools desired more choice in the menus (57). Choice may be handled in several ways. In some cases, the Type A lunch has been provided through a controlled choice from among several main dishes, fruits, vegetables, and desserts. In others, two or three different Type A lunches have been offered with one of them designed as a low-calorie lunch for the weight-conscious students. Other programs have offered choices in hot plates and cold plates (64, 70, 71). One school district in Nevada decided to offer a menu built on student favorites--hamburgers, french fries, and milkshakes. This alternative to the standard Type A lunch met all the requirements of the food pattern (72); however the variety of foods is quite limited.

Along with increasing participation, offering choices may decrease the amount of food left uneaten on the students' plates (63). Hinton (73) stated that choices offered should be between two foods of somewhat comparable nutritional value. For example, the choice for two cooked vegetables may be broccoli and baked squash. Offering choices at lunch is often reserved for high school students; although in a study at Kent State University Goumas (74) reported that choices were offered to five to ten year olds, who were students in the teaching laboratory school operated to provide experiences for college students in the field of education. At Kent State, it was proposed that the best way to teach nutrition was not the formal academic way, but to tie it into the experience of eating in a school feeding operation.

## METHODOLOGY

### Research Site

The study was conducted at a public junior high school with an approximate enrollment of 1,264 located in a medium-sized midwestern city. Students are almost equally distributed between the three classifications, seventh, eighth, and ninth. Along with the junior high schools, the school district consisted of one senior high and nine elementary schools.

The junior high school had a "closed campus" policy; i.e., students were not allowed to leave the campus during their lunch period. All students were required to go to the cafeteria during their lunch period where they could eat the Type A lunch or eat a sack lunch or other food brought from home. Students could purchase additional a la carte items such as milk, ice cream, fruit, or fruit juice. Organization of the lunch period consisted of five lunch periods of approximately twenty-five minutes in length beginning at 10:55 a.m. The foodservice at the junior high school employed twenty persons.

The purpose of the school lunch in the district was to contribute to the health and welfare of the school children. Goals and objectives for the school foodservice included the following: to provide wholesome, appealing meals of wide variety, well-prepared, seasoned and attractively served and to provide one-third of the day's nutritive requirements for the children. Centrally-planned, non-cycle menus are written one month in advance of service by the district foodservice director. Every two weeks the cook managers of the various schools met with the foodservice director

to discuss the menu and make recommendations. A food committee composed of four students from the school represented the junior high school students in expressing their views of the school foodservice.

Data for this research were collected during the fall semester of 1976. Prior to collection of the data, approval was received from the district foodservice director and the junior high school principal. Contact with the cook manager and other foodservice employees of the junior high school also was made to familiarize them with the study. During the spring semester of 1976, observations of the foodservice were made to assist in the planning of the study. Also, further meetings were held with the foodservice director during the summer before the data collection to plan the specific vegetables to be used in the study. Periodic consultation with the district foodservice director, junior high principal, and the cook manager, as well as others involved, continued throughout the study.

### Research Design

An experimental research design, composed of a control period and an experimental period, was used for this study. During the control period the regularly planned menus (Appendix A), which did not include choices in vegetable menu items, were served at the junior high school. During the experimental period the regularly planned menus were served with the addition of another vegetable menu item (Appendix B), allowing the students to have a choice of vegetables each day. Both the control period and the experimental period covered four weeks or nineteen school days in length.

Vegetables served during both periods were planned and presented to the school foodservice director to be incorporated into the menus. The

same vegetables served during the control period were served again during the corresponding week of the experimental period with the addition of another vegetable.

A student foodservice attitude study, also administered as part of the study, consisted of a pre-test and a post-test. The pre-test was given at the beginning of the control period and again after the experimental period to study the influence of offering vegetable choices on attitudes of students towards school foodservice.

### Types of Data Collected

Data for the study consisted of several types including the following:

- (a) school enrollment, attendance, and participation<sup>1</sup> in the school lunch program during the control and experimental period;
- (b) number of persons choosing each vegetable offered on the school lunch menu;
- (c) the amount of vegetables left uneaten on the plate when choices in vegetable menu items were (experimental period) and were not (control period) offered;
- (d) students' attitudes toward the school foodservice both before and after the choice in vegetable menu items was offered.

### Enrollment, Attendance, and Participation in the School Lunch Program

Total student enrollment at the school was obtained from the principal's office at the beginning of the fall semester. The enrollment was

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<sup>1</sup>Participation in the school lunch program is defined as the number of persons who select the Type A school lunch.



constant throughout the study ( $N = 1,264$ ). To determine attendance for the day, the number absent was subtracted from the school enrollment. Faculty attendance also was recorded. There were fifty-five faculty members teaching at the school each day. Every two weeks the number absent each day was obtained from the principal's office by counting the names of those students not in attendance each day. At the end of the last lunch period each day, the total number of students and faculty eating the school lunch was obtained from the cashier and recorded on the form used for recording school enrollment and attendance (Appendix C). Daily percentage participation in the school lunch program was calculated by dividing the number participating by the number in attendance. Procedures for obtaining these figures were the same for the control and experimental periods.

#### Number of Participants Choosing Each Vegetable

Since all students and faculty selecting the Type A lunch were served the same vegetable during the control period, the number of students and faculty participating represented the number choosing the vegetable for the control period. During the experimental period cumulative values of the number choosing each vegetable were recorded on a form (Appendix C). Two single-key tabulators on each of the two cafeteria lines were used by student assistants to record selections. To aid in accuracy of tabulating, the name of the vegetables was written on masking tape that was placed on the single-key tabulators.

#### Measurement of Vegetables Left Uneaten

Several college students were employed to assist with the collection of the vegetable plate waste. An orientation meeting for these assistants

was held to acquaint them with the study and with their duties. Practice sessions at the junior high school also were held to determine the best procedure and to train the student assistants.

Collection of the uneaten vegetables took place inside of the dishroom to facilitate efficiency and reduce distractions to students while eating in the lunchroom. When the junior high students and faculty brought their trays to the window of the dishroom, they were handed to the student assistants who scraped the uneaten vegetables into pans. The contents of the pan were weighed after each of the five lunch periods. Measurements were recorded on a form (Appendix C) in pounds and ounces using a 25-pound capacity scale.<sup>1</sup> During the experimental period, each of the two vegetables were collected in separate pans and weighed separately.

#### Attitude Survey

Development of the Instrument for the Student Attitude Survey. The initial student attitude instrument was adapted from those used by Garrett (36) and Gargano (37) in their studies related to school foodservice. A pilot study was conducted prior to the actual data collection. One eighth grade English class that was not part of the sample for actual data collection was selected randomly for the pilot study.

After administering the pilot study instrument (Appendix D), several revisions were made. In question 4, students were asked to indicate the section of the country where they had lived most of their lives. Since many students answered northeast, rather than midwest (probably thinking of the area of the state), the word "country" was deleted and "United States" replaced it. For questions 3 and 4, several students checked more

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<sup>1</sup>Manufactured by Pelouz, Model Y-25.

than one answer so the final instrument included the words "check one." For questions 7 through 12, which related to frequency of lunch habits, the words "past week" were changed to the "usual 5 day school week" since it was difficult for students to remember exactly what they did in the past week and it seemed more representative to include the usual number. An additional response of "I prefer a sack lunch" was included in question 14, where it was asked why school lunch was not eaten. Question 30 included the words "either at home or at school" in the final instrument when asking how often the student ate breakfast.

The last question of the student attitude study concerned vegetable preferences. In the pilot study several students asked whether it was referring to vegetables eaten at home or at school. For the final instrument, both categories, at home and at school, were included. The format of the vegetable preferences question also was changed. For the pilot study, the format was as follows:

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Please mark each of the following vegetables according to this scale:

<u>Like</u>	<u>Will Eat</u>	<u>Dislike</u>	<u>Have Never Eaten</u>
1	2	3	4

Examples:

30.   2   French Fries  
 31.   1   Peas

30.        French Fries  
 31.        Peas  
 32.        Carrots

---

The following is an example of the vegetable preference question in the final instrument:

<u>Circle 1, 2, 3, or 4</u> <u>when served at home</u>					<u>Circle 1, 2, 3, or 4</u> <u>when served at school</u>			
Like a lot 1	Will eat 2	Have not eaten 3	Don't like 4		Like a lot 1	Will eat 2	Have not eaten 3	Don't like 4
1	2	3	4	Green Peas	1	2	3	4

The final instrument (Appendix E) was comprised of questions concerning biographical data, lunch habits, attitudes towards the school food-service, such as condition of the lunchroom and quality of the food and how well each type of food was liked. The final section of the questionnaire, as shown above, was designed to determine vegetable preferences and whether or not there was a difference in how well the vegetables were liked when they were served at school or at home.

Selection of the Sample for Attitude Survey. Approximately 30 per cent of the student population at the school was selected randomly to participate in the attitude study. Seventh and eighth grade English classes and ninth grade Social Studies classes were selected because these were classes that included all the students enrolled at the junior high school.

Whole classes were used rather than a straight random selection because of the difficulty in administering both a pre-test and a post-test to a large random sample in a school setting. Responses were more likely to be student's own opinions and not influenced by others when administered to a class as a whole. Using the classroom setting utilized the assistance of the teachers in giving standardized instructions. A better response rate also was expected through the use of a group administration.

A schedule of the teachers and their classes was obtained from the principal. Numbers were assigned to the 46 classes represented. The enrollment was almost equal for each of the three classifications; therefore, five classes from each classification were selected randomly for a total of fifteen classes for the 30 per cent sample.

Administration of the Attitude Instrument. Before the administration of the attitude study, notices were sent to the teachers of the participating classes introducing the study and announcing an orientation meeting (Appendix F). Further instructions were discussed at the meeting. Another letter was distributed to the teachers to introduce the post-test (Appendix G).

The instruments were delivered to each teacher two days prior to the date of administration for both the pre-test and post-test. Notices were sent home with the students before the pre-test to acquaint parents with the study and to indicate participation in the study was voluntary (Appendix H). Before both the pre-test and post-test instructions were given to the teachers to read to the classes (Appendix I). The parent letter and the instructions indicated students who did not wish to participate should return the questionnaires unanswered. After administering the questionnaires to their participating classes, the teachers delivered the questionnaires to the principal's office in the manila envelopes provided.

### Analysis of Data

Mean number absent, daily student attendance, daily number of faculty and students eating the Type A school lunch, percentage participation, and

total ounces of vegetables left uneaten were compared for control and experimental periods using the t test for related samples (75, 76). Percentage participation was computed by dividing the number of persons eating the school lunch by the number attending school. Vegetable plate waste per person per day was calculated by dividing the ounces of vegetable waste by the total number of students and faculty participating in the lunch program. For the experimental period vegetable waste also was calculated for each of the vegetable choices separately. Mean ounces of vegetable plate waste per person per day during the control and experimental period also were compared using the t test for related samples.

Chi square tables for items 7 through 30 of the attitude instrument compared pre-test and post-test responses (75, 76). Items 15 through 29 were categorized into either food-related questions (eight items) or nonfood-related questions (seven items). The responses for these items were given a weight of one, two, or three, with the most positive response weighted highest; one question had only two responses. An overall score, a food score, and a nonfood score were computed by summing the scores of individual items (Appendix J). The overall score was the cumulative weight of all fifteen attitude items. In computation of scores, a neutral value was added for missing values. The maximum overall score possible was 44; food score, 24; and nonfood, 20. The t test for two independent samples was used to compare pre- and post-test scores and scores on individual items (75, 76).

Analysis of variance with the Scheffé test for examining differences among groups was used to compare the following scores (75, 76): food, nonfood, and overall scores in both the pre-test and the post-tests in

relation to student classification and frequency of Type A lunch participation. Respondents were grouped as frequent participants if they ate the school lunch three or more times a week or infrequent, if they ate less than three times a week. The t test for two independent samples was used to compute scores on individual items for frequent and infrequent participants.

The vegetable preference question of the attitude instrument was analyzed by using the chi square test to compare the differences in vegetable preferences at home and at school in both the pre-test and the post-test. Pre- and post-test vegetable preference scores at home and at school (1 = like a lot to 4 = don't like) also were compared using the t test for two independent samples.

## RESULTS AND DISCUSSION

Enrollment, Attendance, and Participation in the  
School Lunch Program

The junior high school students' absences and attendance during the control and experimental periods are presented in Table 1. Absences were slightly higher during the experimental period causing a slight decrease in attendance, although attendance was essentially the same for both study periods. Student enrollment at the junior high school remained constant with 1,264 students.

Table 1: Student absences and attendance during control and experimental periods<sup>1</sup>

	control period		experimental period		t value <sup>2</sup>
	mean	s.d.	mean	s.d.	
absences	66.6 ± 17.2		72.0 ± 11.2		1.42
attendance	1197.4 ± 17.2		1192.0 ± 11.0		1.41

<sup>1</sup> School enrollment for the study periods was 1264.

<sup>2</sup> t test for related samples.

Student participation in the Type A school lunch did not change significantly between the control and experimental periods (Table 2). Consistently, the student participation was approximately 80 per cent. Per cent participation is the percentage of those students in attendance who participated in the Type A lunch program. This result was not surprising



Table 2: Participation in school lunch during control and experimental periods

	attendance			participation <sup>1</sup>			% participation <sup>2</sup>		
	exper.		t <sub>3</sub>	control		t	control		t
	period	mean	value	period	mean	value	period	exper.	value
	s.d.	s.d.		s.d.	s.d.		s.d.	period	
faculty <sup>4</sup>									
students	1197.4 ±17.2	1192.0 ±11.0	1.41	0.17	14.4 ± 3.6	2.86	18.2 ± 4.4	26.1 ± 0.1	2.86
						0.01		33.0 ± 0.1	0.01
total						0.17		79.5 ± 2.5	0.28
						0.34		77.5 ± 0.3	0.53

<sup>1</sup>Participation refers to number of persons eating the Type A school lunch.

<sup>2</sup>% participation = percentage of those in attendance who participated in Type A lunch program.

<sup>3</sup>t test for related samples.

<sup>4</sup>There were 55 faculty members teaching at the school each day.

because of the "closed campus" policy which did not allow students to leave the campus during the noon hour, leaving few alternatives to the Type A school lunch. Faculty participation in the Type A school lunch program increased significantly from the control to the experimental period. There were fifty-five faculty members teaching at the school each day. The percentage increase was 6.9 per cent. Positive attitudes of the faculty and administration towards the school foodservice have been shown to have a positive effect on the students' acceptance of the school foodservice program (61, 62).

### Vegetable Selections

The percentage of participants choosing each vegetable during the experimental period is enumerated in Table 3. All persons eating the Type A lunch during the control period were served the same vegetable; i.e., the number of vegetable portions served was the same as the number participating in the program.

The percentage choosing a particular vegetable during the experimental period when choices were offered apparently was dependent on the popularity of the other choice. For example, when mixed vegetables were served with corn (day 10) a low percentage (14.6 per cent) selected mixed vegetables; however, when mixed vegetables were served with brussel sprouts (day 19) a high percentage (78.5 per cent) chose mixed vegetables. Another example was spinach. On day 3, spinach was served with stewed tomatoes as the other choice. Spinach was chosen by 73.1 per cent. When carrots were offered as a choice with spinach, only 30.6 per cent selected spinach. However, corn was an exception in that it was selected by a large percentage of students without regard to the other vegetable item served.

Table 3: Percentage of participants choosing each vegetable during the experimental period

day	vegetable	N	%	vegetable	N	%
1	carrots	423	44.62	mixed vegetables	525	55.38
2	corn	893	93.80	coleslaw	59	6.20
3	spinach	713	73.05	stewed tomatoes	263	26.95
4	broccoli	195	21.06	green beans	731	78.94
5	peas and carrots	281	27.79	relishes	730	72.21
6	relishes	789	79.22	sauerkraut	207	20.78
7	asparagus	669	68.47	zucchini	308	31.53
8	peas	783	81.06	lima beans	183	18.94
9	spinach	306	30.63	carrots	693	69.37
10	corn	851	85.44	mixed vegetables	145	14.56
11	succotash	684	70.88	broccoli	281	29.12
12	wax beans	857	91.17	harvard beets	83	8.83
13	coleslaw	224	23.16	green beans	743	76.84
14	breaded tomatoes	93	9.62	peas and carrots	874	90.38
15	mixed vegetables	332	34.95	green peas	618	65.05
16	corn	772	86.16	green beans	124	13.84
17	carrots	519	55.81	cauliflower	411	44.19
18	lima beans	515	49.71	cabbage	521	50.29
19	brussel sprouts	206	21.53	mixed vegetables	751	78.47

## Vegetables Left Uneaten

Total ounces of vegetables left uneaten decreased during the experimental period (Table 4). Ounces per person (students and faculty participating in school lunch) per meal also decreased during the experimental period. It was hypothesized that offering choices in vegetable menu items would increase the acceptability of the school foodservice program. It also was assumed that if the food that is offered is acceptable, it will be eaten more often by more students. Although there was not a significant decrease in amount of vegetables left uneaten, there was a trend towards fewer ounces left uneaten during the experimental period ( $P \leq .10$ ). This may have been more evident if the study had continued for a longer period than the 19 days comprising each phase of this study.

Table 4: Ounces of vegetables left uneaten during control and experimental periods

	control period		experimental period		t value <sup>1</sup>	P
	mean	s.d.	mean	s.d.		
total ounces <sup>2</sup>	1110.53 ± 429.61		913.21 ± 330.00		1.78	0.09
ounces per person <sup>3</sup>	1.14 ± 0.43		0.94 ± 0.33		1.76	0.09

<sup>1</sup> t test for related samples.

<sup>2</sup> Mean total ounces per day; 19 days in each period.

<sup>3</sup> Mean ounces per person (students and faculty participating in school lunch) per meal.

Table 5 details the ounces of vegetables left uneaten per person per meal per day. Vegetables that resulted in the least plate waste included corn, green beans, green peas, succotash, sauerkraut, asparagus, relishes,

Table 5: Ounces of vegetables left uneaten per person per meal during the control and experimental periods

day	control period			experimental period		
	vegetable	N	oz. per person	vegetable	N	oz. per person
1	mixed vegetables	984	1.44	carrots	423	1.11
2	coleslaw	1030	1.91	corn	893	.46
3	spinach	951	1.25	spinach	713	1.09
4	broccoli	938	1.23	broccoli	195	.54
5	relishes	992	.24	peas and carrots	281	1.04
6	green peas	939	1.26	relishes	789	.28
7	corn	970	.77	asparagus	669	.74
8	relishes	1012	.29	green peas	783	.90
9	carrots	993	1.31	spinach	306	2.01
10	asparagus	991	.63	corn	851	.61
11	broccoli	929	1.05	succotash	684	.90
12	green beans	1012	.98	wax beans	857	1.27
13	harvard beets	986	1.58	coleslaw	224	2.08
14	peas and carrots	942	1.59	breaded tomatoes	93	2.35
15	mixed vegetables	954	1.37	mixed vegetables	332	1.48
16	cauliflower	967	1.46	corn	772	.47
17	corn	995	.79	carrots	519	1.27
18	lima beans	959	1.35	lima beans	515	1.27
19	brussel sprouts	1007	1.13	brussel sprouts	206	1.41
				mixed vegetables	751	1.34
				mixed vegetables	525	.90
				coleslaw	59	1.64
				stewed tomatoes	263	1.40
				green beans	731	.96
				relishes	730	.21
				sauerkraut	207	.40
				zucchini	308	.85
				lima beans	183	.79
				carrots	693	1.15
				mixed vegetables	145	.86
				broccoli	281	.61
				harvard beets	83	1.94
				green beans	743	.74
				peas and carrots	874	1.23
				green peas	618	1.13
				green beans	124	1.13
				cauliflower	411	1.21
				cabbage	521	1.16
				mixed vegetables	751	1.34

and broccoli. Vegetables with the most plate waste were coleslaw, harvard beets, peas and carrots, cauliflower, spinach, breaded tomatoes, brussel sprouts, and stewed tomatoes. Corn was consistently the vegetable with the least amount left uneaten per person per meal. This finding coupled with the selection data probably indicated that corn was the most popular vegetable offered in this study. The standard portion of vegetables at the junior high school was approximately one-third cup, with the exceptions of relishes, asparagus, and broccoli. The portion size was slightly less for these vegetables. These findings generally agree with those of Litman's et al. (33). They found that carrots, corn, peas, and beans were among the vegetables rated comparatively well by Minnesota school children. Green and yellow vegetables, such as spinach and cabbage, were rated low.

With only a few exceptions, the ounces of vegetables left uneaten for an individual vegetable were less for the experimental period than for the control period. For example, the ounces per person of plate waste for cauliflower (day 16) was 1.46 during the control period and 1.21 (day 17) during the experimental period. Consumption of vegetables tended to be greater when choices were offered. The participants may have believed that offering choices allowed them more independence and they were more willing to eat vegetables. Also, students were permitted to select the vegetable that they liked which also should increase consumption.

Choices in vegetable menu items were discontinued at the junior high school after the experimental period. Several students expressed disappointment in not having choices continued. This may be another indication that had the study continued for a longer period of time, there may have been a significant decrease in vegetables left uneaten.

## Attitude Survey Data

## General Information

Students in the randomly selected classes completed the thirty item attitude survey and the vegetable preference questions (N = 386). The sample included an approximately equal distribution of girls and boys and of students in seventh, eighth, and ninth grades (Table 6). Data presented in Table 6 describes the group participating in the pre-test (administered before the control period when no choices in vegetable menu items were offered). This was the same group for the post-test (administered 10 weeks after the pre-test, after the experimental period when choices in vegetable menu items were offered). The group was slightly smaller (N = 359) during the second test administration because of absences.

Table 6: Comparison of study sample for attitude survey and junior high student body population

	school population		study sample	
	N	%	N	%
classification:				
seventh grade	408	32.3	129	33.5
eighth grade	415	32.8	138	35.8
ninth grade	441	34.9	118	30.7
total	1264	100.0	385	100.0
sex: <sup>1</sup>				
girls	625	49.4	197	52.0
boys	639	50.6	182	48.0
total	1264	100.0	379	100.0

<sup>1</sup> Several students failed to respond.

Table 7 details biographical information for the sample. Nearly 80 per cent of the students had lived in a medium-sized city (25,000 - 150,000) most of their lives. The midwest was the section of the United States where 83 per cent had lived most of their lives. Over one-third of the study sample had lived in two to three different places. The next highest group was represented by those who had lived in one location (29.2 per cent). Over 39 per cent of the students were in their first year at the junior high school; whereas 35.3 and 25.4 per cent were in their second and third year, respectively.

The question in the attitude survey concerning breakfast habits revealed that most students were frequent breakfast eaters, 73.3 per cent in the pre-test and 75.3 per cent in the post-test ate breakfast 3 or more times a week. Approximately 20 per cent of the students indicated they hardly ever ate breakfast.

#### Lunch Habits of Junior High Students

Students were asked to indicate their usual lunch habits during the school week (Table 8). The majority of the students ate the Type A school lunch five times a week in both the pre-test (63.4 per cent) and the post-test (61.1 per cent). The slight decrease in stated participation also was shown in the actual participation data reported previously. The percentage of students adding food, such as milk, fruit, fruit juice, or ice cream, remained fairly constant during both periods. Very few students ate two school lunches in one day.

Few students brought a lunch from home; 76.4 per cent in the pre-test and 77.4 per cent in the post-test never brought lunch from home. Also, only a few students added food to the lunch brought from home. Since there



Table 7: Description of study sample for attitude survey

	N <sup>1</sup>	%
student classification	385	
seventh grade		33.5
eighth grade		35.8
ninth grade		30.7
sex	379	
female		52.0
male		48.0
community size most of life	380	
big city (over 150,000)		6.1
medium city (25,000-150,000)		79.7
small city (2,500-25,000)		8.7
rural community (less than 2,500)		5.5
section of U.S. most of life	377	
west		6.4
southwest		2.1
midwest		83.0
northeast		6.1
southeast		1.3
outside U.S.A.		1.1
number of different places lived	373	
1		29.2
2-3		34.3
4-6		22.0
more than 6		14.5
number of years at this school	382	
first year		39.3
second year		35.3
third year		25.4

<sup>1</sup>N varies slightly because of nonresponses. The same group was surveyed for the post-test; however the total N was 359 because of absences from school.

Table 8: Lunch habits of junior high school students<sup>1</sup>

		times per week						$\chi^2$ <sup>2</sup>
		0	1	2	3	4	5	
		%	%	%	%	%	%	
eat the school lunch								
pre-test <sup>3</sup>		9.1	3.9	3.9	6.7	13.0	63.4	1.51
post-test <sup>4</sup>		11.1	3.6	3.3	6.4	14.5	61.1	
add food to school lunch								
pre-test		33.4	16.3	14.5	13.5	7.5	14.8	4.76
post-test		35.9	11.4	16.4	12.0	7.5	16.8	
eat two school lunches								
pre-test		97.9	1.1	0.5	0.0	0.0	0.5	3.31
post-test		95.8	1.9	1.2	0.3	0.0	0.8	
bring lunch from home								
pre-test		76.4	9.1	3.4	3.1	4.1	3.9	4.02
post-test		77.4	9.7	2.8	1.7	2.8	5.6	
add food to lunch from home								
pre-test		79.8	7.8	3.1	3.1	3.4	2.8	4.02
post-test		81.6	8.4	3.3	1.7	1.7	3.3	
eat no lunch								
pre-test		87.8	6.8	3.6	0.5	0.0	1.3	3.00
post-test		86.1	8.0	2.8	1.1	0.3	1.7	

<sup>1</sup> N = 386 for pre-test; N = 359 for post-test.

<sup>2</sup>  $\chi^2$  values nonsignificant for all comparisons of responses on pre- and post-tests.

<sup>3</sup> Given before control period when no choices in vegetable menu items were offered.

<sup>4</sup> Given 10 weeks after pre-test, after period when choices in vegetable menu items were offered.

was a "closed campus" policy, the students who did not eat the Type A school lunch had only the alternatives of bringing a lunch from home, buying a la carte items, or eating no lunch. In the usual school week, over 85 per cent of the students never skipped lunch.

Frequent participants (those who ate the school lunch three or more times a week) were asked to indicate reasons for eating the school lunch (Table 9). Responses were similar for both the pre- and post-tests. Over 70 per cent responded that they ate the school lunch because their friends did also. Although not a response on the instrument, the closed noon hour probably was a predominant reason for eating at school for a large number of the students. The next highest response indicated that the students liked the food.

Infrequent participants (those who ate school lunch two or less times a week) indicated why they did not participate in the school lunch program. On the pre-test, the most frequent reason given was, "prefer a sack lunch" (64.1 per cent); whereas, 48.7 per cent responded that they didn't like the food. The reasons were reversed for the post-test with more students checking "I don't like the food" than "I prefer a sack lunch." "It's cheaper to bring a sack lunch" also received over 40 per cent of the students' responses for both the pre- and post-tests.

#### Attitude Scores

Mean nonfood, food, and overall attitude scores are shown in Table 10. Responses for the fifteen attitude items were weighted one, two, or three with the most positive response weighted highest (one item had only two response categories). The nonfood score is the sum of nonfood related items; the food score is the sum of the food related items; and the overall

Table 9: Factors influencing frequency of participation in school lunch program

reasons frequent participants eat school lunch	pre-test <sup>1</sup> (N = 321)		post-test <sup>2</sup> (N = 294)		$\chi^2$ <sup>3</sup>
	N <sup>4</sup>	%	N	%	
like the food	189	60.6	164	58.0	0.32
friends eat there	239	76.6	207	73.1	0.77
parents want me to	194	62.2	171	60.4	0.12
lunch price is low	73	23.5	50	17.7	2.63

reasons infrequent participants do not eat school lunch	pre-test (N = 65)		post-test (N = 65)		$\chi^2$ <sup>3</sup>
	N <sup>4</sup>	%	N	%	
don't like the food	19	48.7	27	65.9	1.75
prefer a sack lunch	25	64.1	21	51.2	0.88
friends and I bring lunch	5	12.8	8	19.5	0.26
sack lunch is cheaper	17	43.6	17	41.5	0.00
have food allergies	0	0.0	2	4.9	0.46
vegetarian	0	0.0	1	2.4	0.00

<sup>1</sup>Given before control period when no choices in vegetable menu items were offered.

<sup>2</sup>Given 10 weeks after pre-test, after experimental period when choices in vegetable menu items were offered.

<sup>3</sup> $\chi^2$  values nonsignificant for all comparisons of responses on pre- and post-tests.

<sup>4</sup>Number of times each reason was selected. Students could select one or more reasons.

Table 10: Mean attitude scores<sup>1</sup> for pre- and post-tests<sup>2</sup>

	pre-test <sup>3</sup>		post-test <sup>4</sup>		t value <sup>5</sup>	P
	mean	s.d.	mean	s.d.		
<u>nonfood related items</u>						
lunch room is noisy	2.49 ± 0.81		2.38 ± 0.88		1.72	0.09
lunch room is clean	2.16 ± 0.75		2.05 ± 0.79		1.95	0.05
cooks are friendly	2.36 ± 0.73		2.24 ± 0.81		2.05	0.04
lunch room is cheerful	2.07 ± 0.56		2.06 ± 0.54		0.15	0.88
*price of lunch is low	1.57 ± 0.50		1.53 ± 0.50		1.24	0.21
cashiers are friendly	2.39 ± 0.72		2.34 ± 0.79		0.98	0.33
lunch is rushed	1.95 ± 0.83		2.02 ± 0.88		1.02	0.31
<u>food related items</u>						
size of servings is right	1.89 ± 0.81		1.73 ± 0.81		2.75	0.01
hot foods hot	2.05 ± 0.68		1.95 ± 0.67		1.99	0.05
cold foods cold	2.25 ± 0.63		2.34 ± 0.65		1.84	0.07
food is good	2.01 ± 0.68		1.92 ± 0.70		1.68	0.09
like meat dishes	2.22 ± 0.68		2.23 ± 0.71		0.21	0.83
like vegetables	1.63 ± 0.67		1.53 ± 0.69		2.00	0.05
like desserts	2.54 ± 0.58		2.52 ± 0.62		0.41	0.68
eat most of food	2.53 ± 0.62		2.46 ± 0.68		1.40	0.16
nonfood score <sup>6,7</sup>	14.97 ± 2.44		14.60 ± 2.49		2.07	0.04
food score	17.08 ± 2.99		16.63 ± 3.04		2.01	0.04
overall score	32.05 ± 4.64		31.23 ± 4.78		2.37	0.02

<sup>1</sup> Higher score = more positive response. All items scored on 3 point scale except for starred item (\*) which was scored on a 2 point scale.

<sup>2</sup> Pre-test; N varies from 382 to 371.  
Post-test; N varies from 339 to 353.

<sup>3</sup> Given before control period when no choices in vegetable menu items were offered.

<sup>4</sup> Given 10 weeks after pre-test, after experimental period when choices in vegetable menu items were offered.

<sup>5</sup> t test for two independent samples; probability level is indicated.

<sup>6</sup> Nonfood score =  $\Sigma$  of nonfood related item scores.  
Food score =  $\Sigma$  of food related item scores.  
Overall score = nonfood score + food score.

<sup>7</sup> In computation of summative scores neutral values were included for missing values.

attitude score is the sum of the two scores. All three scores, nonfood, food, and overall attitude scores, had very small, but significant decreases on the post-test. These negative scores may be attributed to the time of the semester in which the survey was administered. The pre-test had been given only a few weeks after the beginning of the semester when students may have a better attitude towards school in general. The post-test was administered late in the semester during the week before a holiday. The students may have been ready for a vacation which could have had a negative effect on their attitude.

Mean attitude scores also were analyzed in relation to student classification (Table 11). Seventh grade students' scores were significantly higher on the pre-test for all three scores (food, nonfood, and overall attitude). For the food score and overall attitude score, there was a significant difference between the seventh and eighth grade students' scores and between the seventh and ninth grade students. For the nonfood score, seventh and ninth grade students' scores differed significantly. There were no significant differences among student classifications in the post-test, although the seventh grade students still had slightly higher mean scores. Possibly, because seventh grade students were new to the junior high school they had not developed cynicism towards the school foodservice system. Also, the program no doubt differed greatly from the program in elementary school and was somewhat novel to them initially. Eighth grade students had slightly higher scores than the ninth grade students, though not significantly.

Frequency of participation in the school lunch program also was analyzed in relation to attitude scores (Table 12). For both the pre- and post-tests there were significant differences in the scores of the

Table 11: Relationship of attitude score to student classification

classification	pre-test <sup>1</sup>				post-test <sup>2</sup>			
	N	mean	s.d.	F ratio <sup>3</sup>	N	mean	s.d.	F ratio
<u>food score</u>								
seventh grade	129	18.22 ± 2.90		15.35***	118	17.06 ± 3.04		1.76
eighth grade	138	16.67 ± 3.13	*		127	16.43 ± 3.20		
ninth grade	118	16.33 ± 2.55			114	16.41 ± 2.85		
<u>nonfood score</u>								
seventh grade	129	15.64 ± 2.37		9.99***	118	14.97 ± 2.43		1.96
eighth grade	138	14.98 ± 2.46	*		127	14.46 ± 2.67		
ninth grade	118	14.28 ± 2.29			114	14.37 ± 2.32		
<u>overall score</u>								
seventh grade	129	33.85 ± 4.46		17.35***	118	32.03 ± 4.76		2.47
eighth grade	138	31.65 ± 4.80	*		127	30.90 ± 5.17		
ninth grade	118	30.61 ± 3.96			114	30.78 ± 4.28		

<sup>1</sup> Given before control period when no choices in vegetable menu items were offered.

<sup>2</sup> Given 10 weeks after pre-test, after experimental period when choices in vegetable menu items were offered.

<sup>3</sup> F ratio with Scheffé test to study differences among means. Lines between means indicate significant differences.

\*\*\*  $P \leq .001$

Table 12: Relationship between attitude scores and frequency of participation in the school lunch

frequency of participation	pre-test <sup>1</sup>				post-test <sup>2</sup>			
	N	mean	s.d.	F ratio	N	mean	s.d.	F ratio
<u>food score</u>								
infrequent	65	15.94 ± 2.97			65	15.42 ± 3.10		
frequent	321	17.31 ± 2.95		11.64***	294	16.90 ± 2.97		13.15***
<u>nonfood score</u>								
infrequent	65	13.91 ± 2.68			65	13.94 ± 2.58		
frequent	321	15.19 ± 2.34		15.45***	294	14.75 ± 2.45		5.64*
<u>overall score</u>								
infrequent	65	29.85 ± 4.91			65	29.35 ± 4.91		
frequent	321	32.50 ± 4.46		18.47***	294	31.65 ± 4.66		12.63***

<sup>1</sup> Given before control period when no choices in vegetable menu items were offered.

<sup>2</sup> Given 10 weeks after pre-test, after experimental period when choices in vegetable menu items were offered.

\*  $P \leq .05$       \*\*\*  $P \leq .001$



infrequent and frequent participants. Apparently, students who had a negative attitude towards the school foodservice were more likely not to participate in the Type A lunch program.

#### Analysis of Items on Attitude Scales

In addition to the analyses of attitude scores, food and nonfood related items were analyzed individually. The food related items were concerned with serving size, temperature and flavor of the food, acceptance of meat, vegetable and dessert menu items, and perception of usual amount of food consumed. The nonfood related items pertained to lunch room noise and cleanliness, cooks' and cashiers' attitudes, lunch room atmosphere, price of the lunch, and perception of time allowed for lunch.

Nonfood Related Items. Significant differences were found on two nonfood related items when comparing pre- and post-test ratings, items 16, "lunch room is clean" and 20, "cooks are friendly" (Table 10). These decreases in post-test ratings also may reflect the time of the semester, as mentioned above, when attitudes of all persons involved in the school foodservice operation may have been less positive. On the other hand, this may be entirely the students' own perceptions of the cleanliness of the lunch room and the friendliness of the cooks.

Nonfood related items also were analyzed in relation to frequency of participation (Table 13). Several significant differences were found in pre-test ratings of the frequent and infrequent participants: "lunch room is noisy," "cooks are friendly," and "cashiers are friendly." Frequent participants rated these items more positively. All other nonfood related items also were rated higher by frequent participants; although the difference was nonsignificant. There were no significant differences in

Table 13: Relationship between items<sup>1</sup> on attitude scales and frequency of participation in the school lunch<sup>2</sup>

	pre-test <sup>3</sup>			post-test <sup>4</sup>		
	infrequent mean	s.d.	frequent mean	infrequent mean	frequent mean	t value
<b>nonfood related items</b>						
lunch room is noisy	2.28 ± 0.93		2.54 ± 0.78	2.26 ± 0.89	2.41 ± 0.88	1.22 0.23
lunch room is clean	2.09 ± 0.84		2.18 ± 0.73	1.94 ± 0.88	2.08 ± 0.77	1.17 0.25
cooks are friendly	2.05 ± 0.80		2.41 ± 0.71	2.12 ± 0.81	2.26 ± 0.81	1.24 0.22
lunch room is cheerful	1.94 ± 0.64		2.09 ± 0.54	2.03 ± 0.54	2.07 ± 0.55	0.44 0.66
*price of lunch is low	1.54 ± 0.50		1.58 ± 0.49	1.47 ± 0.50	1.54 ± 0.50	1.05 0.30
cashiers are friendly	2.20 ± 0.73		2.43 ± 0.72	2.25 ± 0.77	2.36 ± 0.80	0.97 0.34
lunch is rushed	1.78 ± 0.81		1.99 ± 0.83	1.87 ± 0.87	2.05 ± 0.87	1.47 0.15
<b>food related items</b>						
size of servings is right	1.85 ± 0.74		1.90 ± 0.82	1.67 ± 0.76	1.74 ± 0.82	0.63 0.53
hot foods hot	1.90 ± 0.67		2.08 ± 0.68	1.76 ± 0.69	1.98 ± 0.66	2.16 0.03
cold foods cold	2.22 ± 0.72		2.26 ± 0.61	2.34 ± 0.62	2.34 ± 0.66	0.00 0.99
food is good	1.88 ± 0.62		2.03 ± 0.68	1.63 ± 0.65	1.98 ± 0.70	3.67 0.00
like meat dishes	1.86 ± 0.66		2.29 ± 0.67	1.93 ± 0.78	2.29 ± 0.68	3.25 0.00
like vegetables	1.46 ± 0.60		1.67 ± 0.68	1.49 ± 0.66	1.54 ± 0.70	0.49 0.62
like desserts	2.42 ± 0.56		2.56 ± 0.59	2.36 ± 0.67	2.55 ± 0.61	1.99 0.05
eat most of food	2.40 ± 0.72		2.56 ± 0.60	2.24 ± 0.82	2.51 ± 0.65	2.24 0.03

<sup>1</sup>Higher score = more positive response. All items scored on 3 point scale except for starred item (\*) which was scored on a 2 point scale.

<sup>2</sup>N varies from 58 to 65 for infrequent participants and from 314 to 317 for frequent participants in the pre-test. N varies from 53 to 63 for infrequent participants and from 286 to 291 for frequent participants in the post-test.

<sup>3</sup>Given before control period when no choices in vegetable menu items were offered.

<sup>4</sup>Given 10 weeks after pre-test, after experimental period when choices in vegetable menu items were offered.

<sup>5</sup>t test for independent samples.

ratings on nonfood related items for the post-test; however, ratings for every item were slightly higher for frequent participants. Table 17 (Appendix K) enumerates the percentage responses on the nonfood related items on pre- and post-tests.

Food Related Items. Three food related items were rated significantly lower on the post-test: "size of servings is right," "hot foods hot," and "like vegetables." Food related items also were analyzed in relation to frequency of participation. Frequent participants rated two items significantly higher on the pre-test: "like meat dishes" and "like vegetables." All other items also were rated higher by frequent participants. On the post-test, ratings differed significantly on the following items: "hot foods hot," "food is good," "like meat dishes," "like desserts," and "eat most of food." Frequent participants in both the pre- and post-tests had a higher opinion of the food served on the menus of the school lunch program. The percentage responses to the food related items of the attitude survey are shown in Appendix K (Table 18).

#### Vegetable Preferences

A list of twenty-four vegetables was used to study vegetable preferences of the students at home and at school. Mean scores for students' preferences of vegetable menu items on the school lunch menu for the pre- and post-tests are shown in Table 14. The items were scored from 1 to 4 with 1 = like a lot to 4 = don't like. Percentage responses are listed in Table 19 (Appendix K).

Preference scores did not differ significantly on pre- and post-tests except for: carrots, cabbage, harvard beets, breaded tomatoes, and stewed tomatoes. Scores for these vegetables were significantly lower on the

Table 14: Junior high school students' preferences of vegetables served on the school lunch menus

vegetable	pre-test <sup>1</sup>		post-test <sup>2</sup>		t value	P
	mean <sup>3</sup>	s.d.	mean	s.d.		
french fries	1.80 ± 0.96		1.75 ± 0.94		0.68	0.50
green peas	3.16 ± 1.09		3.05 ± 1.11		1.29	0.20
carrots	2.92 ± 1.14		3.09 ± 1.11		1.98	0.05
lima beans	3.47 ± 0.89		3.57 ± 0.86		1.52	0.13
green beans	2.65 ± 1.15		2.68 ± 1.17		0.28	0.77
mashed potatoes	1.77 ± 0.98		1.82 ± 1.01		0.63	0.53
cabbage	3.19 ± 1.05		3.47 ± 0.93		3.77	0.00
broccoli	3.24 ± 1.09		3.22 ± 1.10		0.19	0.85
harvard beets	3.34 ± 0.87		3.50 ± 0.84		2.50	0.01
breaded tomatoes	3.34 ± 0.85		3.59 ± 0.79		3.96	0.00
tri-tators	1.89 ± 0.99		1.83 ± 1.05		0.78	0.43
zucchini	3.29 ± 0.85		3.33 ± 0.89		0.55	0.59
tator-tots	1.56 ± 0.88		1.57 ± 0.92		0.28	0.78
asparagus	3.43 ± 0.91		3.49 ± 0.92		0.78	0.44
buttered beets	3.41 ± 0.87		3.53 ± 0.87		1.86	0.06
corn	1.78 ± 0.98		1.83 ± 1.07		0.66	0.51
mixed vegetables	3.10 ± 1.09		3.12 ± 1.11		0.25	0.81
wax beans	3.35 ± 0.91		3.40 ± 0.94		0.68	0.50
cauliflower	3.26 ± 1.01		3.28 ± 1.08		0.16	0.87
brussel sprouts	3.36 ± 0.95		3.48 ± 0.93		1.69	0.09
peas and carrots	3.28 ± 1.01		3.26 ± 1.04		0.25	0.80
succotash	3.31 ± 0.75		3.42 ± 0.86		1.79	0.07
spinach	3.41 ± 0.99		3.42 ± 0.99		0.12	0.90
stewed tomatoes	3.43 ± 0.87		3.60 ± 0.80		2.67	0.01

<sup>1</sup> Given before control period when no choices in vegetable menu items were offered. N varies from 355 to 367.

<sup>2</sup> Given 10 weeks after pre-test, after experimental period when choices in vegetable menu items were offered. N varies from 339 to 348.

<sup>3</sup> Scored as follows: 1 = like a lot, 2 = will eat, 3 = have not eaten, and 4 = don't like.

post-test. Potato products and corn were vegetables with the most positive preference scores.

Table 15 compares vegetable preferences at home and at school. Preference scores were significantly more positive for "at home" ratings with only one exception (post-test rating of succotash). Students may prefer vegetables at home more than at school because of the method of preparation. Also, family influences compared to the influence of peers may be a factor. If other students are not eating an item, this may influence a student not to eat the item either. At home parents may influence their children to eat vegetables or only well liked vegetables may be served at family meals.

Vegetables liked, disliked, and never eaten by junior high school students are shown in Table 16. Vegetables are listed in descending order according to the pre-test results. Vegetables were included in the list if either the pre-test or post-test results qualified them.

At school, 50 per cent or more of the students either liked or would eat, tator tots, french fries, mashed potatoes, corn, tri-tators, and green beans. In addition to those, carrots, green peas, and mixed vegetables were liked or eaten by 50 per cent or more of the students at home.

Items disliked by 50 per cent or more of the students at school included eighteen items, or 75 per cent of the listed vegetables. Items disliked by 50 per cent or more at home decreased to thirteen items or less than 55 per cent. Items disliked at school but not at home included broccoli, green peas, mixed vegetables, zucchini, and carrots.

Items that 10 per cent or more of the students had not eaten included thirteen items (or 54 per cent) at school and 8 items (34 per cent) at home. Items included in the school list that were not included in the home list included cauliflower, brussel sprouts, asparagus, cabbage, and lima

Table 15: Vegetable preferences at home and at school in the pre- and post-tests

vegetable	pre-test <sup>1</sup>			post-test <sup>2</sup>		
	at home mean	s.d.	at school mean	at home mean	s.d.	at school mean
vegetable	mean	s.d.	at school mean	at school s.d.	t <sup>3</sup> value	t <sup>3</sup> value
french fries	1.15 ± 0.55	1.71 ± 1.01	11.16	1.18 ± 0.58	1.70 ± 0.98	10.02
green peas	2.27 ± 1.26	2.99 ± 1.27	11.73	2.25 ± 1.23	2.94 ± 1.23	10.36
carrots	2.10 ± 1.22	2.73 ± 1.32	10.54	2.37 ± 1.26	2.97 ± 1.24	9.03
lima beans	3.01 ± 1.29	3.25 ± 1.20	5.18	3.20 ± 1.20	3.44 ± 1.08	4.10
green beans	1.83 ± 1.15	2.44 ± 1.32	10.81	1.86 ± 1.12	2.53 ± 1.30	9.98
mashed potatoes	1.21 ± 0.66	1.67 ± 1.04	9.32	1.24 ± 0.71	1.76 ± 1.04	10.02
cabbage	2.69 ± 1.32	3.03 ± 1.24	6.69	2.85 ± 1.27	3.34 ± 1.12	7.61
broccoli	2.66 ± 1.37	3.06 ± 1.30	7.68	2.66 ± 1.36	3.11 ± 1.24	7.46
harvard beets	3.00 ± 1.21	3.15 ± 1.15	3.17	3.18 ± 1.13	3.38 ± 1.05	3.76
breaded tomatoes	2.96 ± 1.22	3.14 ± 1.14	3.73	3.34 ± 1.06	3.47 ± 1.01	2.55
tri-tators	1.67 ± 1.02	1.77 ± 1.07	2.12	1.62 ± 1.00	1.76 ± 1.09	2.31
zucchini	2.74 ± 1.27	3.08 ± 1.15	6.70	2.93 ± 1.20	3.21 ± 1.07	4.58
tator tots	1.33 ± 0.84	1.44 ± 0.94	2.60	1.32 ± 0.79	1.50 ± 0.96	3.43
asparagus	2.91 ± 1.31	3.19 ± 1.24	5.21	3.04 ± 1.27	3.34 ± 1.14	4.93
buttered beets	2.99 ± 1.30	3.20 ± 1.18	3.91	3.22 ± 1.19	3.36 ± 1.15	2.52
corn	1.20 ± 0.60	1.68 ± 1.04	10.38	1.26 ± 0.70	1.73 ± 1.12	7.97
mixed vegetables	2.52 ± 1.27	2.91 ± 1.29	7.31	2.64 ± 1.26	2.97 ± 1.27	5.75
wax beans	2.91 ± 1.26	3.13 ± 1.20	4.24	3.05 ± 1.21	3.25 ± 1.16	3.57
cauliflower	2.62 ± 1.38	3.05 ± 1.26	7.61	2.77 ± 1.35	3.14 ± 1.25	6.08
brussel sprouts	2.92 ± 1.33	3.14 ± 1.23	4.25	3.09 ± 1.24	3.33 ± 1.15	4.42
peas and carrots	2.72 ± 1.31	3.05 ± 1.28	6.46	2.79 ± 1.29	3.09 ± 1.25	4.79
succotash	2.97 ± 1.19	3.07 ± 1.12	2.16	3.15 ± 1.13	3.25 ± 1.12	1.91 n.s.
spinach	2.76 ± 1.40	3.19 ± 1.27	7.59	2.86 ± 1.34	3.25 ± 1.21	6.33
stewed tomatoes	2.96 ± 1.32	3.21 ± 1.20	4.92	3.29 ± 1.11	3.46 ± 1.05	3.67

<sup>1</sup> Given before control period when no choices in vegetable menu items were offered.<sup>2</sup> Given 10 weeks after pre-test, after experimental period when choices in vegetable menu items were offered.<sup>3</sup> t test for related samples; all values significant at .05 level or beyond except for the one indicated n.s.

Table 16: Vegetables liked, disliked, and never eaten by junior high school students

50% or more "liked a lot" or "will eat"	at school		50% or more "liked a lot" or "will eat"	at home	
	pre-test %	post-test <sup>2</sup> %		pre-test %	post-test %
tator tots	89.3	88.8	corn	98.1	95.1
french fries	86.1	86.7	french fries	97.0	96.9
mashed potatoes	85.7	83.2	mashed potatoes	96.4	95.1
corn	83.8	81.8	tator tots	90.0	90.6
tri-tators	77.6	77.7	green beans	79.9	80.7
green beans	54.7	53.7	tri-tators	75.1	78.8
			carrots	72.6	63.7
			green peas	66.4	68.5
			mixed vegetables	56.4	52.3
<hr/>					
items disliked by 50% or more	%	%	items disliked by 50% or more <sup>3</sup>	%	%
lima beans	70.2	76.9	lima beans	61.4	67.1
spinach	69.6	70.8	stewed tomatoes	58.7	67.0
asparagus	66.9	71.2	brussel sprouts	57.5	61.4
stewed tomatoes	64.5	76.2	buttered beets	57.2	65.8
broccoli	63.3	63.0	asparagus	55.7	60.2
brussel sprouts	63.2	72.1	spinach	54.1	55.6
buttered beets	62.7	72.7	harvard beets	51.4	59.0
peas and carrots	62.4	62.4	wax beans	51.1	55.7
wax beans	59.0	65.9	breaded tomatoes	49.2	66.9
cauliflower	59.0	64.8	peas and carrots	48.1	50.1
green peas	59.0	54.3	cabbage	47.4	51.9

<sup>1</sup> Given before control period when no choices in vegetable menu items were offered.

<sup>2</sup> Given 10 weeks after the pre-test, after the experimental period when choices in vegetable menu items were offered.

<sup>3</sup> If at least 50% of the students indicated "dislike" on pre- or post-test, the item was included.

Table 16: (cont.)

items disliked by 50% or more	at school		items disliked by 50% or more	at home	
	pre-test %	post-test %		pre-test %	post-test %
cabbage	56.9	71.4	cauliflower	46.2	52.2
harvard beets	56.0	68.3	succotash	44.4	54.4
mixed vegetables	55.5	57.6			
breaded tomatoes	54.5	73.2			
zucchini	49.6	55.2			
carrots	49.3	56.5			
succotash	45.8	61.0			
<hr/>					
items 10% of students <sup>4</sup> have not eaten	%	%	items 10% of students have not eaten	%	%
succotash	41.6	25.5	succotash	39.3	28.5
zucchini	34.9	28.3	breaded tomatoes	25.1	16.7
breaded tomatoes	29.2	16.4	zucchini	25.0	22.0
harvard beets	26.1	17.9	harvard beets	22.0	17.7
wax beans	22.4	13.7	tri-tators	18.6	13.8
battered beets	20.2	13.8	wax beans	17.6	15.5
stewed tomatoes	19.1	11.9	battered beets	17.2	12.8
cauliflower	16.6	9.0	stewed tomatoes	11.6	10.9
brussel sprouts	15.5	10.8			
asparagus	14.8	12.8			
cabbage	14.4	10.4			
tri-tators	11.3	9.3			
lima beans	10.2	7.8			

<sup>4</sup> If at least 10% of the students indicated "have not eaten" on the pre- or post-test the item was included.



beans. All the vegetables listed as "never eaten" at school were offered during this study and there was a decrease in the percentages of students who had not eaten these vegetables from the pre-test to the post-test. This indicates that some students may be willing to try vegetables that they had not previously eaten.

The high degree of preference for potatoes agreed with the study conducted at Fresno State College where freshman men and women rated baked potatoes high among their preferred foods (25). Pilgrim (27) reported that Army men rated french fried potatoes as one of their favorite foods. Other studies (29, 31) also indicated that potatoes are a favorite food of people of all ages. Studies (25, 33) have shown that corn, carrots, peas, and beans are other preferred vegetables. This study tends to agree with these findings, particularly the "at home" ratings.

Broccoli, asparagus, and cauliflower were vegetables disliked in Pilgrim's (27) study. These three vegetables also were among the least preferred vegetables in this study. Fourth, fifth, and sixth grade students reported dislike for peas, green beans, tomatoes, celery sticks, mixed vegetables, and buttered corn in Sun's (32) study. Green beans were not included in the list of disliked vegetables either at home or at school in this study and mixed vegetables were not on the disliked list of vegetables served at home.

Vegetables selected as "liked a lot" were studied in relation to the actual selection of vegetables from the cafeteria line during the experimental period (refer to Tables 3 and 16). Corn, an item liked a lot or eaten by almost 84 per cent on the attitude survey, was consistently chosen by a large majority of students in the experimental period. Green beans, another item liked a lot or eaten by nearly 55 per cent at school, was

selected by a majority of the students in every case except when offered with corn as the other choice.

When two items that were listed as disliked by 50 per cent or more of the students were offered together, these vegetables generally were selected by approximately equal numbers of students in the experimental period. These choices included: carrots and mixed vegetables, carrots and cauliflower, and lima beans and cabbage. In most instances, the higher the percentage of students disliking a vegetable, the lower the percentage of students who actually selected that vegetable in the experimental period. An exception occurred when asparagus and zucchini were offered as a choice (on day 7). Asparagus was given a lower preference rating on the attitude survey than zucchini, but was selected by over 68 per cent during the experimental period. This perhaps can be attributed to the high percentage of students who had never eaten zucchini and probably would not have selected it because of unfamiliarity.

## SUMMARY AND CONCLUSIONS

Approximately 50 per cent of the 51 million children enrolled in school participated in school lunch in 1975. However, more children could be participating. Offering choices in menu items is one approach that has been designed to increase participation and to decrease the amount of food left uneaten on the plate by children who do participate.

The objective of this study was to study the influence of offering choices in vegetable menu items on acceptability of the school foodservice program and on the attitudes of junior high school students towards school foodservice. The junior high school which was used as the research site had a "closed campus" policy; i.e., students were not allowed to leave the campus during their lunch period. Data for this research were collected during the fall semester of 1976. Prior to collection of the data, approval was received from the district foodservice director and the junior high school principal. Others involved with the study also were oriented.

An experimental research design, composed of a control period and experimental period, was used for this study. During the control period regularly planned menus, which did not include choices in vegetable menu items, were served at the junior high school. During the experimental period the regularly planned menus were served with the addition of another vegetable menu item, allowing the students to have a choice each day. Both the control period and the experimental period covered four weeks or nineteen school days in length. The same vegetables served during the control period were served again during the corresponding week of the experimental period with the addition of another vegetable.

A student foodservice attitude study, also administered as part of the study, consisted of a pre-test and a post-test. The attitude survey was given at the beginning of the control period and again after the experimental period to study the influence of offering choices in vegetable menu items on attitudes of students towards school foodservice.

School enrollment, attendance, and participation in the school foodservice program was determined for the control and experimental periods. Absences were slightly higher during the experimental period causing a slight decrease in attendance, although attendance was essentially the same for both periods. Student enrollment remained constant with 1,264 students. Student participation in the Type A school lunch did not change significantly between the control and experimental periods. Consistently, the student participation was approximately 80 per cent which probably was attributable to the closed noon hour policy. Faculty participation increased significantly during the experimental period which may have a positive influence on student acceptance of the school foodservice program.

Since all students and faculty selecting the Type A lunch were served the same vegetables during the control period, the number of persons participating in the program represented the number served the vegetable. During the experimental period cumulative values of the number choosing each vegetable were recorded. The percentage choosing a particular vegetable during the experimental period when choices were offered apparently was dependent on the popularity of the other choice.

Amount of vegetables left uneaten was measured during both control and experimental periods. Total ounces of vegetables left uneaten decreased during the experimental period; ounces per person per meal also decreased. Although there was not a significant decrease in amount of vegetables left

uneaten, there was a trend towards fewer ounces of vegetable plate waste during the experimental period which may have been more evident if the study had continued for a longer period than the 19 days comprising each phase of this study.

Vegetables that resulted in the least amount left uneaten included corn, green beans, green peas, succotash, asparagus, relishes, and broccoli. Vegetables with the most ounces of plate waste included coleslaw, harvard beets, peas and carrots, cauliflower, spinach, breaded tomatoes, brussel sprouts, and stewed tomatoes. Corn was consistently the vegetable with the least amount left uneaten per person per meal. The standard portion of vegetables at the junior high school was approximately one-third cup, with the exceptions of relishes, asparagus, and broccoli. The portion size was slightly less than one-third cup. Consumption of vegetables was greater when choices were offered; participants were allowed independence in selection and were able to choose the vegetable that they liked.

On the attitude survey students were asked to indicate their usual lunch habits during the week. The majority of the students ate the Type A school lunch five times a week. Frequent participants indicated they ate the school lunch because their friends did also. Although not a response on the instrument, the closed noon hour probably was a predominant reason for eating at school for a large number of the students. The next highest response indicated that the students liked the food.

Mean attitude scores on the attitude survey were analyzed in relation to student classification. Seventh grade students' scores were significantly higher on the pre-test for all three scores (food, nonfood, and overall attitude). Possibly, because seventh grade students were new to the junior high school they had not developed cynicism towards the school

foodservice system. Also, the program no doubt differed greatly from the program in elementary school and was somewhat novel to them initially.

Frequency of participation in the school lunch program also was analyzed in relation to attitude scores. For both the pre- and post-tests there were significant differences in the scores of the infrequent and frequent participants. Students who had a negative attitude towards the school foodservice were more likely to participate infrequently in the Type A lunch program.

A list of twenty-four vegetables was used to study vegetable preferences of the students at home and at school. Preference scores were significantly more positive for "at home" ratings with only one exception (post-test rating of succotash). Students may prefer vegetables at home more than school because of the method of preparation or the influence of family compared to the influence of peers.

At school, 50 per cent or more of the students either liked or would eat tator tots, french fries, mashed potatoes, corn, tri-tators, and green beans. In addition to those carrots, green peas, and mixed vegetables were liked or eaten by 50 per cent or more of the students at home. Items disliked by 50 per cent or more of the students at school included 75 per cent of the listed vegetables; whereas only 55 per cent of the vegetables were disliked by 50 per cent or more in the "at home" ratings. All the vegetables in the attitude survey listed as "never eaten" at school were offered during this study and there was a decrease in the percentages of students who had not eaten these vegetables from the pre-test to the post-test. This indicates that some students may be willing to try vegetables that they had not previously eaten.

Offering choices in vegetable menu items to junior high school students decreased the amount of vegetables left uneaten, though not significantly. Further research in offering choices in menu items would give additional evidence in determining the influence of offering choices. Longer studies may provide more evidence to support offering choices. Also, in future studies, it may be beneficial to control the menus so that the entire menu of the control period would be served exactly the same for the experimental period with the addition of the choice. Other menu items offered with the vegetable menu items may influence students' selections.

The vegetable preference questions of the attitude survey revealed that potato products and corn were the favorite vegetables of the junior high students. Since many girls of this age are concerned about their appearance, and particularly their weight, they will often decrease consumption of items such as potatoes and corn. It would be interesting to analyze the vegetable ratings in relation to sex to see if there was a difference in boys' and girls' preferences.

One item on the attitude survey concerned breakfast habits of the students. The responses indicated that nearly 20 per cent of the junior high school students never ate breakfast. Other researchers may wish to study the relationship between lunch habits and eating or not eating breakfast.

It was evident from this study that vegetables are not a popular item and that very few vegetables are liked by students, especially at school. These data suggest that methods of vegetable preparation should be given particular attention in the school foodservice operation. Since vegetables are important sources of many vitamins and minerals in the diet, nutrition education should emphasize vegetable consumption. Starting with the

elementary grades, before children have developed strong food habits, probably would provide the best results.



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## APPENDIXES

APPENDIX A  
School Lunch Menus  
Control Period

School Lunch Menus<sup>1</sup>  
Manhattan Junior High School

- |   |  |
|---|--|
| <p>1. Ham and Cheese on<br/>Homemade Bun with<br/>Lettuce, Tomato and Dressing<br/>Mixed Vegetables<br/>Chocolate Ice Cream Cup</p> <p>2. Italian Pizza with<br/>Mozzarella Cheese<br/>Coleslaw<br/>Frozen Mixed Fruit<br/>Cinnamon Puff</p> <p>3. Mile High Roast Beef on<br/>Sesame Bun with Catsup<br/>Buttered Spinach<br/>Shredded Lettuce Salad<br/>Crazy Quilt Fruit Cobbler</p> <p>4. Chicken and Home Style<br/>Noodles<br/>Buttered Broccoli Spears<br/>Tossed Green Salad<br/>Buttered Caramel Roll</p> <p>5. Sloppy Joe on Homemade Bun<br/>Tater Tots with Catsup<br/>Vegetable Relish Plate<br/>(Dill Pickles, Carrot Sticks)<br/>Apple Cobbler</p> <p>6. Wieners on Homemade Bun<br/>with Catsup and Mustard<br/>Potato Puffs<br/>Green Peas<br/>Watermelon Wedge</p> <p>7. Batter Fish and Chips<br/>with Catsup<br/>Red and White Coleslaw<br/>Buttered Whole Kernel Corn<br/>Buttered Wholewheat Roll</p> | <p>8. Hamburger on Homemade Bun<br/>with Catsup and Mustard<br/>Golden Brown French Fries<br/>Crisp Garden Relishes<br/>(Tomato Slice and Dill Pickles)<br/>Fresh Fruit</p> <p>9. Crispy Fried Chicken<br/>Whipped Potatoes<br/>Buttered Carrot Coins<br/>Fresh Fruit Cup<br/>Buttered Cornmeal Roll</p> <p>10. Beef Taco Pie<br/>Shredded Lettuce<br/>Tomato and Cheese<br/>Buttered Asparagus<br/>Cinnamon Bun</p> <p>11. Smoked Turkey on<br/>Homemade Bun with<br/>Lettuce and Salad Dressing<br/>Broccoli with Cheese Sauce<br/>Mixed Fruit Cup</p> <p>12. Spaghetti and Meat Sauce<br/>Buttered Green Beans<br/>Combination Salad with Dressing<br/>Hot Italian Bread - Butter<br/>Italian Blue Plums</p> <p>13. Po' Boy Sandwich with<br/>Lettuce, Tomato and Dressing<br/>Harvard Beets<br/>Potato Chips<br/>Fresh Fruit</p> <p>14. Breaded Beef Cutlet<br/>Buttered Peas and Carrots<br/>Tossed Salad with Dressing<br/>Buttered Whole Wheat Roll<br/>Pineapple Upsidedown Cake</p> |
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<sup>1</sup> Served between September 13, 1976 and October 8, 1976.  
Milk was served with all menus to complete Type A requirements.



School Lunch Menus  
Manhattan Junior High School

15. Reuben Hot Dog on  
Homemade Bun with Catsup  
Buttered Mixed Vegetables  
Fresh Apple Wedges
16. Glazed Baked Ham Patty  
Cauliflower with Cheese Sauce  
Chopped Lettuce and  
Spinach Salad  
Buttered Peanutbutter Twist
17. Mexican Burritoos with  
Meat Sauce  
Buttered Whole Kernel Corn  
Relish Tray  
Cherry Cobbler  
Buttered Hot Roll
18. Fish Square on Homemade Bun  
with Catsup  
Hash Browns  
Buttered Lima Beans  
Orange Gelatin Mold
19. Italian Pizza with  
Mozzarella Cheese  
Buttered Brussels Sprouts  
Iced Mixed Fruit  
Cinnamon Puffs

APPENDIX B  
School Lunch Menus  
Experimental Period

School Lunch Menus<sup>1</sup>  
Manhattan Junior High School

- |  |  |
|--|--|
| <p>1. Fish Square on Homemade Bun<br/>with Catsup<br/>Tator Tots<br/>Buttered Carrot Coins or<br/>Mixed Vegetables<br/>Fresh Apple Wedges</p> <p>2. Roast Beef<br/>Buttered Whole Kernel Corn or<br/>Creamy Coleslaw<br/>Fresh Fruit Cup<br/>Buttered Whole Wheat Roll</p> <p>3. Ham and Cheese on Homemade<br/>Bun with Lettuce, Catsup<br/>and Mustard<br/>Buttered Spinach or<br/>Stewed Tomatoes<br/>Chilled Sliced Peaches</p> <p>4. Turkey and Noodles<br/>Buttered Broccoli or<br/>Buttered Green Beans<br/>Strawberry and Banana Gelatin<br/>Buttered Rye Roll</p> <p>5. Italian Pizza<br/>with Mozzarella Cheese<br/>Buttered Peas and Carrots or<br/>Crisp Garden Relishes<br/>(Carrot Sticks and Dill Pickles)<br/>Buttered Cinnamon Puff</p> <p>6. Ranchburger on Homemade Bun<br/>with Catsup and Mustard<br/>Golden Brown French Fries<br/>Relish Plate (Tomato Slices and<br/>Dill Pickles) or<br/>Sauerkraut<br/>Chilled Fruit Cup or<br/>Orange Juice</p> | <p>7. Shrimp Shapes with<br/>Shrimp Sauce or<br/>Macaroni and Cheese<br/>Buttered Asparagus or<br/>Zucchini Squash<br/>Rice Krispie Square<br/>Buttered Cornmeal Roll</p> <p>8. Po'Boy Sandwich with<br/>Lettuce and Dressing<br/>Green Peas or<br/>Buttered Lima Beans<br/>Fresh Garden Relishes<br/>Strawberry Fruit Cup</p> <p>9. Bicentennial Menu:<br/>Immigrants Special<br/>Mexican Taco Pie<br/>German Carrots or<br/>Swiss Spinach<br/>Greek Ambrosia<br/>Italian Garlic Breac</p> <p>10. Wieners on Homemade Bun<br/>with Catsup<br/>Buttered Whole Kernel Corn or<br/>Mixed Vegetables<br/>Lettuce and Spinach Salad<br/>with Dressing<br/>Fresh Fruit</p> <p>11. Oven Fried Steak Fingers<br/>Broccoli with Cheese Sauce or<br/>Succotash<br/>Fresh Relish Plate<br/>Blushed Applesauce<br/>Butter Twist Rolls</p> <p>12. Hot Turkey Sandwich with<br/>Whipped Potatoes<br/>Buttered Wax Beans or<br/>Harvard Beets<br/>Fresh Fruit Relishes</p> |
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<sup>1</sup> Served between October 25, 1976 and November 19, 1976.  
Milk was served with all menus to complete Type A requirements.

School Lunch Menus  
Manhattan Junior High School

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|--|---|
| 13. Baked Lasagne<br>Buttered Green Beans or<br>Coleslaw<br>Chilled Sliced Peaches<br>Buttered Cinnamon Roll   | 17. Mile High Roast Beef<br>on Homemade Bun with Catsup<br>Cauliflower with Cheese Sauce or<br>Buttered Carrots<br>Lettuce and Dill Pickles<br>Blushed Applesauce |
| 14. Glazed Ham Patty<br>Potato Rounds<br>Buttered Peas and Carrots or<br>Breaded Tomatoes<br>Apple Cobbler<br>Buttered Whole Wheat Roll  | 18. Italian Pizza with<br>Mozzarella Cheese<br>Buttered Lima Beans or<br>Cabbage Au Gratin<br>Crisp Garden Relishes<br>Cinnamon Puff or Crisp                     |
| 15. Fish Square on Homemade Bun<br>Crisp Tator Tots - Catsup<br>Buttered Peas or<br>Buttered Mixed Vegetables<br>Peanutbutter Brownie  | 19. Po'Boy Sandwich<br>with Lettuce, Tomato<br>and Dressing<br>Buttered Brussels Sprouts or<br>Mixed Vegetables<br>Chilled Peach Slices                           |
| 16. Wieners and Sauerkraut<br>Buttered Green Beans or<br>Whole Kernel Corn<br>Carrot Sticks and Cherry Tomato<br>Mixed Fruit Cup with Fresh Apple<br>Cornbread Square - Butter |   |

APPENDIX C

Participation and Amount of Food Left Uneaten

## PARTICIPATION AND AMOUNT OF FOOD LEFT UNEATEN

DATE \_\_\_\_\_

ENROLLMENT TODAY \_\_\_\_\_

NUMBER ABSENT \_\_\_\_\_

NUMBER PARTICIPATING \_\_\_\_\_

ATTENDANCE TODAY \_\_\_\_\_

% PARTICIPATION \_\_\_\_\_

[illegible]

1.

TOTAL POUNDS \_\_\_\_\_

2. \_\_\_\_\_

TOTAL POUNDS \_\_\_\_\_

NUMBER CHOOSING VEGETABLE 1. \_\_\_\_\_

NUMBER CHOOSING VEGETABLE 2. \_\_\_\_\_

APPENDIX D  
Instrument for Pilot Study

Department of Institutional Management  
Justin Hall  
Manhattan, Kansas 66506  
Phone: 913 532-5521

### ATTITUDES OF JUNIOR HIGH SCHOOL STUDENTS TOWARDS SCHOOL LUNCH

Below is a questionnaire concerning the attitudes of junior high school students towards school lunch. All information provided will be anonymous and will be kept fully confidential. Code numbers are used for analysis and electronic data processing purposes only. You will not be identified with your answers individually. Please follow the directions carefully and answer each question. Thank you.

Please check the response that applies to you.

1. Student Classification
    - ☐ (1) 7th grade
    - ☐ (2) 8th grade
    - ☐ (3) 9th grade
  2. Sex
    - ☐ (1) Female
    - ☐ (2) Male
  3. In what size community did you spend most of your life?
    - ☐ (1) Big city (over 150,000)  
for example, Kansas City
    - ☐ (2) Medium city  
(25,000-150,000)  
for example, Manhattan
    - ☐ (3) Small city  
(2,500-25,000)  
for example, Concordia
    - ☐ (4) Rural community (less than 2,500)
  4. In what section of the country have you lived most of your life?
    - ☐ (1) West
    - ☐ (2) Southwest
    - ☐ (3) Midwest
    - ☐ (4) Northeast
    - ☐ (5) Southeast
    - ☐ (6) Outside U.S.A., please specify \_\_\_\_\_
  5. In how many different cities, towns, or communities have you lived?
    - ☐ (1) 1
    - ☐ (2) 2-3
    - ☐ (3) 4-6
    - ☐ (4) more than 6
  6. Number of semesters in Manhattan Junior High School including this semester
    - ☐ (1) 1-2 semesters
    - ☐ (2) 3-4 semesters
    - ☐ (3) more than 4 semesters
- Below is a list of things you may do about lunch. In the blank before each statement put the number of times in the past week you did what the statement describes. Answers may be chosen from 0, 1, 2, 3, 4, or 5.
7. ☐ I ate the school lunch
  8. ☐ I bought some extra food or drink to add to my school lunch
  9. ☐ I ate two school lunches in one lunch period
  10. ☐ I ate a lunch brought from home



11. ☐ I brought some food or drink to add to my sack lunch from home
12. ☐ I did not eat any lunch
13. If you eat the Type A school lunch more than 3 times a week, check as many of the following as you feel are correct for you.
- ☐ (1) I usually like the food that is served
- ☐ (2) My friends eat the school lunch also
- ☐ (3) My parents want me to eat the school lunch
- ☐ (4) The price of the school lunch is low
14. If you rarely or never eat the Type A school lunch, check as many of the following as you feel are correct for you.
- ☐ (1) I don't like the food that is served at the school
- ☐ (2) My friends and I bring sack lunches
- ☐ (3) It's cheaper to bring a sack lunch
- ☐ (4) I'm allergic to some foods
- ☐ (5) I'm a vegetarian, and do not eat the main dishes that contain meat
- Please rate your school lunch program by checking the one answer to each question that best describes your feelings.
15. The school lunch room is noisy.
- ☐ (1) most of the time
- ☐ (2) some of the time
- ☐ (3) the noise doesn't bother me
16. The lunch room is clean.
- ☐ (1) most of the time
- ☐ (2) I don't really notice
- ☐ (3) some of the time
17. The size of the servings is about right.
- ☐ (1) most of the time
- ☐ (2) some of the time
- ☐ (3) the servings are too large
- ☐ (4) I don't get enough to eat
18. The food in the school lunch program is:
- ☐ (1) usually the right temperature
- ☐ (2) hot food is not really hot
- ☐ (3) cold food is not well chilled
19. The cooks in the school lunch program are:
- ☐ (1) usually friendly
- ☐ (2) friendly sometimes
- ☐ (3) often crabby
20. The lunch room is cheerful.
- ☐ (1) yes, very cheerful
- ☐ (2) okay, so-so
- ☐ (3) not really very cheerful
21. The food in the school lunch program is:
- ☐ (1) almost always good
- ☐ (2) good only some of the time
- ☐ (3) usually not very good
22. The price of the school lunch is:
- ☐ (1) too high
- ☐ (2) about right
- ☐ (3) too low
23. The cashiers in the school lunch program are:
- ☐ (1) usually friendly
- ☐ (2) friendly sometimes
- ☐ (3) often crabby

24. I like the meat dishes:  
     \_\_\_(1) most of the time  
     \_\_\_(2) some of the time  
     \_\_\_(3) not very often

25. I like the vegetables:  
     \_\_\_(1) most of the time  
     \_\_\_(2) some of the time  
     \_\_\_(3) not very often

26. I like the desserts:  
     \_\_\_(1) most of the time  
     \_\_\_(2) some of the time  
     \_\_\_(3) not very often

27. We are rushed during lunch time:  
     \_\_\_(1) most of the time  
     \_\_\_(2) some of the time  
     \_\_\_(3) not usually

28. When I eat the school lunch  
     \_\_\_(1) I usually eat most of my food  
     \_\_\_(2) I usually eat about half of my food  
     \_\_\_(3) I usually leave a lot of my food

29. I eat breakfast:  
     \_\_\_(1) most of the time  
     \_\_\_(2) some of the time  
     \_\_\_(3) hardly ever

Please mark each of the following vegetables according to this scale:

Like	Will Eat	Dis- like	Have Never Eaten
<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>

Examples:

30. 2 French Fries

31. 1 Peas

30. \_\_\_ French Fries

31. \_\_\_ Peas

32. \_\_\_ Carrots

33. \_\_\_ Lima Beans

34. \_\_\_ Green Beans

35. \_\_\_ Mashed Potatoes

36. \_\_\_ Cabbage

37. \_\_\_ Broccoli

38. \_\_\_ Harvard Beets

39. \_\_\_ Breaded Tomatoes

40. \_\_\_ Tri-tators

41. \_\_\_ Zucchini

42. \_\_\_ Tator-tots

43. \_\_\_ Asparagus

44. \_\_\_ Buttered Beets

45. \_\_\_ Corn

46. \_\_\_ Mixed Vegetables

47. \_\_\_ Wax Beans

48. \_\_\_ Cauliflower

49. \_\_\_ Brussel Sprouts

50. \_\_\_ Peas and Carrots

51. \_\_\_ Succotash

52. \_\_\_ Spinach

53. \_\_\_ Stewed Tomatoes

APPENDIX E  
Attitude Study Final Instrument

## SCHOOL LUNCH STUDY

Department of Institutional Management  
Justin Hall  
Manhattan, Kansas 66506  
Phone: 913 532-5521

This is a questionnaire concerning your attitudes towards school lunch. All information provided will be anonymous and will be kept fully confidential. Code numbers are used for analysis and electronic data processing purposes only. You will not be identified with your answers individually. Please follow the directions carefully and answer each question frankly and honestly. Thank you.

Karen Gutsch, Graduate Student  
Kansas State University

PLEASE CHECK THE RESPONSE THAT APPLIES TO YOU.

1. Student Classification
    - ☐ (1) 7th grade
    - ☐ (2) 8th grade
    - ☐ (3) 9th grade
  2. Sex
    - ☐ (1) Female
    - ☐ (2) Male
  3. In what size community have you spent most of your life? (Check one.)
    - ☐ (1) Big city (over 150,000) for example, Kansas City
    - ☐ (2) Medium city (25,000-150,000) for example, Manhattan
    - ☐ (3) Small city (2,500-25,000) for example, Concordia
    - ☐ (4) Rural community (less than 2,500)
  4. In what section of the United States have you lived most of your life? (Check one.)
    - ☐ (1) West
    - ☐ (2) Southwest
    - ☐ (3) Midwest
    - ☐ (4) Northeast
    - ☐ (5) Southeast
    - ☐ (6) Outside U.S.A., please specify \_\_\_\_\_
  5. In how many different cities or towns, including Manhattan, have you lived?
    - ☐ (1) 1
    - ☐ (2) 2-3
    - ☐ (3) 4-6
    - ☐ (4) more than 6
  6. How long have you attended school at Manhattan Junior High?
    - ☐ (1) This is my first year
    - ☐ (2) This is my second year
    - ☐ (3) This is my third year or longer
- BELOW IS A LIST OF THINGS YOU MAY DO ABOUT LUNCH. IN THE BLANK BEFORE EACH STATEMENT PUT THE NUMBER OF TIMES IN THE USUAL 5 DAY SCHOOL WEEK YOU DO WHAT THE STATEMENT DESCRIBES. ANSWERS MAY BE CHOSEN FROM 0, 1, 2, 3, 4, or 5.
7. ☐ I eat the school lunch
  8. ☐ I buy some extra food or drink to add to my school lunch
  9. ☐ I eat two school lunches in one lunch period
  10. ☐ I eat lunch brought from home
  11. ☐ I buy some food or drink to add to my sack lunch from home
  12. ☐ I do not eat any lunch
  13. If you usually eat the Type A school 3 times or more a week, check as many of the following as you feel are correct for you.
    - ☐ (1) I usually like the food that is served
    - ☐ (2) My friends eat the school lunch also
    - ☐ (3) My parents want me to eat the school lunch
    - ☐ (4) The price of the school lunch is low

14. If you usually eat the Type A school lunch only 2 times or less each week, check as many of the following as you feel are correct for you.

☐ (1) I don't like the food that is served at the school  
☐ (2) I prefer a sack lunch  
☐ (3) My friends bring sack lunches  
☐ (4) It's cheaper to bring a sack lunch  
☐ (5) I'm allergic to some foods  
☐ (6) I'm a vegetarian, and do not eat the main dishes that contain meat

PLEASE RATE YOUR SCHOOL LUNCH PROGRAM BY CHECKING THE ONE ANSWER TO EACH QUESTION THAT BEST DESCRIBES YOUR FEELINGS.

15. The school lunch room is noisy.

☐ (1) most of the time  
☐ (2) some of the time  
☐ (3) the noise doesn't bother me

16. The lunch room is clean.

☐ (1) most of the time  
☐ (2) I don't really notice  
☐ (3) some of the time

17. The size of the servings is about right.

☐ (1) most of the time  
☐ (2) some of the time  
☐ (3) the servings are too large  
☐ (4) I don't get enough to eat

18. The hot foods (meats, vegetables, etc.) served in the school lunch are:

☐ (1) usually hot enough  
☐ (2) sometimes hot, sometimes not  
☐ (3) often cold

19. The cold foods (salads, canned fruits, etc.) served on the school lunch are:

☐ (1) often lukewarm  
☐ (2) sometimes chilled, sometimes not  
☐ (3) usually well chilled

20. The cooks in the school lunch program are:

☐ (1) usually friendly  
☐ (2) friendly sometimes  
☐ (3) often crabby

21. The lunch room is cheerful.

☐ (1) yes, very cheerful  
☐ (2) okay, so-so  
☐ (3) not really very cheerful

22. The food in the school lunch program is:

☐ (1) almost always good  
☐ (2) good only some of the time  
☐ (3) usually not very good

23. The price of the school lunch is:

☐ (1) too high  
☐ (2) about right  
☐ (3) too low

24. The cashiers in the school lunch program are:

☐ (1) usually friendly  
☐ (2) friendly sometimes  
☐ (3) often crabby

25. I like the meat dishes:

☐ (1) most of the time  
☐ (2) some of the time  
☐ (3) not very often

26. I like the vegetables:

☐ (1) most of the time  
☐ (2) some of the time  
☐ (3) not very often

27. I like the desserts:

☐ (1) most of the time  
☐ (2) some of the time  
☐ (3) not very often

28. We are rushed during lunch time:

☐ (1) most of the time  
☐ (2) some of the time  
☐ (3) not usually

29. When I eat the school lunch

☐ (1) I usually eat most of my food  
☐ (2) I usually eat about half of my food  
☐ (3) I usually leave a lot of my food

30. On school days, I eat breakfast (either at home or at school):

☐ (1) every day  
☐ (2) 3 or 4 times a week  
☐ (3) 1 or 2 times a week  
☐ (4) hardly ever

WE WANT TO KNOW HOW WELL YOU LIKE VARIOUS VEGETABLES. ALSO, IS THERE A DIFFERENCE IN HOW YOU LIKE THESE VEGETABLES WHEN THEY ARE SERVED AT SCHOOL OR AT HOME? PLEASE MARK EACH OF THE VEGETABLES LISTED IN THE FOLLOWING MANNER. CIRCLE 1, 2, 3, OR 4 TO INDICATE YOUR LIKE OR DISLIKE OF THESE VEGETABLES WHEN SERVED AT HOME AND WHEN SERVED AT SCHOOL.

**EXAMPLE:**

CIRCLE 1, 2, 3, OR 4  
WHEN SERVED AT HOME

LIKE A LOT	WILL EAT	HAVE NOT EATEN	DON'T LIKE
1	2	3	4

(1) 2 3 4

1 (2) 3 4

French Fries

Green Peas

CIRCLE 1, 2, 3, OR 4  
WHEN SERVED AT SCHOOL

LIKE A LOT	WILL EAT	HAVE NOT EATEN	DON'T LIKE
1	2	3	4

1 2 3 4

1 2 3 (4)

**EXPLANATION:** 1 means you like French fries a lot whether served at home or school. For green peas, 2 means you will eat peas at home, but they aren't your favorite; 4 means you don't like the peas served at school.

CIRCLE 1, 2, 3, OR 4  
WHEN SERVED AT HOME

LIKE A LOT	WILL EAT	HAVE NOT EATEN	DON'T LIKE
1	2	3	4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

French Fries

Green Peas

Carrots

Lima Beans

Green Beans

Mashed Potatoes

Cabbage

Broccoli

Harvard Beets

Breaded Tomatoes

Tri-tators

Zucchini

Tator-tots

Asparagus

Buttered Beets

Corn

Mixed Vegetables

Wax Beans

Cauliflower

Brussel Sprouts

Peas and Carrots

Succotash

Spinach

Stewed Tomatoes

CIRCLE 1, 2, 3, OR 4  
WHEN SERVED AT SCHOOL

LIKE A LOT	WILL EAT	HAVE NOT EATEN	DON'T LIKE
1	2	3	4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

1 2 3 4

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1 2 3 4

1 2 3 4

APPENDIX F

Introduction Letter to Teachers

Pre-test

Department of Institutional Management  
Justin Hall  
Manhattan, Kansas 66506  
Phone: 913 532-5521

September 9, 1976

TO:

FROM: Karen M. Gutsch  
Graduate Research Assistant

Allene G. Vaden, Ph.D., R.D.  
Assistant Professor of  
Institutional Management

SUBJECT: Foodservice Questionnaire

The Department of Institutional Management at Kansas State University is studying the attitudes of junior high school students towards the food-service. Mrs. Greig, School Foodservice Director, and Mr. Marsh have approved the study and Mr. Marsh has agreed that students may be asked to participate. We're selecting an approximate thirty per cent sample of the junior high students, stratified by grade level. We have randomly selected fifteen classrooms to participate in the study, five at each grade level. We hope you will be willing to assist us by distributing the questionnaires to your classes that were selected to be part of the sample. Classes selected for the sample are from the seventh and eighth grade English classes and ninth grade Social Studies classes since all students are enrolled in one of these. Two of your classes were selected for the study, including your second-third and your sixth-seventh hours. I will meet with you in the near future to arrange a time for distribution. Would you please distribute these questionnaires during those periods on the date we arrange? Please return the questionnaires to the principal's office in the envelope provided on the same day they are completed by the students.

Notices explaining the study to the parents will be provided and should be distributed two days before the questionnaire is given. Although we would like all students to participate, they are not obligated to do so and should leave the questionnaire blank if they do not wish to participate. Please encourage the students to give frank, but serious responses and assure them they will not be identified individually. A post-test consisting of the same questionnaire will be given to the same classes in November.

Thank you for your help!



APPENDIX G  
Introduction Letter to Teachers  
Post-test

Department of Institutional Management  
Justin Hall  
Manhattan, Kansas 66506  
Phone: 913 532-5521

November 10, 1976

TO: Teachers of classes participating in school foodservice study

FROM: Karen M. Gutsch, R.D.                      Allene G. Vaden, Ph.D., R.D.  
Graduate Research Assistant              Assistant Professor of  
Institutional Management

SUBJECT: Post-test

As you know, the Department of Institutional Management at Kansas State University is studying the attitudes of junior high school students towards the foodservice. In September you participated in the pre-test questionnaire. We are now planning a post-test consisting of the same questionnaire to be given on Friday, November 19. We hope you will be willing to assist us again by distributing the questionnaires to the same classes as in the pre-test. I will bring your questionnaires and the instructions to be read to the students before November 19.

Attached is a note to remind you of which classes were randomly selected to participate. Thanks for your help!

APPENDIX H  
Notice to Parents

Department of Institutional Management  
Justin Hall  
Manhattan, Kansas 66506  
Phone: 913 532-5521

September 16, 1976

Dear Parents:

The Department of Institutional Management at Kansas State University is working on a research project which involves studying the attitudes of junior high school students towards the school foodservice.

Your child is enrolled in one of the classes that was randomly selected for the study. A questionnaire concerning the foodservice and the school lunch will be given during the week of September 20. The questions are of a non-sensitive nature--students' ratings of the food, service, selections provided, etc. Also we're asking them about their preferences for vegetables. All information provided will be anonymous and will be kept fully confidential. The students will not be identified with their answers individually. We will appreciate your child's help in this study. However, students are not obligated to participate. Thank you for your cooperation.

Sincerely,

Research Team:

Karen M. Gutsch  
Allene G. Vaden, Ph.D., R.D.  
Assistant Professor of  
Institutional Management

Karen M. Gutsch  
Graduate Research Assistant  
Department of Institutional  
Management

## APPENDIX I

### Students' Instructions for Attitude Study

Department of Institutional Management  
Justin Hall  
Manhattan, Kansas 66506  
Phone: 913 532-5521

TO: Teachers of Participating Classes

FROM: Karen M. Gutsch  
Graduate Research Assistant

Allene G. Vaden, Ph.D., R.D.  
Assistant Professor of  
Institutional Management

SUBJECT: Introduction of Study

Please read the following explanation in introducing the study to the students. It is important that all students receive the same basic information.

"The Department of Institutional Management at Kansas State University is studying the attitudes of junior high school students towards the school foodservice. Mrs. Greig, School Foodservice Director, and Mr. Marsh have approved the study. The researchers hope you will be willing to help them by filling out this questionnaire, which was described in the notice you took home to your parents on Wednesday. They would like for all students to participate, but if you do not wish to do so, you should turn your questionnaire in blank. Please give frank, honest, and sincere answers to all questions. You will not be identified individually with the questionnaires. They will be studied in a group only. The Department of Institutional Management appreciates your help. When you have completed the questionnaire, please turn it over. When everyone has finished, all questionnaires will be collected."

Please place completed questionnaires in the envelope provided which is marked for this class. Thank you!

APPENDIX J  
Scoring of Attitude Instrument

## Scoring of Attitude Instrument

<u>Item Score</u>		<u>Item Score</u>	
	15. The school lunch room is noisy.		22. The food in the school lunch program is:
1	_____ most of the time	3	_____ almost always good
2	_____ some of the time	2	_____ good only some of the time
3	_____ the noise doesn't bother me	1	_____ usually not very good
	16. The lunch room is clean.		23. The price of the school lunch is:
3	_____ most of the time	1	_____ too high
2	_____ I don't really notice	2	_____ about right
1	_____ some of the time		_____ too low
	17. The size of the servings is about right.		24. The cashiers in the school lunch program are:
3	_____ most of the time	3	_____ usually friendly
2	_____ some of the time	2	_____ friendly sometimes
	_____ the servings are too large	1	_____ often crabby
1	_____ I don't get enough to eat		25. I like the meat dishes:
	18. The hot foods (meats, vegetables, etc.) served in the school lunch are:	3	_____ most of the time
3	_____ usually hot enough	2	_____ some of the time
2	_____ sometimes hot, sometimes not	1	_____ not very often
1	_____ often cold		26. I like the vegetables:
	19. The cold foods (salads, canned fruits, etc.) served in the school lunch are:	3	_____ most of the time
1	_____ often lukewarm	2	_____ some of the time
2	_____ sometimes chilled, sometimes not	1	_____ not very often
3	_____ usually well chilled		27. I like the desserts:
	20. The cooks in the school lunch program are:	3	_____ most of the time
3	_____ usually friendly	2	_____ some of the time
2	_____ friendly sometimes	1	_____ not very often
1	_____ often crabby		28. We are rushed during lunch time:
	21. The lunch room is cheerful	1	_____ most of the time
3	_____ yes, very cheerful	2	_____ some of the time
2	_____ okay, so-so	3	_____ not usually
1	_____ not really very cheerful		29. When I eat the school lunch
		3	_____ I usually eat most of my food
		2	_____ I usually eat about half of my food
		1	_____ I usually leave a lot of my food



## Computation of Scores

### Overall Score

The overall score is the sum of scores for items 15 - 29  
(Maximum score = 44).

### Food Score

The food score is the sum of scores for items 17 - 19, 22, 25 - 27, 29  
(Maximum score = 24).

### Nonfood Score

The nonfood score is the sum of items 15, 16, 20, 21, 23, 24, 28  
(Maximum score = 20).

APPENDIX K  
Supplemental Tables  
Tables 17-19

Table 17: Percentage responses to nonfood-related attitude items

item	pre-test <sup>1</sup>		post-test <sup>2</sup>		$\chi^2$
	N <sup>3</sup>	%	N	%	
15. The school lunch room is noisy.	379		348		
- most of the time		20.6		26.7	
- some of the time		9.8		8.4	
- the noise doesn't bother me		69.6		64.9	3.92
16. The lunch room is clean.	382		353		
- most of the time		37.7		34.0	
- I don't really notice		40.8		37.1	
- some of the time		21.5		28.9	5.40
20. The cooks in the school lunch program are:	371		349		
- usually friendly		50.9		47.3	
- friendly sometimes		33.7		29.2	
- often crabby		15.4		23.5	7.79*
21. The lunch room is cheerful.	381		352		
- yes, very cheerful		18.9		17.9	
- okay, so-so		68.8		70.2	
- not really very cheerful		12.3		11.9	0.18
23. The price of the school lunch is:	374		348		
- too high		42.5		47.2	
- about right		56.7		51.4	
- too low		0.8		1.4	2.43

<sup>1</sup> Given before control period when no choices in vegetable menu items were offered.

<sup>2</sup> Given 10 weeks after pre-test, after experimental period when choices in vegetable menu items were offered.

<sup>3</sup> N varies because of nonresponses on some items.

\*  $P \leq .05$

Table 17: (cont.)

item	pre-test		post-test		$\chi^2$
	N	%	N	%	
24. The cashiers in the school lunch program are:	376		349		
- usually friendly		53.5		53.9	
- friendly sometimes		32.4		26.1	
- often crabby		14.1		20.0	6.30*
28. We are rushed during lunch time:	378		351		
- most of the time		37.0		37.4	
- some of the time		30.7		23.6	
- not usually		32.3		39.0	5.65

Table 18: Percentage responses to food-related attitude items

item	pre-test <sup>1</sup>		post-test <sup>2</sup>		$\chi^2$
	N <sup>3</sup>	%	N	%	
17. The size of the servings is about right.	376		346		
- most of the time		27.9		22.5	
- some of the time		33.2		27.5	
- the servings are too large		1.1		0.3	
- I don't get enough to eat		37.8		49.7	11.51**
18. The hot foods (meats, vegetables, etc.) served in the school lunch are:	373		341		
- usually hot enough		25.7		19.9	
- sometimes hot, sometimes not		53.4		54.8	
- often cold		20.9		25.3	4.12
19. The cold foods (salads, canned fruits, etc.) served in the school lunch are:	375		339		
- often lukewarm		10.4		10.0	
- sometimes chilled, sometimes not		54.1		46.0	
- usually well chilled		35.5		44.0	5.60
22. The food in the school lunch program is:	372		346		
- almost always good		23.1		20.8	
- good only some of the time		54.6		50.6	
- usually not very good		22.3		28.6	3.78

<sup>1</sup> Given before control period when no choices in vegetable menu items were offered.

<sup>2</sup> Given 10 weeks after pre-test, after experimental period when choices in vegetable menu items were offered.

<sup>3</sup> N varies because of nonresponses on some items.

\*\*  $P \leq .01$

Table 18: (cont.)

item	pre-test		post-test		$\chi^2$
	N	%	N	%	
25. I like the meat dishes:	373		347		
- most of the time		36.7		39.1	
- some of the time		48.8		45.0	
- not very often		14.5		15.9	1.08
26. I like the vegetables:	374		346		
- most of the time		11.0		11.6	
- some of the time		41.4		30.1	
- not very often		47.6		58.3	10.50**
27. I like the desserts:	376		347		
- most of the time		58.2		58.8	
- some of the time		37.3		34.3	
- not very often		4.5		6.9	2.27
29. When I eat the school lunch	374		345		
- I usually eat most of my food		59.9		57.1	
- I usually eat about half of my food		33.4		32.2	
- I usually leave a lot of my food		6.7		10.7	3.72

Table 19: Vegetable preferences at school in the pre- and post-tests

vegetable	like a lot	will eat	haven't eaten	don't like	$\chi^2$
	%	%	%	%	
french fries <sup>1</sup>					
pre-test <sup>2</sup>	46.0	40.1	1.9	12.0	
post-test	49.1	37.6	2.4	10.9	0.93
green peas					
pre-test	9.1	25.1	6.8	59.0	
post-test	9.8	29.5	6.4	54.3	2.10
carrots					
pre-test	11.9	33.2	5.6	49.3	
post-test	9.9	27.8	5.8	56.5	4.13
lima beans					
pre-test	3.6	16.0	10.2	70.2	
post-test	4.6	10.7	7.8	76.9	6.43
green beans					
pre-test	17.2	37.5	8.1	37.2	
post-test	17.7	36.0	7.1	39.2	0.59
mashed potatoes					
pre-test	49.3	36.4	1.9	12.4	
post-test	47.8	35.4	3.5	13.3	1.77
cabbage					
pre-test	9.5	19.1	14.5	56.9	
post-test	6.4	11.8	10.4	71.4	16.35*
broccoli					
pre-test	11.0	17.5	8.2	63.3	
post-test	11.0	18.8	7.2	63.0	0.38

<sup>1</sup> Given before control period when no choices in vegetable menu items were offered.

<sup>2</sup> Given 10 weeks after pre-test, after experimental period when choices in vegetable menu items were offered.

\*  $P \leq .05$

Table 19: (cont.)

vegetable	like a lot	will eat	haven't eaten	don't like	$\chi^2$
	%	%	%	%	
harvard beets					
pre-test	4.4	13.5	26.1	56.0	
post-test	4.6	9.2	17.9	68.3	12.57*
breaded tomatoes					
pre-test	4.1	12.2	29.2	54.5	
post-test	4.3	6.1	16.4	73.2	29.46*
tri-tators					
pre-test	44.5	33.1	11.3	11.1	
post-test	52.5	25.2	9.3	13.0	7.43
zucchini					
pre-test	5.0	10.5	34.9	49.6	
post-test	6.1	10.4	28.3	55.2	3.86
tator-tots					
pre-test	62.8	26.6	2.8	7.8	
post-test	63.0	25.8	1.8	9.4	1.35
asparagus					
pre-test	5.3	13.0	14.8	66.9	
post-test	6.7	9.3	12.8	71.2	3.80
battered beets					
pre-test	4.4	12.7	20.2	62.7	
post-test	5.9	7.6	13.8	72.7	11.95*
corn					
pre-test	50.1	33.7	4.7	11.5	
post-test	51.2	30.6	2.6	15.6	4.67
mixed vegetables					
pre-test	8.8	27.9	7.8	55.5	
post-test	10.2	25.0	7.0	57.6	1.12
wax beans					
pre-test	5.5	13.1	22.4	59.0	
post-test	5.8	14.6	13.7	65.9	9.05
cauliflower					
pre-test	8.3	16.1	16.6	59.0	
post-test	11.1	15.1	9.0	64.8	10.34*



Table 19: (cont.)

vegetable	like a lot	will eat	haven't eaten	don't like	$\chi^2$
	%	%	%	%	
brussel sprouts					
pre-test	5.8	15.5	15.5	63.2	
post-test	7.0	10.2	10.8	72.0	9.36*
peas and carrots					
pre-test	5.8	22.8	8.9	62.5	
post-test	7.9	20.6	9.1	62.4	1.53
succotash					
pre-test	2.2	10.4	41.6	45.8	
post-test	5.6	7.9	25.5	61.0	27.14*
spinach					
pre-test	8.0	13.0	9.4	69.6	
post-test	7.3	14.6	7.3	70.8	1.40
stewed tomatoes					
pre-test	4.7	11.6	19.2	64.5	
post-test	4.1	7.8	11.9	76.2	12.14*

INFLUENCE OF OFFERING CHOICES IN VEGETABLE  
MENU ITEMS ON FOOD ACCEPTABILITY IN  
THE SCHOOL FOODSERVICE PROGRAM

by

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B.S., Kansas State University, 1975

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AN ABSTRACT OF A MASTER'S THESIS

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## ABSTRACT

Offering choices in menu items has been identified as an approach to increase participation and to decrease the amount of food left uneaten in the school lunch program. The objective of this research was to study the influence of offering choices in vegetable menu items on acceptability of the school lunch and on the attitudes of junior high school students towards school foodservice.

An experimental research design, composed of a control period and an experimental period, was used for this study. During the control period regularly planned menus, which did not include choices in vegetable menu items, were served at the junior high school which was the research site. During the experimental period the regularly planned menus were served with the addition of another vegetable menu item, allowing the students to have a choice each day. Both periods consisted of nineteen school days. Participation and plate waste were measured during each period. A food-service attitude instrument was administered at the beginning of the control period and at the end of the experimental period.

Student participation in the Type A school lunch did not change significantly between the control and experimental periods. Consistently, the student per cent participation was approximately 80 per cent. Faculty participation increased significantly during the experimental period which may have a positive influence on student acceptance of the school food-service program. Percentages of participants choosing a particular vegetable during the experimental period apparently was dependent on the popularity of the other choice offered. Total ounces of vegetables left

uneaten decreased during the experimental period. Ounces per person per meal also decreased during the experimental period. Although there was not a significant decrease in amount of vegetables left uneaten, there was a trend towards fewer ounces of vegetable plate waste during the experimental period which may have been more evident if the study had continued longer.

Corn was consistently the vegetable with the least amount left uneaten, indicating that it was the most popular vegetable in this study. Other vegetables that appeared to be the most preferred included green beans, green peas, and succotash. Less well liked vegetables included coleslaw, harvard beets, peas and carrots, cauliflower, spinach, breaded tomatoes, brussel sprouts, and stewed tomatoes. In most instances, the ounces of vegetables left uneaten for individual vegetables were less for the experimental period indicating that students consumed more vegetables when allowed to choose the vegetable they liked and given the independence choices allowed.

On the attitude survey students were asked to indicate their usual lunch habits. The majority of the students ate the Type A school lunch five times a week. Frequent participants indicated that their most frequent reason for eating the school lunch was because their friends ate there. The next highest response indicated that the students liked the food.

Mean attitude scores on the attitude survey showed that seventh grade students' scores were significantly higher on the pre-test. Frequency of participation in the school lunch program also was analyzed in relation to attitude scores. Students who had a negative attitude towards the school foodservice were more likely to participate infrequently in the program.

A list of twenty-four vegetables was used to study vegetable preferences of the students at home and at school. Preference scores were significantly more positive for "at home" ratings with only one exception.