THE FOOD HABITS AND NUTRIENT INTAKE OF ELEMENTARY SCHOOL CHILDREN: A LONGITUDINAL APPROACH

Thesis for the Degree of M. S.
MICHIGAN STATE UNIVERSITY
NANCY REGINA BEYER
1972

ABSTRACT

THE FOOD HABITS AND NUTRIENT INTAKE

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By

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The nutritional status of preschool children has been studied intensively, but very seldom have researchers looked at these same children in later years. The present study is a longitudinal one. It looks at the nutrient intake of a group of healthy elementary school children, and compares these data with data obtained on the same children during their preschool years.

Forty-four children participated in the current study. A home interview relating to family and health characteristics, food habits, and dietary history was conducted with the mother. In addition, two 24-hour food intake records were kept for each child, and height and weight measurements were taken by the investigator. Preschool food intake records and height and weight data were available from earlier studies.

Interview results for the elementary school children were compared to those obtained as preschoolers, in order to determine changes in physical and environmental characteristics. The nutrient intake data for both preschool and elementary school was analyzed by computer, and presented as percent of the recommended dietary allowance (RDA). Height

and weight data were compared with the Stuart and Meredith percentile tables to evaluate increments of growth.

These children appeared to be adequately nourished. The mean intake of all nutrients was above the RDA, with the exception of the preschool iron intake and the elementary school caloric intake. The most limiting nutrients for the elementary school children were vitamin A and ascorbic acid. Iron was also limiting for the preschool children.

There was a remarkable consistency in food habits from one period to the next. Most mothers thought that their child's diet was nutritionally adequate. Mealtime patterns had been slightly altered since the preschool years as a result of the school routine. All children ate breakfast and dinner at home, while approximately half ate lunch at school. Children of both ages liked meat, but the older children also liked mixed dishes. Vegetables were overwhelmingly disliked by both age groups. Snacking was important in the overall nutrient intake of both groups, but was at a slightly higher level for the preschoolers. Growth rate was also fairly constant between the two age groups.

This study has shown that the preschool years are important for establishing good food habits for later life. Since young children copy what the rest of their family does, it is necessary that parents provide their children with a good example from birth.

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A THESIS

Submitted to

Michigan State University

in partial fulfillment of the requirements

for the degree of

MASTER OF SCIENCE

Department of Food Science and Human Nutrition

1972

ACKNOWLEDGEMENTS

I would like to thank each of the families who participated in this project. Without their help, there would have been no study.

Thanks are also expressed to my committee members, Dr. Olaf Mickelsen and Dr. Dorice Narins, for their interest in this project.

A special word of thanks and appreciation is due to my thesis advisor, Dr. Portia Morris, for her patient understanding and encouragement throughout the entire study.

I would also like to thank my aunt, Ruth Beyer, for typing this manuscript.

And finally, I would like to express my appreciation and love to my parents, whose guidance and example have inspired me to strive for excellence.

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CHAPTER I

INTRODUCTION

Many people are interested in the study of why people eat what they do, and how this affects their physical growth and health. While much of this work has involved adults, there have been a number of studies involving children, particularly the preschool child. Kallen (1971) has stated that a child is most susceptible to diseases of malnutrition between the ages of one and four--hence, the intensive interest which has been focussed on this age group. Less attention has been given to the elementary school child.

Most of these studies have been cross-sectional, short-term projects. They have assessed the nutritional status of a given population at a given time, with little consideration for the history or subsequent development of each subject. It has been proposed that longitudinal studies give a better understanding of the relationship between dietary intake and growth during childhood, as well as the effect of dietary habits on the health of the individual as an adult (Beal, 1961).

Although children during the elementary school years show a steady, gradual increase in growth as compared to the growth spurts of infancy and adolescence, they are important years for building up body stores of nutrients for the later period of rapid growth, as well as for developing sound nutrition habits (McWilliams, 1967). As children progress through the elementary school grades, however, more dietary deficiencies are reported to occur (Morgan, 1959).

During the school years 1967-68, 1968-69, and 1969-70, children attending the Michigan State University Laboratory Preschool were involved in studies which assessed their eating habits, nutrient intake, and physical growth.

The first study (Lanz, unpublished) involved approximately 50 children. It consisted of a home interview on food habits and health characteristics, and a single 24-hour food intake record. Height and weight data were available from preschool records.

The second study (Sims, 1971) involved 163 children. In addition to the 64 children from the Michigan State University Laboratory Preschool, 91 children from the Spartan Nursery School and eight children from the Ingham County Public Health Clinic were included in the sample. This study included a more detailed home interview schedule, involving both socioeconomic and nutritional parameters. It also consisted of three 24-hour food intake records, three sets of height and weight measures, a series of anthropometric measurements, and biochemical data of blood and urine samples.

It was decided to resurvey those children from the Michigan State University Laboratory Preschool who were now attending elementary school. This research describes the current food habits and nutrient intake of these children, and tries to define the underlying influences which affect growth and eating habits.

Objectives

The resurvey had as a primary objective to determine whether there were changes in eating habits from preschool to school age, and if so, whether these affected growth. A second objective was to determine the food preferences of children in this age group.

CHAPTER II

LITERATURE REVIEW

Nutritional status has been defined as the degree of well-being of a population as it is affected by food intake (Morgan and Odlund, 1959). One of the ways that has been proposed for determining the nutritional status of a population is by some type of food intake record (U. S. Department of Health, Education, and Welfare, 1971). By this method, the investigator attempts to learn the types and quantities of food eaten during a given period of time. Means of collecting food intake data include the weighed intake, the dietary history, the food record, and the 24-hour recall (Pike and Brown, 1967).

Some workers feel that weighing is the only accurate method of determining food intake (Huenemann and Turner, 1942; Whiting and Leverton, 1960). Many workers in this field have admitted that the weighed intake requires considerable time, effort, and cooperation on the part of the subject. Others have stated that questioning or recall may closely approximate weighing (Bransby et al., 1948; Mickelsen, 1963). It has been mentioned by several authors that no one method is without flaw (Trulson and McCann, 1959; Wiehl and Reed, 1960; Beal, 1969). Beal (1969) recommended using a three-month dietary history with a concurrent 24-hour intake record to check validity.

Several studies have been done to determine whether children can accurately report what they have eaten. Results show that children younger than nine years of age have difficulty (Eads and Meredith, 1948;

Young et al., 1951). In a study by Meredith et al. (1951), the school children forgot both how much and what they had eaten. They also had difficulty in identifying some of the foods served in the school lunch.

Although there have been few longitudinal studies on the nutrient intake of children, one important contribution to this field is the work of Beal (1953, 1954, 1955, 1956) at the Child Research Council in Denver, Colorado. These papers report the changes in nutrient intake of a single group of healthy children from birth to five years of age. The general trend is a rapid increase in intake during the first year, concurrent with the infant's growth spurt. There is then a decline in intake which plateaus during the second and third years, and is followed by a gradual increase to the fifth year.

Beal (1953) found that intakes of calories, carbohydrates, and fat did not show a decline, but rather a slower increase in consumption during the second and third years. Protein, however, plateaued between eighteen months and three years.

In evaluating mineral intake, Beal (1954) observed that calcium and phosphorus followed the general pattern of intake. Calcium needs are lowest between two and four years because skeletal growth rate has decreased. For the first three months, milk was the essential source of calcium. After that time, other dietary sources supplied significant amounts of this mineral. Iron intake also peaked at one year, and then declined. This was attributed to the iron fortification of commercially-prepared infant formulas and cereals. As the infant foods were replaced with home-prepared foods, the child's iron intake dropped and stayed at a low level throughout the preschool years.

Beal (1955) also looked at the dietary levels of B vitamins. Although an average of 40% of the children at each age level received supplementary

vitamins, these were not included in the calculations. She found that the pattern of dietary thiamine consumption was similar to that for protein. Riboflavin paralleled calcium intake, both of which reflected a decrease in milk consumption between the second and third year. Niacin levels were low compared to the RDA, but they did not include that niacin which could be converted from tryptophan.

Lastly, Beal (1956) looked at intake patterns for vitamins A and D, and ascorbic acid. The intake of vitamin A from animal sources (mainly milk) showed relatively little variation. In contrast, the intake of vitamin A from plant sources showed a high degree of variability. A rise in intake occurred when commercially-prepared infant vegetables were introduced. The majority of these have a high carotene content. After one year, however, there was a decrease in intake as infant foods were replaced by a wider variety of home-prepared vegetables. This was compounded by the samll quantity of vegetables eaten by most preschool children. After three years, the intake of vitamin A increased slightly. Dietary sources provided adequate amounts of vitamin A, although some children received additional supplements. Vitamin D showed a high intake level in the first year as a result of using irradiated milk plus supplemental vitamin D. The consumption then slowly decreased to the fifth year. Ascorbic acid showed no decrease in intake during the preschool years. As infants, these children received ascorbic acid supplements, switching to dietary sources by one year of age. After the first few months, dietary sources provided adequate amounts of ascorbic acid.

In summary, Beal (1955) described the factors which lead to changes in dietary intake as being physiologic demand and environmental/emotional changes. The first nine months are characterized by rapid growth, a good appetite, a steady increase in food consumption, and few feeding problems.

However, after the first year the growth rate and appetite decline, and the child experiences independence in the form of self-feeding and expression of choice. She concluded that:

> ...there are changes in the level of intake as the individual progresses from birth to maturity; the significance of these changes in regard to both cause and effect presents a challenging field of study.

No matter how nourishing the food served to a child may be, his growth and freedom from malnutrition are dependent only on the food which enters his stomach and is absorbed into his body. Several studies have tried to determine what influences the food attitudes of children. Breckenridge (1959) has said that food attitudes (1) contribute to the quality of the relationship with parents and other adults, (2) may determine whether the child is well-fed or poorly-fed, (3) may be an expression of covert feelings about self or others, and (4) reflect tradition and culture. She further states that:

> ...an understanding of children's food preferences and prejudices, and of their dynamics can be of value both to those who plan and supervise the feeding of children, and to those who are engaged in promoting sound food habits through nutrition education.

According to Clark (1969), food habits are a result of education, sociological background, and present situations.

In looking at the eating habits of preschool children, Kerrey et al. (1968) suggested that:

> ...food practices and attitudes established during the early years are believed to affect choice and consequently nutritional status throughout life.

The necessity of longitudinal nutritional surveys of normal populations has been stated by Krehl and Hodges (1965). More effort needs to be expended on evaluating the nutritional status of populations with an

abundant food supply, and on gaining more information on the late effects of early nutrition.

CHAPTER III

EXPERIMENTAL PROCEDURES

Selection and Description of the Sample

Letters were sent to the parents of 83 of the children who had previously participated in a nutrition survey at the Michigan State University Laboratory Preschool, asking them to participate in this current study (see Appendix A). Many families had moved out of the area, some could not be located, and others preferred not to participate. Forty-four parents replied that they would be willing to let their children be resurveyed.

The criteria for the children involved in this study were that:

(1) they had participated in an earlier study,

(2) they could be located,

(3) they were currently attending an elementary school, and

(4) their mothers were willing to keep two 24-hour food intake records and participate in an interview of the child's dietary history.

The sex and racial distribution of these children are described in Tables 3.1 and 3.2. The distribution by age and grade is shown in Tables 3.3 and 3.4. The mean age in December 1971 was 7 years and 2 months.

Table 3.1. Sex Distribution

	Number	Percentage
Males	18	40.9
Females	26	59.1

Table 3.2. Racial Distribution

	Number	Percentage
White	36	81.8
Negro	6	13.6
Oriental	2	4.5

Table 3.3. Age Distribution

Age in Years as of 12/71	Number	Percentage
$5\frac{1}{2}$-6	2	4.5
6-$6\frac{1}{2}$	4	9.1
$6\frac{1}{2}$-7	12	27.3
7-$7\frac{1}{2}$	8	18.2
$7\frac{1}{2}$-8	7	15.9
8-$8\frac{1}{2}$	5	11.3
$8\frac{1}{2}$-9	6	13.6

Table 3.4. Grade Distribution

Grade as of Fall 1971	Number	Percentage
K	2	4.5
1	19	43.2
2	13	29.6
3	10	22.7

Data Collection

The interviews took place in the late fall of 1971. The mothers of the sample children were phoned by the investigator, and a home interview appointment was made for the following week. At the time the appointment was made, the mother was mailed two forms on which to record her child's 24-hour intake of food on any two days prior to the interview (see Appendix B). Both weekdays and weekends were allowed for recording, but none of the families kept a record on Thanksgiving, the only holiday during the study period. These forms were then collected at the time of the interview.

All interviews were conducted by the investigator, and required approximately forty-five minutes to complete. A copy of the interview schedule may be found in Appendix B.

If the child was at home during the interview, height and weight measurements were gathered at that time. However, if the child was in school at the time of the interview, arrangements were made to return at a suitable time to collect these measurements. Height was measured with a steel tape and a right-angled wooden triangle (U. S. Department of Health, Education, and Welfare, 1971). The children were measured without shoes, with heels and scapula in contact with a flat vertical surface, such as a wall. Weight was determined by using a portable bathroom scale, which had previously been checked against a standard thirty-pound weight.

Data Analyses

The information from the two 24-hour intake records was transformed by the procedure described by Sims (1971), and transferred to data processing cards. This method follows the guidelines set up by Davenport (1964) for machine tabulation of diets. Nutritive values for the first 512 food items were taken from the U. S. Department of Agriculture Home and Garden Bulletin No. 72 (1964). For the additional 300 food items, nutritive values were taken from Agriculture Handbook No. 8 (Watt and Merrill, 1963), Bowes and Church (Church and Church, 1970), and information supplied by food manufacturers. Nutrient intake values were compared with the recommended dietary allowance (RDA) for 6 to 8 year old children (Food and Nutrition Board, 1968). Analyses were performed on the Control Data Corporation (CDC) 3600 model computer, utilizing a program written by a Michigan State University computer consultant (Sims, 1971).

CHAPTER IV

FINDINGS

Results of Home Interview

Characteristics of families and information about the child's health and his food habits were obtained by a home interview with the parents of the sample children.

Family Characteristics

The largest number of children came from two-parent, four-member families (Table 4.1). Almost as many families had three children. Half of the participating children were first-born. Only two children came from single-parent families.

Table 4.1. Household Size

A. Number of Persons in Home	Number	Percentage
3	5	11.3
4	17	38.6
5	9	20.5
6	7	15.9
7-10	6	13.7
B. Number of Children in Home	**Number**	**Percentage**
1	4	9.1
2	16	36.3
3	12	27.3
4	7	15.9
5-8	5	11.3

The educational level of the parents in the sample is considerably higher than average (Table 4.2). The average father had completed 18.5 years of school, equivalent to 2.5 years of post-graduate education. The average mother had completed 16.2 years of school, approximately equivalent to the bachelor's degree. Twenty-two fathers and four mothers had earned the Ph. D. or M. D. degrees.

Table 4.2. Education of Parents

Number of School Years Completed	Father %	Mother %
<16 years	11.3	29.6
16 years	15.9	31.8
>16 years	72.7	38.6
MEAN	18.5 years	16.2 years

All of the fathers were employed full-time (Table 4.3). Only 11.3% of the mothers had full-time jobs. The remainder listed "homemaker" as their foremost occupation. However, 11.3% were part-time students and 27.3% had a variety of part-time jobs.

Table 4.3. Employment of Parents

	Father %	Mother %
University faculty	52.4	2.3
Other profession	14.3	2.3
Retailing	9.5	--
Other full-time job	23.8	6.8
Homemaker	--	88.7

Health Characteristics

Only four children were currently allergic to some food item, whereas seven of the observed children had had an allergy while in the preschool. Two children were now allergic to foods containing mold, one child was allergic to meat, and one to chocolate. Only two of these children were on special diets for their allergies. No child was on a special diet for weight gain or loss, although several mothers said they felt their child should reduce his caloric intake.

Mothers were asked whether their child had ever been anemic. It was assumed that those who were anemic had been diagnosed as such by a physician. However, it was not known whether the diagnoses were made on the basis of observation, hemoglobin level, or serum iron level. Three children were reported to have been anemic since starting school. Two others had been anemic as infants. All five received iron supplements to alleviate this condition.

None of the mothers had recently consulted a physician about feeding problems with her child, although 31% had done so during the preschool years.

As preschoolers, 71% of the children received vitamin supplements. As grade school children, only 50% received vitamins. Table 4.4 shows the type and frequency of supplementation.

Table 4.4. Type and Frequency of Vitamin Supplementation

Type	Percentage	Frequency	Percentage
None	50.0	Never	50.0
Multivitamins	29.5	Daily	36.5
Multivitamins plus iron	18.2	3-6 times/week	13.7
Vitamin-mineral mix		Once/week	2.3
with fluoride	2.3	Winter only	4.5

Most children took the chewable children's multivitamins of their own preference. Only one child received wheat germ several times a week as an additional supplement, while there had been three children who took wheat germ as preschoolers.

In one-fourth of the sample, there was someone in the immediate family who was on a special diet. Most frequently mentioned was a gastrointestinal problem of one of the parents.

Over 80% of the children had been seen by a doctor within the last year (Table 4.5). Most of the others were older children who last saw the doctor for their physical exam before entering school. Reasons for the last doctor's visit are listed in Table 4.6.

Table 4.5. Frequency of Medical and Dental Visits

Time since last visit	Doctor %	Dentist %
0-6 months	54.5	81.8
7-12 months	27.3	13.6
>1 year	18.2	4.5

Table 4.6. Reasons for the Most Recent Medical and Dental Visits

	Doctor %	Dentist %
Routine checkup	70.5	77.3
Illness	22.7	--
Tooth filled	--	13.6
Orthodontia	--	4.5
Other	6.8	4.5

Over 80% of the children had been to the dentist within the previous six months (Table 4.5). There were many mothers who mentioned that their children went to the dentist twice a year. Reasons for dental visits are also listed in Table 4.6. The frequency of filled teeth as a function of

grade level is presented in Table 4.7. Only 12% of the children had fillings as preschoolers. This suggests that the occurrence of dental caries increases with age.

Table 4.7. Number of Filled Teeth as a Function of Grade (expressed as %)

Number of Fillings	K	1	2	3	Total
0	0	25.0	6.8	6.8	38.6
1	2.3	0	4.5	0	6.8
2-4	2.3	9.1	9.1	4.5	25.0
4-8		9.1	6.8	4.5	20.4
>8			2.3	6.8	9.1

86.4% of the children got between 10 and 12 hours of sleep on the average each night. The remainder (13.6%) slept for 8 to 9 hours.

Food Habits

Most mothers (88.6%) thought that their child's diet was nutritionally adequate, although many of these could suggest ways for improvement. The most frequently mentioned food group lacking in the children's diets was vegetables.

36.3% of the children received no special attention at mealtime. None of the children was forced to eat, but 22.7% (mainly the younger children) had to be coaxed to eat at times. Nearly 30% received a variety of types of attention--praise, scolding, coaxing--depending on their behavior. Several parents mentioned the need to restrict amounts of food eaten, and others placed an emphasis on table manners, rather than on quantity of food consumed.

Over 80% of the children had no snacks at school, except for occasional birthday or holiday celebrations. Those who regularly snacked at school were the younger children, and this was limited to once a day.

Table 4.8 is a summary of the mothers' evaluation of her child's level of activity, and of his attitude toward food.

Table 4.8. Mothers' Evaluation of Child's Activity and Attitude Toward Food

A. Activity	Percentage	B. Attitude Toward Food	Percentage
Very active	38.6	Enjoys eating	59.1
Moderately active	54.5	Attitude varies	31.8
Quiet	6.8	Indifferent	6.8
		Has to be urged to eat	2.3

84.1% of the children helped their mothers in the preparation of food. Three children helped almost every day, but the majority helped only occasionally, usually when they felt like it. The most frequently mentioned types of help included baking cookies, making sandwiches, preparing salads and raw vegetables, and making gelatin. The boys provided as much help in the kitchen as the girls did.

Over 40% of the children prepared their own meals at some time or other. This was limited to breakfast and lunch--none of the children prepared his own dinner. The need to prepare their own breakfast occurred most frequently on weekend mornings when their parents were sleeping in. Several children got breakfast for younger siblings, as well as for themselves. Only one child had to prepare lunch for herself every day. The remainder of the children fixing their own meals did it much less frequently.

Nearly 30% of the children had no responsibilities around the home. The frequency of various types of home responsibilities is listed in Table 4.9 for the thirty-two children who did help out.

The attitudes of families toward new recipes or new foods are summarized in Table 4.10. Over half of the families had a positive attitude about trying new foods.

Table 4.9. Frequency of Home Responsibilities

	Number
Set table	18
Clear table	9
Make bed	17
Keep room neat	15
Care for pet	5
Take out garbage	6

Table 4.10. Family's Attitude Toward New Foods or Recipes

	Percentage
Enthusiastic	9.1
Willing	47.7
Cautious	20.5
Reluctant	15.9
Refuse	6.8

Most of the families ate dinner together. This was also true as preschoolers. However, breakfast and lunch were usually eaten together only on weekends. Most of the families never or rarely snacked together (Table 4.11). One child did not eat with his parents because of a very flexible meal schedule.

Table 4.11. Meals Eaten Together as a Family (expressed as %)

Meal	Never	$<\frac{1}{2}$ the time	$>\frac{1}{2}$ the time	Almost always
Breakfast	18.2	52.3	9.1	20.4
Lunch	36.3	61.3	0	2.3
Dinner	2.3	6.8	4.5	86.3
Snack	40.9	43.2	4.5	11.3

The mother's opinion of the importance of her child eating everything he had been served is shown in Table 4.12. Over half of the mothers felt that this was not very important.

Table 4.12. Importance of Eating All That is Served

	Percentage
Not important	34.1
Slightly important	29.6
Moderately important	25.0
Considerably important	11.3

All of the children ate their breakfast and dinner at home. However, during the school week, 43.2% ate lunch at school, the remainder going home for lunch.

The majority of the children ate breakfast between 7:30 and 8:30 a.m. (Table 4.13). In many cases this was earlier than their preschool pattern (Sims, 1971), and was a result of their need to be at school by approximately 9:00 a.m. Lunch was also on a more rigid schedule as a result of the school routine. Nearly three-fourths of the children ate between 11:30 and 12:00 noon. Over 80% of the families ate dinner between 5:30 and 6:30 p.m.

Table 4.13. Usual Mealtimes

Breakfast	%	Lunch	%	Dinner	%
7:00-7:30	13.6	11:00-11:30	6.8	5:00-5:30	4.5
7:30-8:00	45.5	11:30-12:00	72.7	5:30-6:00	31.8
8:00-8:30	38.6	12:00-12:30	20.5	6:00-6:30	50.0
8:30-9:00	2.3			6:30-7:00	13.6

The frequency of snacking is summarized in Table 4.14. Snacks are most frequently consumed after school.

Four of the preschool children skipped meals at times. Three of these were still skipping meals in elementary school. Two of the children missed dinner most often; one because of illness due to an allergy, and the other because he became too involved in his play. One child missed breakfast most often because she was nervous and afraid of missing the school bus.

Table 4.14. Frequency of Snacking (expressed as %)

Time of Snack	Never	Occasionally	Almost always
Before breakfast	93.2	2.3	4.5
Between breakfast and lunch	72.7	18.2	9.1
Between lunch and dinner	0	13.7	86.3
After dinner	31.8	25.0	43.2

The mothers' impression of when her child was hungriest for snacks, as well as for what meal he had his best appetite are summarized in Table 4.15.

Table 4.15. Time When Most Hungry for Snacks and Meals

Snacks	%	Meals	%
Morning	4.5	Breakfast	4.5
Afternoon	90.9	Lunch	22.7
Evening	2.3	Dinner	68.2
Combination	2.3	Combination	4.5

Over one-third of the mothers described their child's appetite during the previous three months as excellent. Nearly one-half reported good appetites. Only one-fifth said that their child's appetite was fair. Table 4.16 compares this to the preschool data.

Table 4.16. Mothers' Assessment of Appetite

	Preschool %	Elementary school %
Excellent	28.6	34.1
Good	52.4	45.5
Fair	16.7	20.4
Poor	2.3	0

A little more than one-half of the children said that their favorite food was meat. One-fourth of these specifically mentioned chicken. Next in popularity were mixed dishes, such as spaghetti and pizza. This is contrary to Breckenridge (1959) who reported dislike of meat mixtures by

5 to 12 year old campers. Desserts and sweets were named as favorite foods by four children. Two other children listed ice cream as their favorite. Two children selected corn-on-the-cob as being a favorite, the only vegetable mentioned. There were no fruits mentioned as favorite foods. Breads and cereals were named by two children, as were snack-type foods. It should be noted that these favorite foods may reflect the fact that these data were collected in the fall. Table 4.17 compares these data with the likes of the children as preschoolers.

Table 4.17. Most Favorite Food (expressed as %)

	Preschool	Elementary school
Dairy	11.1	4.5
Meat	38.8	52.3
Fruit	5.5	0
Vegetable	5.5	4.5
Mixed dish	11.1	20.4
Dessert	5.5	9.1
Snack item	16.7	4.5
Bread, cereal	5.5	4.5

As preschoolers, cooked vegetables, liver, and mixed dishes were most often mentioned as food dislikes. This trend continued into the elementary school years (Table 4.18). 70.4% of the children refused to eat at least one disliked item, while 29.6% ate some of everything they were served.

The mothers were asked to list the factors which had an influence on their meal planning. These results are summarized in Table 4.19.

They were also asked to list the one most important influence. 61.3% of the mothers stated that the nutritional value of the food was the most important influence on her family meal planning. Almost half that number (29.6%) stated that they were most influenced by the likes of their family. Although many mothers were influenced by their own likes, no one admitted to putting them first. Three mothers listed cost as the most

Table 4.18. Frequency of Foods Listed as Disliked

	Preschool n=42	Elementary school n=44
Liver	4	8
Other meat	5	5
Mixed dish	8	7
Fish	2	4
Eggs	1	3
Milk	1	1
Cottage cheese	2	1
Fruit	2	1
Cooked vegetables	29	31
Raw vegetables	3	4

Table 4.19. Influences on Family Meal Planning

	%
Cost of the food	65.9
Time required for preparation	54.5
Likes of the family	93.2
Likes of mother	86.4
Health needs of the family	93.2
Nutritive value of the food	95.5

important influence, while one student-mother said that time was most important to her.

The mothers were also asked to comment on various types of feeding problems commonly encountered in children. These results are shown in Table 4.20. In general, mothers felt that their child was consuming an appropriate amount of food, including meat and milk. Nearly half reported that their child chose a limited variety of foods, and a similar number said that he ate too few fruits or vegetables, vegetables being mentioned most often. Nearly one-third felt that their child ate too many sweets. These data either agree with or are less than the preschool data reported by Sims (1971), indicating a downward trend in feeding problems.

79.6% of the mothers perceived their children as being of average weight for his height. 9.1% felt their child was overweight, and 11.3%

Table 4.20. Mothers' Assessment of Child's Feeding Problems

	%
Eats too little food	15.9
Eats too much food	11.4
Chooses a limited variety of foods	45.5
Eats too few fruits or vegetables	43.2
Dawdles with his food	29.5
Eats too much meat	4.5
Eats too little meat	13.6
Drinks too much milk	6.8
Drinks too little milk	13.6
Eats too many sweets	31.8

felt their child was underweight. Table 4.21 compares this data with the number of children who actually were overweight (weight percentile larger than height percentile) or underweight (weight percentile smaller than height percentile) based on the Stuart and Meredith tables (Watson and Lowrey, 1967).

Table 4.21. Comparison of Mothers' Perception of Child vs. Stuart and Meredith Percentile Tables

	Overweight %	Underweight %
Mothers' Perception of Child	9.1	11.3
Stuart and Meredith Assessment of Child	34.1	22.7

The majority of the children (90.9%) enjoyed school. Three children were indifferent, and one child disliked school.

Nutrition Education

Nearly 90% of the mothers were able to name at least three of the Basic Four Food Groups as being necessary to her child's daily diet, while over half (54.5%) correctly named all four. The remaining mothers named two of the four.

Only two of the mothers had had any contact with "nutrition education" since their child started school. Both of these were public health instruction for therapeutic diets; one for herself, the other for her husband.

Over 70% of the mothers reported that they were not influenced by any particular person as far as meal planning and family care was concerned. Five mothers mentioned a recent influence exerted by a dentist in regard to the amount of sweets their child should have. In regard to the media, Table 4.22 lists those felt to be most valuable to the mothers.

Table 4.22. Most Valuable Sources of Food Information

	Percentage
Magazines	29.6
Newspapers	15.9
Cookbooks	13.6
Extension bulletins	6.8
Other	4.5
None	29.6

Evaluation of Dietary Data

Two 24-hour food intake records were analyzed for nutrient content, percentage of the recommended dietary allowance (RDA), and the pattern of calorie and protein consumption. These results were averaged to give one set of data for each child. Although vitamin supplements were taken by half of the children, the data presented reflect only the dietary sources of nutrients.

The RDA for 3 to 4 year old children (preschool) and 6 to 8 year old children (early elementary school) may be found in a publication by the Food and Nutrition Board of the National Research Council (1968).

In order to compare the two age groups, the mean intake of each nutrient was converted to the mean percentage of the RDA. These data are shown in Table 4.23.

Table 4.23. Mean Intake as Percentage of RDA (± Standard Deviation)

	3-4 year old children	6-8 year old children
Calories	122.1 ± 37.1	94.3 ± 22.9
Protein	201.6 ± 76.7	202.9 ± 55.9
Vitamin A	198.8 ± 240.6	127.0 ± 74.4
Ascorbic Acid	270.4 ± 173.5	214.9 ± 109.3
Niacin*	218.6 ± 85.5	178.0 ± 49.3
Riboflavin	223.1 ± 108.4	171.8 ± 44.4
Thiamine	138.6 ± 55.8	120.9 ± 43.0
Calcium	129.0 ± 59.2	112.7 ± 35.5
Iron	83.2 ± 36.9	104.2 ± 27.7

*Calculated on the assumption that 1% of the dietary protein was tryptophan and that 60 mg tryptophan yields 1 mg niacin.

Except for the preschool iron intake, and the elementary school caloric intake, these values exceeded the RDA. Mean intake of protein was approximately the same for both age groups. Mean iron intake was higher in the older children. The remaining nutrients, however, showed a 15% or greater decrease in mean intake with age, although all nutrients remained above the RDA. This supports the belief that the school age child eats less of the RDA than the preschool child (Emerson, 1967).

Although the mean nutrient intake levels were above the RDA, some of the children had diets which were insufficient in some nutrients. The RDA includes a "margin of safety" (Food and Nutrition Board, 1968), and some authors (Metheny et al., 1962; Kerrey et al., 1968) have used two-thirds of the RDA as a measure of dietary adequacy. When the diets were evaluated on this basis, vitamin A and ascorbic acid were found to be most limiting in the diets of elementary school children. As preschoolers, these two nutrients plus iron were most limiting (Table 4.24).

The percentage of calories supplied by carbohydrate, protein, and fat was remarkably constant from one period to the other (Table 4.25), but the range was larger for the preschool period. Approximately half

Table 4.24. Percentage of the Sample Meeting Specified Proportions of the RDA

	% of Recommended Dietary Allowance					
	<67%		67-100%		>100%	
	P*	E*	P	E	P	E
Calories	4.9	2.3	34.1	65.1	61.0	32.6
Protein	0	0	9.8	0	90.2	100.0
Vitamin A	17.1	20.9	19.5	27.9	63.4	51.2
Ascorbic Acid	12.1	11.7	2.5	4.6	85.4	83.7
Niacin	2.5	0	2.5	2.3	95.0	97.7
Riboflavin	4.9	0	4.9	4.6	90.2	95.4
Thiamine	4.9	6.9	17.1	28.0	78.0	65.1
Calcium	9.8	4.6	26.8	34.9	63.4	60.5
Iron	41.5	6.9	31.7	48.9	26.8	44.2

*P=preschool children
E=elementary school children

of the calories came from carbohydrate. Fat supplied a little over one-third of the calories with protein providing the remainder. This level of dietary fat intake is in accord with the recommendations of the American Heart Association (1961) for reducing the incidence of heart attacks in adults.

Table 4.25. Percentage of Calories Supplied by Carbohydrate, Protein, and Fat

	Mean %		Range	
	P	E	P	E
Carbohydrate	50.7	50.5	36.3-68.6	39.1-62.8
Protein	13.9	14.3	5.7-25.8	10.8-19.6
Fat	35.4	35.2	18.1-49.6	26.2-44.5

In order to determine the importance of snacking, the mean percentage of calories and protein consumed as a meal or as a snack was computed (Table 4.26). The results show that snacks contain a larger amount of calories than protein. In other words, a larger percentage of protein is consumed at mealtime. The data also show that the mean percentage

of calories and protein consumed as snacks is lower for the child in elementary school than for the preschooler.

Table 4.26. Mean Percentage of Calories and Protein Consumed as Meals and as Snacks

	Preschool		Elementary school	
	Meal	Snack	Meal	Snack
Calories	78.2	21.8	82.6	17.4
Protein	87.8	12.2	90.6	9.4

The frequency of various types of snacks is shown in Table 4.27. Elementary school children consumed more fruits and juices, and less breads and cereals, popcorn, and potato chips than they did several years earlier.

Table 4.27. Frequency of Various Types of Snacks

	P	E
Breads, cookies, cereals	73	62
Fruits, juices	42	50
Vegetables	6	3
Milk	29	33
Koolaid-type drinks	22	14
Sweets (candy, pop, dessert)	50	44
Nuts, popcorn, chips	14	5

Results of Height and Weight Measurements

Height and weight data were gathered on the children at one or more times in the preschool, and again as a part of the present research. These data were evaluated in terms of the Stuart and Meredith height and weight percentile tables (Watson and Lowrey, 1967) (Table 4.28). Trends in total growth were determined by visual inspection, and the results are shown in Table 4.29. An increase in height or weight increments means moving from one growth channel to a higher channel. Nearly half of the children

remained in the same channel for both height and weight. Either increasing or decreasing both height and weight increments maintains a normal weight-for-height, but the child is larger or smaller than average. More children

Table 4.28. Growth Data

	Total (%)	Boys (%)	Girls (%)
A. Height:			
Increased	15.0	6.25	20.83
Stayed the same	60.0	62.50	58.33
Decreased	25.0	31.25	20.83
B. Weight:			
Increased	17.5	0	29.17
Stayed the same	55.0	50.0	58.33
Decreased	27.5	50.0	12.50

Table 4.29. Changes in Growth Patterns (expressed as %)

Height increments	Weight increments		
	Increased	No change	Decreased
Increased	7.5	7.5	0
No change	10.0	40.0	10.0
Decreased	0	7.5	17.5

reduced their rate of growth than increased it. Increasing height increments while maintaining weight increments at a normal level, or decreasing weight increments while maintaining height increments result in a more slender body build. Conversely, increasing weight increments while maintaining height increments, or decreasing height increments while maintaining weight increments result in a plumper body build.

CHAPTER V

DISCUSSION AND CONCLUSIONS

Most of the children involved in this study appeared to have more than adequate diets. The most limiting nutrients were vitamin A and ascorbic acid. Although all nutrients showed a range of intake, these two were particularly variable. This is to be expected, however, because they are supplied in large amounts by only a small number of foods, primarily fruits and vegetables (Beal, 1961).

As preschoolers, the variation in nutrient intake was considerably wider than it was for the older children. Protein intake showed relatively little variability. For the preschool children, the highest level was five times greater than the lowest level. By elementary school, this ratio had dropped to 3:1. However, preschool ratios (maximum:minimum) for vitamin A were 42:1, dropping to 12:1, and likewise, ascorbic acid ratios for preschoolers were 258:1, dropping to 12:1.

Studies by Filer (1969) have shown that iron deficiency is a significant public health problem among young children. For the children as preschoolers, the mean iron intake was below the RDA. However, this was not the case for the elementary school group. Beal and Meyers (1970) reported that for their middle-class, white population from infancy to adolescence, iron intakes seldom reached the RDA, but hemoglobin and hematocrit levels were satisfactory. Serum iron levels, however, are a better indicator of depletion (Food and Nutrition Board, 1968).

The eating habits and pattern of nutrient intake are fairly constant from preschool to school age. This implies that practices established with very young children provide the foundation for nutritional status in later life. This also underlines the necessity of training children to eat the right foods at an early age. A child's food consumption patterns are frequently those of his parents (Emerson, 1967). As a young child, he imitates the family food habits (Burkhart, 1969), and these become his own. Therefore, it is important that parents provide a good example right from the start. Hill (1969) has aptly stated that it is easier to develop good food habits in young children than it is to correct poor habits as children grow older. This requires that parents know and practice good nutrition from the time their children are born, if not before.

The most common nutritional problem of the young school age child is dental caries. Most children enjoy sweets, and because they often provide only "empty" calories, they are sometimes restricted. However, as the child becomes more independent, he may increase his consumption of these foods, with the result being an increased incidence of cavities.

Snacks have become a very important part of our food pattern (Burkhart, 1969). The results of the current study show that snacking has a slightly more important role in the overall food consumption of the preschool child (see Table 4.26). Here again there is a wide range among children. Some rarely snacked; others ate 75% of their calories as snacks. The decreased percentage of calories and protein eaten as snacks in elementary school may reflect an increased appetite at mealtime. After school snacks are regularly consumed by this age group, but subsequent play results in a good appetite at dinnertime for many of the children. Snacking patterns of the two age groups were surprisingly similar, with the older group showing less intake of pop and potato chips on the days recorded. Those children

who snacked on "empty" calories as preschoolers tended to continue this habit, and those who consumed nutritious snacks were also consistent (see Table 4.27).

In a study of preschool children, Vance (1932) found that children did not like vegetables, although raw vegetables were liked better than cooked. This was also found to be true for the children studied by Sims (1971). She reported that 81% of the preschoolers listed a vegetable as his most disliked food. This trend has continued to the elementary school years in these children. Breckenridge (1959) also found a great dislike for vegetables among elementary school children.

The favorite foods of the preschool children (Sims, 1971) were meats (33%), breads and cereals (24%), and sweets (18%). As elementary school children, however, over half liked meat best, with mixed dishes being next.

It is significant to note the near-absence of skipping breakfast. While some breakfasts were more nutritious than others, all of the children usually started the day with something in their stomachs. In conjunction with this, it should be mentioned that most of the children enjoyed school, and were reported to be doing well.

Limitations of the Present Research

1. Two sources of preschool data on these children were used (Lanz, unpublished and Sims, 1971). Although the questionnaires were different, both records included information on health characteristics, food likes and dislikes, and mealtime practices. At least one preschool food intake record was available for all of the children, some of them having as many as three such records. Preschool height and weight measurements were available for all children.

2. Although the validity of the food records of these children may be subject to question, their parents were cooperative and familiar with

the procedures. Previous studies (Sims, 1971), as well as cross-checks using dietary histories, and in some cases, food models, support the accuracy of these records.

Summary and Conclusions

This study has provided a longitudinal look at the food habits and nutrient intake of a group of healthy children, primarily from middle-class homes. These children appeared to be well-nourished both as preschoolers and as elementary school children. Although a few individual changes were noted in nutrient intake, food habits, and growth rate, most of the children showed a large degree of consistency in these parameters from one period to the next.

The most remarkable change in nutrient intake was the increase in mean iron level as percent of RDA. Other nutrients, while increasing in absolute quantities consumed, showed slight decreases in the percentage of RDA met, although all but calories remained greater than 100%.

Vegetables were still the least favorite food of the majority of the children. However, the unpopularity of liver showed a noticeable increase. In contrast, mixed dishes were much more accepted now than they were during the preschool age.

The elementary school child appeared to eat a smaller proportion of his total food intake as snacks. The types of foods eaten as snacks were consistent from preschool to elementary school for most individuals.

Growth data showed most children to be maintaining a constant rate of growth. More children appeared to be growing heavier than were growing taller.

These data stress the importance of the preschool years as a training period for good nutrition in later life. Children are great imitators,

and their family's food habits soon become second nature to them. In light of this, nutrition education needs to be aimed at the family as a whole--parents as well as children--in order to improve the nutritional status of a population.

Suggestions for Future Research

This investigator recommends a resurvey of this group of children at three-year intervals. Such a longitudinal study would add to our knowledge of the effects of early eating habits on later nutritional status and health.

The problem of anemia has been extensively studied in infants, adolescent girls, and women of child-bearing age. In view of the fact that several of these children were reported to be anemic, additional research in this area seems warranted. It is recommended that blood samples from these children be analyzed for serum iron, as well as for hemoglobin and hematocrit, in order to determine the extent of this problem among elementary school children, and its relation to nutritional intake.

The marked increase in dental caries as reported by the parents indicates a need for further study of the diets in relation to sucrose and total carbohydrate content. The determination of the DMF score by a public health dentist would give a sound basis for comparing the incidence of caries with the diet.

This study revealed that the percentage of fat in the diets of the children both at the preschool and the elementary school age corresponds to the American Heart Association (1961) recommendation of 35%. Heald et al. (1969) has reported that adolescent diets contain 40-43% fat. The average American diet contains 40-45% fat (U. S. Department of Agriculture, 1955). Continued study of the diets of these children should indicate the

period during which this change occurs. In addition, the investigator should look at the types of food eaten, and the meal patterns which accompany this increase in fat consumption, as well as other parameters which may be causative factors.

In this study, a number of children had a tendency to be heavy for their height. This suggests a possible incidence of overweight children. A resurvey of this group might well include a more definitive study of these anthropometric measures. All existing height and weight records should be collected from hospital, parental, and school sources, and should be evaluated in relation to the heights and weights of each child's parents.

The mother's perception of her child as overweight, underweight, or just right may be related to her expectations for her child and her own self-image. Are these significant factors in the development of overweight or obese children?

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APPENDICES

APPENDIX A

Correspondence

1. Initial letter to parents
2. Letter of thanks and appreciation

APPENDIX A-1

Initial letter to parents

MICHIGAN STATE UNIVERSITY, East Lansing, Michigan 48823

College of Human Ecology - Dept. of Food Science and Human Nutrition

May 14, 1971

Dear

While your child was enrolled in the Laboratory Preschool at Michigan State University, you participated in a nutrition survey. Your help in that survey was very much appreciated.

Now that your child is in elementary school, we would like to resurvey his food habits. This interview will take place during the fall, and we will ask the same type of questions as the first one.

In addition, we want to evaluate methods of taking better nutrition histories. This will involve perhaps an additional half hour to an hour of your time.

Would you please fill out the enclosed postcard and return it to me as soon as possible? You will be contacted by mail early in the fall for an appointment.

Thank you for your help.

Sincerely,

Nancy Beyer
Graduate Student

Dr. Portia Morris
Associate Professor

APPENDIX A-2

Letter of thanks and appreciation

MICHIGAN STATE UNIVERSITY, East Lansing, Michigan 48823

College of Human Ecology - Institute for Family and Child Study

February 8, 1972

Dear

Now that we have completed the data collection for studying the nutritional status of elementary school children, we would like to thank you for your valuable assistance in this project. Without your help in recording your child's daily food intake, and in bringing us up-to-date on his eating habits, this study will not be possible.

We would also like to thank each child for letting us take height and weight measurements, and for keeping track of the food items he ate while away from home.

The next few months will be spent analyzing the data, and hopefully the study will be completed late this spring or summer. At that time we will send you a brief summary of the study.

Sincerely,

Nancy Beyer
Graduate Student

Dr. Portia Morris
Associate Professor

APPENDIX B

Instruments

1. Food Intake Recording Form
2. Home Interview Schedule

APPENDIX B-1

Food Intake Recording Form

Code Number _____ Name _____

Day _____

TWENTY-FOUR HOUR FOOD INTAKE

Record your child's food intake on two days of this week. Record everything that is eaten at meals and between meals. Indicate the amount eaten in household measurements, that is, in cup or tablespoon measurements. Please be as explicit as possible.

Breakfast: Time: _____ a.m.

	Amount:
Fruit:	
Orange juice	_____
Other Citrus juice	_____
Other juice	_____
Citrus fruit	_____
Other fresh fruit	_____
Canned fruit	_____
Dried fruit	_____
Cereal:	
Ready-to-eat plain or sugar-coated	_____
Cooked	_____
Milk or Cream on Cereal:	
Skim milk	_____
Low fat milk	_____
Whole milk	_____
Half and half or light cream	_____
Sugar on Cereal:	_____
Bread:	
White	_____
Whole wheat	_____
Rye	_____
Other bread	_____
Spread:	
Butter	_____
Margarine	_____
Other Spread:	
Jam, jelly, preserves, or honey	_____
Cinnamon sugar	_____

	Amount:
Egg:	
Whole	_____
Scrambled	_____
Bacon:	_____
Milk:	
Skim	_____
Low fat	_____
Whole	_____
Whole, vitamin D	_____
Chocolate	_____
Other Beverage:	
Cocoa	_____
Coffee or Tea	_____
Milk or Cream in Beverage:	
Skim milk	_____
Low fat milk	_____
Whole milk	_____
Half and half or light cream	_____
Sugar in Beverage:	_____
Other Foods:	
_____	_____
_____	_____
_____	_____

Between Breakfast and Noon Meal:

Food Eaten:	Time:	Amount:
_____	_____ a.m.	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Noon Meal: Time: _____ a.m.

Soup:	Amount:
Broth base	_____
Cream soup	_____
Main Dish:	
Beef, pork, veal, lamb, or poultry	_____
Liver	_____
Fish	_____
Prepared meat (as frankfurters, luncheon meat, canned meat, sausage)	_____
Casserole with meat or fish	_____
Casserole without meat or fish	_____
Cheese	_____
Egg	_____

	Amount:
Vegetables:	
Dried peas or beans (or in dishes such as chili)	_____
Potatoes	
White	_____
Sweet	_____
Chips	_____
Green and yellow	_____
Other	_____
Bread and Cereal:	
Bread	
White	_____
Whole wheat	_____
Rye	_____
Other Bread	_____
Crackers	_____
Macaroni, rice, spaghetti, noodles	_____
Spread (on bread, potato, vegetables):	
Butter	_____
Margarine	_____
Other Spread:	
Jam, jelly, preserves, or honey	_____
Gravy:	_____
Salad Dressing:	_____
Milk:	
Skim	_____
Low fat	_____
Whole	_____
Whole, vitamin D	_____
Chocolate	_____
Buttermilk	_____
Other Beverage:	
Citrus juice or alternate	_____
Other juice	_____
Coffee or tea	_____
Soft drink	_____
Low calorie soft drink	_____
Other (as Koolaid)	_____
Milk or Cream in Beverage:	
Skim milk	_____
Low fat milk	_____
Whole milk	_____
Half and half or cream	_____
Sugar in Beverage:	_____

Dessert:	Amount:
Citrus fruit or alternate	
Other fresh fruit	
Canned fruit	
Dried fruit	
Jello	
Custard	
Milk dessert (as pudding, ice cream)	
Other dessert (as cake, pie, cookies, doughnuts, brownies)	

Other Foods:

Between Noon and Evening Meals:

Food Eaten:	Time:	Amount:
	p.m.	

Evening Meal: Time: p.m.

Main Dish:	Amount:
Beef, pork, veal, lamb, or poultry	
Liver	
Fish	
Prepared meat (as frankfurter, luncheon meat, canned meat, sausage)	
Casserole with meat or fish	
Casserole without meat or fish	
Cheese	
Egg	

Vegetables:	
Dried peas or beans (or in dishes such as chili)	
Potatoes	
White	
Sweet	
Chips	
Green and yellow	
Other	

Bread and Cereal:	
Bread	
White	
Whole wheat	
Rye	
Other bread	

	Amount:
Crackers	
Macaroni, rice, spaghetti, noodles	
Spread (on bread, potato, vegetables):	
Butter	
Margarine	
Other Spread:	
Jam, jelly, preserves, or honey	
Gravy:	
Salad Dressing:	
Milk:	
Skim	
Low fat	
Whole	
Whole, vitamin D	
Chocolate	
Other Beverage:	
Citrus juice	
Other juice	
Coffee or tea	
Soft drink	
Low calorie soft drink	
Other (as Koolaid)	
Milk or Cream in Beverage:	
Skim milk	
Low fat milk	
Whole milk	
Half and half or cream	
Sugar in Beverage:	
Dessert:	
Citrus fruit	
Other fresh fruit	
Canned fruit	
Dried fruit	
Jello	
Custard	
Milk dessert (as pudding, ice cream)	
Other dessert (as cake, pie, cookies, doughnuts, brownies)	
Other Foods:	
_____	
_____	
_____	

Between Evening Meal and Bedtime:

Foods Eaten:	Time:	Amount:
_____	_____ p.m.	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Is this day's intake usual? _____ more than usual? _____

less than usual? _____

APPENDIX B-2

Home Interview Schedule

NUTRITION INTERVIEW

Child's Name _____ Father's Name _____

3. Grade _____ Mother's Name _____

4-6. Identification Number _____ Address _____

7. Sex: 1. Male; 2. Female _____

8-13. Birthdate (month/day/year) ___/___/___

14-15. Elementary School _____

Interview Appointment Information _____

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* *

Introduction

We are conducting a study to learn more about the growth and eating habits of early elementary school children. While your child was enrolled in the Laboratory Preschool at MSU, you participated in a nutrition survey. Now that your child is in elementary school, we would like to resurvey his food habits. This study should answer several important questions, and you alone, as a parent of a young child, can supply the information we need.

There are no "right" or "wrong" answers to the questions you will be asked. All participants will be assigned a code number and responses will be analyzed by computer, so you may be sure that your answers will be kept confidential. Please answer the questions as frankly and accurately as possible.

HOUSEHOLD CHARACTERISTICS

Family Members (names)	Relationship to Participating Child	Age	Sex	State of Health	Highest No. Years School Completed	Occupation
1.						
2.						
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						

PLEASE DO NOT WRITE IN THIS SPACE

Total number of persons in household _____ 16
Total number of persons in family unit _____ 17
Total number of adults in household _____ 18
Total number of parents in household _____ 19
Total number of children in family unit _____ 20
Ordinal position of participating child _____ 21
Parent marital status _____ 22
Family parental status _____ 23

First, we would like some information about _____'s health record and medical history.

24. Birth Weight _____

	Mother	Father
25-30. Present Height	_____	_____
31-36. Present Weight	_____	_____

37. Has _____ recently been allergic to any foods?

0. No
   Yes. If so, which foods is _____ allergic to now?
1. Milk
2. Eggs
3. Meat
4. Fruit, specify _____
5. Combination of foods: _____
6. Other, specify _____

38. Is _____ on a special diet now?

0. No
   Yes. Why is he on this diet?
1. Weight reduction -- own prescription.
2. Weight reduction -- physician's prescription.
3. For gaining weight.
4. Other, specify _____.

39. Has _____ been anemic since starting school?

0. Don't know.
1. No.
   Yes. At what age was anemia present?
2. 5-6 years.
3. 7-8 years.

40. Was medication prescribed for the anemia?

0. Not applicable
1. No
2. Yes

41. Have you consulted a physician about feeding problems with _____ since starting school?

0. No
   Yes. At what age?
1. 5-6 years
2. 7-8 years

42. Do you give _____ a vitamin/mineral supplement?

0. No
   Yes. Name _____
1. Multivitamin
2. Vitamin-mineral
3. Multivitamin plus iron
4. Single vitamin (e.g. Vitamin C)
5. Group of vitamins (e.g. B complex)
6. Iron
7. Other, specify: _____

43. How often is this given?

0. Not applicable
1. Daily
2. 3-6 times/week
3. Once a week
4. Only occasionally

44. Do you give _____ any other kind of supplement of health food (e.g. wheat germ)?

0. No
1. Yes Kind _____
Reason _____

45. If you do give any supplements, on whose recommendation?

0. Not applicable
1. Physician
2. Friend or relative
3. Your own

46. Do you think _____'s diet is nutritionally adequate?

0. No
1. Yes
How could _____'s diet be improved? _____

_____

47. What kind of attention does _____ receive at meals?

1. Scolding
2. Coaxing
3. Forcing
4. Praise
5. Other or combination, specify _____

48. Do any members of your immediate family have any disease or condition (e.g. diabetes) which requires a special diet?

0. No
1. Yes Who? _____ Condition _____

49. How much sleep does _____ get on the average each day?

0. Don't know
1. Less than 8 hours
2. 8-9 hours
3. 10-12 hours
4. 13-15 hours
5. More than 15 hours

50. When was the last time that _____ was examined by a physician?

0. Don't know
1. Never
2. Less than one month ago
3. 1-6 months ago
4. 7-12 months ago
5. More than 1 year ago

51. What was the reason for _____ last seeing a physician?

0. Does not apply
1. Don't know
2. Routine check-up
3. Injury
4. Illness
5. Immunization
6. Other, specify _____

52. When was _____ last examined by a dentist?

0. Never
1. Don't know
2. Less than one month ago
3. 1-6 months ago
4. 7-12 months ago
5. More than one year ago

53. What was his reason for seeing the dentist?

0. Does not apply
1. Don't know
2. Routine check-up
3. Injury
4. Tooth extraction
5. Tooth filled
6. Other, specify _____

54. Does _____ have any filled teeth?

0. No
   Yes. How many? _____
1. 1
2. 2-4
3. 4-8
4. More than 8

Now we would like some information about _____'s usual eating habits.

55. Does _____

1. Come home for lunch?
2. Carry his lunch to school?
3. Purchase milk at school? How much does it cost? _____
4. Purchase lunch at school? How much does it cost? _____

56. Does _____ eat at school, other than for lunch (e.g. snacks)?

0. No
1. Yes. Describe _____

57. How active is _____?

1. Constantly 'on the go' (e.g. running, jumping, playing ball).
2. Sometimes active, sometimes quiet during the course of a day.
3. Generally prefers quiet activities (e.g. reading, watching TV, playing records).

58. What sort of attitude does _____ have toward food?

1. Enjoys eating
2. Attitude varies
3. Indifferent to food
4. Has to be urged to eat
5. Presents an eating problem

59. Does _____ ever help you prepare food?

0. No
   Yes How often?
1. Every day
2. Several times a week
3. Once a week
4. Less than once a week

What type of work (e.g. making salads, baking cookies)? _____

_____

60. Does _____ ever prepare his own meals?

0. No
   Yes Which ones?
1. Breakfast
2. Lunch
3. Dinner
4. Breakfast and lunch
5. Breakfast and dinner
6. Lunch and dinner
7. Breakfast, lunch and dinner

61. How often?

0. Does not apply
1. Every day
2. Occasionally
3. Infrequently

Explain _____

_____

_____

62. Does _____ have any specific chores or duties?

0. None
1. Setting table
2. Clearing table
3. Washing dishes/loading dishwasher
4. Making bed
5. Other, specify _____

63. How does your family generally accept new foods or new recipes?

1. Enthusiastically
2. Willingly
3. Cautiously
4. Reluctantly
5. Not at all
6. Other, specify _____

64. What is _____'s attitude toward school?

1. Enjoys school
2. Indifferent
3. Dislikes school

How often does your total family eat meals together during the week?

Meal	1. Never	2. Less than ½ the time	3. ½ the time or more	4. Almost always
65. Breakfast				
66. Lunch				
67. Dinner				
68. Other, e.g. snacks				

69. Do children eat at the same time as the adults in your family?

1. Yes, almost always
2. Usually
3. Only occasionally (4-6 times a week)
4. Rarely
5. Never

70. How important do you think it is that a child eats everything he has been served on his plate?

1. Not at all
2. Slightly
3. Moderately
4. Considerably
5. Extremely

What time does _____ usually eat

71. Breakfast ____:____ 72. Lunch ____:____ 73. Dinner ____:____

74. Where is breakfast usually eaten?

1. Home
2. School
3. Other, specify _____

75. Where is lunch usually eaten?

1. Home
2. School
3. Other, specify _____

76. Where is dinner usually eaten?

1. Home
2. Other, specify _____

77. Does _____ eat in the morning before breakfast?

0. No
Yes. How often?
1. Every day 2. 2-3 times/week 3. Less than once a week

78. Does _____ eat between breakfast and lunch?

0. No
Yes. How often?
1. Every day 2. 2-3 times/week 3. Less than once a week

79. Does _____ eat between lunch and dinner?

0. No
Yes. How often?
1. Every day 2. 2-3 times/week 3. Less than once a week

80. Does _____ eat between dinner and bedtime?

0. No
Yes. How often?
1. Every day 2. 2-3 times/week 3. Less than once a week

Card 2

7. Does _____ ever miss any meals?

0. No
Yes. Which does he miss most often?
1. Breakfast 2. Lunch 3. Dinner

8. Why does _____ miss meals?

0. Does not apply
1. Lack of time
2. Illness
3. Lack of appetite
4. Other, specify _____

9. At what time of day does _____ seem to be the most hungry for snacks?

   1. Before lunch 2. After school 3. After dinner

10. Would you describe _____'s appetite in the past 3 months as

    1. Excellent 2. Good 3. Fair 4. Poor

11. What foods does _____ like particularly well? Itemize specific foods _____

    _____

    _____

12. What is _____'s favorite food? _____

13. What foods does _____ dislike? Itemize _____

    _____

14. Does _____ refuse to eat any foods?

    0. No
    1. Yes. What are they _____

When planning meals for your family, are you influenced by the following:

		0. No	1. Yes
15.	Cost of the food		
16.	Time required for preparation		
17.	Likes of the family		
18.	Your own likes		
19.	Health needs of the family		
20.	Nutritive value of the food		

21. Which do you believe is the most import influence? (Circle)

Do you think this child:

		0. No	1. Yes
22.	Eats too little food		
23.	Eats too much food		
24.	Chooses a limited variety of foods		
25.	Eats too few fruits and vegetables		
26.	Dawdles with his food		
27.	Eats too much meat		
28.	Eats too little meat		
29.	Drinks too much milk		
30.	Drinks too little milk		
31.	Eats too many sweets		

32. Other, specify _____

33. How do you perceive your child?

1. Overweight
2. Average weight for height
3. Underweight

34. When does _____ seem to be the hungriest?

1. Before breakfast
2. Before lunch
3. Before dinner
4. After dinner

Card 3

Now we would like you to indicate _____'s usual intake of food during the past 3 months. Indicate frequency with which food is eaten and usual portion size.

	MILK	None	1 cup a day	2 cups a day	3 cups a day	1 qt. or more a day
7.	Skim	0	1	2	3	4
8.	Low fat	0	1	2	3	4
9.	Whole (Vitamin D)	0	1	2	3	4
10.	Chocolate	0	1	2	3	4
11.	Cocoa (made with milk)	0	1	2	3	4
12.	Buttermilk	0	1	2	3	4

13-14. Cream: Half and half or light coffee cream

How often?	Size of portion
0. Never	0. None
1. Less than once a week	1. 2 tablespoons
2. Once a week	2. ¼ cup
3. 2 to 3 times a week	3. ½ cup
4. More than 3 times a week	4. More than ½ cup

15-16. Whipping cream

0. Never	0. None
1. Less than once a week	1. 2 tablespoons
2. Once a week	2. ¼ cup
3. 2 to 3 times a week	3. ½ cup
4. More than 3 times a week	4. More than ½ cup

17-18. Sour Cream

0. Never	0. None
1. Less than once a week	1. 2 tablespoons
2. Once a week	2. ¼ cup
3. 2 to 3 times a week	3. ½ cup
4. More than 3 times a week	4. More than ½ cup

CHEESE

19-20. Cheddar or American

0. Never	0. None
1. Less than once a week	1. 1 oz.
2. 1 to 2 times a week	2. 2 oz.
3. 3 to 4 times a week	3. More than 2 oz.
4. 5 times a week or more	

21-22. Swiss

0. Never	0. None
1. Less than once a week	1. 1 oz.
2. 1 to 2 times a week	2. 2 oz.
3. 3 to 4 times a week	3. More than 2 oz.
4. 5 times a week or more	

23-24. Cottage cheese

0. Never	0. None
1. Less than once a week	1. ¼ cup
2. 1 to 2 times a week	2. ½ cup
3. 3 to 4 times a week	3. More than ½ cup
4. 5 times a week or more	

25-26. Cream cheese

0. Never	0. None
1. Less than once a week	1. 2 tablespoons
2. 1 to 2 times a week	2. ¼ cup
3. 3 to 4 times a week	3. More than ¼ cup
4. 5 times a week or more	

27-28. Yogurt

0. Never	0. None
1. Less than once a week	1. ¼ cup
2. 1 to 2 times a week	2. ½ cup
3. 3 to 4 times a week	3. More than ½ cup
4. 5 times a week or more	

EGGS

29-30. Whole

0. Never	0. None
1. Less than once a week	1. 1
2. Once a week	2. 2
3. 2 to 3 times a week	3. More than 2
4. More than 3 times a week	

31-32. Scrambled

0. Never	0. None
1. Less than once a week	1. ¼ cup
2. Once a week	2. ½ cup
3. 2 to 3 times a week	3. More than ½ cup
4. More than 3 times a week	

33-34. French toast

	Number of slices
0. Never	0. None
1. Less than once a week	1. 1
2. Once a week	2. 2
3. 2 to 3 times a week	3. More than 2
4. More than 3 times a week	

35. Egg salad

0. Never
1. Less than once a week
2. Once a week
3. 2 to 3 times a week
4. More than 3 times a week

MEAT, POULTRY, FISH

36-37. Liver

0. Never	0. None
1. Less than once a week	1. 1 oz.
2. 1 to 2 times a week	2. 2 oz.
3. 3 to 4 times a week	3. 3 to 4 oz.
4. 5 or more times a week	

38-39. Fish (including tuna)

0. Never	0. None
1. Less than once a week	1. 1 oz.
2. 1 to 2 times a week	2. 2 oz.
3. 3 to 4 times a week	3. 3 to 4 oz.
4. 5 or more times a week	

40-41. Prepared meat (such as frankfurters, luncheon meat, canned meat, sausage)

0. Never	0. None
1. Less than once a week	1. 1 oz.
2. 1 to 2 times a week	2. 2 oz.
3. 3 to 4 times a week	3. 3 to 4 oz.
4. 5 or more times a week	

42-43. Beef, veal, pork, lamb, poultry

0. Never	0. None
1. Less than once a week	1. 1 oz.
2. 1 to 2 times a week	2. 2 oz.
3. 3 to 4 times a week	3. 3 to 4 oz.
4. 5 or more times a week	4. More than 4 oz.

44. Casserole with meat

0. Never
1. Less than once a week
2. 1 to 2 times a week
3. 3 to 4 times a week
4. 5 or more times a week

FRUITS

45-46. Citrus juice or alternate (such as Tang, Awake)

0. Never	0. None
1. Less than once a week	1. $\frac{1}{4}$ cup
2. 1 to 2 times a week	2. $\frac{1}{2}$ cup
3. 3 to 4 times a week	3. More than $\frac{1}{2}$ cup
4. 5 or more times a week	

47-48. Other juice

0. Never	0. None
1. Less than once a week	1. $\frac{1}{4}$ cup
2. 1 to 2 times a week	2. $\frac{1}{2}$ cup
3. 3 to 4 times a week	3. More than $\frac{1}{2}$ cup
4. 5 times or more a week	

49-50. Citrus fruit (or other fruit rich in Vitamin C)

0. Never	0. None
1. Less than once a week	1. Small
2. 1 to 2 times a week	2. Medium
3. 3 to 4 times a week	3. Large
4. 5 times or more a week	

51-52. Other fresh fruit

0. Never	0. None
1. Less than once a week	1. Small
2. 1 to 2 times a week	2. Medium
3. 3 to 4 times a week	3. Large
4. 5 times a week or more	

53-54. Canned fruit

0. Never	0. None
1. Less than once a week	1. 2 tablespoons
2. 1 to 2 times a week	2. $\frac{1}{4}$ cup
3. 3 to 4 times a week	3. $\frac{1}{2}$ cup
4. 5 times a week or more	

55-56. Dried fruit

0. Never	0. None
1. Less than once a week	1. 2 tablespoons
2. 1 to 2 times a week	2. $\frac{1}{4}$ cup
3. 3 to 4 times a week	3. $\frac{1}{2}$ cup
4. 5 times a week or more	4. More than $\frac{1}{2}$ cup

VEGETABLES

57-58. Dried peas or beans, cooked (or in dishes such as chili)

0. Never	0. None
1. Less than once a week	1. 2 tablespoons
2. 1 to 3 times a week	2. $\frac{1}{4}$ cup
3. 4 to 5 times a week	3. More than $\frac{1}{4}$ cup
4. 6 times a week or more	

59-60. White Potatoes

0. Never	0. None
1. Less than once a week	1. $\frac{1}{4}$ cup
2. 1 to 3 times a week	2. $\frac{1}{2}$ cup
3. 4 to 5 times a week	3. More than $\frac{1}{2}$ cup
4. 6 times a week or more	

61-62. Sweet Potatoes

0. Never	0. None
1. Less than once a week	1. ¼ cup
2. 1 to 3 times a week	2. ½ cup
3. 4 to 5 times a week	3. More than ½ cup
4. 6 times or more	

63-64. Dark green and deep yellow vegetables (such as greens, carrots, broccoli, yellow squash)

0. Never	0. None
1. Less than once a week	1. 2 tablespoons
2. 1 to 3 times a week	2. ¼ cup
3. 4 to 5 times a week	3. ½ cup
4. 6 times or more a week	4. More than ½ cup

65-66. Vitamin C vegetables (such as tomatoes, raw cabbage)

0. Never	0. None
1. Less than once a week	1. 2 tablespoons
2. 1 to 3 times a week	2. ¼ cup
3. 4 to 5 times a week	3. ½ cup
4. 6 times a week or more	4. More than ½ cup

67-68. Other vegetables

0. Never	0. None
1. Less than once a week	1. 2 tablespoons
2. 1 to 3 times a week	2. ¼ cup
3. 4 to 5 times a week	3. More than ¼ cup
4. 6 times a week or more	

BREAD AND CEREAL

69-70. White bread

	Amount per day
0. Never	0. None
1. Less than once a week	1. 1 slice
2. 1 to 3 times a week	2. 2 slices
3. 3 to 4 times a week	3. 3 slices
4. 5 times a week or more	4. More than 3 slices

71-72. Whole Wheat bread

0. Never	0. None
1. Less than once a week	1. 1 slice
2. 1 to 2 times a week	2. 2 slices
3. 3 to 4 times a week	3. 3 slices
4. 5 times a week or more	4. More than 3 slices

73-74. Rye bread

0. Never	0. None
1. Less than once a week	1. 1 slice
2. 1 to 2 times a week	2. 2 slices
3. 3 to 4 times a week	3. 3 slices
4. 5 times a week or more	4. More than 3 slices

75. Other breads (sweet rolls, etc.)

0. Never
1. Less than once a week
2. 1 to 2 times a week
3. 3 to 4 times a week
4. 5 times a week or more

Card 4

Cereal

7-8. Ready-to-eat

0. Never	0. None
1. Less than once a week	1. ½ cup
2. 1 to 2 times a week	2. 3/4 cup
3. 3 to 4 times a week	3. 1 cup
4. 5 times a week or more	4. More than 1 cup

9-10. Cooked

0. Never	0. None
1. Less than once a week	1. ½ cup
2. 1 to 2 times a week	2. 1 cup
3. 3 to 4 times a week	3. More than 1 cup
4. 5 times a week or more	

11-12. Macaroni, rice, spaghetti, noodles

0. Never	0. None
1. Less than once a week	1. ¼ cup
2. 1 to 2 times a week	2. ½ cup
3. 3 to 4 times a week	3. 1 cup
4. 5 times a week or more	4. More than 1 cup

13. Waffles and pancakes

0. Never
1. Less than once a week
2. Once a week
3. 2 to 3 times a week
4. More than 3 times a week

DESSERTS

14-15. Jello

0. Never	0. None
1. Less than once a week	1. ¼ cup
2. 1 to 2 times a week	2. ½ cup
3. 3 to 4 times a week	3. More than ½ cup
4. 5 times a week or more	

16-17. Custard

0. Never	0. None
1. Less than once a week	1. ¼ cup
2. 1 to 2 times a week	2. ½ cup
3. 3 to 4 times a week	3. More than ½ cup
4. 5 times a week or more	

18-19. Pudding

0. Never	0. None
1. Less than once a week	1. ¼ cup
2. 1 to 2 times a week	2. ½ cup
3. 3 to 4 times a week	3. 1 cup
4. 5 times a week or more	4. More than 1 cup

20-21. Ice cream

0. Never	0. None
1. Less than once a week	1. ¼ cup
2. 1 to 2 times a week	2. ½ cup
3. 3 to 4 times a week	3. 1 cup
4. 5 times a week or more	4. More than 1 cup

22. Other desserts (such as cake, pie, cookies, doughnuts, brownies)

0. Never
1. Less than once a week
2. 1 to 2 times a week
3. 3 to 4 times a week
4. 5 times a week or more

FATS

		None	1 tbsp. a day	2 tbsp. a day	more than 2 tbsp. a day
23.	Butter	0	1	2	3
24.	Margarine	0	1	2	3

25-26. Bacon

0. Never	0. None
1. Less than once a week	1. 1 slice
2. 1 to 2 times a week	2. 2 slices
3. 3 to 4 times a week	3. More than 2 slices
4. 5 times a week or more	

27. Gravy

0. Never
1. Less than once a week
2. 1 to 2 times a week
3. 3 to 4 times a week
4. 5 times a week or more

28. Salad dressing

0. Never
1. Less than once a week
2. 1 to 2 times a week
3. 3 to 4 times a week
4. 5 times a week or more

SUGARS

	None	1 tsp. a day	1 tbsp. a day	more than 1 tbsp. a day
29. Sugar	0	1	2	3

30-31. Jam, jelly, preserves, honey

0. Never
1. Less than once a week
2. 1 to 2 times a week
3. 3 to 4 times a week
4. 5 times a week or more

0. None
1. 1 tbsp.
2. 2 tbsp.
3. More than 2 tbsp.

32. Molasses and syrup

0. Never
1. Less than once a week
2. 1 to 2 times a week
3. 3 to 4 times a week
4. 5 times a week or more

33. Candy

0. Never
1. Less than once a week
2. 1 to 2 times a week
3. 3 to 4 times a week
4. 5 times a week or more

MISCELLANEOUS

34-35. Broth base soup

0. Never
1. Less than once a week
2. 1 to 2 times a week
3. 3 to 4 times a week
4. 5 times a week or more

0. None
1. ½ cup
2. 1 cup
3. More than 1 cup

36-37. Cream soup

0. Never	0. None
1. Less than once a week	1. ½ cup
2. 1 to 2 times a week	2. 1 cup
3. 3 to 4 times a week	3. More than 1 cup
4. 5 times a week or more	

38. Pizza

0. Never
1. Less than once a week
2. 1 to 2 times a week
3. 3 to 4 times a week
4. 5 times a week or more

39-40. Peanut butter

0. Never	0. None
1. Less than once a week	1. 1 tablespoon
2. 1 to 2 times a week	2. 2 tablespoons
3. 3 to 4 times a week	3. More than 2 tablespoons
4. 5 times a week or more	

		Never	Less than once/wk	1 to 2 times/wk	3 to 4 times/wk	5 or more times/wk
41.	Nuts	0	1	2	3	4
42.	Popcorn	0	1	2	3	4
43.	Pretzels	0	1	2	3	4
44.	Potato Chips	0	1	2	3	4
45.	Olives, pickles, relish	0	1	2	3	4
46.	Chocolate syrup	0	1	2	3	4
47.	Tea or coffee	0	1	2	3	4

48-49. Soft drinks

Regular	Low calorie
0. Never	0. Never
1. Less than once a week	1. Less than once a week
2. 1 to 2 times a week	2. 1 to 2 times a week
3. 3 to 4 times a week	3. 3 to 4 times a week
4. 5 times a week or more	4. 5 times a week or more

50. Other drinks (Koolaid)

0. Never
1. Less than once a week
2. 1 to 2 times a week
3. 3 to 4 times a week
4. 5 times a week or more

Card 2

Nutrition Education

35. What foods do you think you should serve your child every day? (Record answer verbatim; probe for specific foods.)

_____

_____

36. Have you taken any classes or attended any group activities concerned with food and nutrition since the last interview

0. No
   Yes. Which?
1. College, professional training
2. Adult education classes
3. Public health classes, clinics, prenatal classes
4. Other, specify _____

37. There are many people from whom homemakers can get information concerning needs of families. Which of the following persons has recently influenced you the most? (Circle)

0. No one
1. Mother or other relative
2. Friends or neighbors
3. Physician
4. Dentist
5. Nurse
6. Home economist, dietician, or nutritionist
7. Other, specify _____

38. What sources of information about family food needs do you now use?

1. Books
2. Magazines
3. Extension and other government bulletins
4. Television
5. Radio
6. Newspapers
7. Other, specify _____

39. Which is the most valuable? (Underline)

IMPRESSION OF INTERVIEW

Identification Number _____

1. The information from this mother (is/is not/is partly) reliable.

   Comments _____

2. The mother (was/was not) cooperative.

3. Did the mother attempt to give a false impression about any question(s), perhaps because she felt she was being judged? _____

   Discuss _____

4. Did the mother appear to know enough about nutrition to insure a reasonable adequate intake for the child? _____

5. Was the mother interested that the child have an adequate diet? _____