

SNACKING; THE EFFECTS OF NUTRITION EDUCATION

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## CHAPTER I

### INTRODUCTION

Children are the future of any society. Children comprise approximately 35 percent of the total population of the United States today. Concern for the well-being of the future society to be composed of today's children must include their nutritional health. The foods children eat affect their growth, development, ability to learn, and general behavior. Nutrition, most particularly during the period of growth and development, is one of the greatest determinants of human health and well-being.

Snacking has become part of the American culture; it has become America's favorite way to eat. According to U.S. government figures, this country spends \$2 billion a year purchasing potato chips, pretzels, corn chips, and other puffed snacks. A 1966 survey revealed that the average American consumed eighteen gallons of carbonated beverages a year. Today, more than ever, there are more opportunities to make poor food choices because of the broad array of new foods available. Therefore, according to the historical trends that indicate children acquire a major

source of food intake through snacking, they must be taught how to snack.

Food habits which build good health are not acquired naturally, they must be learned. The school classroom provides an excellent opportunity to encourage the development of positive attitudes towards food and to counteract the false and misleading claims about the nutritional value of foods to which children are frequently exposed in our society.

The investigator anticipates, through this study, to show how the nurse can successfully perform the function of imparting nutrition information adapted to the child's level of cognitive development. The desired end result should be improved nutritional snacking practices. As a member of the health profession, involved in the educational system, the school nurse can work with the primary teacher in developing favorable snacking behaviors by initiating a planned nutrition learning system.

#### Statement of the Problem

The problem of this study was to investigate the snack preferences and snack consumptions of a group of first-grade children and to determine the effects of a planned nutrition learning system on these children's snack preferences and snack consumptions.

### Purposes

The specific purposes of this study were to:

1. Determine the snack preferences of a group of first-grade children
2. Discover the snack consumptions of the participating group
3. Develop and implement a nutritional educational tool designed to increase the snack consumption of more nutritious foods of the participating group
4. Evaluate the effects of the educational tool on the selected group's snack preferences and snack consumptions.

### Theoretical Framework

#### Introduction:

I hear and I forget; I see and I remember;  
I do and I understand (Chinese Proverb, original  
source unknown, as cited in Goodwin and Pollen  
1974, p. 1).

It is hypothesized that a significant number of school-age children do not demonstrate the kinds of behavior that the school is capable of developing in them. For years children have been told to eat particular foods because they were good for them. Today, it is realized that such a reason is not enough. Changes are needed in educators' attitudes, approaches, and teaching techniques to find new



ways to encourage children to adopt good nutritional habits. A broadly based theory of how intelligence develops in the child and what an education system can best do to facilitate development is needed. When there is a theoretical understanding of why things are done that seems to "work" or "feel right," there will be more intuitive wisdom on which to base effective methods of teaching (Furth 1970).

Piaget (1969) presented a highly scientific and clinically valid way to reveal how a child learns and how he matures intellectually. Piaget viewed intellectual growth of a child as developing through a series of periods. The sequence of these periods being important, but the ages at which the children reach any period can vary considerably. The sensory-motor period, generally until the age of two years, is the period during which the infant is acquiring experience through his senses and absorbing it into himself as patterns of behavior. Piaget used the word "assimilation" for the absorbing of such experience and "accommodation" for the adaptation that goes on when the schema built up by previous experience has to be adapted to new, and perhaps unexpected experience. This absorption of sensory-motor experience and enrichment of schemata goes on all our lives, throughout all the periods of intellectual development (Piaget and Inhelder 1969).

The preconceptual period lasts, in most children, until the age of four. During this period the child's intellectual growth lies in building up of ideas or notions that in the next period will become concepts founded from the common properties in classes of things and of actions. During this preconceptual period, however, the notions are not well established. The intuitive period lasts, in most children throughout elementary school and very often throughout the first year of junior high school. This is the period during which many of the basic concepts are being formed. If a child's education is handled wrong at this time the concepts can be prevented from forming healthily or a distorted alternative concept can form. A concept becomes an integrated and dynamic part of a child's self (Piaget and Inhelder 1969).

This study is built on the premise that "to teach is to guide" and that "we need students who are active, who learn early to find out by themselves, partly by their own spontaneous activity and partly through material set up for them" (Piaget and Inhelder 1969, p. 35). Piaget's view of the developing intelligence proves to be a viable alternative to other philosophies of teaching and learning now in practice (Furth 1970).

### Background and Significance

A century ago, when our country was mainly rural, a store sold fewer than one hundred different food items consisting mainly of drugs, staples, and produce from nearby farms. Meals were eaten at home, prepared daily from basic ingredients. Perishables were eaten as quickly as possible, or converted into butter, cheese, sausage, and other items that kept longer (Hunter 1971). Today, with a population that is more than 90 percent urban, eating habits and food technology have undergone radical changes. Practically all urban residents eat at least one meal a day away from home. There is also an increased use of "convenience foods" in schools through vending machines. The tendency for snacking arises from this pattern which includes eating away from home and in a hurry. Such a pattern grew logically from a situation where people work long hours away from home in field or factory or office; and where little food was available except at home (Giffit, Washbon, and Harrison 1972).

The idea that food was to be eaten three times a day and only three times became thoroughly entrenched in our concept of what was right and wholesome. This notion prevailed long beyond the time when it was a cultural necessity, but it is fast disappearing because a more

casual eating pattern now better suits our cultural needs (Gifft, Washbon, and Harrison 1972).

Results of the first Health and Nutrition Examination Survey (HANES) have been released, and conclusions drawn from the data have shown that poor nutrition is a fact of life for many Americans. It is not confined to any particular age or socioeconomic group. The most prevalent nutritional problem indicated from the results is widespread iron deficiency. Dietary intakes considered deficient were found especially in children one to five years. Other nutrients analyzed in the report to be deficient were calcium and vitamins A and C (Abraham, Lowenstein, and Johnson 1972). The HANES results seem to confirm evidence of poor nutrition revealed by earlier studies as the prime cause of deficiencies (Anon 1967, 1972; Davis 1969).

One study showed that the snack pattern may be preferable to three meals a day, provided the choice of snacks is good (Fabry 1966). Snacks can be a desirable addition to the diet of a developing child for the nutrients required. But whether snacks serve the purpose of improving nutrition depends on the types of snacks chosen and their effect on the quantity of the diet (Robert 1963).

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

(Clark 1969). Many factors contribute to the development of food habits in children. Television is one medium which affects many children in this society. Research pointed out that children seven years and younger are unable to discriminate between fiction of advertisements and facts of good nutrition (Richmond 1970).

Many nutritionists project that the period between birth and six years of age is the period for developing lifetime eating patterns, particularly if the adult environment does not change from childhood (Hatfield and Stanton 1973). Owen and Kram (1973) of the Ohio State University Pediatrics Department completed a study of the nationwide eating habits of children ages one to six. Their findings showed that 77 percent of those children being tested were willing to try new foods between the ages of one and two. By the time the children were in the two to four category, their willingness to try new food dropped by 10 percent; and when they had advanced to the age of four, their willingness dropped another 7 percent (Eppright 1974).

In the Spring, 1977, the Senate Select Committee on Nutrition and Human Needs released the staff report, Dietary Goals for the United States. The following goals in particular were cited and provide implications for education:

(1) increase the consumption of fruits and vegetables and whole grains, and (2) decrease the consumption of sugar and foods high in sugar content (Latham and Stephenson 1977). The 1969 White House Conference on Food, Nutrition, and Health stated that a comprehensive and sequential program of nutrition education be included as an integral part of the curriculum of every school in the United States and its territories (Callahan 1973).

Whitehead (1951) reviewed nutrition education studies in her doctorate dissertation at Harvard University, which was based upon her own investigation of nutrition education. These studies are shown to vary in purpose, plan, scope, and age range of subjects. In aggregate, these studies suggested certain basic essentials of effective nutrition teaching. All investigators, for example, came to the conclusion that the classroom teacher is the logical person to handle nutrition instruction in the elementary school (Whitehead 1951).

McNutt (1965), Research Associate for the Nutrition Foundation, voiced the opinion that nurses possess certain attributes which augment their potential effectiveness as communicators of nutrition information. Most have academic preparation in the science of nutrition and a great deal of

other education--physiology, pharmacology, pathology--which complements nutrition.

Assuming that snack consumption will be an integral part of the diet of the American society, the question arises from this review of the literature as to how adequately prepared are the primary graders to choose nutritious dietary supplements and to avoid falling prey to misleading health fads.

In conclusion, Senator Humphrey stated:

We have talked about nutrition education for 25 years, but little has been done beyond this rhetorical nod at the need. Children who do not understand the significance of nutrition to their health, physical appearance, and their ability to do well in school can hardly be blamed for reaching for a snack. If they understand the consequences of their nutritional choices, fewer will snack and more will select their diet with care (1973, p. 2).

### Hypotheses

For the purposes of this study, the following hypotheses have been made.

1. For those children who change their initial snack preferences, the probability that any child will change his initial preference from a more nutritious snack to a less nutritious snack is equal to the probability that he will change his initial preference from a less nutritious snack to a more nutritious one

2. For those children who change their second snack preferences, the probability that any child will change his second preference from a more nutritious snack to a less nutritious snack is equal to the probability that he will change his second snack preference from a less nutritious to a more nutritious one

3. For those children who change their snack consumptions after breakfast, after lunch, and after dinner, the probability that any child will change his snack consumption in the positive direction is equal to the probability that he will change his snack consumption in the negative direction

4. For those children who change their frequency of consumptions of particular snack foods, the probability that any child will change his frequency of snack consumption in the positive direction is equal to the probability that he will change his frequency of snack consumption in the negative direction

#### Definition of Terms

For the purposes of this study, the following definitions were utilized:

1. School-age child--a young person of either sex between the age of five years and seven years enrolled in the first grade



2. Snack--any light meal or food eaten between regular meals

3. Nutrition--that science which deals with the identity and function of those substances in food and water required by an organism for growth, maintenance, and reproduction; with the foodstuffs which enable the organism to meet these; and with factors involved in the consumption and utilization of such foodstuffs by the individual

4. Learning--changes in a subject's behavior to a given situation brought about by his repeated experiences in that situation, provided that the behavior change cannot be explained on the basis of native response tendencies, maturation, or temporary states of the subject (fatigue, drugs) (Hilgard and Bowers 1976)

5. Nutrition education--process by which beliefs, attitudes, and understandings about food lead to habits that are nutritionally sound, practical, and consistent with individual needs and available food resources

6. Cognitive development--adaptive process learned through active transactions with persons and features of the environment

7. Planned nutrition learning system--that process or method of learning in which the principles of cognitive development and active involvement of the child are utilized

and based on the recommendations of the White House Conference on Food, Health, and Nutrition (1969)

8. Snack preferences--the light meals or foods eaten between regular meals which the individual chooses or gives priority

9. Snack consumptions--the times, amounts, and frequency that a light meal or food between meals is eaten or drunk by the individual

10. Nutritious snack--contains a contribution of one or more of the nutrient needs of the growing child as defined by the recommended dietary allowances; and/or contains a small amount of sugar

11. Less nutritious snack--does not contain a contribution of one or more nutrient needs of the growing child as defined by the recommended dietary allowances; and/or contains a large amount of sugar

#### Limitations

For the purposes of this study, the following limitations have been identified.

1. The experimental group was preselected and, therefore, not randomized by the investigator

2. Nutritional practices related to the religion of the children in the study

3. Nutritional practices related to the ethnic group of the children in the study
4. The academic achievement of the children in the study
5. The completeness or accuracy of the data received from the surveys

#### Delimitations

For the purposes of this study, the following delimitations have been identified.

1. The children of both sexes were enrolled in the first grade between September 7, 1977 and June 16, 1978
2. The children had no known learning disabilities
3. The children had no known pre-existing nutritional deficiencies or inborn errors of metabolism

#### Assumptions

The major assumptions for this study were

1. Responses given by children are an accurate reflection of their knowledge
2. The ability to think and learn is a growing thing and, therefore, cultivatable
3. Learning results in a change in behavior
4. Health teaching is a function of nursing practice

5. The children will be able to accomplish the tasks of intellectual development for their age group as theorized by Piaget (1969)

### Summary

Non-nutritious snacking is a problem which effects the children of our society today. Food habits can be developed through disseminating nutritional information in such a way that the child is able to conceptualize and utilize these concepts in their snacking practices.

Specific nutritional requirements have been recommended for the school-age child and are described in Chapter II. Studies citing the nutritional practices and food habits of school-age children are described in Chapter II as well as interventions for the improvement of nutrition in school-age children. Chapter III describes the procedure for collecting and interpreting the data of the preferences and consumptions of snacks prior to and following the nutrition learning system. The results and interpretation of the data gathered for this study are recorded in Chapter IV. Chapter V gives direction for further study based on the findings from this study.

## CHAPTER II

### REVIEW OF THE LITERATURE

The theme of this study was the identification of snack preferences and snack consumptions of a group of first-grade children and the identification of the effects of a planned nutrition learning system on these children's snack preferences and snack consumptions.

This chapter is divided into three major sections-- (1) nutritional requirements of the school-age child, (2) nutritional practices and food habits of the school-age child, and (3) interventions for improvement of nutrition in school-age children.

#### Nutritional Requirements of the School-age Child

From early childhood, individuals are taught that the basic physical needs of man are food, shelter, and clothing. Mawlow (1970) postulated that man's needs arrange themselves in a hierarchy--one need must be reasonably satisfied before the need at the next level emerges. The hierarchical pattern Maslow proposed includes five steps. The foundational level is that of physiological needs which take precedence over all other considerations

if man is deprived of any one of them in an extreme way-- hunger and thirst (Maslow 1970).

Few discoveries in medicine, according to Lamb and Hardin (1973), have met with wider acclaim than the revelation that certain components in foods markedly improve man's ability to live longer and to perform effectively. These men further stated that "nutrition is the result of dietary practices after foods have been eaten, digested, and nutrients are absorbed into the blood" (1973, p. 2).

The literature presents studies which relate that the nutritional status of children is unique and demands special attention. Burton (1976) emphasized that these requirements are conditioned primarily by the building and maintenance of new body tissue, by the demands of a high order of physical activity, and to some extent by inter-related intrinsic and environmental factors, such as emotional changes as the growing child reacts to his maturation and his surroundings. In general, the growing child requires a high caloric intake because of his great activity. The child also requires an abundance of good quality protein and minerals because of his rapid growth. The need for vitamins is enhanced beyond that of a sedentary adult because of the characteristic high metabolic activity of this period in the child's life cycle (Burton 1976).

Nutrition is one of the most important single environmental factors affecting our personal well-being (Stare 1970). This statement is also recognized as a basic philosophy of the World Health Organization (Pattison, Barbour, Eppright 1970).

Heald and Roeder (1976) hypothesized that the expression of nutritional requirements during childhood is a complex issue and one which is still unresolved. The energy requirements of an adult are dependent upon (1) physical activity, (2) body size and composition, (3) age, and (4) climate and other ecological factors. The school-age child, however, must contend with a fifth factor--the nutrient needs for growth which are influenced by the velocity of the growth curve from six to eighteen years of age (Heald and Roeder 1976).

During school years boys and girls make large increases in body size. For example, in the Iowa studies, boys of age sixteen were on the average 21 inches taller and 90 pounds heavier than boys of age six. Correspondingly, girls of sixteen and six differed in height by 17 inches and in weight by 77 pounds (Eppright and Sidwell 1954).

Research has repeatedly shown that when inadequate diets of children are improved, growth is improved. Roberts (1968) studied children in an institution who were regularly receiving one pint of milk daily in their diet. The author

added another pint to the diet of some of the children and found that weight gains were much more evident among children having the full quart of milk a day than among those who remained on the usual diet. These results were evident even though the improved diet was below optimum (Roberts 1968).

Spies (1963) studied the effects of poor diet on three thousand children over a period of fifteen years. The study reported the effects on six hundred children who had chronic nutritive failure. These children were as much as three years behind normal height and weight for their age when compared with two thousand children receiving adequate diets. The height of the boys was especially affected by the lack of nourishment. By the time these boys and girls had reached maturity, they had stopped growing at a weight-height level two years behind their growth possibilities (Spies 1963).

Spies (1964) also studied the reversal of growth failure by adding milk solids to the diets of the children. He paired off children similar in nutritive failure, and gave one member of each pair a supplement of varying amounts of milk solids over increasingly longer periods of time. The more milk the children used, within the limits of the study, the greater the increases in height, weight,



physique, and speed of growth of the children (Wetzel 1963) when compared with the records of the children not receiving the extra milk. Benefits of added milk to the children's diets were also evident in the composition of the children's bones. Spies concluded that the retarding effect of prolonged nutritive failure in children is reversed promptly if nutrients in the dietary supplement are supplied in sufficient amounts to overcome the accumulated deficiencies (Spies 1964).

Blair (1974) studied the diets of 150 children ranging in age from two to fourteen years, and found that their diets failed to meet the Recommended Dietary Allowances of the National Research Council in all factors except vitamin A. These diets were particularly lacking in vitamin C and thiamine. Blair increased milk and other dairy products, eggs, whole grain cereals, and fruit juice in quantities which brought the children's diets up to, or in most cases well above the Recommended Allowances.

Children of Iowa surveyed in a mass study of diets and physical development were divided into two groups for study--those who had liberal amounts of all nutrients and those who did not. The children with the liberal diets tended to be slightly taller, heavier, and larger in leg

girth than the children with the poorer diets (Eppright 1954).

The difference between mediocre and excellent diets has been clearly shown in rat experiments. Through generations, Sherman (1968) fed rats a diet which proved to be genetically satisfactory for growth, reproduction, and maintenance of vital functions. When in the diet of succeeding generations of these rats, he doubled the amount of milk and amazing improvements resulted. The animals had even greater vigor, better appearance, greater resistance to disease, and reached a higher plane of positive health than the previous genetically satisfactory generation of rats.

The search for adequate nutrition for their school children led the people of Scotland to adopt the milk-in-school plan. The action was prompted by results of an experiment carried out with twenty thousand elementary school children who were given additional milk for seven months. Growth was 20 percent better for children receiving additional milk. The increased growth was accompanied by noticeable improvements in the children's health, vigor, and mental alertness (MacLeod and Taylor 1950).

The literature includes studies which relate nutrition to mental, emotional, and social well-being. Spies (1963)

described the personalities of children as apathetic who are suffering from nutritive failure (Dreizen and Spies 1962). The same observation was made of children in Newfoundland when their diets were short in many essential nutrients (Adamson 1964).

Dietary allowances have been recommended by the Food and Nutrition Board for childhood. Average caloric requirements increase from 1,300 calories for boys and girls one to three years of age to 2,400 calories at the age of seven to ten. The average requirement for boys eleven to fourteen years old is 2,800 calories; the requirement increases to 3,000 calories between the fifteenth and eighteenth years, in contrast to 2,700 between the ages of twenty-three and fifty, and 2,400 to those over fifty-one. In girls, the picture is similar, though her maturation, and thus maximal caloric need, occurs at an earlier age. On the average, girls eleven to fourteen years old require 2,400 calories (Burton 1976).

The protein and mineral requirements in childhood exhibit a trend similar to caloric needs. While linear skeletal growth is most obvious, the skeleton mineralizes progressively throughout childhood and early adult life and continues to become heavier long after linear growth has ceased. Calcium and phosphorus, the main constituents

of mature bone, must be adequately provided by food for normal skeletal development. The recommended calcium allowance for boys and girls rises from 0.8 grams per day at age of one to 1.2 grams between the ages of eleven and eighteen. This value contrasts considerably with the recommended allowances of 0.8 grams for adult men or nonpregnant, nonlactating adult women (Burton 1976).

In the growing body frame, muscle growth should keep pace with skeletal growth. This calls for active elaboration of muscle tissue, an increase in blood volume and blood constituents, and a continuous positive nitrogen balance. Optimal growth and nitrogen assimilation can take place only if the child's food provides an abundance of all the essential amino acids. Other nutrients required for growth and sufficient calories from nonprotein food sources to spare the protein so that it is not utilized for the creation of energy but for tissue synthesis are also required. While growing children may continue to gain in height and weight on suboptimal food intakes, this is likely to result in mineral-poor bone, nitrogen-poor soft tissue, borderline or frank anemia, a depressed metabolism, a decrease in physical activity, and an increased susceptibility to infection (Burton 1976).

The recommended daily allowance for protein rises gradually through the ages of one to ten from 23 grams to 36 grams. The allowance for boys eleven to fourteen years old is 44 grams and rises to 54 grams between ages fifteen and twenty-two. The corresponding recommended allowance for girls is 44 grams for ages eleven to fourteen, 48 grams for fifteen to eighteen, and 46 grams thereafter. The daily iron allowance rises from early infancy (10 milligrams) to 15 milligrams from the middle of the first to the fourth year. It drops to 10 milligrams per day between the fourth and the tenth years (Burton 1976).

Vitamin D is essential for optimal calcium and phosphorus assimilation. Though many children receive sufficient sunshine in the summer for endogenous vitamin D synthesis, few receive enough in the winter. To ensure a daily supply of 400 IU of vitamin D, it is appropriate to consider the routine consumption of vitamin D milk, a quart of which will not only supply this amount but also satisfy the daily calcium requirement. The allowances for thiamin, riboflavin, niacin, and ascorbic acid follow the trend exhibited by caloric need--these daily requirements increase gradually during early childhood (Burton 1976).

Burton (1976) also emphasized that the essential nutrients as well as calories must be amply provided if

the growing child is to achieve his maximum growth potential and well-being to meet adolescent and adult life. This is best achieved with the aid of three satisfying meals per day, to provide the protective foods at adequate levels, and afternoon and bedtime snacks which include milk. Emphasis should be placed on an adequate breakfast, since this meal follows a prolonged period of fasting. A skimpy breakfast or its omission may lead to a decrease in attention span and efficiency in school or at work during the late morning hours. Burton (1976) postulated that a breakfast which contributes substantial amounts of protein, fat, and carbohydrate, facilitates the maintenance of blood sugar levels above the fasting level in the late morning hours and tends to sustain mental alertness and physical activity until lunchtime. Comparison experiments have indicated, according to Burton (1976), that among school children, the habitual omission of breakfast results in decreased efficiency in the late morning; it runs parallel with a poor attitude toward school work, and appears to detract from scholastic attainments.

According to Martin (1954), a lack of knowledge of children's nutritional needs on the part of the parent explains why many children fail to attain good nutrition. Many parents do not know what constitutes an adequate

diet for childhood. Studies have indicated that children fare somewhat better in homes where the parents have had educational advantages. The families in which the homemaker had a college education came nearer to satisfying the recommended dietary allowances than did the families in which the homemaker had only an elementary school education. Similarly in a dietary study of sixty thousand school-age children, the food intake of those from homes where the fathers were professional men, ranked best. Sixty-four percent of the children in this group had food diets, in contrast to 33 percent of the children in the entire study and 20 percent of the children from the lowest occupational group, classified as "slightly skilled trades, day laborers" (Martin 1954).

Burton (1976) further stated that variety should be maintained in the diet, and the child should be taught to eat portions of everything reasonable and wholesome which is served at the table. Permitting a child to develop peculiarities of taste is a mistake of convenience which may turn into a handicap in adult life (Burton 1976).

Leverton (1970) concluded that there are many reasons for poor diets. He further stated, "a household may lack money to purchase foods. In another family, with sufficient income, the homemaker may be ignorant of the principles of

food selection in relation to health" (1970, p. 18).

Sometimes, there is no motivation to change family's eating habits or food preferences even though the necessary funds are available. Or, there may be a breakdown of the family meal pattern, particularly when both parents work and the children are left to choose foods for themselves at mealtime. In some low-income groups, lack of education and poor kitchen equipment combine with a shortage of money to prevent the family from eating the proper food (Leverton 1970).

It has been stated that the chances of survival of infants and children have been dramatically increased by medical research. Looking beyond survival, every child has the right to achieve abundant health. Every child has the right to the opportunity to achieve the maximum of which he is capable. Children cannot achieve their potential abilities with fatigued minds and bodies which result from habitually poor diets (Pattison et al. 1970).

#### Nutritional Practices and Food Habits of School Children

While the importance of an adequate diet to the optimal growth and development of children is well recognized in the literature, the interplay of factors determining what a mother feeds her family can be confusing.



Emmons and Hayes (1973) cited that the mother's nutritional knowledge, whatever its scope, is not necessarily applied fully in feeding the family because of the family's likes and dislikes, attitudes, customs, and financial constraints. Since the child cannot often select his own diet but must accept or choose from the food offered, he has limited opportunity to relate his nutrition knowledge to eating behavior (Emmon and Hayes 1973).

Eppright (1970) found that 82 percent of the mothers studied believed that "young children do not grow correctly when they have improper diets" (1970, p. 327). However, these mothers were not strongly motivated to feed their children well. Nearly half of them found it a chore to plan meals and felt it was monotonous preparing three meals a day throughout the year.

Lund and Burk (1969) reported that mothers who had some opportunity to take courses with nutrition content during their school years did not take full advantage of these courses at that time. Instead, the mothers' time of highest motivation for learning about feeding a family was not when they were young and unmarried, but when they were faced with the actual problem.

Nutritionists realize that nutrition guidance to mothers of young children may be of value not only for

improvement of the child's diet but also in the establishment of lifelong pattern of good food habits (Sabry et al. 1974). Generalizations have been made about the concern of mothers regarding the diets of their preschool children by authors of texts and books (Spock and Lowenberg 1965, McWilliams 1967, Nelson 1969). One study reported by Dierks and Morse (1965) examined the relationship between assessment by the parent and actual dietary adequacy. In the study, which involved families of university students, 64 percent of the mothers made accurate assessments of their children's diets (Dierks and Morse 1965). In reports by Hewitt and Aldrich (1976) and Beal (1975), the extent of concern was indicated by mother's descriptions of children's appetites rather than by interrogation of mothers with regard to their assessment of dietary adequacy (Hewitt and Aldrich 1976, Beal 1975).

"Children in this society are reached mainly by one medium--television," claimed Richmond (1970, p. 150). Children under eight years of age watch more than two thousand food and beverage television commercials yearly. They spend more time watching television than they spend in school, with their parents, or at play. Children, especially disadvantaged children, learn about food from advertisements. The most heavily advertised foods tend to

be the least nutritious; and there is information cited which gives evidence that the more a child watches food commercials, the more he is likely to influence mother's shopping to purchase the foods seen in the advertisements. In addition, research makes it clear that children seven years and younger are unable to discriminate between the fiction of advertisements and the facts of good nutrition. They believed the unhealthy persuasions used in product promotions (Richmond 1977).

The impact of the communication media, particularly that of television has not been studied as one of the factors affecting food consumption. There has been much controversy in recent years on the actual impact of food and commodity television advertisements on children (Gussow 1972, Ambrosino 1972, Howard and Hulbert 1973). Sales figures argue compellingly for the success of such advertising. However, the ways in which children respond to the advertisements and factors which affect their responses are not known (Clancy-Hepburn, Hickey, and Nevill 1974).

Studies have shown that television provides a vehicle for recognition of and desire for many of the products seen. This is translated into an almost seemingly universal practice of requesting the caregiver to make

purchases for the child (Gussow 1972, Ward and Waldman 1972).

A study by the Committee on Children's Television (CCT) of fifty-four San Francisco children ages eight to twelve years indicated that all the children in the group had some money available to them and that 82 percent of these were not required to spend money on any particular item. The CCT study cited the Random Youth Poll, which reported that children between the ages of eight and twelve spent 2.5 billion dollars in 1973 (Williams 1974).

Children in the CCT study reported spending about one-half of their allowance each week on snacks. That this practice can have nutritional consequences is borne out by another study of fifty-four children (average ten years) done by a University of California nutrition student. In this study the children reported consuming an average of 1.6 cans of soft drinks per day (with some children reporting much higher consumption of 7 to 10 cans a day). Fifty-nine percent in the study said they would choose a soft drink over milk. Further, most children reported having an afternoon snack, which consisted of a candy bar or pastry 20 percent of the time (Compton 1974).

The CCT study indicated that many children were influenced by television in the kinds of snacks they bought

but less so in other areas. The children said they relied to a large extent on peers when they bought snacks, toys, books, games, and sports equipment. These children did not report relying on adults for consumer advice when shopping with them. Even so, most children indicated they would welcome consumer information (Williams 1974).

It was discussed at the White House Conference on Food, Nutrition, and Health that the public should be capable of making wise food choices. However, when advertisements of private industry are contradictory or are at cross purposes with school nutrition efforts, nutrition education is seriously handicapped. There is an increase in availability of imitation foods, processed foods, snacks, and related manufactured products whose composition is generally unknown to the consumer (White House 1969).

A ban on advertising of any product containing more than ten percent sugar by net weight or any product containing non-nutritive sweeteners, was proposed by the government as part of its recommendations for tighter controls on food advertising aimed at children. It was further asserted that we have ample evidence that many consumers today are either baffled by the array of products they face, or simply do not care enough to choose foods wisely (Harkins and Lushbough 1974, p. 541).

Food habits are changing fast because society itself is changing and social structures with it. Technology is developing and the deep ingrained social habits of centuries are being influenced, modified, and remolded. New foods are

appearing, new ways of preparing and processing food are being introduced (Mount 1975).

Vannier (1974) claimed that Americans are considered to be the best-fed people in the entire world. However, there is evidence that many have faulty food habits, are undernourished or obese, tire easily, are victims of false advertising, food fads, and starvation diets (Vannier 1974).

In a two-year study, conducted among sixth and seventy graders in Kansas City, the food habits of pupils of five schools were appraised. Children in all schools were found to be eating unbalanced diets and to fall below the daily nutrition standards by not eating enough milk, eggs, citrus fruits, butter or margarine, potatoes, and green leafy vegetables. An intensified nutrition education program was established and by the end of two years, noticeable differences were made in food selection-patterns of the pupil as well as their scores on standardized hygiene tests (Haag 1972). Recent studies also show that children are not eating as wisely as they should, but can learn to do so at school (Vannier 1974).

Food serves more than just a satisfaction of some physiological nutritional need for most people, including children. Richie stated that

Because of its fundamental role in the struggle for existence, food has acquired a significance in human

society, beyond that of providing nourishment for the body . . . thus, it can arouse many emotions, pleasure, envy, confidence, and even violent fantacism . . . (1950, p. 2).

According to Rowntree ". . . food is eaten for enjoyment, for emotional release, for social prestige," and for attention . . . " (1976, p. 433). Moore said, "Everyone has his taste and from infancy until death he concerns himself with seeking and enjoying the kind of foods that are most pleasurable to him" (1972, p. 789).

Why people accept some foods and reject others has been studied rather extensively. Children learn food habits, including what is considered edible and even when to eat it, from parents and others according to Mead (1967). Mead further stressed that only the twentieth century has available the science of nutrition and the behavioral sciences to direct the development of food habits (Mead 1967).

In studies with 235 graduate students, Smith (1955) found that contacts made early in life greatly influenced food acceptance. Familiarity with food acceptance seemed to be the important factor in food selection in this study (Smith 1955).

College women were reported by Schuck (1961) to be familiar with more foods and were willing to eat more fruits but not more vegetables or meat groups than college

men. Results would indicate that familiarity with a food may increase its acceptance if the early association was a positive, pleasurable situation (Schuck 1961).

Homemakers were interviewed by Lewin (1973) and he found that the mother's nutritional knowledge was the major influence on the food habits of the family. The author established what was considered "food for us" and developed ideologies such as health, taste, status, and cost which family members acquired but could seldom define the values involved. With a questionnaire made up of indirect questions and administered to 2,300 school children, Lewin (1973) determined how children perceived food--as conflict, praise, or scold food, according to the authority in the home.

Davids and Lawton (1961) analyzed sixty mother-child relationships and found that eleven-year-old boys who had positive self-concepts and positive mother-concepts had fewer food aversions and liked a greater variety of food than a comparable group of disturbed boys the same age. These data support the idea that self-concept, mother-concept, and food aversions are interwoven in a child's unconscious processes. The way that oral gratification and feeding situations are handled in early childhood can have lasting effect on the intellectual and emotional development of the child (Davids and Lawton 1961).



Feeding problems often have their beginnings in early infancy. A belligerent attitude, associated with food, may be built up which carries over into later feeding experiences. Studies made at the University of Chicago indicate the extent of this problem as well as some of the responsible factors. Actual observations were made of everything that happened during at least one meal in each home, the amounts and kinds of food eaten, the time required, and the adult's part in the meal. By this method there were observed one hundred city children from comfortable or well-to-do homes, fifty farm children, and one hundred children from a poor section of Chicago. The results are highly suggestive of the effects of feeding practices on the child's eating behavior. In the well-to-do group, only one-third of the children had normal reactions to their food. The remaining two-thirds showed varying degrees of reluctance to eat, forty being of the extreme type that were coaxed constantly during the entire meal which often dragged out to long periods of time. In the other two groups, the findings were more favorable. Among the country children the results were practically reversed, two-thirds of the children reacted normally to their meals, and one-third were reluctant to eat. In the poorer city section, eighty-six of the one hundred children observed

were classified as hungry and fourteen as nonhungry, only five of whom were of the extreme type (Martin 1954).

In the foregoing studies, the diets of these children were superior in respect to types of foods and in meal-spacing. Their sleep and outdoor play were sufficient, and medical and dental care were adequately provided. The psychological factors, however, were in favor in the other two groups, especially in three important respects: these children ate with hungry parents and hungry brothers and sisters, rather than alone. Their parents were occupied either in serving or in eating their own meals. There was little or no urging to eat; food was put on their plates or when requested. Although it was evident in these three studies that physical factors played some part in creating the eating problems, for the majority of the children, psychological factors were predominant (Martin 1954).

The conclusion is supported by the pioneer observations of Aldrich (1968), who attacked the eating problem in his pediatric practice, from the angle of prevention. Believing that over-solicitation and urging on the part of parents was chiefly responsible for developing negativism in children, the researcher instructed parents never to urge their children to eat, to leave them alone at meals, to teach them to feed themselves, and to introduce

new foods gradually. In addition, the parents were instructed to allow considerable leeway in the choice of foods, to avoid emotional upsets at meals, and to report any continual refusal of food to the researcher just as they would vomiting or diarrhea. After five years of such instructions to parents, a check-up of about two hundred children showed that 36 percent ate hungrily, 49 percent willingly, and only 15 percent with reluctance; it was concluded from this study that the problem of food refusal could be prevented by proper management (Martin 1954).

Wallen (1963, 1964, 1968) suggested that food aversions should be based on those foods which have been actually tasted and then rejected. The author, whose research is basic to many current concepts about food aversions, indicated the following reasons for development of food aversion: (1) emotional experience at meals, (2) faulty and capricious training method especially as related to basic physiological processes such as eating and toilet training, (3) fear of the new and strange, (4) unpleasant image association aroused by the food, and (5) neuroses-disorder associated with any one or special combination of anxieties, compulsions, obsessions, phobias, and motor or sensory manifestations resulting in disorganization of personality (Wallen 1963, 1964, 1968).

The research is not conclusive about how greatly the choice of food is determined by physical and chemical make-up, but recent studies reveal interesting variations among individuals. Even though some reasons for acceptance and rejection of foods are very similar for persons of a given age, socioeconomic level of the mother's educational background, basic physiological differences occur which are considered to be individualistically genetic. Snyder (1971) concurred with results from research that as many as 40 percent of individuals do not possess taste sensitivity for certain bitter compounds. He attributed the taste deficiency to a single recessive gene (Snyder 1971).

Pfaffmann (1964) presented a thorough analysis of the sensory properties of taste as differentiated from flavor. Taste is a receptor sensitive to different ions and molecules with selectivity giving rise to an afferent neural code in the taste nerve to the brain resulting in the sensations of salty, sweet, sour, bitter, or some other quality. These sensations control ingestive behavior, either that of acceptance or rejection of the item.

Glanville and Kaplan (1965) described a highly involved research design utilizing 187 adults, which included 39 husband-wife pairs, 16 pairs of monozygotic twins, and 10 pairs of dizygotic twins. Repeated

determinations of the taste threshold of an individual have shown that under controlled conditions thresholds are relatively stable. However, a number of factors affect these thresholds such as a decline in sensitivity with increasing age, heavy smoking is related to insensitivity, and physiological disturbances which increase sensitivity.

Analyses of taste are only a fragment of food acceptance. To illustrate, Lamb (1969) said that sweet is universally well accepted provided it occurs in the "right food," that is, not one which custom, culture, or family has designated to taste otherwise. However, cravings for certain tastes, such as for sweets, develop in prisoners of war. The prisoner's diets show the supply of carbohydrates is sufficient in the form of starch but lacks sucrose. Pfaffmann believed:

The so-called "sweet-tooth" illustrates the fact that certain innately positive stimuli not only instigate ingestion of food but also could serve as rewards or reinforcement for learning (1964, p. 187).

The specific hunger response for sodium chloride is also described by Pfaffmann (1964), who expressed concern for the many unanswered questions as to the precise physiological mechanism by which such hunger is guided and regulated.

Babcock stressed the complexity of the task as centering on "communication of knowledge and attitude appropriate to the health use of food" (1961, p. 546). The primary parameters of food acceptance, postulated Lamb (1964), is the training of the young child in the familiarity with a wide variety of food which is effective in maintenance of health. Food acceptance in the child should be initiated at birth, supported in the home, and propagated by effective educational experiences in several aspects of school.

Preschool children make food selection decisions more often at breakfast and snack periods than at other times. The mother is most frequently involved in making food-selection decisions for the child. The father is similarly involved with only about 1 percent of the children. His involvement is most frequent at the evening meal; 1 percent of the father's involvement is concerned with which foods are eaten and 4 percent on how much food is eaten. Research reveals, according to Eppright (1969), that more children were allowed freedom in deciding upon the amount of food eaten than in deciding upon which foods are eaten. About half the mothers said that they decided the amount of foods the children ate at meals. The study suggested that about half the children enter school with little

experience in making decisions about food selection (Eppright et al. 1969).

Fleck (1971) postulated that man's desire for companionship and sociability is an important reason for a snack period. This is true of all ages. Whenever two or more people get together, sooner or later their thoughts turn to food or drink. Although social reasons are usually the main motivation for eating something between meals, hunger itself is often a factor. A lowered blood sugar has been indicated as being responsible for this. Or the habit of eating between meals may lead one to crave something to eat. Many people become extremely uncomfortable when they are hungry and are unable to concentrate on the task before them. This may occur when little or no breakfast has been eaten or lunch has been light.

Another reason for having snacks is that fatigue may be relieved. If the work of an individual is monotonous or "nerve-racking" then a break will provide a necessary rest period. Often people eat for want of something to do. This is evident when individuals are waiting for a plane, train, or bus. They may eat something even if they are not hungry because they do not know what to do with their time. Not only have many Americans abandoned active sports for

spectator sports, but they also eat while watching them (Fleck 1971).

A person's age also has an influence on the reasons for eating snacks, especially during the early years of life more so than at any other time. Generally fruit juices, milk, and similar nutritious foods are emphasized for the food given young children. In-between feeding for children of elementary school age may not have a nutritive emphasis. When parents are concerned about food youngsters eat, their concern may be reflected in the snacks. When there is a lack of supervision, however, children are inclined to help themselves to whatever they may find and the choice may or may not be nutritious. Whatever the refrigerator or the kitchen shelves yield will be the menu for the snack. However, although even small children enjoy preparing their own snacks, the literature suggested that some guidance is necessary (Fleck 1971).

The literature revealed limited current research on the contribution of snacks to the day's diet. In Eppright's (1955) study of Iowa school children, 13 to 17 percent of the total day's calories came from snacks. As the girls' ages increased, they seemed to increase their caloric intake from snacks. Girls from six to eight had 13 percent



of their day's calories from snacks, while those twelve years of age or older had 16 percent of their calories from the day's snacks. Boys of fifteen years and older and girls of twelve years and older received as many calories from snacks in a day as they did from breakfast. Other information from this study revealed that snacks provided 10 percent of the day's protein and iron, less than 10 percent of vitamin A and niacin, and 10 to 15 percent of calcium, thiamine, riboflavin, and ascorbic acid. In regard to carbohydrates, snacks furnished 20 percent of the amount of carbohydrates ingested every day. Among the foods eaten, milk and fruits rich in vitamin C were not prominent. For all ages, the average intake of milk was about one-half cup. When comparisons were made, it was found that less nutritious food was eaten for snacks than at mealtime (Eppright 1955).

In the study done at Pennsylvania State University by Lowenberg and Hamilton (1957) in regard to food patterns of children, it was discovered that one-tenth of the day's total calories was derived from afternoon and evening snack foods. Another interesting point was that one-half of the total calories of both boys and girls in the study were consumed during the period from after school until

bedtime. The afternoon snack and bedtime snack contributed mainly to this total.

A ten-year survey made by the United States Department of Agriculture indicated that teenager consumption of soft drinks, punches, ades, potato chips, crackers, cookies, doughnuts, ice cream, candy, lunch meats, and peanut butter increased during this period (U.S. Department of Agriculture 1968).

A study of the contribution of snacks to the diets of high school students was made in three states of the Northeast region. All of the children in each state reported eating some food between meals. The actual foods consumed were not reported. In Maine the snacks contributed 10 to 11 percent of the recommended dietary allowances for calories and of the daily intake of calories, for boys, and 10 and 11 percent for girls; in New York the figures were similar, 8 and 10 percent for boys, 9 and 11 percent for girls; while in Rhode Island they were notably higher, 13 and 15 percent for girls. The effect of the snacks on total caloric intake in individual cases has not been recorded, but the average total daily calories for children in each state were found to be below the recommended dietary allowances. In all groups the yield of calories from the snacks was higher proportionately than was the

yield of the various nutrients in relation to need (Martin 1954).

Interventions for Improvement of Nutrition  
in School Children

Action has been taken by professional and community groups against the sale of soft drinks and candy. Such action has taken the form of resolutions or other official statements. Following are excerpts from declarations of representative groups. Each indicates the grounds on which the organization quoted takes exception to the practice of selling soft drinks and sweets on school premises, particularly in the school lunch room. The Council on Foods and Nutrition of the American Medical Association took the position that the purpose of the school lunch is to provide training in good food habits and that the serving of sweets and sweetened beverages does not promote that purpose. The council concluded "Expenditure for carbonated beverages yields a nutritional return much inferior to that from a similar sum spent for milk or other staple foodstuff" (Council on Foods and Nutrition 1968, p. 35). Furthermore, when given a choice between carbonated beverages and milk to accompany a meal, a child may frequently choose the less nutritious beverage. In view of these facts the Council believed that carbonated beverages should not be

sold on school premises (Council on Foods and Nutrition 1968).

The National Congress of Parents and Teachers was concerned with the negative affect on nutrition teaching.

The sale of carbonated beverages, candy and other confections in schools may interfere with effective nutrition education. Many children spend lunch money for these less nutritious foods and are at the same time deprived of a valuable learning experience (Abbott et al. 1976, p. 1).

The American Dental Association, has for many years warned against the hazards of dental health resulting from the consumption of sugar. The House Delegates of this organization passed a resolution which included the following.

Resolved, that the Association recommend that dental societies call to the attention of school administrators the need for eliminating from the schools the sale of sweetened beverages and confections (American Dental Association 1967, p. 2).

The American Dietetic Association went on record as being in agreement with the recommendations cited above. In addition, it meets its responsibility to the public, and particularly to children, by declining to accept advertising in its official journal or exhibit at its annual meeting from companies selling candies or soft drinks (American Dietetic Association 1975).

In recent hearings before the Senate Select Committee on Nutrition and Human Needs, it was stressed that of the ten leading causes of death in the United States today, six of these--heart disease, stroke, cancer, diabetes, atherosclerosis, and cirrhosis of the liver--are or can be related in some way to diet. Similarly, the Committee reflected that the problem of malnutrition, traditionally associated with the lower socioeconomic strata and "under"-consumption of food, has now also become a problem of "over"-consumption compounded by a lack of proper dietary education (National Institute of Arthritis, Metabolism, and Digestive Disease 1977).

The United States Public Health Service conducted nutritional status surveys in various parts of the country. Several studies were sponsored by the Cooperative State Agriculture Experiment Stations and the Agricultural Research Service of the United States Department of Agriculture. These surveys indicated that the population as a whole consumed diets adequate in essential nutrients and the population as a whole was free from symptoms of frank deficiency diseases. There were signs, however, that the nutritional status of pregnant women, infants, preschool children, and adolescent girls merited special concern (McCarthy et al. 1974).

In 1967 a group of concerned citizens raised questions about hunger. Congressional hearings pointed to the probability of problems of serious hunger and malnutrition in the United States. In December, 1967, Congress directed the Secretary of Health, Education, and Welfare to make a comprehensive survey of the related health problems in the United States. The survey undertaken to carry out this mandate is known as the Ten-State Nutrition Survey, 1968-1970. At the same time the Maternal Child Health Service in the Health Services and Mental Health Administration, Public Health Service contracted with a research team for a Preschool Nutrition Survey to study a cross-sectional sample of children one to six years of age in the United States (Mitchell et al. 1974).

The Ten-State Nutrition Survey was conducted in low-income areas in ten states widely distributed throughout the nation and reflected the nutritional problems related to specific ethnic groups and income levels. The outcomes of the TSNS indicated that the growth and development of children zero to nine years of age appeared to present a relatively important problem for both sexes in all ethnic groups regardless of income ratio (Department of Health, Education, and Welfare 1972).

The subject in the Preschool Nutrition Survey represented all socioeconomic and ethnic groups in the United States. The outcomes of this survey also indicated that it is the children in the lowest socioeconomic group who are at risk as demonstrated by their lower dietary intakes, lower biochemical indices, and smaller physical size for age compared with the rest of the subjects. It was concluded that the major nutritional problem is insufficient food for the children in the lowest socioeconomic group. The nutritional quality of the intakes might have been adequate if the quantity of the food eaten had been sufficient (Owen 1974).

The Child Division of the Food and Nutrition Service of the United States Department of Agriculture administered several nutrition programs for children. The nutrition activities of this and other agencies were coordinated at the Federal level (McLaren and Burman 1976).

Positive measures have been taken by the school to provide services and conditions favorable to good nutrition. The school lunch has an important part to play in the nutrition of children. If the school lunch is eaten regularly, it furnishes one-third of the meals of a school day, one-fourth of the meals of the week, and at least one-sixth of the meals of a calendar year. The school lunch

supplements the home diets of children and provides experiences with foods which help to mold good dietary habits (Agran 1969).

It is hereby declared to 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 grant-in-aid and other means, in providing an adequate supply of foods and other facilities for the establishments, maintenance, operations, and expansion of non-profit school lunch programs (Department of Agriculture 1962, p. 210).

The above is the general purpose of the National School Lunch Program passed by Congress in 1962 (as cited in Agran 1969, p. 7).

#### Summary

Particular nutritional requirements have been identified and recommended for the school-age child. Whether children receive these necessary nutrients for adequate growth and development is dependent on aspects such as food practices and food habits. Much research has been done on factors affecting the nutrition of children. Many reasons have been cited in the literature for poor nutritional practices in children as well. The hope for changing the non-nutritious snacking practices of school-age children lies in recognizing these interdependent factors.



## CHAPTER III

### PROCEDURE FOR COLLECTION OF DATA

The design for this study was experimental, utilizing a pretest-posttest situation with one study group. The study group was exposed to a nutrition learning system following the administration of the pretest. The posttest was then given. Five sections were designed to elicit the desired information for this study. The sections included were (1) demographic data, (2) snack preferences, (3) snack consumption times, (4) snack consumption at home, school, and away from home or school, and (5) frequency of consumption of various snack items. Data were ascertained from a study group consisting of first-grade children. The nutrition learning system included in this study was an attempt to improve the nutritional content of the snack preferences and snack consumptions of the study group consisting of first-grade children. This chapter presents how the procedure for the collection of data was conducted.

#### Setting

The study was conducted with a first-grade class of a school district located in northeastern United States. The school is situated in a primarily residential

community of approximately 13,507 persons. The elementary school, from which the study group was selected, contained grades one through six and housed 525 students. The school enrollment was predominately middle-class Caucasian.

The study was conducted in a climate controlled, well-lighted, completely carpeted classroom. Each student had their own desk. The study group was selected at this location because of the willingness of the school district to participate in the study.

#### Population, Method of Selection and Randomization

The population for the study group was selected from a first-grade class. Twenty-three first-grade students were utilized. The study group was a convenient population, although random assignment of the children to the first-grade class utilized was done by the school district. Randomization of both sex and intelligence quotient were done with the children attending the school. The investigator selected one of three first-grade classes to meet the stated purposes of the study. The class contained twenty-three children who met the guidelines specified in the delimitations of the study.

### Development of the Tool

In order to facilitate the identification of snacking practices of children, data were obtained from the following sources: (1) extensive review of the literature, (2) consultation with a Registered Dietician employed at a children's hospital, and (3) an interview session with five first-grade students to determine their snacking practices. These resources aided the investigator in the development of the snack preferences and snack consumption tool.

The tool (appendix A) was designed with four sections: (1) snack preferences, initial and secondary, (2) snack consumptions, after breakfast, after lunch, and after dinner, (3) snack consumption at school, at home, and away from school or home, and (4) frequency of consumption of various snack items. The investigator presented three possible selections in picture form for the child to choose his snack preference, both initial and secondary. The child was asked to circle his/her first preference and cross out his/her second preference. The second section of the tool consisted of questions designed to elicit the snack consumption times, after breakfast, after lunch, and after dinner. The third category which is included elicited the student's most frequently eaten snacks at home, at school, and away

from school or home by asking the student to cite them. The fourth section of the pretest-posttest elicits the frequency of consumption of various snack foods. This is done by having the study group check whether they consume the snack items listed frequently, occasionally, or never (appendix A).

This tool is also a means by which to stimulate interest in the subject to be studied. The tool was designed by the investigator and submitted to a panel of judges consisting of two elementary school instructors and a registered dietician, for recommendations and revisions. Some revisions were made to exclude bias in the snack preferences and to make the tool comprehensible to the study group. These revisions included: (1) uniformity in the size of the pictures presented in the pretest and posttest, (2) random arrangement of the position of snack items in section 1 of the test, and (3) nonuse of product labels in the presentation of snack item pictures in the pretest and posttest. The final form was approved by the panel of judges for use in data collection for this study (appendix A).

A pilot study was carried out to determine the accuracy of this tool. This study was conducted April 5, 1978, with ten first-grade students selected from another class at the same location as the study group. The pilot

group met the guideline of the delimitations set forth in Chapter 1 of this study. No problems were identified in using the tool or in following the directions of the tool to meet the stated purposes of the study.

A demographic data sheet was designed by the investigator. This information was elicited from the parents of the children in the study prior to the initiation of the pretest and posttest (appendix B).

### Curriculum

The nutrition learning system (appendix C) was designed to influence the snack preferences and snack consumptions of the study group. The nutrition learning system was developed by the investigator from materials made available through the National Dairy Council and the California Raisin Advisory Board.

The investigator consulted with two elementary instructors and a registered dietician for recommendations and suggestions in utilization and implementation of the learning system. The learning system was based on the seven concepts developed by the Whitehouse Conference on Food, Health, and Nutrition (1969). It is a sequential nutrition learning system based on cognitive, affective, and behavioral goals. The learning system is geared to the developmental level of the students proceeding from

concrete to abstract. The activities in the learning system are designed to introduce concepts essential to the student's understanding of nutrition in a manner commensurate with his intellectual ability. The stages of intellectual, physical, and social development of children in this age group were fundamental criteria for the selection of activities of this nutrition learning system. The activities for the nutrition learning system were designed to help the student achieve specific concepts and learning objectives (appendix C).

The nutrition learning system was divided into two weeks of lessons, one lesson occurring on each school day. Student activity sheets were utilized which were keyed to the lessons presented. In an effort to link instruction in the classroom with food practices at home, take-home material was provided to the study group. These included a letter to the parents and nutrition information leaflets and hangups. This material was sent home at the beginning of the instructional period. The school food service became an extension of the classroom by utilizing the cafeteria as a real laboratory for food preparation.

#### Method of Data Collection

This study determined pre- and postinstructional snack preferences and snack consumptions possessed by

first-grade children. The study group was exposed to the specially designed nutrition learning system. The classroom instructor gave each child in the study group the snack preference and snack consumption survey prior to the initiation of the nutrition instruction, May 8, 1978. The pretest-posttest was printed on 8-1/2-by-11-inch paper and included five pages. Each child received his own test to complete. The study group was provided pencils with erasers for completion of the pretest. Each child in the study group sat at his own desk, in his regularly assigned seat. Each child was given verbal instructions by the classroom instructor on completing the survey. The pretest was given to the entire study group at the same time and took approximately thirty minutes to complete. Time was allotted for discussion of the survey with the children and an opportunity to answer questions was provided by the classroom instructor. The study group was then exposed to the nutrition learning system which lasted two weeks, which is ten school days and was approximately twenty hours of instruction and activity time. The dates of implementation of the nutrition learning system was May 15 through May 26, 1978. The hours of instruction were from 2:00 P.M. to 3:00 P.M.

One week, on June 7, 1978, following the conclusion of the nutrition learning system, the snack preference and

snack consumption survey, administered previously, was again given to the study group. The same test conditions existed for the posttest administration. The posttest was administered to determine whether or not any changes had occurred in the children's snack preferences and snack consumptions following implementation of a specially designed nutrition learning system.

The nutrition learning system was instructed by a first-grade teacher with the assistance of a student teacher. The instructor held a Bachelor of Science degree in Elementary Education and had been teaching for sixteen years. The investigator was not present during the conduction of the study.

#### Human Rights

The rights of the individuals were respected in this study by the following considerations.

1. An objective critique of this study was made to consider the protection of human rights of each child by the Human Rights Committee of Texas Woman's University

(appendix G)

2. The parents of the participants had the option of volunteering or refusing to participate in the study after receiving a brief written explanation of the study from the investigator (appendix D). The written explanation



to the parents described the problem area to be investigated as well as the significance of the study. The investigator was identified and her reason for attempting the study. A brief description of the study was given explaining how the study was to be conducted and the research data to be gathered

3. The child was approached in the classroom setting and asked his/her verbal consent to participate

4. Permission forms were signed by each participant's parent or guardian who volunteered to participate in this study (appendix E)

5. The agency involved in the study also gave their written permission for the study to be carried out in their facility (appendix F). The proposal was given to the superintendent of schools to obtain his written consent to participate

6. Each participant's right to privacy was respected by providing complete anonymity in presentation of the study's results

#### Treatment of Data

Upon completion of data collection, the data were treated in the following manner:

The data generated from this study was nominal. The results of this study of pre- and postinstructional snack preferences and snack consumptions was statistically analyzed. Through utilization of the McNemar test, pre- and postinstructional snack preferences were analyzed to determine the negative and positive changes. The McNemar test was utilized in analyzing the pre- and postinstructional snacks consumed and the snacking times to determine the negative and positive changes that had occurred. Through utilization of the sign test, the pre- and postinstructional snack items were analyzed individually to determine if there had been a positive or negative change. The alpha level for this analysis was 0.05 for significant and 0.01 for highly significant.

#### Summary

This chapter has discussed the setting at an elementary school, the school-age population of first-grade children, the sample size, and the measures developed for the protection of human rights. Development and implementation of the tool was described. The statistical methods for analysis of the data gathered concluded this chapter.

## CHAPTER IV

### ANALYSIS OF DATA

This study was conducted in order to determine the snack preferences and snack consumptions of first-grade children, and the effects of a planned nutrition learning system on these children's snack preferences and snack consumptions were determined. The data were collected from twenty-three first-grade children who were administered a pretest, instructed on nutrition and then readministered a posttest. Several methods were instituted when analyzing the data generated from this study. Frequency distributions were utilized to describe the demographic data. Frequency distributions were utilized when describing the children's initial snack preferences and snack consumptions. The McNemar and sign tests were applied to the pre- and posttest data. Data generated are presented in tables and narrative form which follow in this chapter.

#### Demographic Data

The population for this study was comprised of twenty-three first-grade children ranging in age from six years and twenty-four days to seven years, six months and fifteen days. There were twelve females and thirteen males.

All the children except for one resided with their parents, and the majority had brothers and sisters. While all of the fathers had full-time employment, most of the mothers did not work. A more detailed presentation of this demographic data is found in table 1.

### Pretest Results

#### Snack Preferences

The snack preference portion of the pretest was organized into nine sections with each section containing a nutritious snack and two less nutritious snacks. Children taking the test were requested to mark both a first and second choice in each section. Each section of the test was analyzed separately to determine the children's preferences of snacks. When the first preferences were analyzed, it was found that in each section of the test the children preferred one of the less nutritious snacks rather than the nutritious one. Overall, five (20 percent) of the children selected the nutritious snack while nineteen (80 percent) selected one of the other less nutritious choices. Data analysis of the second preferences indicated that nine (40 percent) of the children preferred the nutritious snack while fourteen (60 percent) preferred the less nutritious snack, milk and grapefruit. Frequency distributions for the first and second preferences are given in table 2.

TABLE 1

## DEMOGRAPHIC DATA

Item	Number	Percent
<u>Age Distribution</u>		
6 years, 0 months, 24 days to 6 years, 11 months, 15 days	7	30
7 years, 0 months, 16 days to 7 years, 2 months, 22 days	8	36
7 years, 3 months, 7 days to 7 years, 6 months, 15 days	8	36
<u>Sex Distribution:</u>		
Males	13	56
Females	12	52
<u>Person with whom child resides:</u>		
Mother and Father . . .	22	96
Grandmother	1	4
<u>Number of children in the family:</u>		
0	3	13
1	11	48
2	8	36
3	1	4
<u>Ages of siblings:</u>		
Older than subject	17	--
Younger than subject	12	--
<u>Father employed full-time</u>	23	100
<u>Mother employed full-time</u>	2	9
<u>part-time</u>	3	13
<u>none</u>	18	78

N = 23

TABLE 2  
PRETEST SNACK PREFERENCES

Section of Tool	First Preference		Second Preference	
	Number	Percent	Number	Percent
<u>Nutritious</u>				
1. Milk versus iced tea, soda	8	35	19	83
2. Carrot versus pie, carmel corn	6	26	6	26
3. Celery versus cookie, pretzel	4	17	4	17
4. Raisins versus cotton candy, popsicle	7	30	5	22
5. Banana versus lollipop, cake	6	26	6	26
6. Grapefruit versus popcorn, potato chips	6	26	16	70
7. Apple versus ice cream, candy bar	0	0	7	30
8. Cheese versus cookies, jelly beans	2	9	7	30
9. Orange juice versus tomato juice, kool-aid	4	17	5	22
<u>Less Nutritious</u>				
1. Milk versus iced tea, soda	15	65	14	61
2. Carrot versus pie, carmel corn	17	74	17	74
3. Celery versus cookie, pretzel	19	83	19	83
4. Raisins versus cotton candy, popsicle	16	70	18	78
5. Banana versus lollipop, cake	17	74	17	74
6. Grapefruit versus popcorn, potato chips	17	74	7	30
7. Apple versus ice cream, candy bar	23	100	16	70
8. Cheese versus cookies, jelly beans	21	91	16	70
9. Orange juice versus tomato juice, kool-aid	19	83	18	78

65

N = 23.

### Snacking Times and Consumptions

When determining the actual snacking times of the participating group of school children, the data revealed that of the twenty-three subjects, twenty (87 percent) consumed snacks after breakfast. After-lunch snacks were found to be consumed by twenty-three of the children (100 percent). The data revealed that twenty-one (44 percent) of the children consumed snacks following dinner. Overall, the responses the children gave on the pretest consumption of snacks after meals, revealed that the children consumed snacks that were less nutritious. The consumption amounts also revealed that the children consumed a majority of less nutritious snacks and consumed small amounts of nutritious snacks. Further distributions are listed in table 3.

### Snacks Consumed and Parental Participation in Selection of Snacks

Twenty (87 percent) of the study population cited that their mothers occasionally participated in the selection of a snack, one frequently did, and two never did. Students were then asked to give the frequency of consumptions of seventeen snack foods, nine nutritious and eight less nutritious. Table 4 presents an analysis of their overall selections which revealed that eight (34

TABLE 3

## PRETEST SNACKING TIMES AND CONSUMPTIONS

Snack	Number	Percent
<u>After Breakfast</u>		
Nutritious	9	39
Less nutritious	11	48
Consumed nothing	3	13
<u>After Lunch</u>		
Nutritious	6	26
Less nutritious	17	74
Consumed nothing	0	0
<u>After Dinner</u>		
Nutritious	8	35
Less Nutritious	13	57
Consumed nothing	2	9
<u>Consumes Primarily</u>		
Nutritious snacks	3	13
Less nutritious snacks	20	87
<u>Consumes a Small Amount of</u>		
Nutritious snacks	15	65
Less nutritious snacks	8	35

N = 23.

percent) frequently consumed nutritious snack food while twelve (49 percent) occasionally did and four (17 percent) never did. On the other hand, six (27 percent) frequently consumed less nutritious snack foods, twelve (52 percent)



occasionally did, and five (22 percent) never did. The frequency distribution of snacks consumed is listed in table 4.

TABLE 4  
FREQUENCY DISTRIBUTIONS OF SNACKS CONSUMED

	Frequently		Occasionally		Never	
	Number	Percent	Number	Percent	Number	Percent
Mother decides snacks served at home	1	4	20	87	2	9
Foods eaten for snacks:						
Fruits*	6	26	15	65	2	9
Sandwiches*	6	26	17	74	2	9
Pickels	8	35	10	43	5	22
Peanuts*	8	35	10	43	5	22
Popcorn	6	26	16	70	1	4
Crackers*	5	22	16	70	2	9
Candy	6	26	12	52	5	22
Cookies	9	39	13	57	1	4
Cake and pie	3	13	13	57	7	30
Potato chips, corn chips	3	13	14	61	6	26
Raw vegetables*	10	43	6	26	7	30
Ice cream*	7	30	8	35	3	13
Soft drinks	12	52	8	35	3	13
Milk*	15	65	2	9	6	26
Kool-aid	4	17	15	65	4	17
Malts or shakes*	5	22	12	52	6	26
Sweet rolls	6	26	8	35	9	39

N = 23.

\*More nutritious snack foods.

### Location of Snack Consumption

In the last section of the pretest, the children were asked to cite, in three categories, the most frequently eaten snacks at the locations of home, school, and away from home or school. Seventeen (74 percent) of the children cited less nutritious snacks as being consumed at home and away from home or school. Whereas, fifteen (65 percent) of the children cited nutritious snacks as being more frequently consumed at the location of school. The frequency distribution results are listed in table 5.

TABLE 5  
PRETEST SNACKS CONSUMED AT NAMED LOCATIONS

Location	Nutritious		Less Nutritious	
	Number	Percent	Number	Percent
At home	6	26	17	74
At school	15	65	6	26
Away from home or school	6	26	17	74

N = 23.

### Posttest Results

The McNemar test for the significance of changes was applied to the "before and after" design. This analysis was used to determine the effectiveness of the nutritious

education system on the children's preferences and consumptions of snack foods. Each child was used as his own control.

#### Hypothesis 1--Initial Snack Preferences

The null hypothesis was stated as follows: For those children who change their initial snack preferences, the probability that any child will change his initial preference from a more nutritious snack to a less nutritious snack is equal to the probability that he will change his initial preference from a less nutritious snack to a more nutritious one. On one hundred occasions children changed their snack preferences (four of them from a nutritious to a less nutritious, ninety-six from less nutritious to more nutritious). On 104 occasions children did not change their preferences (48 preferring the nutritious snack, 56 preferring the less nutritious snack). Analysis of the data on first preferences resulted in a highly significant difference ( $\chi^2 = 85$ ,  $\chi^2 .01$ ,  $1 = 6.646$ ;  $\chi^2 .05$ ,  $1 = 3.841$ ). The probability was  $p < .001$ . Therefore, the null hypothesis was rejected and the alternate hypothesis that children will change their initial preference from a less nutritious snack to a more nutritious snack is accepted. In looking at the data once again, it is observed that on four occasions, children changed from a less nutritious to a

more nutritious snack. However, on 104 occasions, children's snack preferences did not change. The direction of change and probability values of initial snack preferences are shown in table 6.

TABLE 6

DIRECTION OF CHANGE AND PROBABILITY VALUES  
OF INITIAL AND SECONDARY SNACK PREFERENCES  
(PRETEST-POSTTEST), MCNEMAR TEST

FIRST PREFERENCES

A+-	B++
4	48
56	96
C--	D--+

$$\chi^2 = 85.56$$

$$p < .001$$

SECOND PREFERENCES

A+-	B++
36	41
102	36
C--	D--+

$$\chi^2 = .0139$$

$$.80 < p < .90$$

Cell A is a change from nutritious to less nutritious.  
Cell B is no change, those preferring a nutritious snack.  
Cell C is no change, those preferring a less nutritious snack.  
Cell D is a change from less nutritious to more nutritious.

## Hypothesis 2--Second Snack Preference

The null hypothesis was stated as follows: For those children who change their second snack preferences, the probability that any child will change his second preference from a more nutritious snack to a less nutritious

snack is equal to the probability that he will change his second snack preference from a less nutritious to a more nutritious one. One thirty-six occasions, children changed from nutritious to less nutritious, on thirty-six occasions children changed from less nutritious to nutritious. When changes in second preferences were analyzed, a  $X^2$  of .0139 and probability of  $.80 < p < .90$  was obtained. Therefore, one is unable to reject the null hypothesis. This result is not surprising when one considers that in general, on the second choice, children had to choose between the two less nutritious snacks since the majority selected the more nutritious snack as their first preference. The direction of change and probability values of secondary snack preferences are shown in table 6.

#### Hypothesis 3--Consumption Times and Type Snack Consumed

The null hypothesis was stated as follows: For those children who change their snack consumptions after breakfast, after lunch, and after dinner, the probability that any child will change his snack consumption in the positive direction is equal to the probability that he will change his snack consumption in the negative direction. When analyzing the data based on consumption times, the same null hypothesis was tested for each three primary

consumption times--after breakfast, after lunch, and after dinner. In each case the null hypothesis was rejected. Children showed a highly significant difference in their snack consumptions after breakfast and lunch ( $X_2 = 8.47$ ,  $.001 < p < .01$  and  $X_2 = 18.06$ ,  $p < .001$ , respectively). The children also showed a significant difference after dinner ( $X_2 = 4.0$ ,  $.02 < p < .05$ ). In each case more children changed from a less nutritious to a more nutritious snack than vice versa. However, nine children did not change snack consumptions after breakfast, seven children did not change snack consumption after lunch, and seven children did not change snack consumption after dinner. The direction of change and probability values of snack consumption after breakfast, after lunch, and after dinner are shown in table 7.

The sign test was utilized when determining the effects, if any, of the nutrition learning system on the children's frequency of consumptions of particular snack foods. In applying the sign test, the focus is on the direction of the effects of the nutrition education program, either positive or negative.

TABLE 7

DIRECTION OF CHANGE AND PROBABILITY VALUE OF SNACK CONSUMPTIONS AFTER BREAKFAST, AFTER LUNCH, AND AFTER DINNER (PRETEST-POSTTEST), MCNEMAR TEST

SNACK CONSUMPTIONS  
AFTER BREAKFAST

A+-	B++
3	4
5	14
C--	D-+

$$\chi^2 = 8.47$$

$$.001 < p < .01$$

SNACK CONSUMPTIONS  
AFTER LUNCH

A+-	B++
0	3
4	16
C--	D-+

$$\chi^2 = 18.06$$

$$p < .001$$

SNACK CONSUMPTIONS  
AFTER DINNER

A+-	B++
5	5
2	11
C--	D-+

$$\chi^2 = 4$$

$$.02 < p < .05$$

Hypothesis 4--Frequency of Snack Consumption

When analyzing the data based on the frequency of consumption of particular snack foods, the null hypothesis tested was stated as follows: For those children who change

their frequency of consumptions of particular snack foods, the probability that any child will change his frequency of snack consumption in the positive direction is equal to the probability that he will change his frequency of snack consumption in the negative direction. The investigator used 0.05 as the level of significance and used 0.01 as highly significant. Analysis of the data resulted in a highly significant change in the positive direction for children consuming ice cream ( $p = .004$ ) and raw vegetables ( $p = .004$ ). Foods that resulted in a significant change in the frequency of consumption in the positive direction were pickles, crackers, kool-aid, candy, and cake and pie. Even though some of the snack food consumption frequencies showed no significant difference, those that did change, did so in a positive direction. The data supported the null hypothesis for ten of the snack foods listed and was unable to accept it for seven of the snack foods listed. However, of the seventeen snack foods analyzed, only one, raw vegetables, did the majority of children change (73 percent). The sixteen remaining snack foods (52 to 74 percent) of the children did not change snack consumption frequency between the pretest and posttest. The snack foods, direction of change, number of children, and probability values are shown in table 8.



TABLE 8

DIRECTION OF CHANGE AND PROBABILITY VALUES OF THE FREQUENCY OF  
CONSUMPTION OF PARTICULAR SNACK FOODS--SIGN TEST

Snack Foods	Direction of Change						Probability
	Positive		Negative		No Change		
	Number	Percent	Number	Percent	Number	Percent	
<u>Nutritious</u>							
Crackers	6	26	0	0	17	74	0.032*
Fruits	5	22	0	0	18	75	0.060
Ice cream	6	26	0	0	17	74	0.004**
Malts and shakes	4	17	4	17	15	65	0.99
Milk	5	22	0	0	18	75	0.062
Raw vegetables	16	73	0	0	6	26	0.004**
Sandwiches	7	30	2	9	14	61	0.18
<u>Less Nutritious</u>							
Cake and pie	6	26	0	0	17	74	0.032*
Candy	6	26	0	0	17	74	0.032*
Cookies	5	22	2	9	16	73	0.454
Kool-aid	8	35	1	4	14	61	0.04*
Peanuts	3	13	3	13	7	74	1.0
Pickles	10	43	1	4	12	52	0.012*
Popcorn	3	13	2	9	18	75	0.99
Potato chips	5	22	2	9	16	70	0.454
Soft drinks	5	22	1	4	17	74	0.218
Sweet rolls	6	26	3	13	14	61	0.508

N = 23.

\*0.05 = level of significant difference.

\*\*0.01 = level of highly significant difference.

## CHAPTER V

### SUMMARY, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS

This chapter includes a summary of the study and the conclusions. The implications of this study are primarily for health professionals and educationists involved with school-age children. Recommendations are made for further study based on the analysis of data and conclusions.

#### Summary

The problem of this study was to investigate the snack preferences and snack consumptions of a group of first-grade children and to determine the effects of a planned nutrition learning system on these children's snack preferences and snack consumptions. The purposes of the study were to (1) determine the snack preferences of a group of first-grade children, (2) discover the snack consumptions of the participating group, (3) develop and implement a nutrition learning system designed to increase the nutritional value of snack consumption of the participating group, and (4) evaluate the effects of the educational

method on the selected group's snack preferences and snack consumptions.

The review of literature focused on nutritional requirements of the school-age child, nutritional practices and food habits of the school-age child, and interventions for the improvement of nutrition in school-age children. Pertinent studies and information on these major topics were presented.

The method of research was experimental, using one study group with a pre- and posttest design. A planned nutrition learning system as well as the pre- and posttest was designed by the investigator to meet the purposes stated.

Twenty-three children ranging in age from six years to seven years, six months were included in this study. The selected group was administered the pretest, instructed on nutrition, and then readministered a posttest.

Several methods were instituted when analyzing the data generated from this study. Frequency distributions were used to describe the demographic data and the children's initial snack preferences and snack consumptions. The McNemar and sign tests were applied to the pre- and posttest data. The data were analyzed and presented in narrative form and in appropriate tables.

When analysis of the data was done, frequency distributions of initial snack preferences revealed that nineteen (80 percent) of the children preferred less nutritious snacks prior to the nutrition learning system. Frequency distributions also revealed that pretest snacking times and consumptions were indulged in by snacking after meals on less nutritious snacks. When individual snack items were analyzed for frequency of consumption pre-instructionally, it was revealed that eleven (50 percent) of the children occasionally consumed nutritious snack foods, while 12 (52 percent) occasionally consumed less nutritious snack foods. Frequency distributions of the location of snack consumption pre-instructionally revealed that seventeen (74 percent) of the children consumed less nutritious snacks at home or away from home or school.

The McNemar analysis indicated that the children changed, on ninety-six occasions, their initial snack preferences from a less nutritious snack to a more nutritious snack, thus rejecting the null hypothesis at the .05 level of probability. However, on 104 occasions, initial snack preferences of the children did not change. Secondary snack preferences of the study group remained the same, thus accepting the null hypothesis. However, on 146 occasions second snack preferences changed and on 72

occasions they remained the same. The McNemar test revealed that the children changed their consumption of snacks at various times during the day from less nutritious to nutritious. A significant difference in the consumption of snack foods was shown after breakfast, after lunch, and after dinner.

The sign test analysis revealed various changes in the frequency of consumption of particular snack foods. Two snack items, ice cream and raw vegetables, showed a highly significant level of change in consumption frequency at the 0.01 level of highly significant. Whereas, pickels, crackers, kool-aid, candy, and cake and pie, resulted in a change in consumption frequency at the 0.05 level of significance. The remaining snack food items, fruits, sandwiches, peanuts, popcorn, cookies, potato chips, soft drinks, milk, malts and shakes, and sweet rolls, showed no change in consumption frequencies. However, the change that did occur, seemed to be in the positive direction, from less nutritious to nutritious snack foods.

### Conclusions

The following conclusions were derived based on the findings of this study.

1. First-grade children have definite snack preferences and snack consumptions which are identifiable

2. First-grade children have definable snack preferences and snack consumptions of which some were changed in the positive direction

The theoretical framework for this study presented Piaget's concepts of intellectual growth and development in the child. The concepts were utilized as a philosophy of learning for the development of the nutrition education program for this study. Piaget's theory of how the intelligence develops in a child and what can best be done to facilitate that development seemed to have been a viable alternative for a philosophy of learning.

The results of the analysis of the data have shown that prior to education, children preferred less nutritious snacks over nutritious snacks. Following the program in nutrition education, the children displayed a change in their first preference of snack foods. This overall change was in a positive direction--from a less nutritious snack to a more nutritious one. Even though some of the children showed no change in snack preference, it is important to note that the majority of those children who changed selected a more nutritious snack following the education program. There was not a significant change from less nutritious to more nutritious snack foods in the children's second preferences. This result can be better understood

when one considers that on the second choice many of the children had to select between the two less nutritious snacks since a majority had selected the more nutritious choice as their first preference. Even though the majority of the children displayed no change in their frequency of consumption of the various snack foods, the majority of those children who changed on each snack food did so in a positive direction. The reason for this behavior may be due to the learning of correct responses to the questions. The results of this analysis suggested the ability of instructors to change children's snack preferences and perhaps influence their desire of various foods.

The study has shown that between-meal-snacking was practiced by a majority of the children. Snack consumption following meals bears direct reflection on the adequacy of that particular meal. The children in this study, twenty-three (100 percent), consumed snacks following lunch. This leads one to question the consumption of lunches of these children. These data suggested that a major problem is apparent in that the children apparently are not consuming sufficient amounts of food at lunch which can lead to snacking. This snacking was determined in this study to be primarily of a less nutritious consumption.

A majority, twenty (87 percent), of the children in the study demonstrated that they were influenced by their mothers in the selection of snack foods. The parent's knowledge of nutrition and selection of foods for the children, therefore, can largely determine the recommended daily requirements that these children are receiving.

Seventeen (74 percent) of the children in this study were discovered to have consumed primarily less nutritious snacks at home and away from home or school. This suggested that less nutritious snacks are made available and possibly even selected for the children as snack foods. Nutritious snacks were consumed in school, fifteen (65 percent) of the children, which is congruent with the provision set forth by the school lunch mandate, that is, sweets and carbonated beverages will not be sold on school premises.

It is important to consider that snack preferences of the children in this study showed some change while snack consumption of certain snack foods remained the same. It can be concluded from this that perhaps the children in the study did change their attitudes on nutritious snacking, but were unable to practice it if the nutritious snack foods were not available to them.



The statistical analysis used to determine the significance of change in snack preferences and snack consumptions revealed that some children changed their snack preferences and snack consumptions but a majority did not change. However, of those children that did change their snack preferences and snack consumptions, they did so in a positive direction--less nutritious to nutritious snack.

#### Implications

The implications of this study are directed primarily, but not exclusively, to nurses who practice in the public schools. It is recognized through this study that the school nurse can expand her traditional role to include a direct, constructive, and effective approach to the building of a healthy and dynamic child in this society. The professional nurse with her experience in observation of changing growth and behavioral patterns of a child is in a unique position in the school to assist children in acquiring health knowledge and in developing an attitude conducive to healthful living.

#### Recommendations

This study was limited to a small number of children. It was also limited to one socioeconomic group.

It is recommended that the study be replicated using a much larger population with a variety of socioeconomic groups for the purpose of generalizability. Since the subjects were not selected from the defined population at random, this study cannot be generalized beyond this sample. Selection of other age groups would also help in generalizing beyond this study's sample.

Limited controls incurred in this study. Therefore, more control of the variable is desirable for future studies through the use of a control group. The use of a control group would also help to control the Hawthorne effect, which is inherent in most studies utilizing educational techniques.

The results of this study indicated that children were affected by the nutrition learning system. Further study is suggested to determine why this change occurred. Two areas of concern are parental and peer influence on dietary behavior and dietary recall to determine exact eating patterns.

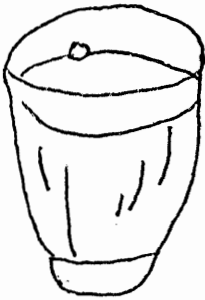
Parent education related to optimal nutritional needs of the child appeared to be influential in children's habit formation and further study is suggested in this area.

## APPENDIX A

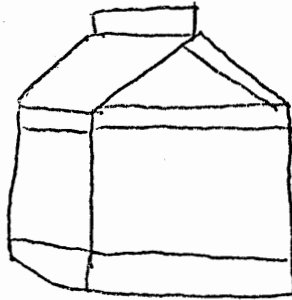
NAME \_\_\_\_\_

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WHICH WOULD YOU LIKE SECOND? PUT AN "X" ON IT.



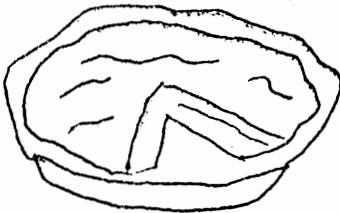
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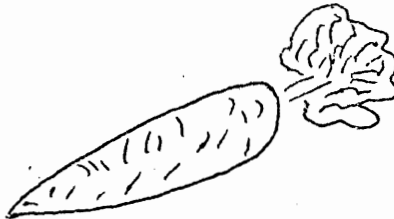
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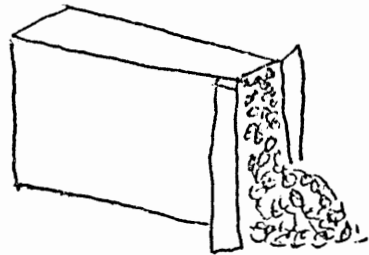
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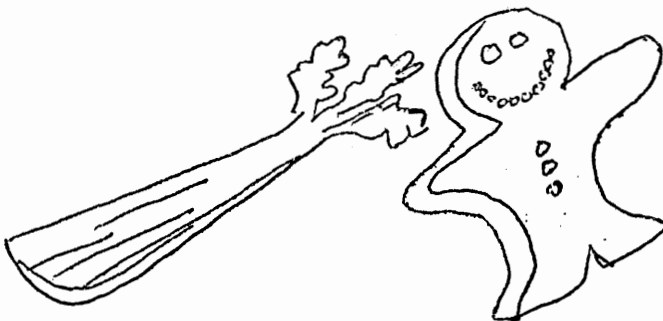
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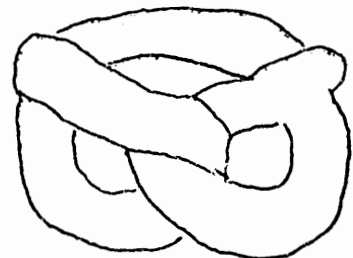


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CELERY

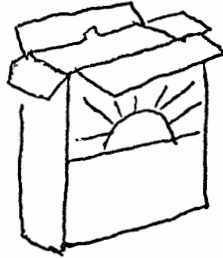
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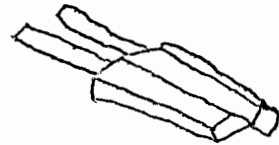
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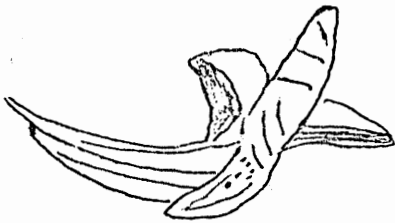
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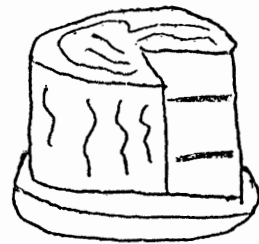
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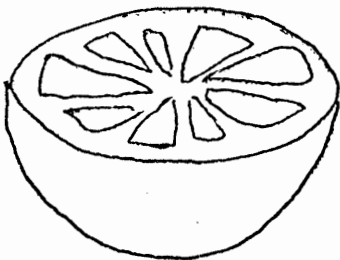
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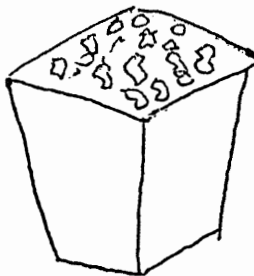
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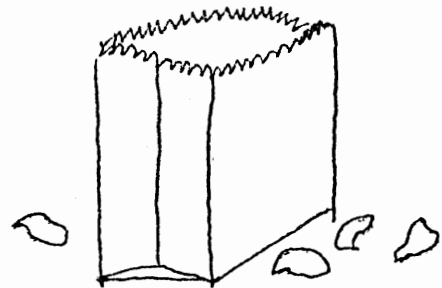
CAKE



GRAPEFRUIT



POPCORN

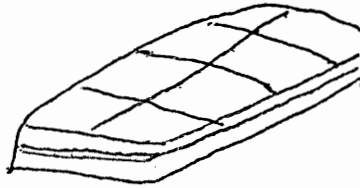


POTATO CHIPS

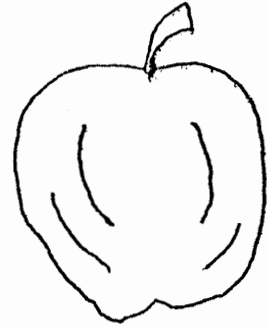
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ICE CREAM

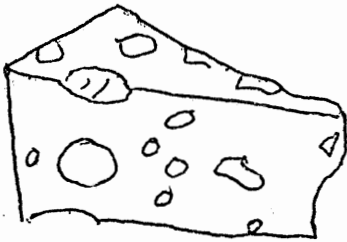


CANDY BAR



APPLE

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CHEESE

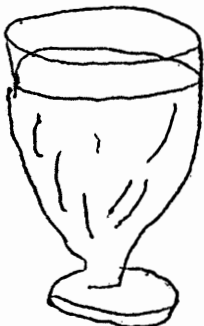


COOKIES

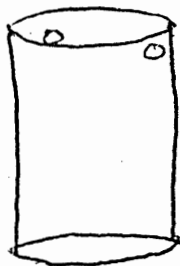


JELLY BEANS

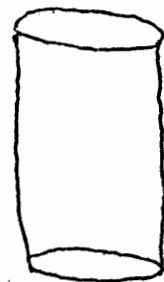
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TOMATO JUICE



ORANGE JUICE



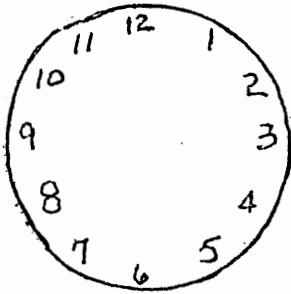
KOOL-AID

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WHAT TIME DID I EAT SNACKS?

WHAT DID I EAT FOR A SNACK?

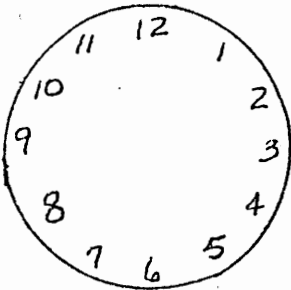
TIME



WHAT DID I EAT AFTER

BREAKFAST FOR A SNACK?

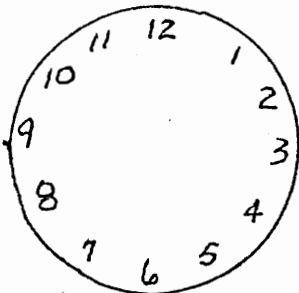
TIME



WHAT DID I EAT AFTER

LUNCH FOR A SNACK?

TIME



WHAT DID I EAT AFTER

DINNER FOR A SNACK?

I EAT A LOT OF

I EAT A LITTLE OF

Does your mother decide which snacks are served at home?

WHAT FOODS DO YOU EAT FOR SNACKS?

	Frequently	Occasionally	Never
1. Fruits			
2. Sandwiches			
3. Pickles			
4. Peanuts			
5. Popcorn			
6. Crackers			
7. Candy			
8. Cookies			
9. Cake and pie			
10. Potato chips, corn chips			
11. Raw vegetables			
12. Ice cream			
13. Soft drinks			
14. Milk			
15. Kool-aid			
16. Malts and shakes			
17. Sweet rolls, doughnuts			



IN EACH CATEGORY, LIST THE THREE MOST FREQUENTLY EATEN  
SNACKS.

At home

1) \_\_\_\_\_ 2) \_\_\_\_\_ 3) \_\_\_\_\_

At school

1) \_\_\_\_\_ 2) \_\_\_\_\_ 3) \_\_\_\_\_

Away from home or school

1) \_\_\_\_\_ 2) \_\_\_\_\_ 3) \_\_\_\_\_

## APPENDIX B

## DEMOGRAPHIC DATA

Name of Student \_\_\_\_\_

Sex of Student \_\_\_\_\_

Birth Date \_\_\_\_\_

Number of Children in Family \_\_\_\_\_

Occupation of Mother \_\_\_\_\_

Employed presently? Yes \_\_\_\_\_ No \_\_\_\_\_

Occupation of Father \_\_\_\_\_

Employed presently? Yes \_\_\_\_\_ No \_\_\_\_\_

## APPENDIX C

## NUTRITION LEARNING SYSTEM

The nutrition learning system introduces five- to seven-year-old students to basic nutrition concepts as follows: (1) Why do I eat? (2) What do I eat? (3) Where does my food come from? (4) When and how much do I eat? The activities are designed to help the student meet the following objectives.

I. Nutrition: Effect of Food on Energy, Growth, and Health

A. Food contains substances for energy, growth, and health.

The learner will be able to:

1. Identify characteristics of living things.
2. State relationships between food, energy, growth, and health.
3. Identify the feeling associated with food choices.

II. Nutrients: Their Relationship to Health

A. Food contains many substances.

The learner will be able to:

1. Identify ingredients in some foods.
2. Demonstrate that foods contain many substances.

B. Foods can be classified.

The learner will be able to:

1. Classify foods as to plant and animal sources.

2. Choose foods from both plant and animal sources.

### III. Food Handling: Its Effects on Health and Food Quality

- A. Food production has many stages and many workers.

The learner will be able to:

1. Name stages in food production
2. Describe appropriate food storage practices.
3. Name nutrition resource people in school.
4. Choose and prepare morning meal menus and other simple foods.

### IV. The Life Cycle: Its Effect on Nutritional Needs of People

- A. Food intake varies in the family and among individuals.

The learner will be able to:

1. Identify variations in the amounts of food consumed.
2. List reasons why people eat varying amounts of food.

### V. Social/Psychological Needs--The Influence on Food Choices

- A. Food choices reflect family, culture, and society.

The learner will be able to:

1. Describe individual and family variations in eating patterns.
2. Identify previously unfamiliar foods.
3. Cite reasons for food choices of self and others.

## VI. Selective Snackology

- A. Develop an awareness of a wide variety of snack foods that contribute to good health.

The learner will be able to:

1. Select a variety of snacks so that he/she will receive a variety of nutrients.
2. Relate knowledge about snacking to personal experience through role playing, and class discussion.

## APPENDIX D



## EXPLANATION OF THE STUDY

Nutrition, most particularly during the period of growth and development, is one of the greatest determinants of human health and well-being. Snacking has become part of the American culture; it has become America's favorite way to eat. Today, more than ever, there are more opportunities to make poor food choices because of the broad array of new foods available. Therefore, children must be taught how to snack.

I am a registered nurse currently working for a Master's degree in nursing. As a part of the course requirement, I am doing research on snack preferences and snack consumptions of first-grade children and the effects of nutrition education on these snack preferences and consumptions. To discover these snack behaviors I will be administering an evaluation to determine your child's snack preferences and consumptions, teaching him or her nutrition and then re-evaluating their snack preferences and consumptions. Your child's name will not be used in the study and the evaluation results will have no effect on your child's achievement or performance record in school.

Your child will also be asked for his/her verbal consent to participate in this study. If you agree to have

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your child participate in this study. please sign the attached form. Your assistance in this research endeavor is most appreciated.

Sincerely,

Louise Weidler R.N.

LW  
Attachment

## APPENDIX E

## STATEMENT OF PARENTAL CONSENT

I agree to have my son/daughter participate in a study which is being carried out to obtain research on the snack preferences and snack consumptions of first-grade children.

I agree to have the investigator administer to my son/daughter an evaluation which will determine their snack practices.

I understand the purpose of this study is to gather information on the snack preferences and snack consumptions of first-grade children and to determine the effects of nutrition education on their snack practices.

NAME \_\_\_\_\_

RELATIONSHIP \_\_\_\_\_

DATE \_\_\_\_\_ TIME \_\_\_\_\_

CHILD'S NAME \_\_\_\_\_

## APPENDIX F

TEXAS WOMAN'S UNIVERSITY  
COLLEGE OF NURSING  
DENTON, TEXAS  
105

DALLAS CENTER  
1810 Inwood Road  
Dallas, Texas 75235

HOUSTON CENTER  
1130 M.D. Anderson Blvd.  
Houston, Texas 77025

AGENCY PERMISSION FOR CONDUCTING STUDY\*

THE Hempfield School District

GRANTS TO Louise Weidler

a student enrolled in a program of nursing leading to a Master's Degree at Texas Woman's University, the privilege of its facilities in order to study the following problem:

To investigate the snack preferences and snack consumptions of a group of first grade children and to determine the effects of a planned nutrition learning system on these children's snack preferences and snack consumptions.

The conditions mutually agreed upon are as follows:

1. The agency (may) (~~may not~~) be identified in the final report.
2. The names of consultative or administrative personnel in the agency (may) (~~may not~~) be identified in the final report.
3. The agency (wants) (~~does not want~~) <sup>need</sup> a conference with the student when the report is completed.
4. The agency is (willing) (~~unwilling~~) to allow the completed report to be circulated through interlibrary loan.
5. Other: Conference is not required, however, a final report  
would be interesting.

Date April 20, 1978

Louise Weidler  
Signature of student

[Signature]  
Signature of Agency Personnel

[Signature]  
Signature of Faculty Advisor

\*Fill out and sign three copies to be distributed as follows: Original -- Student; first copy - agency; second copy - T.W.U. College of Nursing.

## APPENDIX G

TEXAS WOMAN'S UNIVERSITY

Human Research Committee

Name of Investigator: Louise Weidler Center: Dallas  
Address: 1810 Inwood Road, Apt. 208 Date: May 8, 1978  
Dallas,  
Texas 75235

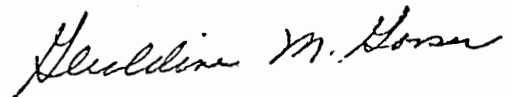
Dear Ms. Weidler:

Your study entitled Snacking: The Effects of Nutrition Education has been reviewed by a committee of the Human Research Review Committee and it appears to meet our requirements in regard to protection of the individual's rights.

Please be reminded that both the University and the Department of Health, Education and Welfare regulations require that written consents must be obtained from all human subjects in your studies. These forms must be kept on file by you.

Furthermore, should your project change, another review by the Committee is required, according to DHEW regulations.

Sincerely,



Chairman, Human Research  
Review Committee  
at Dallas



TEXAS WOMAN'S UNIVERSITY

DENTON, TEXAS 76204



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THE GRADUATE SCHOOL  
P.O. Box 22479, TWU Station

May 23, 1978

Miss Louise Weidler  
1810 Inwood Road, TWU Campus  
Dallas, Texas 75235

Dear Miss Weidler:

I have received and approved the Prospectus for your research project. Best wishes to you in the research and writing of your project.

Sincerely yours,

A handwritten signature in cursive script that reads 'Phyllis Bridges'.

Phyllis Bridges  
Dean of the Graduate School

PB:dd

cc Miss Tommie Wallace  
Dr. Anne Gudmundsen  
Nursing Center  
Graduate Office

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