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BEVERAGE PREFERENCES OF LOW-INCOME PRESCHOOL CHILDREN: RELATIONSHIP TO GROWTH, BEVERAGE AVAILABILITY AND BEVERAGE PREFERENCES OF THE PARENT

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BEVERAGE PREFERENCES OF LOW-INCOME PRESCHOOL CHILDREN: RELATIONSHIP TO GROWTH, BEVERAGE AVAILABILITY AND BEVERAGE PREFERENCES OF THE PARENT

By

Jennifer Rebecca Almy

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ABSTRACT

BEVERAGE PREFERENCES OF LOW-INCOME PRESCHOOL CHILDREN: RELATIONSHIP TO GROWTH, BEVERAGE AVAILABILITY AND BEVERAGE PREFERENCES OF THE PARENT

By

Jennifer Rebecca Almy

Food and beverage intakes of young children can help shape their future eating habits. Relationships exist between the intake of children and their growth status, as well as family food choices and the availability of foods in the home. This study examines children's and their parents' beverage preferences relative to the children's growth data, availability of beverages in the home and the parents' nutritional beliefs about beverages tested. Fifty children and their parents or primary caregivers enrolled in an urban Head Start program were examined for their beverage preference and intake habits. Significant relationships were found between selected beverages, weight for age and height for age data, as well as the availability of beverages for the children at home and the same growth values. Significant results were also seen between selected child beverage preferences and those beverages that are offered to the children at home. No significant results were found relative to beverages in the home and the parents' beliefs about the nutritive value of the beverages tested. Relationships between parent preferences and certain beverages and the presence of beverages in the home were shown to exist. Relationships are evident when looking at beverage preferences and growth, as well as beverage preferences and availability, however, additional factors can affect the beverage intakes of parents and children. Further studies are needed to clarify these relationships.

To my husband Erick, my mother, my sister Christine
and in memory of my father.

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CHAPTER I

INTRODUCTION

All individuals begin life on a milk-based diet, but the intakes of older infants and children rapidly change and develop into eating patterns that are also shaped by their culture and social environment. In today's society, many individuals take for granted the wide array of foods from which they choose at each meal. Whether or not a country is fortunate enough to have the necessary foods available to feed its children, all efforts should be made to provide children with foods that will enhance their growth and development. This is important during the early years of life, particularly infancy and preschool years. Children are learning about foods, experiencing eating in their particular environment and physically growing. Such a period is ideal for the introduction of foods that are an important contributor of essential nutrients to a young child's diet.

During these critical years, children are trying new beverages, including fruit juices (defined as 100% juice beverages), juice drinks (beverages that do not contain 100% juice, such as Hi-C and Kool-Aid) and soft drinks. In addition to water and milk, which they have had since birth, children are becoming familiar with these newer beverages, especially if the beverages are readily available – at home and other frequently visited places. Fruit juice is not introduced until four to six months of life to assure that the child will gain many nutrients and protective factors from the breast milk or formula which they have received until this point. In addition, parents often push fluid consumption as beverages are generally easy to prepare, readily available and accepted by infants. Fruit juice consumption has increased for all age groups in recent years, primarily due to the "healthy" and "natural" images attributed to it. Often fruit juice and

other beverages are used to replace milk, water and even solid foods. A growing child needs the benefit of variety in the diet. Diets high in fruit juice may lack the variety and nutritional value that diets with lower amounts of juice contain. Excess intake of fruit juice and other non-protein based beverages may lead to concerns about the growth of young children, including failure to thrive, short stature and overweight. Also increased juice consumption in young children may contribute to chronic non-specific diarrhea (CNSD) and gastrointestinal problems due to the malabsorption of sugars, specifically fructose and sorbitol found in juices. Such growth issues so early in a child's life can lead to increased problems, as they grow older.

Analyzing the food preferences and intakes of preschool children and their parents' juice consumption is one way to begin to understand what beverages children are consuming, as well as determine the effects that parents have on these choices. This study will look specifically at the beverage preferences of low-income preschool children and the relation to children's weight and height. In addition, the parents' nutrition beliefs and availability of the tested beverages to the child will be analyzed. The availability of the tested beverages at home will provide further information as to the effect parents have on the beverage preferences of their children.

CHAPTER II

LITERATURE REVIEW

Introduction

In the past several decades, childhood health and nutrition have been gaining importance among nutrition professionals, educators, school systems and families. Programs have been developed to specifically target childhood nutrition practices and status, including the National School Lunch Program in 1946, Women, Infants and Children (WIC) program in 1972, as well as the more recent National School Breakfast program in 1975 (Boyle and Morris, 1994). Even as these programs prove to have a positive effect on childhood nutrition, some children remain at risk for the physical, sociological and intellectual impacts of malnutrition. Mild malnutrition, at the very least, can result in children who are frustrated, irritable, lack interpersonal skills and suffer from increased infections due to diminished resistance (American Dietetic Association, 1990). While chronic hunger is a reality in the United States for some children, most children are fortunate to have several food choices in adequate amounts at each meal.

On the other end of the spectrum, childhood obesity is a growing problem in the United States. Factors contributing to the increased prevalence of overweight in children include the increased availability and popularity of fast food choices and lack of physical activity. For infants and preschool children, in particular, there has been recent concern regarding the excessive consumption of fruit juice and other beverages, such as carbonated soft drinks and juice drinks, instead of milk, water and even solid foods. By twelve months of age, 90% of infants in the United States are regularly drinking juice. Juices are the most consumed beverage by children under the age of five. (Smith and

Lifshitz, 1994) The issues surrounding the relationship between increased juice consumption and growth will be discussed further later in this review.

In a longitudinal study by Skinner and colleagues in 1999, fruit drink and carbonated beverages were among the foods most commonly consumed by children aged 24-60 months. In fact, four of the top six foods were beverages, including fruit drinks, carbonated beverages, 2% milk and apple juice. Fruit drink consumption was the highest at ages four and five, while carbonated beverage intakes increase as age increased. Milk and apple juice were consumed more often at the younger ages.

From a very young age most children are taught (most often by example) about the consumption of food, including what is appropriate to consume, as well as where, when and how to consume certain culturally appropriate foods. With an increasing number of "non-traditional situations", such as multi-cultural families and the increased number of hours per day children spend in day care settings, many children are being removed from the "traditional" home environment and experience new foods in new settings. The new meal settings have an array of fast food and pre-prepared food items, frequently targeting working mothers and fathers who are searching for easy ways to feed a family and save time. Many of these foods have a low nutrient density and are high in fat, saturated fat and cholesterol. Increased salt and sugar contents are also characteristics of many foods presented to our children. Marketing tools are also encouraging children to increase their intake. "Super-sized" beverages and other extra large food items may even promote increased consumption at one setting at little extra cost. Toys and games are more popular than ever at fast food restaurants, easily attracting families with children for a quick "fast-food" meal.

To decrease intakes of "fast food" or low nutrient dense foods and encourage foods that are more nutrient dense, our children need to be exposed to healthful food choices at an early age if we expect them to continue to eat nutritious foods. Unfortunately, today's society does not make this a simple task.

Food Programs Targeting Preschool Children

The Women, Infants and Children Program (WIC) and the Child and Adult Care Food Program (CACFP) provide direct assistance with foods for preschool age children. WIC has gained nationwide recognition for its assistance to low income families, with pregnant women, breastfeeding mothers and children up to the age of five. WIC provides coupons for foods such as infant formula, milk, cheese, cereal, juice, eggs and peanut butter. These are all foods that when incorporated into a preschool child's diet will increase the nutritive value of the diet. The supplemental foods from WIC do not serve as a quick cure for malnutrition problems, but as an initial step to assist children of low-income families in obtaining the nutrients they need. CACFP provides non-residential child and adult care centers, both public and private, with federal funding and commodity donated food items. This program helps to ensure that preschools and child care centers are able to adequately feed children nutritious snacks and meals while they are away from their parents (Boyle and Morris, 1994).

In 1999, Bruening and colleagues, studied the effectiveness of CACFP by looking at food and beverage intake and health outcomes in urban preschool care centers. Studied were 40 three to five year old children in one of two centers, one that used CACFP and another that did not participate in the program; instead food and snacks were

brought to the center from home. The center participating in CACFP provided significantly more servings of milk and vegetables, as well as lower amounts of fat and sweet items (Bruening et al., 1999).

In 1994, the American Dietetic Association (ADA) published their standards for the nutrition component of childcare programs, including nutrient requirements for those eating meals at childcare settings, as well as supplemental nutrition education for children and care-givers. These standards state that meals served to the children should be adequate and in accordance with the Dietary Guidelines, emphasizing age appropriate meals and snacks, food safety measures, minimal amounts of fats, sugars and sodium and reflecting appropriate portion sizes (American Dietetic Association, 1994). This information should, if possible, correspond to foodservice aspects of the childcare facility. In addition, the ADA position paper recommends that children should receive adequate information on the relation of health and food habits to the body (American Dietetic Association, 1994). The opportunity for children to practice good nutrition habits at the preschool or child care center is an excellent way of reinforcing previously learned lessons.

The nutritive value of the meals provided at childcare centers needs to meet at least one-half to two-thirds of the RDA for that age group if it is a full-day childcare center (American Dietetic Association, 1994). In a 1989 study, Briley and colleagues analyzed menus of several childcare centers in Texas. The researchers' focus was on the variety of the items served to the children, as well as the nutritive value of the overall daily diet. Results from this study showed that many care centers provided an adequate variety of vegetables, meats, breads and cereals, and dairy products, but were deficient in

providing a variety of fruits/fruit juices. While, an average of six to seven vegetables were served to the children each week, the researchers found that on the average only one type of fruit was included in the meals each week. Often the fruit was served more than once during the week. An example would be if the care center served peaches on two days with no other fruit served at all during that specific week (Briley et al., 1989). Also, at least three different types of low nutrient dense foods, including sweets, were provided for the children each week. In addition to low fruit variety, the menus overall were deficient in calories and iron, failing to meet one half to two thirds of the RDA. Finally, portion sizes were significantly smaller than the CACFP requirements.

As previously stated, a variety of menu items introduced to children at this age can help to increase their overall acceptance of new foods. Ashraf and colleagues (1990) studied the addition of tofu to school menus as a meat substitute to examine overall acceptability of new menu items and to analyze their nutrient content with tofu as the replacement. The low saturated fat, cholesterol and sodium levels of tofu make it an attractive alternative to regular meat products served. Results showed that the children accepted the new item and that there was a significant increase in the nutrient quality of the meals consumed using the tofu. Simple substitutions can introduce unfamiliar foods to children and can also increase the amounts of nutrient dense foods and decrease the amounts of saturated fat and cholesterol offered to the children.

Positive influences on nutrition and health are the multidisciplinary ways in which nutrition can be introduced to children and the individuals that administer these methods. Day care, preschool and elementary school environments are ideal for young children to learn and practice good nutrition behaviors. Often they provide meals and snacks, as well

as structured activities to incorporate basic information about food and nutrition. In addition to the National School Lunch and Breakfast programs, which provide free or reduced meals to school-age children of families meeting certain income criteria, there are large-scale programs which provide financial assistance to day care and preschool settings around the country, such as Head Start. Head Start was developed in 1965 as part of the U.S. Department of Health and Human Services. This program provides children aged 3-5 from lower income families with comprehensive education, health and nutrition services. As a result of this program's success, many children nationwide are more adequately prepared for kindergarten and are healthier than their non-participating counterparts (Crockett and Sims, 1995). Head Start also includes a component to help parents take responsibility for and become active in their child's education and overall development. The CACFP provides food and funding for Head Start programs nationwide. Therefore snacks and meals must meet the US Dietary Guidelines and food safety requirements.

A study testing a Head Start curriculum, *Children, Get A Head Start on the Road to Good Nutrition*, analyzed the knowledge, attitudes and behavior of the children participating. This curriculum contains a series of nine lessons that are interactive and multi-culturally based. At the post-test time, the treatment group of children displayed an increased knowledge of nutrition items, but showed little change in attitudes and behaviors. Two significant positive behavioral changes of children in the treatment group were the increase in number of requests for low sugar snacks and the increase in overall acceptance of foods (Byrd-Bredbenner, 1993).

Environmental Impacts on Children's Food Consumption and Eating Habits

A constantly changing world inevitably creates changing environments for children. Affecting the food behaviors and habits of children is the number of different individuals involved in each child's life. Both the family environment and surrounding community in which children live greatly contribute to the behaviors of children, including food consumption and habits. An immediate and influential factor on food consumption and eating behaviors of children is the family environment, including the parents' employment status, education level of mother, age of the mother and cultural and ethnic traditions, as well as their basic socioeconomic level (Crockett and Sims, 1995). Many families are classified as dual income where both parents are working to support the family unit. In fact, half of all preschool children have working mothers (Ashraf et al., 1990). In these situations, time is of great value to the working mother, as she must plan meals for the family, maintain work hours and the household. Extended work hours or commutes often leave children at preschool for many hours each day; therefore, forcing the child to make eating decisions under the guidance of school personnel without the direct encouragement or influence of their parents. The education level of the mother is also related to overall household earnings and food expenditures. Finally, due to decreased social support and income, the growing population of adolescent mothers frequently suffer from malnutrition or have developed deleterious eating habits of their own. These poor habits may create detrimental eating environments for their children.

At-home nutrition activities parents and children can share together are often developed by nutrition educators based on knowledge of the parents' educational level.

Programs such as *Hearty Heart* and the *Home Team* combine to focus on a parental component and working with the children during the school day. With this family involvement, parents have been able to increase their knowledge and attitude of heart smart foods (Lytle and Achterberg, 1995). Parents who increase communication with their children about healthy foods and offer good foods at mealtime can have a positive impact on overall nutritional status of their children. The consumption of foods meeting basic nutritional criteria at home is based on the availability of these foods to the children for which parents are solely responsible. Children can begin to taste new foods talked about in school if parents are aware and knowledgeable about healthy food choices.

The successful distribution of nutrition information to parents can often pose some difficulties. The *Home Plate* study looked specifically at the delivery of nutrition education to children and parents. A pre-prepared kit, containing a video, paper materials for parents and joint parent-child activities, was distributed to families. Results showed that 90% of the families preferred receiving information at home, as opposed to seminars and workshops after school and work hours (Dunn et al., 1998). Activities at home can be easy and convenient, plus allow parents a great deal of freedom as to what material is covered and how closely they adhere to the kit instructions. Parent and family involvement is necessary to increase the overall impact of a nutrition program as classroom lessons are reinforced at home.

Cultural, ethnic and socioeconomic characteristics also individualize family food consumption patterns and differentiate them from those of surrounding communities. As the United States becomes more diverse culturally, specific foods are becoming mainstream items in traditional childcare and school settings. With an estimated 30% of

the child population in 2000 being either Latino or African-American, new programs to educate children, families and school personnel on the food consumption patterns of these populations has reached new heights. (Crockett and Sims, 1995)

Increased participation in supplemental food programs, such as WIC and Food Stamps, allows us to realize that there are many children suffering from malnutrition due to their family's low socioeconomic status. While children were only about 26% of the total US population in the early 1990's (National Commission on Children, 1991), they comprised 39.6% of the poverty stricken (US Bureau of the Census, 1993). Working mothers, especially if head of the household, often spend a larger percentage of their total budget on food in order to feed their families quickly and easily.

The surrounding community environment also has a great impact on the nutritional status of children, as it establishes the supply, safety and cost of food. Location also plays a role in food availability. Urban children have the lowest kilocalorie intake even with many food assistance programs centered in larger cities. The rural poor and homeless suffer from poverty and decreased kilocalorie intakes leading to a compromised health status. Less than 50% of a child's Recommended Daily Allowance (RDA) for zinc, iron, magnesium and folic acid was consumed by homeless children according to Drake, 1992.

Family and Peer Influences on Children's Nutrition Choices

While children are learning and making choices regarding food and nutrition at preschool, the majority of their food experiences are with family members or peers. Therefore, food preferences of children are affected by the choices that their family

members, in particular their parents and peers, are making. Children are easily affected by the verbal and nonverbal messages of those around them (Anliker, et al., 1990). The literature provides mixed results when looking at the extent of the effects of parents on the food choices of children.

In 1990, Anliker and colleagues studied the effects of parental messages on children's awareness of nutrition. Children answered questions as to what foods they felt made them "stronger", " grow more" and so forth. The children's answers closely corresponded to the amount of positive nutrition messages they received from their parents. Again, this reiterates how easily children are influenced by those around them.

While the individuals in a child's environment have an effect on their knowledge of foods, studies show that there is little correlation between the intakes and preferences of parents and those of their young children. The children may understand what is indeed good for them, but are not sharing the preferences of their parents. Birch (1980b) observed children's eating patterns, obtained preference data for children and gathered the parents' preference information. While the children were eating foods they preferred in the test setting, their preferences and intakes were different from the preferences of their parents.

Skinner and associates (1998) tested toddler's food preferences as a factor of the preferences of various family members. The mothers reported the toddler's intake. In addition the intakes of the mother, father and a sibling, if applicable, were reported by that individual. Results showed that no one family member had a significant influence over the child's intake, in relation to other family members. The authors cited a meta-analysis of five studies that showed weak correlation between the diet of parent/child

pairs (Borah-Giddens and Falciglia, 1993). The results of these analysis are supported in the study above, showing a lack of significant influence over the child's diet. While there is little effect of a single parent on the intake of a child, the overall effects of the family have significant implications as to the nutritional value of the child's diet.

In 1996, Colavito and colleagues, found that the knowledge and attitudes of the meal planners influenced the child's intake of fat and fiber. The fat and fiber levels in the preschoolers' diets reflected those of the meal planners. Overall, when the meal planner was concerned with taste, there was a decreased amount of fiber included in the diet of the child.

Older peers also present an interesting influence, as they are still learning about food and nutrition basics themselves. Birch (1980a) studied the effects of peer modeling on the food choices of preschool children. Since eating is a social experience overall, the author observed the children's preferences for nine vegetables alone and then after seeing what older children would choose. Surprisingly, the children exposed to older children chose what the older child was eating, irrespective of whether it was a vegetable that they preferred in the pretest session. The younger child would not only select the item, but continued to consume the item as well. This poses an interesting twist as to what influences older children may have at school on food choices of younger ones. So often nutrition education focuses on the teacher and foodservice aspects, and ignores the older children who may have a greater influence on choices of younger ones.

Working with Preschool Children

Preschool children are excellent targets for nutrition research and programs because they are beginning to discover new foods, develop food habits and model the habits and actions of family, friends and others around them. The most important aspect for preschool children to understand is the concept that eating a variety of foods is necessary. Nutrition programs for this age group can use several vehicles to reach children, including preschools, daycare settings, their homes, television and even supermarkets. In the late 1970's, over 2 million children regularly attended preschool (Jennings, 1979). Today, the number of children attending day care and preschool is growing rapidly since the workforce is now comprised of two working parents in many cases (Davis, et al., 1983). While this number is growing, sufficient nutrition programs are needed to handle the increases in attendance.

Children are at different levels of cognitive understanding; therefore research methods must be at an appropriate developmental level. Younger children, two and three year olds, are able to perform basic language skills such as naming and identifying familiar items, as well as understanding their general surroundings. Children ages three to five are beginning to be able to classify and identify items based on size, shape and color. Children, as they begin to prepare for kindergarten, are able to understand meaningful food groupings as taught to them. (Hertzler, 1994)

Piaget's Cognitive Development Theory provides further insight as to the developmental level of young children. The pre-operational stage, children age two through six, focuses on the use of primary language skills and the immediate surroundings as more advanced cognitive skills are not developed. As the child reaches

the concrete operational stage, ages seven to eleven, they are able to understand abstract thoughts and the reasoning process in a basic form. The researcher must understand the skills of the age of the child that a research study will target for complete and accurate performance by the child. All too often questions are posed at an advanced level so that the child does not fully comprehend what is being asked.

Determining Food Intakes of Preschool Children

Past work has shown the limited ability of parents, most importantly mothers, to report or recall their preschooler's food intake for a specific period. In 1980, Phillips and Kolasa found that mothers were not able to accurately report their child's intake when the children spent much of their day outside of the home, primarily in preschool or child care settings. Baranowski et al. (1991) looked specifically at the 24-hour recall abilities of mothers of 3-and 4-year-old children. There was a 64% agreement between the mother's report and that of the trained observers of what the child ate during that period. Underreporting foods was the common error made by those mothers.

Fortunately preschool age children are able to provide researchers with some information as to their food preferences and intakes. Simple methods and patience will allow a researcher to carefully obtain diet information from a young preschool child. In 1979, Birch began to examine the food preferences of preschool children. With 17 preschoolers, ranging in age from 3 years and 7 months to 4 years and 7 months, the researchers set out to assess the relationship between child preferences and their actual intake of foods. To determine the preferences, Birch had the child select one of the food items being tested (in this case eight small sandwiches with varied spreads), taste it,

identify the spread and then continue that process with the rest of the sandwiches. After the tasting and identifying was complete, she had the children rank the foods in order of preference. As a result, Birch found that when the children were allowed to sample any sandwich spreads at another time, they would choose the items that they preferred during the ranking session. She concluded in this early study that preference data is a good way to begin to determine the general consumption of children at this age (Birch, 1979b).

In another 1979 study, Birch looked primarily at children's preferences for eight different fruits. The preschoolers were the same age of the previous study and performed the same tasting and ranking exercise to establish a preference ranking of fruits. In this study, however, the authors examined the stability of the preference data obtained. The children were assessed again after seventeen days to see how preferences differed; then again at a later time to assess the verification of the preference method. Finally, they were assessed one last time to see the initial effects of increased exposure of a food item. The correlation for the first and second assessments was 0.86 when looking at the data from four-year-old children. The three year old children had a slightly lower correlation, but still significant at 0.71. Throughout this study, the focus was on the dimensions of familiarity with the food and sweetness of the food. These dimensions, discussed later in relationship to children's food neophobia and exposure issues, are determinants of food choices made by children. The familiarity, sweetness and other dimensions of the fruits were determined and then plotted against the children's preference ranking. Over the four assessments, children preferred the fruits that were familiar to them or that had a distinct sweetness. The results of this study showed that three and four year old children

are capable of providing stable preference information over a period of time (Birch, 1979a).

To further simplify the ranking task of children, Birch (1981) utilized a process for ranking preferences of preschool children in her study on the social contexts affecting food preferences. This process began as that previously described with self-selection of food items, tasting the item and then identification of the item. After each item was tasted and identified, the children then pointed to one of three cartoon faces representing feelings about the food item: like, dislike or neutral. The food and face were recorded along with comments from the children. This process was implemented for each of the food items, one at a time. After completion, the children were asked which food in the "like" category was the very best and that item was placed at the top of the preference list. Then they were asked which item they liked second best and so forth in all categories until all items were ranked. This procedure helped ease the process of straight ranking by dividing up the items for the children initially after they tasted them. The process took approximately 5 minutes per child and was accurate. Such information from preschool age children is reliable and stable (Birch, 1979a). Other studies including Birch et al. (1982, 1984), Birch and Sullivan (1991) and Newman and Taylor (1992) used this process to obtain preschoolers' basic preference data for further comparison with other variables in their respective studies.

Preschoolers' Food Exposure and Acceptance

While Birch and colleagues demonstrated that valuable information can be obtained from preschool children as to their food preferences, the next step was to

determine what information leads children to make the choices they do. Historical research of the late 1930's by both Davis (1939) and Duncker (1938) provides a basis for research today. Davis set out to examine the self-selection patterns of infants and young children. Duncker, on the other hand, chose to study the effects of social influence on food preferences. With their results and those of recent studies, it is known that there are many environmental and social cues that help to direct food preferences and eating behaviors. Taste and preference for foods are learned experiences, which are often influenced by the body's reactions to a food. If foods are positively experienced by the child, there is an increased chance that the food will be accepted. It is often easy to tell what initial reaction a food will cause by the facial expressions of an infant or child. Since young children are not able to verbally express their feelings, often parents and others rely on facial expressions as a sign of acceptance or rejection (Birch, 1990). Expressions and initial reactions should not be the only factors that parents use to determine a child's preference for foods; however, such a means of communication can assist the parents or caregivers.

Past exposure to foods can also increase the food's acceptance by a child. A study published in 1982 by Birch and Marlin, addresses the effects of exposure on acceptance and preference in early preschool age children. With three- and four-year-olds, studies suggest that familiarity and sweetness account for 50-60% of the variability in preference data. While sweetness is a direct characteristic of the food, familiarity is a factor related to the exposure the child has had with a food. Three-year-old children relied on familiarity, while four-year-old children preferred foods that are sweeter (Birch et al., 1982a). In this study, the researchers varied the number of exposures of cheeses

and fruits for two-year-old children. They found that increased exposure of a food did little to elevate the food's preference of two-year-old children. Obviously, these children are too young to familiarize themselves with a food item and recall that information at a later time. Thus, the age of a child has an effect on the child's food preferences (Alles-White and Welch, 1985).

Perhaps one of the great mysteries to parents of young children is how to get them to eat those foods that the parents claim the children do not like. When children are introduced to new foods, there is an initial neophobic reaction that occurs. The children are unfamiliar with this food and are not willing to accept it into their diet immediately. About ten exposures to a food item are necessary for the children to feel comfortable enough to ingest the food (Sullivan and Birch, 1990). Quite often parents of young children give up long before ten exposures and determine that the child "will not eat" a certain food. As they grow and experience more foods, children are able to increase the variety in their diet more easily when the acceptance process becomes familiar.

Contingency and Reward Use of Foods

In addition to a child's exposure to foods and the characteristics of the foods, the use of food items as rewards or means to obtaining a reward have a distinct effect on the child's preference for that food. Not only does the quantity of food experiences determine the child's preference, but the quality and type of interaction that is experienced with the food contributes. (Birch et al., 1982b). Two studies done by Birch and colleagues help to relate preference of foods to their use in a means-end situation. In 1982, Birch studied how children's preferences changed for fruit juices when the beverages were used as a

means reward in a fun child activity. The ranking for the juices followed the same procedure used by Birch et al. (1980) and as described above using the cartoon faces to help break down the activity. The control group of children was exposed to juices and play activities as they normally would be in their day to day activities. There was a decrease in preference for the juices when they were used as a means to reach an end activity. For those children normally exposed to the juices, an increase in preference resulted from the lack of the stigma of the juice as being a way to reach a reward.

In 1984 Birch and colleagues studied the effects of several flavored milk beverages as a means to reach a reward for three- to five-year-old preschoolers. They found that negative shifts in preference resulted when the food was used as the means to an end result. The cartoon ranking exercise was implemented to obtain the preference information for each child. The children were presented with two types of praise, verbal praise and a tangible reward (movie ticket) for drinking the milk beverages. There were no differences in the results with respect to the age or sex of the children or the flavor of the milk.

Newman and Taylor (1992) examined the effects of the use of snack foods in several situations, means-end contingency, temporal order and normal exposure. Their results showed that when a snack was used as the means in a situation, the preference for the snack diminished.

Opposite results occur when using food as the reward in situations. Birch and colleagues (1980) examined the results of the use of food in four social affective contexts. The preschool children were presented with a snack food item in one of four social contexts: as a reward from their teacher, as part of non-contingency adult attention,

in a nonsocial situation and finally in a normal snack situation. The preferences for the snacks were determined with the cartoon face exercise and a ranking of the snack foods was completed. The researchers reported that there was increased preference for the snacks after being presented with adult attention and as a reward from the teacher. The nonsocial exposure and the normal snack exposure did not produce marked changes in the preferences of the snack food items.

While rewarding children with food items does increase preferences for those items, all too often such a plan backfires for parents. The foods used as rewards are often sweets or savory snacks; however, the foods used as the contingency to reach a reward are frequently vegetables or foods that the children do not want to eat in the first place. Due to the already innate preference for sweets and the use of sweets as a reward food, it is obvious that children will prefer sweeter items and will reject the other foods that their parents are trying to encourage them to eat.

Preschoolers' Energy Intake and Growth Status

While determining the choices preschoolers are making is important, it is also necessary to examine how those choices are affecting their energy and nutrient intake and growth status. Children amazingly are able to regulate their overall energy intake. Birch and colleagues (1991) examined the regulation of energy intake of preschool age children. While the meal-to-meal intake showed 33% variability, the total intake for day-to-day variability was 10%. Children easily compensated for a low kilocalorie dense meal by increasing their intake of kilocalories, most often at the following meal. A sample breakfast for the children ranged from 100 kcal to 350 kcal, but the children

would balance out increases or decreases soon thereafter. The children were offered a maximum of 2700 kilocalories daily to eliminate any energy intake limitations (the RDA for young children aged two to five is 1400 kilocalories/day) (Birch et al., 1991b). The practical application for this research is aimed at parents. Without the understanding that children are able to regulate their kilocalorie intake, parents often force children to consume more than they need. As a result of this parental action, children are learning to ignore their feelings of satiety and continue to eat excess amounts. Birch (1993) believes that this provides a simple explanation for some cases of childhood obesity. Unfortunately, this research does not take into account the increases in kilocalories and percent fat of many of the foods that children are consuming.

Energy and nutrientintake and food preferences have a direct effect on a child's growth and development. This period of life is critical for individuals, as children are gaining weight and height at a rapid rate. For low-income preschoolers, such as the Head Start population, there is an extra challenge in meeting nutritional needs for growth. Often children born to low income families, regardless of participation in federal assistance programs, are at an increased risk of being born at a low birth weight. Whether they are born appropriate for gestational age (AGA) or small for gestational age (SGA), these children experience challenges in catching-up in physical size and development. Doong and colleagues (1998) examined the growth of a Head Start population in four counties in a mid-western state. They found that of the children that were born LBW, 60% of the children were, at the time of the study, already below the 50^{th} percentile for height for age and 65% of the children were over the 50^{th} percentile for weight for height. While these children would not yet be classified as short stature or

overweight, respectively, they are falling into a pattern of abnormal growth. This pattern is often exacerbated by poor nutrition and eating habits. Programs such as WIC attempt to intervene with foods and nutrition information, but do not always reach the mothers in time to stop deleterious feeding practices. One example of such practices would be giving excess fruit juice.

Excessive Fruit Juice Consumption In Preschool Children

Fruit juices are often one of the first foods that infants receive besides breast milk or formula. Fruit juice has a positive connotation associated with it for most individuals. As health professionals, we encourage Americans to eat five servings of fruits and vegetables each day (including fresh, frozen, dried, canned and juices). Fruit juice is a good source of fruit and is recognized as a healthy beverage for adults (Dennison, 1997). Controversy arises when adults take the messages that are tailored for them and translate them to infants and very young children. Programs such as WIC often fail to communicate information as to the amount of juice that parents should be feeding their child. From personal experience in a WIC clinic, the researchers observed that many mothers understand that WIC does encourage the drinking of juice by children once they reach four months of age. Unfortunately, the mothers do not realize that the juice consumption is to merely supplement the breast milk or formula the child is already receiving. When coupons are presented to mothers for fruit juices for months, they may see that as an approval for feeding their infants fruit juices frequently.

Fruit juice consumption has caused great controversy among pediatricians and dietitians in the recent past. The types of juices consumed, the timing of the introduction

of juices and the amounts that should be consumed, as well as the adverse effects of excess juice consumption have gained much publicity. Some of the adverse effects, both direct and indirect, of excess fruit juice consumption include failure to thrive, obesity, short stature, chronic non-specific diarrhea (CNSD) and gastrointestinal discomfort due to the malabsorption of sugars, specifically fructose and sorbitol. Not all of the effects are experienced by children consuming excess amounts of juice. Many of these effects are specific to a particular age group or are the result of a particular juice product.

For infants, the need for formula or breast milk outweighs many of the other food items and beverages parents attempt to feed their young child. In 1992, approximately 164 million dollars were spent on bottled juice for infants alone (Klish, 1997). Smith and Lifshitz (1994) studied the effects of excess fruit juice consumption in children with non-organic failure to thrive. These children, one- to two-years-old, were examined through dietary and biochemical evaluations to determine the amount of juice being fed to the child by the parents. Excesses of juice for the young children ranged from 12 to 30 ounces each day. The researchers found that all of the children were below the 5th percentile for weight for age and over half were below the 5th percentile for weight for height. Such statistics led the researchers to intervene to change the diets of the children. With a drastic decrease in juice consumption or removal of juice from the diet completely, these young children showed growth improvement, including increases in the total kilocalorie intake for each day. Smith and Lifshitz (1994) found kilocalorie per kilogram intakes ranging from 80 – 94 kilocalories/ kg body weight for the children on the excessive juice diets, with approximately 59-74% of the kilocalories from carbohydrates. These excessive carbohydrate percentages were due to the excessive juice

intakes. The intake range for the juice restricted diets for the same set of children ranged from 98 – 118 kilocalories per kilogram body weight, with a range of 42 – 52% from carbohydrates. In addition, there were marked gains in the weight of the children on the juice restricted diets when examined in the study for the first few months of the intervention period. The mean weight gain after the intervention was 0.36 kilograms per month, which is an increase over the 0.08 kilograms per month weight gain rate for the children when consuming the excess fruit juice. The formula, milk or breast milk, as well as infant foods in this population are essential for the children to reach the necessary kilocalorie and nutrient intake they need to maintain the rapid growth and development occurring at this age.

Dennison and colleagues found very different results in a study published in 1997. The population in this study was healthy two- and five- year-olds. The researchers set out to examine the fruit juice consumption and growth parameters of the children. They looked at the consumption of milk, fruit juice, Kool-Aid juice drink and soda through the use of a seven-day food record completed by the children's parents. In addition, the child's activity level was assessed to gain perspective as to the energy each child might expend each day. The weight and height of the children was assessed and used to calculate Body Mass Index, BMI, and Ponderal Index. The researchers defined an excess fruit juice as over 12 ounces of fruit juice per day and a lack of milk as less than 16 ounces per day. Pop, milk and other drinks were more commonly consumed by the five-year-old children, while the two-year-olds were drinking excesses of fruit juice. The younger children were also consuming significantly more total beverages per day than the older children, 43.2 vs. 32.6 ml/kg body weight/day, respectively.

The researchers concluded that 42 % of the children drinking excesses of fruit juice were below the 20th percentile for height for age, compared to the normal fruit juice drinking group in which 14% were below the 20th percentile. Low milk intake was not linked with short stature in this age group at the time of the study.

The prevalence of overweight was elevated in children drinking excessive fruit juice, particularly in the two-year-olds. With 53% of the excess fruit juice drinkers having a BMI above the 75th percentile (32% for normal juice drinkers) and with 32% of those being above the 90th percentile (9% for normal juice drinkers), there is great concern for the effects of excess juice consumption on the weight of young children. In conclusion, Dennison and colleagues (1997a) determined that the excesses in juice consumption were related to the overweight status of the two-year-old children, while a lack of activity contributed to the overweigh of the five-year-old children. Unfortunately, several concerns regarding this research exist. These include the limited sample size of children consuming excess amounts of fruit juice (n=19), the lack of information as to the child's genetic makeup, the additional foods consumed by the child during the course of the study and the cutoff points determined for the excess juice intakes (Dhurandhar, 1997; Kennedy, et al., 1997 and Stinson, 1997).

Concerns surrounding fruit juice consumption are not limited to a child's growth. Some juices cause great gastrointestinal discomfort in children and carbohydrate malabsorption leading to increases in diarrhea. Different juices contain varied levels of carbohydrates , including glucose, fructose, sucrose and sorbitol. Fructose is the sugar that is most often malabsorbed in children. Increased levels of sorbitol in juices will inhibit the absorption of fructose, as will decreased levels of glucose. Fructose can be

readily absorbed with the assistance of a glucose transport system, but adequate amounts of glucose need to be present to handle the fructose. Smith et al. (1995) assessed the absorption of white grape juice and apple juice in a preschool population through hydrogen breath analysis and reports of gastrointestinal symptoms from the children. Apple juice contains sorbitol and twice the amount of fructose and glucose, therefore causing malabsorption problems and gastrointestinal discomfort in many children. White grape juice contains no sorbitol and equal amounts of fructose and glucose; therefore, facilitating absorption easier. These researchers found that about 54% of the children experienced some form of fructose malabsorption when consuming the apple juice, whereas only 19% showed signs of malabsorption when consuming the white grape juice. In 1991, the American Academy of Pediatrics recommended that apple and pear juices should be used in moderation in children due to the increased prevalence of diarrhea and discomfort reported in children consuming these (Klish, 1995).

Water and Other Beverages Consumed By Preschoolers

While much of the research related to beverage consumption in preschool children focuses on fruit juices, there are several studies reviewing basic trends in beverage consumption among young children. A British study by Petter and associates (1995) surveyed the beverage consumption of young preschool and elementary age children. Through recording of beverages for a two day period, one week day and one weekend day, and an interview, the child's parents provided the researchers with typical beverage consumption. The most popular beverage categories included squashes (diluted fruit drinks), milk, diet drinks and water, primarily with older children. For the preschool

children, 71.8% never drank plain water while only 50.0% of the older children consumed water in the forty-eight hour period. Over the two day period 15.4% and 16.4% of the preschool and elementary children consumed water only once.

Petter and associates (1995) also determined that in both groups the consumption of squashes was by far the highest of any beverage. Squashes would be the equivalent of Hi-C, Kool-Aid and other fruit flavored drinks in the United States. Interestingly, while the children were consuming increased amounts of fruit drinks, there was little consumption of carbonated beverages in relation to the other beverages consumed. The sweet taste of the squashes and the apparent nutritious appeal of these fruit drinks to parents make them a popular choice when feeding young children. Finally, Petter and colleagues (1995) concluded that approximately 15% of the children received their total recommended intake of carbohydrate from low-nutrient dense fruit drinks. As a result they concluded that future problems related to fruit drink intake may include excessive energy intake, obesity and a lack of necessary nutrient intake through meals. In addition, dental caries and cavities were concerns with the increased carbohydrate consumption.

Another study examining beverage intakes of children in Athens, Greece focused on the relationship between bone fractures in children and their drink consumption (Petridou et al.,1997). A 51-item semi-quantitative food frequency questionnaire was completed for each child with information obtained from both the child and his/her parents. Overall, increased amounts of non-carbonated beverages, carbonated beverages and carbonated non-cola beverages were consumed, as compared to the other beverages. Milk was also consumed in large quantities by many of the children. This study did not

find that the beverage consumption type or amount was related to bone fracture frequency.

Harnack and colleagues reviewed data from the 1994 Continuing Survey of Food Intakes by Individuals (CSFII). Their focus was soft drink consumption by preschool aged children, school age children and adolescents. Almost half of the preschool age children in the sample (ages three to five) did not consume soda at all, while almost 40% consumed up to nine ounces per day. The consumption percentages are markedly increased for school age children and adolescents with intakes for the latter up to 26 ounces per day or more. In addition, Harnack et al. (1999) determined that elevated levels of carbonated beverage intake were related to decreased milk and fruit juice consumption. Such beverage patterns may lead to poor eating habits in adults including dependence on caffeine and increased kilocalorie intake.

A final study focused on the intake of sugars, excluding milk and plant sugars, in beverages by children ages 1.5 to 4.5 years old. (Gibson, 1997) These sugars, described as "non-milk extrinsic sugars" in the study, include table sugar, syrups, honey and sugars found in fruit drinks. The mean intake of energy from these sugars was 18.9% and 18.6% of total caloric intake for boys and girls, respectively. In addition, as higher levels of non-milk extrinsic sugars were consumed, the author found that there were significant decreases in the intake of calcium, zinc, thiamin, riboflavin and niacin. Vitamin C intakes were adequate or exceeded the recommended level for most children. The increased percentage of energy from juices and decreases in micronutrients cause one to wonder why it is that people are continually feeding children so much juice.

Conclusions

While there has been a great deal of research involving the eating behaviors and food preferences of children, there are still many unanswered questions. All factors affecting each child's food habits and preferences are immeasurable. Targeting the most influential factors in a child's environment is a basic and logical first step. Longitudinal studies are necessary as we further examine relationships between food intake and growth status of children. Exploratory research is also necessary to begin to discover other possible relationships between children, their environment and their eating habits. Methods for obtaining food intake and preference information from younger children and their parents are beginning to take shape, but need further attention. This study will examine relationships between the beverage preferences and growth parameters of Head Start children, as well as the beverage preferences and nutrition beliefs of their parents.

CHAPTER III

METHODS

Subjects

The subjects for this study were 50 preschool children and their primary caregiver who participated in the Capital Area Community Service (CACS) Head Start program in a mid-western urban area. The Head Start program benefits children approximately ages 3-5 from low socioeconomic status. Head Start focuses on early child development, nutrition, health and general social services. Another unique feature of the program is the required participation of the parents or caregivers in the child's development and growth (Boyle and Morris, 1994).

Human subject use approval was obtained from the University Committee on Research Involving Human Subjects (UCRIHS) at Michigan State University prior to beginning the data collection. This approval letter can be found as Appendix A.

Materials

Materials included the National Center for Health Statistics (NCHS) growth charts for males and females aged birth to thirty-six months and aged two to eighteen. Updated charts had not yet been published at the time of the data analysis. All growth information plotted by the researcher on the NCHS growth charts was obtained from the children's Head Start records. A second researcher verified all data entered. A survey was developed and distributed to the children's primary caregiver (parent/guardian) for information as to the beverage preferences of the parents and the beverage consumption

habits at home (Appendix B). A pilot test of this questionnaire is described under procedures.

The materials necessary for the beverage preference exercise included: clear plastic tasting cups, plastic gloves for preparation and seven commercially prepared beverages (2% white milk, 1% chocolate milk, bottled water, caffeine-free Coca-cola, 100% apple juice, Hi-C Boppin' Berry Punch and Kool-Aid Strawberry-Kiwi drink). In addition, laminated pictures of clearly drawn cartoon faces expressing the feelings of like, dislike and neutral were used to help the children classify their beverage preferences (Appendix C).

Research Site

The study took place at several of the Head Start classroom sites during the fall of 1998. The classroom sites varied, depending primarily on the availability and participation of the children and caregivers at each site. All classrooms required the same criteria for participation in the Head Start program and this study. All classrooms were part of one overall Head Start program. Primary caregiver data were collected during group parent/caregiver meetings at the various Head Start classroom sites.

Procedures

Consent was obtained from the primary caregivers prior to collecting the children's beverage preference data (Appendix D). In addition, each caregiver completed a form containing child food and beverage allergy information (Appendix E). At the time

of the study, no child had allergies to any of the beverages tested as reported by the caregiver.

The growth status of each child was examined through the use of the most recent weight, height, age, birth weight and gestational age data as provided by the Head Start site. These data were plotted on the age and sex specific NCHS growth charts. By plotting the weight for height and the height for age, the researchers were able to assess the children's body weight and stature relative to nationally used standards. These values are commonly used to assess the growth of young children. The weight for height data takes into account the height of the child in determining the percentile for the child's weight, providing the examiner with the child's weight percentile independent of age. A useful assessment of a child's weight cannot be determined by their weight for age value (Falkner, 1985). The height for age value, examines the child's stature and is a "stable and valuable" indicator of short stature (Falkner, 1985). The data collected from this portion of the study was used to identify correlations between beverage preferences and growth. Weight for height percentile values above the 95th percentile were considered overweight and under the 5th percentile were underweight. As for height, short stature was defined as values below the 5th percentile for height for age (Trowbridge, 1983).

To obtain information regarding parent and child beverage consumption and beverage exposure in the home, the parent/guardian was asked to complete a short questionnaire. A pilot test of twenty-six primary caregivers participating in the Women, Infant and Child (WIC) Supplemental Food and Nutrition program in the same mid-western urban area was conducted to examine the readability and overall format of the

questionnaire. Two versions were tested on the WIC participants and revised until the final version was developed.

The study questionnaires were completed at the monthly parent meetings held by the Head Start staff. The researcher was present at all meetings to answer any questions and assist anyone needing help completing the questionnaire. The primary caregivers provided information regarding their assessment of the nutritional value of the beverages the children were consuming. Specifically, they were asked to rank the beverages that the children tested. Finally, the parent/guardian answered questions pertaining to the availability of beverages in the home for the child, focusing on the past three months.

The beverages offered to the children at Head Start as part of their regular feeding were recorded for 5 consecutive days during a typical week. The type of drink, time of day when the drink was offered and most recent meal offered to the children was recorded on a data collection sheet included in the appendix. These data provided information regarding the children's exposure to beverages while at Head Start. (Appendix F)

The beverage preference data was collected using a method developed, validated and used extensively by L.L. Birch (Birch et al., 1980). This method begins with the self-selection of one of several food items by the children, continues with the tasting and identification of the item by the child and concludes with a ranking exercise. The preference data collection was completed in a private area outside of the classroom with the researchers. Children used three cartoon faces to assist in communicating their beverage preferences. Prior to beginning the experiment, the researchers reviewed the

meanings of the cartoon faces (like, dislike and neutral) with each child individually, using phrases the child could comprehend.

In this study, the children were asked to identify and taste the seven beverages in a designated sequence: 100% apple juice, Kool-Aid Strawberry-Kiwi drink, Hi- C Boppin' Berry Punch, Caffeine-free Coca-cola, bottled water, 2% white milk and 1% chocolate milk. Previous studies using this method vary the number of food items tested from five to eight. These beverages were selected since they are often included in children's diets and because their long term use or lack of use can affect the physical growth of the child and nutrient intake. Each child was presented with a tray containing the seven beverages in small, clear plastic tasting cups. The child was asked to identify the drink and then taste it. Since dealing with a young population, several words or phrases were accepted as the identification. For example, Kool-Aid and Hi-C could be called fruit juice, juice drink or simply juice. Apple juice could also be identified by the child as juice and it was accepted. For soda the following words and phrases were accepted: Coke, soda, pop and cola. Water, milk and chocolate milk were the only terms accepted to identify those products.

For children who were unable to identify a beverage, the researcher assisted the child by prompting with descriptive words and phrases. For example, "What does this drink look like?" or "What color is this drink?" If the child was still unable to identify a beverage, the researcher told the child the name of the beverage and continued with the tasting portion of the data collection. If a child was not willing to taste a particular beverage, the researchers noted this and proceeded with the next beverage. The child's ability to identify a beverage as well as any comments (i.e. color, preference, texture,

taste) made by the children during the tasting session were recorded on the data collection sheet (Appendix G).

After identification and tasting of the beverage, the children were then asked to point to the cartoon face that showed how they felt when they drank this beverage (like, dislike or neutral). The experimenter used age appropriate words and phrases, in order to help decrease any misunderstandings by the preschool children. For example, "How does this drink make you feel?" and "What is this drink called?" The procedure of identification, tasting and preliminary ranking continued until all seven beverages had been tested and grouped.

At this point, the child was asked to rank the drinks they placed in the "like" category. The researcher then asked "Which of these is your favorite?" or "Which do you like the very best?" This was recorded and the drink was removed from the child's sight. Then they were asked which of the beverages they like second best and continued on throughout the remainder of the beverages and neutral and dislike groups, until a preference ranking was established. The use of two steps in the ranking procedure simplified the task for the children. In addition, the use of three cartoon faces, as opposed to a more traditional five point Lickert scale, helped to simplify the task for the children, while still allowing for the collection of more specific data. This method of collecting children's preference data has been successful and not invasive, showing no risk or harm to the children, in previous studies with varied types of food items (Birch et al., 1982; Birch et al., 1984; Birch and Sullivan, 1991 and Newmann and Taylor, 1992).

Table 3.1. Variable coding used in statistical analysis.

Category	Code
Age	Numerical value in months
Sex	Male = 1 Female = 2
Ethnicity	Caucasian = 1 Asian = 4 Hispanic = 2 Biracial = 5 Black = 3
Ethnicity Grouping	Caucasian = 1 Not Caucasian = 2 Hispanic = 1 Not Hispanic = 2 Black = 1 Not Black = 2 Asian = 1 Not Asian = 2 Biracial = 1 Not Biracial = 2
Birth weight, Weight	Numerical value in kg
Height	Numerical value in cm
Weight for Age, Height for Age, Weight for Height, Birth weight	> or = 95th percentile = 1 = 90 or 90-95th percentile = 2 = 75th or 75-90th percentile = 3 =50th or 50-75th percentile = 4 =25th or 25-50th percentile = 5 = 10th or 10-25th percentile = 6 =5th or 5-10th percentile = 7 <5th percentile = 8
Groupings for Wt/Age, Ht/Age, Wt/Ht	> or = 90th percentile = 1 =10th or10-90th percentile = 2 < 10th percentile = 3
Beverage Availability in Home during past Three Months	Yes = 1 No = 2
Child's Ability to Identify the Beverage	Yes = 1 No = 2
Child's Preference Ranking	Most favorite = 1 Least favorite = 2
Grouping of Child's Preference Ranking	Top 3 of rank = 1 Bottom 4 of rank = 2
Parent's Preference Ranking	Most favorite = 1 Least favorite = 2
Grouping of Parent's Preference Ranking	Top 3 of rank = 1 Bottom 3 of rank = 2
Parent's Idea of Nutritive Value of Beverage	Most healthy = 1 Least healthy = 2
Grouping of Parent's Idea of Nutritive Value of Beverage	Top 3 of rank = 1 Bottom 3 of rank = 2

Statistical Analysis

All data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 6.1.4, copyright 1995. Table 3.1 is a summary of how the variables were coded for the statistical analysis. Basic student's t (t-test) and one way analysis of variance (ANOVA) tests, as well as the Tukey's b post hoc test, were performed to correlate variables. Significance was determined by a p value less than 0.05.

Null Hypothesis Statements

The first hypothesis (H_1) tested in this study states that there is no relationship between the fluid beverage preferences of a Head Start preschool sample and their most recent weight for height and height for age data. The second null hypothesis (H_2) tested states that the fluid beverage preferences of a preschool Head Start sample are not indicative of their parents' beverage preferences and nutritional beliefs. The objectives for the hypotheses are stated below:

For the first hypothesis (H_1):

H_{1a}. To determine any correlation existing between weight for height and height for age data and the beverage preferences of the preschool children.

H_{1b}. To determine any correlation existing between weight for height and height for age data and the beverages most often offered to the child as per parental reporting.

For the second hypothesis (H_2):

H_{2a}. To determine the relationship between the children's fluid beverage preferences and the beverages offered to them.

H_{2b}. To examine relationships between the beverages offered to the children at home and the belief of the parents as to their relative nutritive value.

H_{2c}. To examine the relationship between beverages offered at home and the beverage preference of the parents.

CHAPTER IV

RESULTS

Demographic Data

Fifty preschool age children enrolled in a Head Start program in a mid-western urban area were examined for their beverage preferences and exposure to beverages at home. Weight and height data were collected for each child in the study. Of the children in the sample, 54% were male and the average age of the children was 46 months. Table 4.1 lists the demographic characteristics of the sample. The children were from twelve different classrooms participating in the same Head Start program. The children and caregivers were enrolled in the study based upon the willingness of the caregiver to sign the consent form for the child to participate and complete the survey. In addition, the children could not have any allergies to the beverages consumed in the experiment. Only two children had food allergies as reported by the primary caregiver. These allergies were to corn and oats; therefore, they had no effect on the ability of the children to taste the beverages. No child was reported to have any choking or swallowing problems, nor were there any reasons indicated by caregivers why their children could not taste a beverage.

The ethnic profile of the sample includes Caucasian (34%), Hispanic (14%), Black (42%), Asian (4%) and children who are biracial (6%). In addition to different backgrounds, ten children were born prematurely with gestation being on average 4.7 weeks shorter that the children born at term. This information was taken from Head Start records. Prematurity was defined as birth prior to 37 weeks of gestation.

Table 4.1 Demographic data collected from the caregiver survey and Head Start records.

Category	Variables
Sex (n = 50)	Male 54% (n=27) Female 46% (n=23)
Age in months (n = 50)	Mean = 46.0 (min. = 33.0; max. = 57.0)
Ethnicity (n = 50)	Caucasian 34% (n=17) Hispanic 14% (n=7) Black 42% (n=21) Asian 4% (n=2) Biracial 6% (n=3)
Premature at birth (n = 50)	Yes 20% (n=10) No 80% (n=40)
Number of weeks premature (n = 10)	Mean = 4.7 (min. = 1.0; max. = 12.0)
Have Food Allergies (n = 50)	Yes 4% (n=2) No 96% (n=48)
Number of children in household (n = 50)	Mean = 2.46 (min. = 1.0; max. = 5.0)
Primary caregiver (n = 50)	Male head of household 0% (n=0) Female head of household 46% (n=23) Both 36% (n=18) Other 18% (n=9)
Food shopper (n = 50)	Male head of household 4% (n=2) Female head of household 78% (n=39) Both 0% (n=0) Other 18% (n=9)
Meal planner (n = 50)	Male head of household 4% (n=2) Female head of household 76% (n=38) Both 20% (n=10) Other 0% (n=0)
Participate in food assistance programs (n = 50)	Yes 70% (n=35) No 30% (n=15)

The average number of children in a participating household was 2.46. Additional household information obtained included the roles of the meal planner and food shopper - 76% of the meal planner and 78% of the food shopper roles were filled by the female head of household. Only two households indicated the male head of household as the primary meal planner and food shopper, while others listed both the male and female sharing the roles, or another individual filling the responsibility, i.e. a grandparent.

Many of the families participating in the Head Start program are often eligible for additional supplemental food programs, such as Women, Infants and Children (WIC) and Food Stamps. Seventy percent (35 households) were participating in an additional food assistance program at the time of the study.

Anthropometric Data

All weight and height data were reported to the researcher by the Head Start staff from past records. The weight and height data were collected by the Head Start staff throughout the year. Birth weight was also provided by Head Start. Table 4.2 displays the mean birth weight, weight and height data for the children, as well as the distribution of the children according to the percentiles from the 1979 version of the NCHS growth charts. An updated version of the NCHS growth charts which includes the body mass index (BMI) calculation in assessing a child's growth status, became available in late 2000 but was not available at the time the data was analyzed.

The mean birth weight was 3.23 kg and almost one quarter (24%) of the children were at the 50^{th} or between the 50^{th} and 75^{th} percentiles at birth. The average weight of

Table 4.2 Anthropometric data at birth and at time of the study.

Category	*Variable*		
Birth weight in kg (n = 50)	Mean = 3.23 kg (min. = 1.0; max. = 4.20)		
Birth weight (n = 50)	> or = 95th percentile	6%	(n=3)
	= 90 or 90-95th percentile	18%	(n=9)
	= 75th or 75-90th percentile	14%	(n=7)
	= 50th or 50-75th percentile	24%	(n=12)
	=25th or 25-50th percentile	8%	(n=4)
	= 10th or 10-25th percentile	20%	(n=10)
	=5th or 5-10th percentile	6%	(n=3)
	<5th percentile	4%	(n=2)
Weight in kg (n = 50)	Mean = 16.716 (min. = 11.0; max. = 24.50)		
Weight/Age (n = 50)	> or = 95th percentile	12%	(n=6)
	= 90 or 90-95th percentile	10%	(n=5)
	= 75th or 75-90th percentile	28%	(n=14)
	=50th or 50-75th percentile	14%	(n=7)
	=25th or 25-50th percentile	16%	(n=8)
	= 10th or 10-25th percentile	8%	(n=4)
	=5th or 5-10th percentile	2%	(n=1)
	<5th percentile	10%	(n=5)
Height in cm (n = 50)	Mean = 99.01 (min. = 73.8; max. = 110.0)		
Height/Age (n = 50)	> or = 95th percentile	4%	(n=2)
	= 90 or 90-95th percentile	2%	(n=1)
	= 75th or 75-90th percentile	12%	(n=6)
	=50th or 50-75th percentile	30%	(n=15)
	=25th or 25-50th percentile	24%	(n=12)
	= 10th or 10-25th percentile	8%	(n=4)
	=5th or 5-10th percentile	6%	(n=3)
	<5th percentile	14%	(n=7)
Weight/Height (n = 49)*	> or = 95th percentile	12%	(n=6)
	= 90 or 90-95th percentile	16%	(n=8)
	= 75th or 75-90th percentile	28%	(n=14)
	=50th or 50-75th percentile	16%	(n=8)
	=25th or 25-50th percentile	12%	(n=6)
	= 10th or 10-25th percentile	12%	(n=6)
	=5th or 5-10th percentile	2%	(n=1)
	* One child's value was off growth chart.		

the children was 16.716 kg with children spanning the growth chart. Twenty-eight percent of children were at the 75th or between the 75th and 90th percentile. Ten percent of the children (n=5) were below the 5th percentile for weight for age.

In looking at stature, height for age growth chart percentiles were used. The mean height for the children was 99.01 cm. Twelve, thirty and twenty four percent of the children were at the 75th or between the 75th and 90th percentile, at the 50th or between the 50th and 75th percentile, or at the 25th or between the 25th and 50th percentile, respectively. Seven (14%) of the children were below the 5th percentile, indicating short stature or growth stunting.

One can determine appropriate weight for age and can indicate incidence of over- or underweight using the weight for age percentile. Only data from 49 children were used, as one child's height was below the lower value on the growth chart. Therefore, this information could not be plotted on the readable area of the growth chart. Twenty eight percent of the children were at the 75th or between the 75th and 90th percentile. The remainder of the children were distributed throughout the weight for age growth chart with twelve percent being overweight (greater than the 95th percentile) and no children being below the 5th percentile.

Beverage Collection and Caregiver Questionnaire

Forty-four (88%) of the fifty total children participating in the study tasted all of the beverages offered. Two children were absent on the day of the testing and one child refused to taste any of the beverages but did go through the ranking exercise. Three other children did not taste all of the seven beverages. Two children tasted all but two and one

child tasted all but three. The tasting exercise took place at least one hour after the children had a meal or snack. This was done to avoid confusion due to prior food intake or consumption of a beverage. Overall, the children were cooperative and the researchers kept the testing moving along, so as not to lose the attention of the children. Each beverage exercise took approximately five to ten minutes. This included setting up the beverages, explaining the exercise to the children and conducting the tasting exercise. In addition, all tasting exercises were performed in an area outside of the classroom, so that other children were not around to disrupt the tasting exercise. Due to the young age of the children and the classroom setting, it was assumed that they would not share information regarding the exercise so as to influence children who had not yet performed the exercise. This would be a concern when dealing with older children. The children made additional comments of note during the testing sessions. Many children were easily able to identify soda as "pop", as well as "Coke." Chocolate milk was identified as "coffee" by one Hispanic child. Most children easily identified the fruit drinks and apple juice as such. It would be difficult to distinguish between different brands of juices, such as Kool-Aid and Hi-C, without showing the child a commercial or label to assist them in distinguishing between the two.

All Head Start classroom sites served milk with either the breakfast and lunch sessions or the lunch and snack sessions, depending on the time of day the classes met. One site also served orange juice in addition to milk. All beverage preference test sessions were conducted at least one hour after the child had a meal, either at Head Start or home.

Caregiver questionnaire information was helpful in learning the beverages most often found in the home, as well as the beverage preferences and nutritional beliefs of the caregivers. However, the last page of the questionnaire, a simplified food frequency questionnaire, was completed incorrectly by most caregivers even though it was explained to them and the researcher was available to answer questions about the completion of the questionnaire. As a result, the data from this section were not used in this study. In addition, two questions regarding beverages actually offered to children at home and beverages the child consumes while in the caregiver's care were often not completed. This poor response eliminates an attempt to gather information about the child's beverage consumption at home.

Thirty –two percent of the primary caregivers ranked soda as their least favorite when asked to rank six beverages: soda, water, milk, apple juice, chocolate milk and juice drinks. Forty-eight percent stated that milk was either their first or second favorite of the same six beverages. When asked about the "healthiness" of the beverages, 80% of the caregivers ranked soda or cola last, while 84% ranked water in the top three and 86% ranked milk first or second.

Hypothesis 1 (H_1):

H_1: There is no relationship between the fluid beverage preferences of a Head Start preschool population and their most recent weight for height and height for age data.

For this hypothesis the independent variables included the preference or ranking of the beverages by the children, the rankings grouped into the top three favorites, the bottom four preferences and the child's ability to identify the beverage. In addition, the availability of the beverages at home, taken from the parent survey, was an independent variable. The dependent variables included all weight and height information available on the children participating (weight, height, weight for age, height for age and weight for height). T-tests and analysis of variance (ANOVA) were used due to the small sample size. Total sample size (n) varied at times during the study, as some caregiver survey questions were not completed correctly and two children never performed the beverage preference exercise due to absences on the day of the exercise.

The mean body weight of those children who ranked water as a top three preference was significantly lower (p=0.027) than the weight of those who gave it a lower overall rank (Table 4.3). Table 4.3 also shows that children who were able to identify Hi-C beverage were lighter (mean weight of 16.5692 kilograms) than children who were not able to identify it. No other significant differences were found in body weight relative to preference of beverage or ability to identify a beverage.

Table 4.3 Factors contributing to significant differences between weight.

	N	*Mean**	*P Value*
Rank of Water			P=0.027
Top 3 ranking	14	16.0786	
Bottom 4 ranking	32	17.0844	
Able to ID Hi-C			P=0.002
Yes	13	16.5692	
No	34	16.9000	

* Values represent weight in kilograms.

Differences were also present between preference ranking, ability to identify beverages and the availability of beverages at home with respect to the weight for age percentile on the NCHS growth charts. Table 4.4 and 4.5 show the differences that were significant. Children who gave Hi-C a higher preference rank, as well as those able to identify it, had a lower mean weight for age (when numerical values are assigned to the percentiles) than their counterparts with p values of 0.035 and 0.040, respectively. Caregivers who indicated that there is bottled water at home had children with a lower mean weight for age. These children were lighter than those whose caregivers did not indicate bottled water was in the home. The households with low fat milk (1/2%,1% and 2%) milk had children with a higher overall weight for age percentile when grouped, as seen in Table 4.5. This was significant with a p value of 0.029.

Table 4.4 Significant differences between mean values of weight for age.

	N	*Mean**	*p Value*
Rank of Hi-C			P=0.035
Top 3 ranking	24	4.2917	
Bottom 4 ranking	22	3.8182	
Able to ID Hi-C			P=0.040
Yes	13	4.6154	
No	34	3.7941	
Bottled water at home			P=0.022
Yes	18	1.9444	
No	32	1.875	

* Values for weight for age are defined as follows:
1 = >95th %tile; 2 = 90-95th %tile; 3 = 75-90th %tile;
4 = 50-75th %tile; 5 = 25-50th %tile; 6 = 10-25th %tile;
7 = 50-10th %tile; 8 = <5th %tile

Table 4.5 Significant differences between means of weight for age grouped.

	N	*Mean**	*P Value*
Low fat milk at home			P=0.029
Yes	28	1.7857	
No	22	2.0455	

* Values for weight for age are defined as follows:
1 = >90th %tile; 2 = 10-90th %tile; 3 = <10th %tile

Table 4.6 Significant differences between means of height for age grouped.

	N	*Mean**	*P Value*
Rank of Chocolate Milk			P=0.0101
Ranked it #1	17	2.3529	
Ranked it #3	6	1.6667	
Able to ID Hi-C			P=0.023
Yes	13	2.3077	
No	34	2.0882	
Low fat milk at home			P=0.025
Yes	28	2.0000	
No	22	2.3182	

* Values for height for age are defined as follows:
1 = >90th %tile; 2 = 10-90th %tile; 3 = <10th %tile

Significant differences indicated in means of height for age were with the ranking of chocolate milk, ability to identify Hi-C and the availability of low fat milk at home. Children who ranked chocolate milk as the highest preference were significantly shorter than those children who ranked it third. The means for the numerical values assigned to the percentiles were 2.3529 and 1.6667 for those ranking chocolate milk first and third, respectively (Table 4.6). There were no other significant differences between height for age percentiles relative to beverage preference rank or ability to identify a beverage.

Children able to identify Hi-C were also found to be shorter than their counterparts unable to identify Hi-C, p = 0.023 (Table 4.6). Caregivers who indicated that low fat milk is present in the home had children who were taller than those who did not have low fat milk at home, p = 0.025 (Table 4.6).

In looking at a child's weight for height value, one can see whether or not the child may be over or underweight. Several differences in the mean weight for height values were found in children with regards to beverage preference and availability of certain beverages at home. Table 4.7 and 4.8 profile this data. Mean values for weight for height in looking at all percentiles individually (numerical values assigned to each percentile to calculate the mean) for children with and without bottled water at home was 3.6667 and 3.3226, respectively (p=0.029). Therefore children with bottled water at home were smaller overall. When grouping the percentiles, the same conclusion results but with slightly more significance, p=0.000.

Children ranking soda and water in the top three show different results with regards to weight for height. Those ranking soda in the top 3 were heavier than their counterparts who gave soda a lower ranking. Mean values were 1.7667 for a top three rank of soda and 1.8667 for a lower rank of soda. The opposite result occurs for children who ranked water in the top three, mean was 1.9286, versus children who did not rank water high, mean 1.7419. Children who ranked water higher had a smaller weight for height overall.

The presence of low fat milk at home versus no low fat milk at home has means of 1.6786 and 1.8095, respectively; this indicates that the children with low fat milk at home were larger than their counterparts. Reverse results were shown with children

having non-cola sodas (lemon-lime, orange flavored, gingerale, etc) in the home. These children were smaller than their counterparts without non-cola sodas in the home. Table 4.7 and 4.8 display these results.

Table 4.7 Significant differences between means of weight for height relative to the availability of a beverage at home.

	N	*Mean**	*P Value*
Bottled water at home			P=0.029
Yes	18	3.6667	
No	31	3.3226	

* Values for weight for height are defined as follows:
1 = >95th %tile; 2 = 90-95th %tile; 3 = 75-90th %tile;
4 = 50-75th %tile; 5 = 25-50th %tile; 6 = 10-25th %tile;
7 = 5-10th %tile; 8 = <5th %tile

Table 4.8 Significant differences between means of weight for height grouped relative to beverage preference and availability.

	N	*Mean**	*P Value*
Rank of Soda			P=0.048
Top 3 ranking	30	1.7667	
Bottom 4 ranking	15	1.8667	
Rank of Water			P=0.001
Top 3 ranking	14	1.9286	
Bottom 4 ranking	32	1.7419	
Bottled Water at home			P=0.000
Yes	18	1.8889	
No	31	1.6452	
Low fat milk at home			P=0.015
Yes	28	1.6786	
No	21	1.8095	
Non-Cola Soda at home			P=0.033
Yes	20	1.8000	
No	29	1.6897	

* Values for weight for height are defined as follows:
1 = >90th %tile; 2 = 10-90th %tile; 3 = <10th %tile

Hypothesis 2 (H_2):

H_2: The fluid beverage preferences of a preschool Head Start population are not indicative of their parents' beverage preferences and nutritional beliefs.

The second null hypothesis relies on information collected from the parent surveys, the ability of the children to identify beverages during the preference testing and their actual preference data. The children's ability to identify two beverages correlated with the fact that those beverages are more often present in the home. One beverage, however, showed the opposite result (Table 4.9). Children were more able to identify white milk if low fat milk was present in the home. ($p=0.023$). They were also more likely to identify soda if the had non-cola sodas (such as orange soda, lemon-lime, gingerale, etc) in the home as opposed to those who did not have these beverages in the home with mean values of 1.0000 and 1.1111, respectively. The opposite result was seen for water. Children with bottled water in the home had a higher mean value for the ability to identify water and therefore were less able to identify it correctly.

Significant differences existed between the mean beverage preference rank for children who had chocolate milk at home and those that did not have the beverage at home. (Table 4.10). Children with chocolate milk at home gave chocolate milk a mean rank of 2.4000, while those who typically do not have chocolate milk in the home had a mean rank of 3.6452; therefore, an opposite result was seen for children who had non cola soda in the home. These children ranked regular soda lower overall (mean 3.2632), when their counterparts without "other sodas" in the home gave it a mean rank of 2.5185.

There were no significant differences with regard to having a beverage at home and the parent believing it is a healthy beverage. Finally, Table 4.11 shows results when looking at the parent ranking of several beverages and whether or not they are in the home. The first result stated in Table 4.11, displays the parent's mean rank of chocolate milk, 1.4762 and 1.2400, for those who have whole milk or do not have whole milk in the home, respectively (p=0.010). For both white milk and soda, the mean rank was higher for those that have milk or diet caffeine free soda in the home. While there are differences, neither of the mean rankings indicated that white milk or soda were in the top three beverages most of the time.

Table 4.9 Significant differences between mean ability of children to identify beverages relative to beverage availability.

	N	*Mean**	*p Value*
ID White milk			
Low fat milk at home			p=0.023
Yes	26	1.0000	
No	21	1.0476	
ID Soda			
Non-Cola Sodas at home			p=0.001
Yes	20	1.0000	
No	27	1.1111	
ID Water			
Bottled water at home			p=0.009
Yes	18	1.0566	
No	29	1.0000	

*1= Able to ID beverage; 2= Unable to ID beverage

Table 4.10 Significant differences between means of children's ranking of beverages relative to the availability of beverages at home.

	N	*Mean**	*p Value*
Rank of Chocolate milk			
Chocolate milk at home			p=0.003
Yes	15	2.4000	
No	31	3.6452	
Rank of Soda			
Non-cola sodas at home			p=0.001
Yes	19	3.2632	
No	27	2.5185	

* Rank of beverages: 1= most favorite; 7= least favorite

Table 4.11 Significant differences between means of parent's ranking of beverages relative to the availability of beverages at home.

	N value	*Mean**	*p Value*
Parent rank of Chocolate milk			
Whole milk at home			p=0.010
Yes	21	1.4762	
No	25	1.2400	
Parent rank of Milk			
Skim milk at home			p=0.026
Yes	29	1.9310	
No	16	2.0000	
Parent rank of Soda			
Diet caffeine free soda at home			p=0.011
Yes	18	1.9444	
No	28	2.0000	

*Rank of beverages: 1 = Top 3 favorites; 2 = Least favorites

Additional Results

In addition to looking at results directly related to the null hypotheses, much of the data were compared with respect to sex and ethnicity to indicate differences in the means of this sample. The results are listed in Tables 4.12 - 4.15. Most notable is the male mean ability to identify beverages. This was lower; therefore, more males identified the beverages correctly than their female counterparts. This was true for Hi-C, Kool-Aid, white milk, soda and water. All males correctly identified white milk, soda and water.

Several anthropometric differences also existed with respect to race, particularly whether or not a child was Black or Caucasian. Black children had a higher mean value for height for age and were therefore shorter when coding was interpreted than children who were not Black. A higher mean value was true for weight for age among children that were Black as opposed to all others, indicating that Black children weighed less for their age as opposed to their non-Black counterparts.

Caucasian children had a higher birth weight overall than their non Caucasian counterparts, mean birth weight values of 3.4765 kilograms versus 3.1000 kilograms. In addition, their value for birth weight for age was smaller indicating (when coding was translated) that they were larger for their age at birth overall ($p=0.030$).

Tables 4.14 and 4.15 display mean differences in ranking of beverages and the ability to identify beverages correctly among ethnic groupings. Both apple juice and soda had an overall higher mean rank among Black children when compared to their non-Black counterparts. The opposite result was seen for Kool-Aid. Apple juice was given higher preference among children who were not Caucasian, as opposed to those who

were Caucasian. The mean ability to identify water and chocolate milk was higher (less able to identify it correctly) among Black children, while the ability to identify soda was lower (more able to identify it) among Caucasian children.

No data were significant with respect to whether or not the children were Asian, biracial or Hispanic. The sample sizes from each of those ethnic groups was too small to determine an accurate value.

Table 4.12 Significant differences with ability to identify beverages with respect to sex.

	N	*Mean**	*p Value*
Ability to ID Hi-C			
Sex			p=0.018
Male	26	1.6538	
Female	21	1.8095	
Ability to ID Kool-Aid			
Sex			p=0.000
Male	26	1.6538	
Female	21	1.9048	
Ability to ID white milk			
Sex			p=0.023
Male	26	1.0000	
Female	21	1.0476	
Ability to ID soda			
Sex			p=0.000
Male	26	1.0000	
Female	21	1.1429	
Ability to ID water			
Sex			p=0.023
Male	26	1.0000	
Female	21	1.0476	

* 1 = Able to ID beverage; 2 = Unable to ID beverage.

Table 4.13 Significant mean anthropometric differences with respect to ethnicity.

	N	*Mean**	*p Value*
Height for Age			
Ethnicity			p=0.006
Black	21	2.2857	
Not Black	29	2.0345	
Weight for Age			
Ethnicity			p=0.003
Black	21	1.9048	
Not Black	29	1.6071	
	N	*Mean***	*p Value*
Birth weight			
Ethnicity			p=0.045
Caucasian	17	3.4765	
Not Caucasian	33	3.1000	
	N	*Mean****	*p Value*
Birth weight for age			
Ethnicity			p=0.030
Caucasian	17	3.4118	
Not Caucasian	33	4.5152	

* Values for weight for age and height for age are defined as follows: 1 = >90th %tile; 2 = 10-90th %tile; 3 = <10th %tile

** Values in kilograms.

*** Values for weight for height are defined as follows:
1 = >95th %tile; 2 = 90-95th %tile; 3 = 75-90th %tile;
4 = 50-75th %tile; 5 = 25-50th %tile; 6 = 10-25th %tile;
7 = 50-10th %tile; 8 = <5th %tile

Table 4.14 Significant differences between means for ranking beverages with respect to ethnicity.

	N	*Mean**	*p Value*
Rank of Apple juice			
Ethnicity			p=0.000
Black	21	1.5238	
Not Black	25	1.8400	
Rank of Kool-Aid			
Ethnicity			p=0.001
Black	21	1.8571	
Not Black	25	1.6400	
Rank of Soda			
Ethnicity			p=0.002
Black	21	1.4762	
Not Black	25	1.2000	
Rank of Apple juice			
Ethnicity			p=0.020
Caucasian	15	1.8000	
Not Caucasian	31	1.6452	

* Rank of beverages: 1 = Top 3 favorites; 2 = Least favorites

Table 4.15 Significant differences between ability to identify beverages with respect to ethnicity.

	N	*Mean**	*p Value*
Able to ID chocolate milk			
Ethnicity			p=0.022
Black	21	1.1905	
Not Black	26	1.0769	
Able to ID water			
Ethnicity			p=0.023
Black	21	1.0476	
Not Black	26	1.0000	
Able to ID soda			
Ethnicity			p=0.009
Caucasian	15	1.0000	
Not Caucasian	32	1.0938	

* 1= Able to ID beverage; 2 = Unable to ID beverage

Summary of Null Hypotheses

Both null hypotheses are rejected in this study. The first null hypothesis stated that there is no relationship between beverage preferences and a child's growth status. The two objectives for this null hypothesis were to determine correlation between weight for height and height for age data and the beverage preferences of the children; also to determine correlation between the previously stated growth data and beverages most often offered to the children participating. Significant results for each objective exist and therefore the first null hypothesis can be rejected. Further studies are needed to provide more detailed information regarding such relationships.

The second null hypothesis states that beverage preferences of the children are not related to their parents' beverage preferences and parents' nutritional beliefs. The three objectives for this hypothesis were to determine relationships between children's preferences and the beverages offered to them, to determine correlation between beverages offered to the children at home and their parents' nutrition beliefs about the beverages and finally to examine the relationship of the beverages offered at home and the beverage preferences of the parents. Two of the three objectives were completed successfully. Significant values indicate that there is a relationship between the beverages offered at home and the preferences of both the parents and children. There was however, no significant data found to support a relationship with beverages offered at home and the parents' nutritional views regarding beverages. Therefore only part of the second null hypothesis can be rejected. Again further studies are needed to validate this study as well as provide more in depth examination of such relationships.

CHAPTER V

DISCUSSION

General Information

This study examined relationships between beverage preferences in preschool children and their specific anthropometric data, as well as parent preferences and nutritional beliefs about commonly consumed beverages. Previous studies have shown relationships between food preferences, consumption, growth status and familial influences on young children (Birch, 1979a; Birch 1980b; Birch and Billman, 1986a; Colavito et al., 1996; Skinner et al., 1998 and Smith and Lifshitz, 1994). Little has been done in the area of beverage preferences and consumption. This study was designed to provide general information regarding beverage preferences and their relationship to anthropometric data and availability of beverages at home.

Fifty children and their primary caregivers participating in an area Head Start program served as the sample. The participants were selected randomly on the basis of caregiver attendance at the Head Start parent meetings. The distribution of male and female child subjects was almost even. No children participating had any allergies or intolerances to the beverages served. Also no children had any swallowing or choking problems, as indicated by the primary caregivers. Therefore, all children were eligible to taste every beverage, although this was not the case due to absences and children refusing to taste beverages. The children participated in the entire activity, with few exceptions. The researcher performing the preference exercise had assistance to ensure that the

exercise moved along and that the child's attention was kept throughout. Approximately ten to fifteen minutes was spent with each child to conduct the exercise.

Over one-third of the children were Caucasian and over one-half were Hispanic or Black. This exceeds the estimate that one third of the child population in 2000 would be Latino or Black. (Crockett and Sims, 1995) A larger sample or a sample encompassing several different urban and rural areas may indicate otherwise. In addition, there were a few children that were Asian or biracial. Future studies would need to collect data from a larger sample size in order to examine specific relationships between beverage preferences and the cultural background of the participants.

In the majority of the households (over 75%), the female fills the traditional "role" of meal planning and food shopping with occasional assistance from the male counterpart or other household members. The primary caregiver is often female or caregiver duties are shared by the male and female in the household. The socioeconomic status of the families is consistent with the qualifications for the Head Start program. In addition, a majority of the families participate in Food Stamps, WIC or another food assistance program. The children and families participating in these federal programs benefit from the services provided. The focus on this subset of the population does assist with our understanding of factors contributing to the growth and development of low socioeconomic status children.

Eighty-eight percent of children tasted all of the beverages provided. Several children did not taste one or two of the beverages and some children were unable to perform the tasting exercise due to absence. All of the head start sites served milk exclusively with snacks and meals provided to the children. One site also offered juice to

accompany a snack. Exposure to milk at Head Start daily is essential for children to become familiar with the beverage and develop a taste for it. Whether milk is served at home is the discretion of the caregivers and often the effects of their own beverage preferences and nutritional beliefs. One Hispanic child identified chocolate milk as "coffee." Coffee is often consumed in Hispanic countries and when consumed it has added milk. His identification of chocolate milk as "coffee" indicates his awareness of beverages at home.

Results from this study showed that most caregivers feel that water and milk are the healthiest beverages to drink for themselves and their children. Soda or cola was indicated as nutritionally inferior by most caregivers. It is unknown whether or not the parent/caregiver provided information that they thought the researcher would want to hear compared to accurate information. Such a variable is difficult to identify and control.

Weight and height data examined showed that most children were within acceptable percentiles for their age. Almost one quarter (24%) of the children were between 50-75th percentile at birth for weight for age and over one quarter (28%) of the children were between the 75- 90th percentile at birth. Therefore over half of the children were above the 50th percentile for weight for age. Only four percent of the children, including two of the premature children, were below the 5th percentile for birth weight for age. While this contradicts a common assumption that children from lower income families are born at a lower birth weight than higher income counterparts, the sample size in this study is small. A much larger sample size would be needed to further analyze that relationship.

Stature is measured by height and can be analyzed looking at height alone or height for age. Stature can also be predicted by looking at the heights of the child's parents. Those data were not collected in this study, but would be helpful to look at in further studies with a specific focus on stature. Fourteen percent of the children were considered "short-stature," below the 5th percentile for height for age.

In looking at the weight for height data, one can determine if a child is defined as over or underweight. There were no children classified as underweight according to the data provided by Head Start. Twelve percent of the children were plotted above the 95th percentile for weight for age. Factors contributing to increased weight in children can include excess calorie intake, especially from non-nutrient dense foods, as well as lack of physical activity and heredity. This list is not all-inclusive, as additional environmental and physical factors can lead to obesity in both adults and children.

Hypothesis 1 (H_1):

H_1: There is no relationship between the fluid beverage preferences of a Head Start preschool population and their most recent weight for height and height for age data.

This null hypothesis examines the relationship between beverage preferences and anthropometric data of the preschool child sample. In several instances there was a significant relationship evident between the weight and height data and the child's beverage ranking and or ability to identify a beverage. Not all beverages showed significant results.

Children ranking water in the top three of the seven beverages weighed less than their counterparts who did not provide water with a high preference ranking. These children were lighter overall, but not underweight. The lack of calories in water and the "healthy" connotation of water may indicate that these children have healthier eating habits at home and that their parents drink water. It is unknown as to the type of bottled water purchased by these households. Reasons for purchasing bottled water were also not examined and would be helpful in future studies. The children's eating habits were also not examined in this study. In addition, children with bottled water at home had a mean smaller weight for age. With regard to weight for height values, children who ranked water higher and those who have bottled water at home were smaller than those children who did not rank water high or have bottled water at home. Water is most often not the drink of choice for children. Exposure to this beverage may increase its popularity and consumption among younger children. No estimation of tap water intake or preference was obtained.

Hi-C and other popular fruit drinks fill the stores shelves enticing children and parents to purchase and try them. These beverages provide most of their calories as sugar and lack many of the vitamins and minerals that other juices contain. In this study significant relationships were found with children who were able to identify Hi-C as a fruit drink or juice beverage. Children who were able to identify it correctly had a lower weight overall and a lower weight for age. Also the children ranking Hi-C in the top three of the seven beverages were smaller when looking at weight for age. This brings forth an interesting point in that usually juice and fruit drink consumption often leads to excessive calorie intake and overweight children, but this study shows the opposite result.

This study does not identify the amount of the Hi-C or other fluid drink beverages consumed by the children, just their rank of it and ability to identify it. Additional information would be needed to make an assumption related to excess consumption and weight for height data. Children able to identify Hi-C were also shorter when looking at height for age data. This may be related to a lack of milk consumption among these children.

When examining milk specifically, children with low fat milk at home were taller (height for age) and larger (weight for age and weight for height) than children from families who did not have low fat milk at home. Additional calories in the low fat milk versus the skim milk may contribute to such differences, but overall information regarding food intakes are essential to make such an assumption. No significant relationship existed with whole milk and weight and height data. Children ranking chocolate milk high were overall shorter than their counterparts giving chocolate milk a lower preference ranking. There are no logical explanations for this relationship.

Soda consumption is increasing among older, school-age children. However, soda is consumed by preschool age children (Harnack, 1999). Whether cola, lemon-lime, ginger-ale or other type of soda, children are drinking it. Heavier children in this study showed a higher preference for soda that those children weighing less. Children without non-cola sodas, such as lemon lime, ginger-ale, grape and orange, at home were larger than their counterparts with these beverages at home. More data is needed to further examine this relationship.

Hypothesis 2 (H_2):

H_2: The fluid beverage preferences of a preschool Head Start population are not indicative of their parents' beverage preferences and nutritional beliefs.

This hypothesis is also proven incorrect due to several significant differences in the information provided by the children and caregivers. Children with low fat milk at home were more often able to identify white milk. Children with chocolate milk at home gave it a higher mean ranking overall in the preference exercise. Increased exposure to these beverages at home increased the probability that the child is able to identify them correctly. Parents with whole milk at home ranked chocolate milk lower than parents who do not typically have whole milk at home. This suggests that white milk may be consumed more often at home as opposed to chocolate milk. Finally, parents with skim milk at home ranked milk higher overall. The "healthy" label often associated with milk, especially skim milk, was evident. It is encouraging to know that parents are making wise beverage choices and hopefully set a good example for their children.

Children in households with non-cola sodas at home more often identified regular soda correctly, yet had a lower rank for soda. Possible use of lemon lime and orange sodas, etc could lead to a decreased use of regular cola sodas and therefore a lower ranking among children. More information about consumption at home would be needed to identify further relationships. On the other hand, parents with diet caffeine free soda at home, gave soda a higher ranking. This could be due to the fact that diet caffeine free is lacking two elements that regular soda contains – caffeine and calories. A great deal of advertising may go into making this beverage alternative quite appealing to adults.

Additional Information

Additional data was examined to determine any further relationships among beverage preferences, weight and height data and the ethnicity or sex of the children participating. All males were able to correctly identify Kool-Aid, white milk, soda, Hi-C and water more often than their female counterparts. There were no significant differences for any of the weight and height data collected among the sexes. However, there were significant differences involving Black and Caucasian children. Black children were shorter and weighed less for their age than their non-Black counterparts. Caucasian children weighed more at birth than their non-Caucaisan counterparts. Mixed results were shown with respect to different ethnicities and their beverage preferences and abilities to identify various beverages. Larger sample sizes are needed to validate these results.

While relationships are evident in this study, there are other various factors linked with growth status in children. Likewise, there are other factors influencing parent choices for purchasing beverages for their household. Previous research relates child food intakes and eating habits and environmental influences, as indicated in the literature review. This study does not provide concrete evidence of relationships, but only identifies possible ones.

CHAPTER VI

CONCLUSION

Study Strengths and Limitations

Strengths of this study include the fact that one researcher recorded all beverage preference data and comments made by the children. In addition, little has been done in the area of beverage preferences with a young population. The controlled environment of Head Start was an ideal setting to conduct the caregiver surveys, obtain recent weight and height data, as well as collect the children's preference data.

Limitations of the study include the small sample size and the single preference exercise for each child. Repeated preference exercises with the same children and beverages would have provided possibly more accurate data and may have shown changes in preferences over a period of time. Children who were tested earlier in the day may have been tired, since they could not sleep in as late. This was not necessarily observed or recorded in this study.

Beverage availability at home was not examined by food records or visits to the home sites; instead caregiver reporting on the questionnaire was used to collect this information. In this population, home visits may not be well received and other methods of collection of exact beverage information may need to be used. Beverage intake away from home, beside the Head Start program, was not collected.

Also, the last page of the caregiver questionnaire was meant to collect valuable beverage frequency data, but due to subject errors, much of the data was incomplete and could not be used. Finally, an in depth examination of the foods consumed, as well as the

amounts of beverages consumed by the children in a given period of time would have provided additional dietary data relating to growth status. Overall, several relationships between children's and parents' beverage preferences, growth status, as well as availability of beverages in the home were suggested.

Implications for Practice and Education

This study suggests several unexpected significant relationships between child beverage preferences, their growth data and the availability of beverages at home. In addition, correlation was found with regards to parents' preferences and beverages found in the home. While further research is needed to validate this information and provide additional details, these preliminary results provide areas for health and nutrition professionals to focus upon with regards to child beverage consumption. Knowing that such relationships exist can provide avenues for teaching both children and their parents/caregivers good nutrition habits, not only with beverages, but with foods as well.

Health professionals can use the results from this study to further educate parents and caregivers, as well as children, on appropriate beverage intake and the effects on the body. Specifically, they can focus on excess juice consumption, white milk as opposed to chocolate milk consumption and soda as a source of added calories in children's diets.

Implications for Future Research

While it may seem as if it is a logical relationship, there was no data from this study to support that the beverages in the home are relative to the parents' nutritional beliefs of the tested beverages. Other reasons for having beverages in the home were not fully examined, including financial limitations, preferences or needs of other family

members beside the child tested and the parents/caregivers or even the ability to obtain certain beverage items. Additional research can focus on these specific areas to more closely examine the relationship.

This study provides ideas for further studies focusing on beverage intake and preferences of young children. Some of the results show that beverages children drink at home or at Head Start are related to growth status and preferences. It is important to begin teaching children good eating and drinking habits at an early age. Young children are perceptive at home and school and will quickly develop habits that can mimic those of the adolescents and adults around them (Birch, 1980a; Crockett and Sims, 1995). Soda and non-nutritive fruit drinks, such as Hi-C and Kool Aid, in excess amounts can mask a child's preference for water, milk, juice and other healthier beverages. The beverages most often seen in the results in this study included water, milk, chocolate milk soda and Hi-C. Few significant findings included Kool-Aid or apple juice.

The use of z scores, a measure of standard deviation, in analyzing the height and weight data could be used in future studies. This would allow each child in the study to be compared to a "healthy" population, as well as comparing the mean anthropometric data of the study sample to the "healthy" population mean. This information would provide the researcher with an idea of the overall growth status of the study sample.

Future, more focused hypotheses can be derived from the results of this study. Specific areas can include, but are not limited to, an examination of children's beverage preferences as related to their actual beverage intake, child beverage preferences in relation to overall calorie and food intake and relation to growth parameters. An examination of cultural backgrounds and beverage availability and child preferences

would also provide additional data necessary for health professionals when counseling multicultural populations.

APPENDIX A

UCRIHS Letter

MICHIGAN STATE
UNIVERSITY

December 9, 1998

TO: **Dr. Jenny Bond**
2100 South Anthony Hall

APPROVAL DATE: December 9, 1998

RE: **IRB # 98765** CATEGORY: 1-C,E,G
TITLE: BEVERAGE PREFERENCES OF LOW-INCOME PRESCHOOL CHILDREN

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete and I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the **UCRIHS approved this project.**

RENEWALS: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Projects continuing beyond one year must be renewed with the green renewal form. A maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for a complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB# and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.

PROBLEMS/CHANGES: Should either of the following arise during the course of the work, notify UCRIHS promptly: 1) problems (unexpected side effects, complaints, etc.) involving human subjects or 2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of further assistance, please contact us at 517 355-2180 or via email: UCRIHS@pilot.msu.edu. Please note that all UCRIHS forms and instruction are located via the web: http://www.msu.edu/unit/vprgs/UCRIHS/

Sincerely,

David E. Wright, Ph.D.
UCRIHS Chair

DEW: db
Jennifer Krenos

OFFICE OF
RESEARCH AND GRADUATE STUDIES

niversity Committee on Research Involving Human Subjects (UCRIHS)

Michigan State University
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APPENDIX B

Parent/Guardian Questionnaire

Preschool Children's Beverage Preferences
Parent/ Guardian Questionnaire

Subject #_____ Date _____

Please respond to the following questions as they pertain to you and the members of your household. Your time and effort is greatly appreciated and will assist us in examining the beverage preferences of preschool children.

GENERAL HOUSEHOLD INFORMATION

1. Who **takes care** of the children in your household and about how old is **each** person? _____

   _____

   _____

   How many years of school have each of them completed?_____

2. How many **other teenagers and adults** (age 13 and over) live in the house?_____

   What are their ages? _____

3. How many **infants and children** live in the house?_____

   What are their ages?_____

4. In the **past three months**, who has decided what most of the meals will be?
   (check all that apply)
   _____ mother/female head of household
   _____ father/male head of household
   _____ other individual, please list_____

5. In the **past three months**, who has done most of the food shopping in the household?
   (check all that apply)
   _____ mother/female head of household
   _____ father/male head of household
   _____ other individual, please list_____

6. In the **past three months**, have the members of the household participated in food assistance programs?
   (circle one)
   Yes No

   If yes, which ones? (check all that apply)
   _____ WIC (Women, Infants and Children)
   _____ Food Stamps
   _____ Other, please list _____

7. What type of **water** do the household members drink most often in the home?
(check all that apply)
_____ well water
_____ city water
_____ bottled water
_____ no water is consumed

Why? _____

8. What type of **milk** is most often consumed by the members of the household?
(check all that apply)
_____ whole, (Vitamin D)
_____ 2% milk
_____ 1% or ½% milk
_____ skim milk
_____ chocolate milk
_____ lactose-free milk
_____ no milk is consumed

Why? _____

9. What type of **soda/pop** is most often consumed by the members of the household?
(check all that apply)
_____ regular
_____ regular, caffeine-free
_____ diet
_____ diet, caffeine-free
_____ other sodas (Mountain Dew, Orange, Sprite, 7-UP, lemon lime, etc)
_____ no soda is consumed

Why? _____

PRESCHOOL CHILD'S INFORMATION

10. Has a health provider told you that **your preschooler** has any food allergies? (circle one)

Yes No If yes, what are they? _____

11. Does **your preschooler** have any food allergies (ex. Milk allergy, lactose intolerance) right now? (circle one)

Yes No If yes, what are they? _____

12. Please indicate how **you think your preschooler** would **rank** the following beverages according to preference? (1= favorite, 2= second favorite, etc.) Place an X if your child has never tried the beverage.

_____ whole milk
_____ apple juice
_____ water
_____ regular cola
_____ juice drinks (such as Kool-Aid, Hi-C, etc)
_____ chocolate milk

13. What beverages do you **offer your preschooler** when they are in your care? (please list)

_____

_____

14. What beverages does **your preschooler drink** most often when they are in your care? (please list)

_____

_____

15. Does **your preschooler** eat before going to Head Start each day? (circle one) Yes No

If yes, what foods do they **typically** have?_____

_____

PARENT/GUARDIAN INFORMATION

16. Please rank the following beverages according to **your preference** for them (1= favorite, 2= second favorite, etc.) Place an X if you rarely drink the beverage.

_____ whole milk
_____ apple juice
_____ water
_____ regular cola
_____ juice drinks (such as Kool-Aid, Hi-C, etc)
_____ chocolate milk

17. Please rank the following beverages according to how healthy **you think** they are for children. (1=healthiest, 6 = least healthy) There are no right or wrong answers.

_____ whole milk
_____ apple juice
_____ water
_____ regular cola
_____ juice drinks (such as Kool-Aid, Hi-C, etc)
_____ chocolate milk

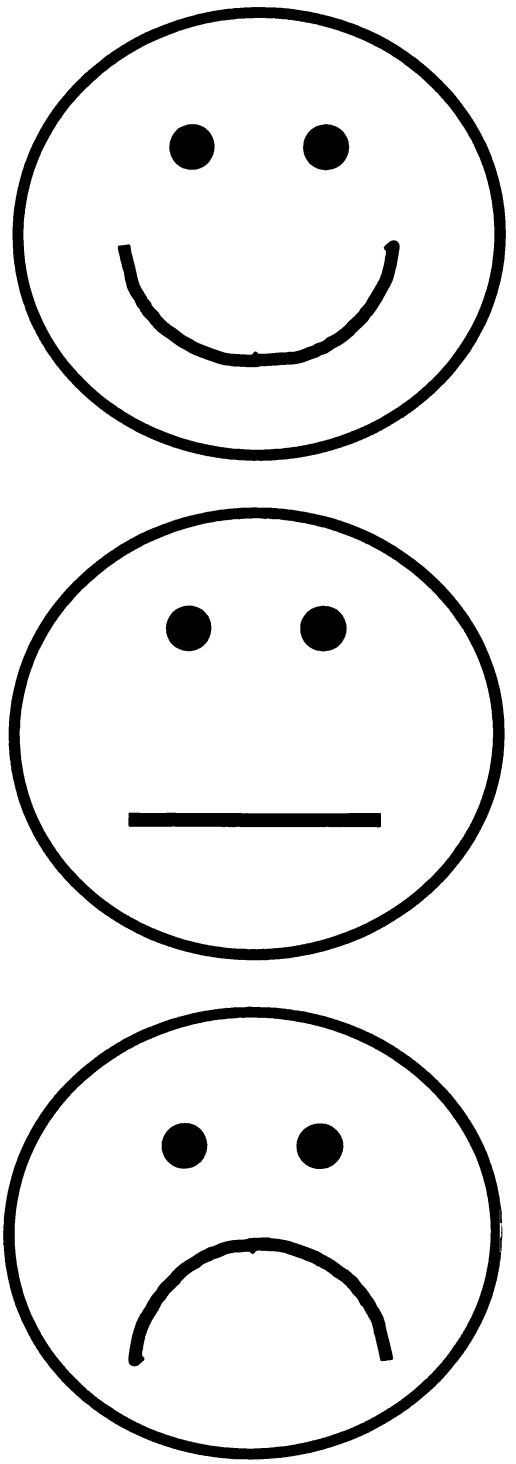
18. Please circle how often **you** have had these beverages within the **past three months**:

Beverage	# of times per day						OR	# of times per week					
Water	0	1	2	3	4	5 or more		0	1	2	3	4	5 or more
White milk	0	1	2	3	4	5 or more		0	1	2	3	4	5 or more
Chocolate milk	0	1	2	3	4	5 or more		0	1	2	3	4	5 or more
Regular soda/pop	0	1	2	3	4	5 or more		0	1	2	3	4	5 or more
Diet soda/pop	0	1	2	3	4	5 or more		0	1	2	3	4	5 or more
100% juice (orange, apple, Juicy Juice, etc.)	0	1	2	3	4	5 or more		0	1	2	3	4	5 or more
Juice Drinks (Hi-C, Kool Aid, Capri Sun, etc.)	0	1	2	3	4	5 or more		0	1	2	3	4	5 or more
Coffee	0	1	2	3	4	5 or more		0	1	2	3	4	5 or more
Tea	0	1	2	3	4	5 or more		0	1	2	3	4	5 or more

19. What other non-alcoholic beverages do **you** consume? (please list) _____

APPENDIX C

Cartoon Faces for Beverage Preference Exercise



APPENDIX D

Consent Form

Consent for Research

Your child who is in Head Start, _____,
(First name of child) (Last name of child)

is allowed to participate in a tasting exercise as a part of a study through the Michigan State University, Department of Food Science and Human Nutrition.

By signing below, you indicate that you have read the consent letter explaining the research, understand the information listed below and allow your child to participate in the study.

- Your child will taste the following drinks: 2% white milk, 1% chocolate milk, Hi-C Boppin' Berry drink; Kool Aid Strawberry-Kiwi drink; apple juice, bottled water and caffeine-free Coca-cola.
- Your child will have a small taste of each beverage and then be asked to rank the beverages as to which they like the most. The total time the child will spend with the researcher will be approximately ten (10) minutes.
- Your child will not be forced by the researchers to taste any beverages that he/she does not want to taste.
- Your child's most recent height and weight data and birthdate will be given to the researchers by the Head Start staff.
- All data collected will remain anonymous. The information collected from the parent/guardian and the tasting exercise will be used by the researchers only. Code numbers will be used so that names of the individuals (children and parents) will not be needed when the information is collected.
- Children with allergies to the beverages in the study, medical problems prohibiting their intake of the beverages or choking/swallowing problems will not participate in the tasting portion of the study.

_____
(parent/guardian signature) (date)

_____
(print parent/guardian name)

APPENDIX E

Preschool Child Information Sheet

Preschool Child Information Sheet

Child's Name _____
(last) (first) (initial)

Sex of child (circle one): Male Female

Classroom Name: _____

Class time (circle one): Morning Afternoon All Day

1. Please list any **PAST** food allergies that your child has had:

Allergy	Age when Child had this allergy

2. Please list any **CURRENT** food allergies your child has. How long have they had this allergy?

Allergy	For how long?

3. Is it ok to give your child a small taste of the following drinks? Circle yes or no. If no, please explain why (allergic, diabetic, etc.).

2% white milk	Yes	No	If no, why? _____
1% chocolate milk	Yes	No	If no, why? _____
Hi-C Boppin'Berry Punch	Yes	No	If no, why? _____
Kool-Aid Strawberry-Kiwi drink	Yes	No	If no, why? _____
Bottled Water	Yes	No	If no, why? _____
Apple Juice	Yes	No	If no, why? _____
Caffeine-free Coca-cola	Yes	No	If no, why? _____

4. Does your child have any choking or swallowing problems? (circle one) Yes No
If yes, please explain the problem.

_____

_____

APPENDIX F

Head Start Beverage Information Collection Sheet

Preschool Children's Beverage Prefereaces
Head Start Beverage Information

Record of Beverages offered to Head Start Participants

Day of the Week_____ Date _____

Beverage	Time of Day	Additional Foods Offered
1.		
2.		
3.		
4.		
5.		

Day of the Week_____ Date _____

Beverage	Time of Day	Additional Foods Offered
1.		
2.		
3.		
4.		
5.		

Day of the Week_____ Date _____

Beverage	Time of Day	Additional Foods Offered
1.		
2.		
3.		
4.		
5.		

Day of the Week_____ Date _____

Beverage	Time of Day	Additional Foods Offered
1.		
2.		
3.		
4.		
5.		

Day of the Week_____ Date _____

Beverage	Time of Day	Additional Foods Offered
1.		
2.		
3.		
4.		
5.		

APPENDIX G

Beverage Preference Data Collection Sheet

Beverage Preferences in Head Start Preschool Children
Data Collection Sheet

Subject # _____ Age (in yr. and mo.)_____ Birthdate _____

Birthweight_____ From record or parent recall _____

Date (Wt. & Ht.) _____ Weight (lbs.) _____ Height (inches) _____ Weight/Age_____

Weight and height information taken from: _____

Weight/ Height _____ Height/Age_____ Ethnic Background _____ Sex_____

Last time child ate/ drank anything: Food/beverage _____ When? _____

Beverage Preference Exercise Results **Date** _____

Tasting Order:

	Beverage	Correct Identification	Tested	Original Placement	Child's Comments
1.	Apple Juice	Yes / No	Yes / No		
2.	Kool-Aid	Yes / No	Yes / No		
3.	Hi-C	Yes / No	Yes / No		
4.	Soda	Yes / No	Yes / No		
5.	Water	Yes / No	Yes / No		
6.	White milk	Yes / No	Yes / No		
7.	Chocolate milk	Yes / No	Yes / No		

Preference Order (most preferred=1, least =7):

	Beverage	Additional Comments during Ranking
1.		
2.		
3.		
4.		
5.		
6.		
7.		

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