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Teacher Attitudes, Perceived Influences, and Self-Reported Classroom Behaviors Related to School Nutrition Environments

Beverly Lawler Girard
University of South Florida

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by

Beverly Lawler Girard

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Major Professor: Waynne B. James, Ed.D.
Victor Hernandez-Gantes, Ph.D.
Arthur Shapiro, Ph.D.
William Young, Ed.D.

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Dedication

To Ellery . . . your love, support, and commitment are unequalled. We have been through so much together, yet you always keep your smile and upbeat attitude. You are an amazing gift, and I will be forever grateful that you are my husband and my very best friend. Thank you for every cup of coffee and every meal you made while I toiled away in front of the computer. It is my turn to give back to you.

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Abstract

This study determined attitudes of kindergarten through fifth grade teachers about school nutrition environments, their perceived influence on school nutrition environments, and self-reported classroom behaviors. Specific objectives were to: (a) identify perceived factors that influence the school nutrition environment, according to teachers surveyed; (b) examine relationships between elementary school teacher attitudes about school nutrition environments and perceived influence on the environment; (c) examine relationships between elementary school teachers' attitudes about school nutrition environments, and self-reported classroom behaviors; (d) examine relationships between perceived influence over the school nutrition environment and self-reported classroom behaviors; and, (e) examine relationships between teachers' demographic characteristics and attitudes and perceived influence on school nutrition environments, and self-reported classroom behaviors.

Research was conducted in a mid-size Florida school district including 501 participants from 23 elementary schools. The Teacher Survey on School Nutrition Environments instrument was developed and validated by the researcher.

Teachers identified the Food and Nutrition Services department as having the greatest impact on school nutrition environments, followed by student lunches and snacks sent from home. Responses to open-ended questions identified parents as part of the problem in developing healthy school nutrition environments. The Food and Nutrition Services department and parents were identified as having primary responsibility for

encouraging healthy food choices at school, followed by administration, then teachers. Teachers did not perceive opportunities to provide input or to impact the school nutrition environment beyond their classrooms.

The greater self-efficacy the teachers possessed, the more they felt they influenced the nutrition environment, and the more likely they were to offer menu suggestions, to sit or eat with students, to discuss food-related topics, and to integrate nutrition into lessons. Similar results were noted for teachers with college coursework in nutrition and those who were more experienced teachers.

Classroom teachers should be encouraged to become involved and to recognize their role in developing and maintaining a healthy school nutrition environment. Increased communication should occur between school nutrition programs and teachers. Local wellness policy development and implementation should emphasize teachers' influence.

Chapter 1

Introduction

Teachers may not be actively engaged in addressing the issues of childhood nutrition (Baxter, 1998; Gross & Cinelli, 2004; MacLellan, Taylor, & Freeze, 2009; Murimi, Sample, & Hunt, 2008), even though these issues are featured in the media almost daily, and childhood obesity has been declared a national health emergency (Ebbeling, Pawlak, & Ludwig, 2002; Larson & Story, 2010; Ogden, Carrroll, Curtin, McDowell, Tabak, & Flegal, 2006). Research conducted by Hartline-Grafton, Rose, Johnson, Rice, and Webber (2009) suggests that some teachers and school personnel may actually serve as negative role models to children concerning nutrition, weight status, and overall health status.

Second only to parents, elementary teachers influence children to attempt and/or accept new food items in ways that the teachers themselves may not be aware (Hendy & Raudenbush, 2000; Savage, Fisher, & Birch, 2007). The role of school board members, district superintendents, principals, food service directors, parents, and students regarding influence on child nutrition programs and dietary development exists in the literature (Brown, Akintobi, Pitt, & Berends, 2004; Cho & Nadow, 2004; Fisher, Mitchell, Smiciklas-Wright, & Birch, 2002), but few studies have considered the role of the teacher. Rafiroui and Evans (2005) suggest that inadequate attention has been paid to teachers and that a "gap in the literature" (p. 30) exists regarding teachers' influence on dietary behavior development in children.

Due to the regular contact teachers have with students, teachers have the potential to influence children's dietary behaviors, as reported by Killen, Telch, and Robinson over 20 years ago in 1988, and more recently by Murimi, Sample, and Hunt in 2008. Teachers can facilitate nutrition education and healthy eating habit development through formal instruction and, informally, as role models. Perez-Rodrigo and Aranceta (2003) claim that nutrition education and promotions geared for children must address the role of the teacher, and must be creative, engaging, inexpensive, and widely disseminated. Earlier studies by Contento, Balch, Bronner, and Maloney (1995) and Lytle (1994) cautioned that nutrition education that increases knowledge without a focus on behavioral change has short-term effects, at best, and is insufficient to make long-term changes.

The environment in which a child receives information and is encouraged to develop and practice good habits provides the basis of the healthy school nutrition environment (USDA, 2001). A healthy school nutrition environment is one in which nutrition and physical activity are taught and supported in the classroom, in the cafeteria, and throughout the school. Positive messages are provided and students have opportunities to practice healthy habits. The United States Department of Agriculture has identified six components of an healthy school nutrition environment (USDA, 2003). The six components are: a commitment to nutrition and physical activity, quality school meals, other healthy food choices, pleasant eating experiences, nutrition education, and marketing.

An approach originally conceived to aid in the promotion of a healthy school nutrition environment, with attention to behavior modification, is the local wellness policy. The Child Nutrition Reauthorization Act of 2004 required each school district in

the United States participating in the National School Lunch Program (NSLP) to have its own unique, school board-approved local wellness policy by July 1, 2006 to address the issue of school-based nutrition and physical activity programs. The implementation of the policy and broad variations of interpretation from state to state and within states are problematic. The development of local wellness policies, which were intended to bring direction and clarity to school nutrition and physical activity issues within schools and local school districts, may have had the unintended effect of addressing key issues without providing answers to the toughest questions of implementation (Longley & Sneed, 2009; Moag-Stahlberg, Howley, & Luscri, 2008). The Institute of Medicine has proposed a national nutrition policy to provide a more unified, cohesive approach, and more measurable criteria for implementation. Interest is growing for the introduction of a national nutrition policy from the Institute of Medicine, as the thousands of local wellness policies range from being highly restrictive to very lenient. See Appendix A for an explanation of the local wellness policy.

The intent of the local wellness policy was to affect and to modify the overall school nutrition environment. However, the call for change has been accompanied by a tendency to blame schools for the increases in childhood obesity instead of recognizing schools as a vehicle for change, and to demand immediate action instead of recognizing the long-term efforts that will be required (K. Ayoob, personal communication, March 1, 2009). The challenge of implementation of local wellness policies, of turning policy into practice, is left to the individual school. The declared childhood obesity epidemic, fueled by well known individuals such as First Lady Michelle Obama and President Bill Clinton; interest groups to include the Alliance for a Healthier US Generation, Action for

Healthy Kids, the Robert Wood Johnson Foundation, the American Heart Association, and the American Medical Association; and, the media have sometimes identified specific foods as good or bad, often identified school cafeterias as a key contributor to childhood obesity, and have demanded additional school nutrition regulations. None of these entities, however, has been able to identify sustainable, funded solutions to the challenges (Anonymous, Briggs, Safaii, & Beall, 2003).

Complicating the issue, federal funding for the National School Lunch Program is not consistent with food and labor costs. Recent headlines from across the country indicate that finances are low and costs are high. Newspaper articles with titles such as, "Schools get a lesson in lunch line economics: food costs unravel nutrition initiatives" (Glod, 2008, p. A01); "As food costs rise, so do school lunch prices" (Hu, 2008, p. B2); "Food costs driving up meal prices" (Ramirez, 2008, p. 7); "School cafeterias struggling to keep food on the table" (Toppo, 2008, p. D6); and "Schools will limit variety to keep prices low: rising costs will cut fruit and vegetable choices" (Winchester, 2008, p. B1), herald a difficult time for child nutrition programs.

Increasing nutritional demands and rising food and labor costs have not been accompanied by dedicated funding for operations or nutrition education at the local school district level (Wharton, Long, & Schwartz, 2008). The early 1980s to the present date have been a time of unprecedented growth in weight for height, sedentary lifestyles, and poor eating behaviors, especially among school-aged children. It is a reality that these issues have taken place when the government touts the need for nutrition intervention, but fails to fund nutrition education at the local school district level (Gordon, Crepinsek, Briefel, Clark, & Fox, 2009). Even the federal stimulus dollars

provided by the American Recovery and Reinvestment Act are earmarked only for school cafeteria equipment replacement, not for escalating food or labor costs, or for nutrition education.

Research indicates that parents, teachers, school board members, superintendents, principals and school nutrition personnel typically deflect responsibility regarding ownership for quality lunch and nutrition education programs (Cho & Nadow, 2004; Fisher, Mitchell, Smiciklas-Wright, & Birch, 2002). The government has issued mandates for the National School Lunch Program to meet Local Wellness Policy guidelines without providing essential funding (Gordon et al., 2009). School nutrition programs are, therefore, at a crossroads in a nation demanding an increased emphasis on the nutritional integrity of school meals, without a clearly defined champion of the cause.

Background of the Problem

Schools participating in the National School Lunch Program serve over 30.5 million students daily, representing over 101,000 schools throughout the nation, with estimated expenditures of $8.7 billion in 2007 (School Nutrition Association, 2008). Countless school-aged children benefit from the availability of federally funded child nutrition programs in public schools in all 50 states in the United States. The National School Lunch Program, established in 1946, was originally charged with a mission of providing one-third of the Recommended Daily Allowance of nutrients and calories for children of varying ages and development. Over the past 60 years, this mission has remained the same, with an evolving, special emphasis on the over 18 million economically disadvantaged youth in the United States who rely on meals served through the National School Lunch Program.

The purpose of the National School Lunch Program is to provide nutritious foods to school-aged children at no, or a reduced, cost. Eligibility for free lunches is determined by a family income at or below 130% of the poverty level. Reduced priced meals are available to families whose incomes range from 130% to 185% of the poverty level. Approximately 58% of school lunches nationwide are served to children at less than the 185% poverty level. However, the National School Lunch Program subsidizes all meals, including paid meals, so all school children and their families may derive a benefit from this federal program (School Nutrition Association, 2008). A shift has occurred in recent years, however, from the task of providing meals to the more difficult task of promoting and providing good nutrition, and leading the way in the establishment of appropriate nutrition behaviors among children in a nation concerned about nutrition issues, but lacking the connections between values and practice (Newman, Ralston, & Clauston, 2008).

Children mimic adults and model their food selections and eating behaviors after adults (Birch & Fisher, 1998; Kremers, Brug, de Vries, & Engels, 2003). The presence of school nutrition programs within elementary schools and the opportunities for teacher involvement in shaping children's nutritional behaviors seem apparent, but there is a dearth of research to make the case for greater involvement of teachers in the promotion and maintenance of healthy school nutrition environments (MacLellan, Taylor, & Freeze, 2009).

A disconnect also exists between the priorities of establishing and implementing local wellness policies and the perceptions of school district personnel in assuming a role in the establishment of an healthy school nutrition environment. A special emphasis

needs to be placed on the role of teachers, those adults who exert the most influence on children in a school setting. School nutrition programs are being held responsible to implement local wellness policies, but they are not the only parties to determine the importance and immediacy of developing healthy school nutrition environments and the quality of such environments. United States Department of Agriculture funding for the continuation of school meal programs depends upon adherence to local wellness policies, but child nutrition programs cannot be the sole players in this initiative. No defined role and no budgetary implication is in place for any entity in a school district to influence children's nutrition, other than the school nutrition program.

Statement of the Problem

Limited research existed to address teacher attitudes and perceived influence on school nutrition environments and related self-reported classroom behaviors. Teachers may be an overlooked resource in efforts to develop appropriate dietary behaviors with their students. School nutrition program directors and nutrition educators would benefit from information about teacher attitudes toward school nutrition environments, their perception of influence on school nutrition environments, and how they relate to and are manifested in classroom behaviors. Specifically, how teachers feel about the school nutrition environment and how they believe they influence the environment was of interest. As well, the sense of self-efficacy teachers have concerning the school nutrition environment, translated into behaviors, was of interest. However, no instrument had been developed to survey or measure attitudes and influence on the school nutrition environment, and related self-reported classroom behaviors prior to this study.

According to Bauer, Yang, and Austin (2004) and Bell and Swinburn (2004), tremendous pressure is being exerted on school nutrition programs to provide foods and an atmosphere that promote and establish good nutritional intakes among school aged children. The Child Nutrition Reauthorization Act of 2004 required the creation of local wellness policies by July 1, 2006, but the responsibility of school districts did not end with the collaboration and cooperation of interested parties in developing a document. The Child Nutrition Reauthorization Act requires the implementation of the local wellness policy, monitoring of the implementation, and detailed progress reports. Sixty-seven school districts in Florida developed local wellness policies, but concern had been voiced by child nutrition directors to the Department of Food and Nutrition Management, under the Department of Education in Tallahassee, Florida, about how school nutrition programs can influence teachers, administrators, superintendents, school business officials and school staff to participate in the establishment and maintenance of healthy school nutrition environments.

The School Board of Sarasota County has a history of promoting an effective school nutrition program, complete with a nutrition educator who makes classroom visits and provides hands-on education and training with special emphasis on kindergarten through third grade students. The position of Nutrition Educator is not specifically funded by the National School Lunch Program under the United States Department of Agriculture, but the administration of the Food and Nutrition Services department feels strongly about the resources provided by a trained, qualified Nutrition Educator who provides direct classroom nutrition activities and instruction. Food and Nutrition

Services programs across the nation have not created or funded this position, but Sarasota County has since 1996.

The Food and Nutrition Services Department of Sarasota County is also unique in the aspect that it has one of only two school district-based dietetic internships in the nation approved by the Commission on Dietetic Registration, the credentialing agency of the American Dietetic Association. The department currently has five registered dietitians on staff, including the director, three area supervisors, and the nutrition educator. The number of registered dietitians on staff in the Food and Nutrition Services department is greater than any other school district of its size in the United States. The Food and Nutrition Services program has won numerous state and national awards for promoting nutritional integrity while maintaining financial solvency, including the first Action for Healthy Kids "Healthy Schools Hero" award in 2002.

A challenge for Food and Nutrition Services is the ratio of one Nutrition Educator to over 900 elementary school teachers. Observations made by Nutrition Educators and Food and Nutrition Services employees indicate that while some teachers in Sarasota County voice concern about promoting good nutrition with their students, other teachers appear to be uninterested or disengaged. Limited collaboration takes place with teachers, and teacher feedback, despite the efforts of Food and Nutrition Services to provide a sound nutrition program, is sometimes negative. Teachers often appear to hold the school nutrition program responsible for providing good nutrition, but continue to provide food rewards and treats in the classroom that are not allowed in the Food and Nutrition Services program. The Food and Nutrition Services program is interested in learning more about teacher attitudes and perceived influence on the school nutrition

environment, as well as self-reported behaviors to attempt to identify better ways to connect with teachers, and to partner to provide an enhanced overall school nutrition environment.

Results of this study may serve as a source to improve dialogue between kindergarten through fifth grade teachers and school districts' nutrition programs within the School Board of Sarasota County, Florida. Potential benefits may occur for kindergarten through fifth grade students, with secondary benefits for other teachers, parents, school nutrition personnel, curriculum writers, principals, the superintendent, school board members and the industry which supports child nutrition programs.

Purpose of the Study

The purpose of this study was to determine the attitudes of kindergarten through fifth grade teachers about school nutrition environments, their perceived influence on school nutrition environments, and self-reported classroom behaviors. The specific objectives of this study were to: (a) identify teacher attitudes, perceived influence, and self-reported behaviors related to the school nutrition environment; (b) examine the relationship between elementary school teacher attitudes about school nutrition environments and perceived influence on the environment among kindergarten through fifth grade teachers; (c) examine the relationship between elementary school teachers' attitudes about school nutrition environments and self-reported classroom behaviors; (d) examine the relationship between perceived influence over the school nutrition environment and self-reported classroom behaviors; and, (e) examine the relationship between teachers demographic characteristics and attitudes and perceived influence on school nutrition environments, and self-reported classroom behaviors.

Research Questions

The following research questions were examined in this study:

1. What attitudes, perceived influences, and self-reported behaviors do kindergarten through fifth grade teachers identify regarding the school nutrition environment?
2. Are teacher attitudes about school nutrition environments and their perceived influence on the environment related?
3. Are teacher attitudes about school nutrition environments and self-reported classroom behaviors related?
4. Are perceived influences on the school nutrition environment and self-reported classroom behaviors related?
5. Are teacher demographic characteristics related to attitudes and perceived influence on school nutrition environments and self-reported classroom behaviors?

Significance of the Study

The issues investigated may provide insight into how school nutrition programs can work more collaboratively and effectively with kindergarten through fifth grade teachers. Teachers who perceive the importance of the overall school nutrition environment may help to promote a healthy school nutrition environment. Teachers who perceive that they influence the school nutrition environment may convey their beliefs to students in their own behavior and classroom practices. An identification of teachers' perceptions of importance and influence may assist school nutrition administrators in learning how to communicate more effectively with teachers, and develop, promote, and maintain healthier school nutrition environments.

Theoretical Framework

Parents, teachers, other adults, and even other children have the potential to serve as influencers and models within the environment (Bronfenbrenner, 1979). According to Bronfenbrenner (1977), development occurs within the context of the individual child and their environment, including family, school and community environments. Ecological systems theory recognizes five related, yet separate, systems: microsystem, mesosystem, exosystem, macrosystem, and chronosystem (Bronfenbrenner, 1977, 1979); and examines the interrelatedness of each system.

The environment in which a child learns about nutrition, how adult role model attitudes affect behaviors of children, and how nutrition information and behaviors are transmitted to students, may be the greatest influences on and determinants of school nutrition environments, which may affect nutrition-related attitudes and behaviors among children. A study of teacher attitudes, perceived influence, and self-reported classroom behaviors that may have an effect on the development of healthy school nutrition environments may be examined utilizing Bronfenbrenner's ecological systems theory

Many studies surrounding nutrition research also employ social cognitive theory to explain and describe the variables that affect human nutrition (Chapman-Novakofski, 2005; Contento, Balch, Bronner, & Maloney, 1995; Cantrell, Young, & Moore, 2003; Fahlman, McCaughtry, Martin, Shen, Flory, & Tischler, 2009; Rinderknecht & Smith, 2001). Social cognitive theory attempts to explain how different variables, (including personal factors such as thoughts, feelings) and attitudes affect perceptions and how perceptions affect behavior (Bandura, 1986).

Bandura (2004) states that self-efficacy, or the confidence to carry out or fulfill an intended behavior, is needed to adopt and maintain healthy behaviors. Self-efficacy enhances an individual's abilities and skills to act on motivations, despite perceived barriers. Although individuals have the capacity to exert influence over their own behaviors and their environments, the environment also shapes behaviors (Contento, 2007).

The attitudes that teachers have about school nutrition environments may be related to perceived influences over the school nutrition environment and related self-reported classroom behaviors. As the level of self-efficacy increases, the more effort may be expended to persist in a behavior despite potential challenges or difficulties (Bandura, 1997).

Limitations

The following limiting conditions apply:

1. The population was confined to kindergarten through fifth grade teachers in the School Board of Sarasota County, Florida; this limited the generalizability of the study's findings to teachers outside this school district.
2. All participants were volunteer respondents.
3. Data relied on self-reports from survey instruments.

Definition of Terms

The following terms and definitions are used in this study:

Attitude: A judgment that can change as a function of experience (Tesser, 1993). In this study, attitudes about school nutrition environments were explored.

Behavior: The collection of behaviors exhibited by human beings and influenced by culture, attitudes, emotions, values, ethics, authority, rapport, persuasion, and/or genetics (Arbrey, 1970). In this study, teachers self-reported classroom behaviors and activities that occurred within their own classrooms are examined

Child Nutrition Reauthorization Act of 2004: Public Law 108-265. Every four years, Congress reauthorizes the National School Lunch Program. In 2004, in addition to numerous other requirements, the development of a Local Wellness Policy for every school district in the United States participation in the National School Lunch Program was mandated, with an effective date of introduction and implementation of July 1, 2006.

Influence: The power or capacity to cause an effect in an indirect way (Bandura, 1986). In this study, how teachers feel they affected the school nutrition environment was examined.

Local Wellness Policy (LWP): A component of the Child Nutrition Reauthorization Act of 2004 which required each school district in the United States participating in the National School Lunch Program to develop a plan to address nutrition guidelines, nutrition education, physical activity, and other school-based activities designed to promote student wellness.

National School Lunch Program (NSLP): Established in 1946, the National School Lunch Program is a federally funded program administered by the United States Department of Agriculture (USDA) that assists in providing school meals to students in 96,000 schools in the United States.

Participation (or Meal Participation): The total number of students eating school lunch in relation to daily attendance (also known as Average Daily Participation).

Role: In this study, the role of teacher may be described as instructor. However, the role may also include modeling eating behaviors, or motivating, or facilitating nutritional habits of students (Prelip, Erausquin, Slusser, Vecchiarelli, Weightman, Lange, & Neumann, 2006).

Self-efficacy: People's judgments of their capabilities to organize and execute courses of action required to attain designated types of performances (Bandura, 1986).

Teachers: Kindergarten through fifth grade teachers who currently teach in schools throughout the School Board of Sarasota County, excluding charter schools.

Organization of the Study

Chapter 1 includes an introduction of the research, background of the problem, statement of the problem, purpose of the study, research questions, significance of the study, theoretical framework, limitations, definition of terms, and an organization of the study.

Chapter 2 included a review of the literature related to the study. This chapter contains research on ecological systems theory, teacher attitudes, influence, behaviors, and demographic characteristics, social cognitive theory, and a summary of the chapter.

Chapter 3 describes the research methods and procedures used to conduct the study. An explanation of the research design, a description of the population, instrumentation developed and used in the study, data collection methods, a description of the data analysis used, and a summary of methods are included.

Chapter 4 included the findings of the study. This chapter contained characteristics of participants, results, and a summary of the chapter.

Chapter 5 included the study summary, conclusions, implications of the study, and recommendations.

Chapter 2

Review of the Literature

The purpose of this study was to examine kindergarten through fifth grade teachers' attitudes about school nutrition programs, their perceived influence on school nutrition environments, and self-reported classroom behaviors. The parts of this chapter explore the literature pertaining to ecological systems theory to include school nutrition policies, a national view of nutrition education, external influences, the school nutrition environment, factors that influence food intake, teacher surveys of school nutrition programs, and nutrition and achievement. Sections are also presented on teacher attitudes, influences, and behaviors to include classroom rewards, and teacher characteristics. A discussion of social cognitive theory completes the review of literature.

Limited studies exist that explore the relationship of teacher attitudes toward school nutrition environments and their perceived influence on the school nutrition environment. Rafiroui and Evans (2005) suggest an overall gap in the literature regarding teachers' influence on the nutrition environment at school and children's dietary behavior development. School board members' perceptions of factors influencing school nutrition policy have been studied (Brown, Akintobi, Pitt, & Berends, 2004). School nutrition policies, and the attitudes and practices of school principals were the variables of a study conducted by French, Story, and Fulkerson (2002). Perceived influence on the nutrition environment of combined groups, such as Cho and Nadow's study of superintendents, principals, foodservice directors, nurses and health educators (2004) and foodservice staff

(Fulkerson, French, Story, Snyder, & Paddock, 2002) have also been conducted. Little research, however, has focused on the teacher in relationship to healthy school nutrition environments.

Teachers' attitudes about school nutrition environments, their perceived influence on the school nutrition environment, and self-reported classroom behaviors were the focus of this research. Teachers, due to their regular contact with children in the classroom environment, have the potential to affect nutrition behavior development and the broader school nutrition environment through their verbal and non-verbal messages, actions, and practices. To provide a background for this discussion, a number of studies are presented under separate categories. The categories are ecological systems theory, teacher attitudes, influence, behaviors, and demographic characteristics, and social cognitive theory. A brief explanation of ecological systems theory follows.

Ecological Systems Theory

Environment has been defined as the physical and social surroundings of a person (Bubolz & Sontag, 1993). Environment may be described in the narrow context of a specific place and a specific time, but it can also be described as broadly as a culture or a nation in which an individual lives.

Bronfenbrenner (1979) proposes that behavior results as a function between the person and their environment. Ecological systems theory (EST) provides a framework for considering the mutual accommodation that occurs between a person and his/her immediate environment. The environments in which relationships develop are also affected by the broader scope of social context.

EST provides a structure to examine the influences and connections between people and their environment. Systems and people are interconnected, with systems affecting people and people affecting systems (Anderson, 2003; Day, 2003). EST establishes that the whole is greater than the sum of its parts (Day, 2003; Newman & Newman, 1999). According to Bronfenbrenner, the interconnectedness of an individual and their environment affects behavior and responses. Functions and identity are shared-- such is the case with a family, a classroom, and a school (Anderson, 2003; Day, 2003; Newman & Newman, 1999).

EST attempts to examine how behaviors within environments are developed. Five interconnected, nested, yet separate systems describe EST: the microsystem, mesosystem, exosystem, macrosystem, and chronosystem (Bronfenbrenner, 1977, 1979; Bubolz & Sontag; 1993). The chronosystem is the system that includes the dimension of time as a factor in the development of a person within their various environments, and does not usually appear in the typical Bronfenbrenner model (Berk, 2003). The chronosystem integrates the influence of a person's development of changes over time in which the person is living. Bronfenbrenner refers to this system as the individual's life course. The chronosystem is the temporal change in children's environments which produce new conditions that affect development. These changes can be imposed externally or can arise from within the child (Berk, 2003). Changes may then occur due to the life events imposed, or those that may have developed within the child. In ecological systems theory, development is neither controlled by environmental circumstances nor driven by inner dispositions. Instead, children are both products and producers of their environments, in a network of interdependent effects (Berk, 2003).

Longitudinal studies, in which research participants are followed for a period of time, may describe the chronosystem, and the many variables, influences, and relationships that lead to changes in macrosystems, exosystems, mesosystems and microsystems. For the purposes of this study, the chronosystem is not further discussed, as insufficient research has been conducted to explore the dimension of time as it relates to the school nutrition environment. The presentation of the remaining separate systems of ecological systems theory follows, beginning with a review of the broadest of the systems, the macrosystem.

Macrosystem. The foundational elements of society, the blueprints that exist in a culture that establish patterns for structures and activities occurring at a concrete level, comprise the macrosystem (Bronfenbrenner, 1977; Bubolz & Sontag, 1993). Certain macrosystems exist due to laws, regulations, and rules; however, most macrosystems are informal and develop through custom and routine practice in daily life. Macrosystems are conceived and examined not only in structural terms, but also as carriers of information and ideology that, both implicitly and explicitly, give meaning and motivation to agencies, social networks, roles, activities, and other interrelations. For example, if the consumption of high fat or high sugar items routinely occurs in the home, these behaviors become custom and practice. Meaning and motivation from these customs and practices may be translated to peer groups, school activities, and an entire school system. Bronfenbrenner's ecological model provides a framework for considering ways in which intrafamilial processes are influenced by extrafamilial conditions and environments (Bronfenbrenner, 1986; Bubolz & Sontag, 1993).

***School nutrition policies*.** Hippocrates recommended a balanced diet, sufficient physical activity, and a moderate lifestyle in order to maintain the good health needed to

grow old (Olsterdorf, 2003) Early nutrition policy in the United States and throughout the developed and developing world was directed toward the goal of food security to produce sufficient amounts of food at reasonable prices. During the past few decades, there has usually been enough safe and inexpensive food available for consumption, at least in the United States. However, the emphasis of food policy, even though food production continues to be professionally controlled and regulated by law, has shifted. Now, there are as many overfed people in the world as there are hungry people. The focus of nutrition policy has changed from one of food security to nutrition security. Olsterdorf suggests that more needs to be learned about human behavior to promote healthy lifestyles, beyond the establishment of policy; a return to the teachings of Hippocrates warrants consideration.

Over 30 years ago, Teuterberg, a historian at the University of Munster organized a group of scientists with a common interest in food behavior research. Excerpts from the 1976 German Nutrition Report included Teuteberg's beliefs about the need to foster nutrition research:

> Theory and concept: Eating and drinking is more than satisfying basic needs, hunger and thirst. Food habits are embedded in value systems of the individual and the society. . . . Food and health are more than body function and physiology. . . . Food behavior is determined by individual psychological factors and socio-cultural ones. Food behavior is the result of a socio-cultural process (socialization). The central construct of food behavior research is the Meal. The theoretical model adopts the basic models of Talcott Parsons (structural, functional systems) and uses the following important explanatory values (preferences, avoidance); social communication . . . . Prevention has to recognize the socio-cultural determinants of food behavior. (pp. 36-37)

Olsterdorf suggests that policy makers are too focused on eating foods as a matter of individual choice. He suggests that policy makers too often ignore social and cultural

influences. Social marketing approaches and interdisciplinary nutrition research, Olsterdorf contends, should provide the basis for modern public health nutrition programs, with an emphasis on longitudinal perspectives. A consideration of the time dimension in behavior changes related to social and cultural changes must occur, as well as, the effects of information and communication for changes in nutrition behavior.

However salient Olsterdorf's recommendations may be, the United States appears to be creating more policies, programs, recommendation and guidelines, all aimed at the nutritional well-being of its citizenry, but in particular, school-aged children. The Child Nutrition Reauthorization Act of 2004, which required the establishment of local wellness policies by July 1, 2006 did not provide specific details of what each policy should include, but indicated that the policies must have local school board adoption by the stated date. This directive left many school districts, especially small districts, or those without highly trained administrators overseeing the child nutrition program, in a quandary. The School Nutrition Association, with support form the National Dairy Council analyzed the largest 100 school districts' wellness policies in October, 2006, and also analyzed another 140 district policies across regions of the country, representing various sizes of school districts to better understand the characteristics of local wellness policies. Soon after the results of the October 2006 study were collected, the focus started to change from one of policy characteristics to implementation and evaluation. On May 3, 2007, an online survey was sent to 4,850 School Nutrition Association director level members, with a closing date of June 5, 2007. Responses were received from 1,350 members, of which 976 usable surveys were analyzed. The remaining 374 surveys were not utilized, due to incomplete or duplicate responses, or revealed that a

district's school board had not yet passed a local wellness policy (School Nutrition Association, 2007). Only 42% of respondents indicated that their district was evaluating the impact or implementation of the local wellness policy; the remaining 48% indicated that they planned to evaluate the implementation. However, the evaluation of implementation, progress made, and identification of on-going challenges to be addressed is a required component of the local wellness policy. No mention was made of progress or challenges. See Appendix A for frequently asked questions concerning the local wellness policy.

An example of a well organized and thoughtfully administered national assessment is the School Health Policies and Programs Study (SHPPS), the largest, most comprehensive review of school health policies and programs. Conducted in 1994, 2000, and 2006, and sponsored by the Centers for Disease Control and Prevention, SHPPS researchers collected data from telephone interviews with state-level and district-level staff, and in-person interviews with school staff (students were not interviewed). Eight components of school health programs were assessed in this study: health education, physical education, health services, mental health and social services, school policy and social services, school policy and environment, food service, faculty and staff health promotion, and family and community involvement. The 2006 SHPPS study indicates that fried foods, the availability of low nutrient dense foods, and the readily available but nutritionally questionable beverage selections have not been addressed by the majority of states (O'Toole, Anderson, Miller, & Guthrie, 2007). The availability of healthier food items had increased, but too many schools, school districts, and states had not taken

action to limit foods high in sugar, fat, and sodium. The SHPPS study did not take an in-depth look at teachers and the food practices that occur in classrooms.

Researchers with Action for Healthy Kids (AFHK), a nationwide non-profit organization dedicated to improving health and education through better nutrition and physical activity, indicate that budget challenges and full agendas continue to present challenges for wellness policy implementation (Moag-Stahlberg, Howley, & Luscri, 2008). A convenience sample of 256 approved local wellness policies were compared with federal regulations and the AFHK Wellness Policy Fundamentals, a tool which documented best practices for nutrition and physical activity in schools. Sixty-eight percent met the federal mandates, but 32% did not address one or more federal mandates, and 15% did not address evaluation or monitoring goals. No policies included all of the suggested AFHK's Fundamentals.

Moag-Stahlberg et al. (2008) stated that schools need assistance to meet the federal mandates. According to the researchers, additional funds are needed; a lack of funding limits the degree of policy implementation, revision, and improvement. In a similar statement issued by Bergman and Gordon (2010), on behalf of the American Dietetic Association, implementation and evaluation of a strong nutrition policy is linked to adequate funding of school meal programs. No additional funding had been provided for wellness policy implementation or evaluation at the time of the study. Moag-Stahlberg et al. concluded that wellness policy implementation will take time and patience, and that the impact on student health and learning may take many years to accomplish.

States and individual school districts have proposed that the Local Wellness Policy mandate, with insufficient parameters, geared toward the local level, leave too many variables unaddressed. The foodservice industry, manufacturers, vendors, and food science research and development teams, struggle to meet the diverse requirements of school districts in states where nutritional requirements and standards vary widely, even within a given state. Foodservice operators and industry, but also Congress, has called for the establishment of national nutrition standards by 2011, only a few years after the deadline for local wellness policies that required individualized standards.

The Institute of Medicine of the National Academies (IOM) convened a task force of 15 researchers, nutritionists, school board members, and nutrition advocacy representatives, who reported to the 110th Congress on May 10, 2007. The IOM Committee on Nutrition Standards for Foods in Schools produced a report, *Nutrition Standards for Foods in Schools: Leading the Way Toward Healthier Youth*, which stated that responses of school districts to meeting wellness policy requirements have not been consistent. In its recommendations, the IOM Committee proposed nutritional standards for "competitive" foods and beverages available in schools, (i.e., foods outside the National School Lunch Program that may be sold in ala carte cafeteria lines, vending machines, or school stores). The standards recommend limitations of saturated fat, salt, added sugars, caffeine, and total calories. The standards promote selection and consumption of fruits, vegetables, whole grains, and non-fat or low-fat dairy products consistent with the Dietary Guidelines for Americans and National School Lunch Program guidelines. Recommendations include "11 Standards for Nutritive Food Components" and specific Tier 1 foods and drinks, to be made available to all students

during the school day, and Tier 2 foods and drinks, available only to high school students after school hours. Although the IOM report has many positive recommendations, according to the School Nutrition Association, the reality of enforcing specific restrictions, especially among high school students, is questionable.

In response to the Child Nutrition Reauthorization's "patchwork" of policies and standards, from very general to very specific, and more recently, to the IOM report, the School Nutrition Association established a task force to develop recommendations for national school food and beverage guidelines (National Standards for Food and Beverages in Schools, Task Force Update, 2007). Foremost among the SNA committee's task force concerns is the current availability, or lack thereof, of appropriate foods and beverages to meet specific IOM recommendations. The SNA task force suggested a more realistic approach, as students can opt out of school meal programs as well as a la carte programs if they cannot have access to the foods and beverages they prefer. Despite good intentions, the desired outcome of modifying students' nutritional behaviors and food selections by limiting availability of food items will not be successful if students do not participate in the program. Specific, relevant concerns of the SNA task force include:

- focus on nutrient density of foods served;
- appropriate portion sizes;
- foods as a meal or complete snack instead of "nutrient profiling" of specific, foods or beverages;
- reasonably enforceable standards; and,
- acknowledge diverse nutrient, caloric, and food security issues of the millions of school children served, from early childhood to adolescence.

Confusing and frustrating as the dialogue may be at the national level, this lack of consistency and direction filters to the local level (Wharton et al., 2008). Teachers and parents, reading the latest headlines, and administrators and students, who can become overwhelmed with the changes in direction, may tire of the debate. School nutrition directors are charged with the responsibility of creating and maintaining a local wellness policy that may not be popular with students and staff. School nutrition directors have the additional burden of risking the loss of funding for the reimbursable meals programs (breakfast and lunch) if the policies are not enforced, since Child Nutrition Reauthorization governs USDA programs, and USDA is the parent agency of the National School Breakfast and Lunch Programs. An additional concern is that the local wellness policy and its implementation are expected to be monitored on a school-wide basis. School nutrition directors have jurisdiction only over the school nutrition programs and may make suggestions, but typically have no authority in decisions made outside the cafeteria regarding competitive food sales. The principal, not the foodservice director, has authority over the school.

The role of the principal was deemed to be most a most important consideration, as identified by a study conducted among key stakeholders in the Canadian province of Prince Edward Island (PEI) aimed at identifying enabling and barrier factors to the development, implementation, and evaluation of wellness policies (MacLellan, Taylor, & Freeze, 2009). As in the United States, childhood overweight and obesity is a concern in Canada, but specifically in PEI, with 25% of the adolescent male population classified as overweight or obese. Acknowledging the prevention of future health problems through early intervention, wellness policies have gained attention and momentum. MacLellan et

al. identified school principals as the most important person of influence on the school wellness policy. As stated by Evans (1996), principals are "Indispensable to innovation. No reform effort, however worthy, survives a principal's indifference or opposition. He (or she) is the leader closest to the action, the operational chief of the unit that must accomplish the change" (p. 202).

An additional enabling factor in the MacLellan et al. study was the existence of a strong policy work group; one that could bridge the gap between practicality and possibilities of the "school world," and the nutrition guidelines, expectations, and parameters desired by the "nutrition world." Similarly, the process of policy development, an understanding of negative responses to change, and problem solving to modify approaches to the next steps in the initiative were suggested as enabling factors.

Important barrier factors were also identified by MacLellan et al. (2009). Similar to a California study conducted by Brown et al. (2004) and a national study conducted by Longley and Sneed (2009), cost, lack of time, and competing priorities were listed as barriers to the development, implementation, and evaluation of wellness policies. Recognition that healthier foods cost more to purchase was reinforced by inadequate existing funding for child nutrition programs. Traditional fundraising initiatives that promote high profit, high calorie food items, such as candy and cookies, present one of the biggest barriers to school nutrition policy implementation. A lack of time, lack of human resources, and competing priorities also proved to be a challenge. Stakeholders acknowledged the importance of good health and good nutrition, but did not consider it a top priority at their school. The researchers offered that systemic change will require a comprehensive approach that involves parent, government, and communities.

Despite the work and effort expended, researchers found that the local wellness policy may not have the single most important desired effect, that of changing students' dietary behaviors. A study conducted in the Los Angeles Unified School District found that students may respond negatively to enforced nutrition policies (Vecchiarelli, Takayanagi, & Neumann, 2006). Twelfth grade students were provided an opportunity to respond to the implementation of two separate policies in their school district, entitled the Obesity Prevention Motion and the Healthy Beverage Resolution, both developed to enforce nutrition policy through ala carte sales, student store sales, vending machines, and fund-raising. Although 55.5% of students indicated that the Healthy Beverage Resolution impacted the beverages they drank at school, only 16.2% of students reported the policy impacted the beverages consumed at home or outside of school. Similarly, the Obesity Prevention Motion resulted in 56.2% of students indicating that snack choices were impacted at school, with 20.2% indicating that the policy had an impact on snacks selected and consumed at home, or outside of school (Vecchiarelli et al., 2006). Written responses from the high school seniors provide insight to the perceptions the students have of the nutrition policies. "By taking away the food, it gives kids a reason to go home and eat all these junk foods and soda because at school they haven't eaten anything all day," and "If anything, this ban makes me binge when I get home because I don't like the enforced healthy food at school," as well as "I really don't think that changing the way a student eats at school will affect the way they eat outside of school. Unless it begins in elementary school."

Schwartz, of the Rudd Center for Food Policy and Obesity at Yale University recently posted this comment:

> In my entire career of treating obesity, eating disorders, and studying food policies around the country, nothing has gotten people so worked up and upset as the idea of banning cupcakes or junk food from school parties. This issue has caused more disrespectful behavior among parents at PTO meetings than nearly anything else. (Schwartz, 2010, personal communication)

Considering the responses from students and parents, Olsterdorf's contention that behavior change is related to a time dimension, as well as social and cultural change, deserves consideration and further investigation.

A national perspective on nutrition education. A research gap exists regarding healthy eating determinants among children and youth. Early studies conducted to assess teacher preparation related to nutrition education influenced the federal government's initiation of the Nutrition Education and Training (NET) program. Teacher preparation was one of the key issues of the White House Conference Panel on Nutrition Teaching in Elementary and High Schools as long ago as 1970. The panel recognized that preservice and inservice training could play key roles in the success of nutrition education programs. Nutrition education was, at one time, a priority of the government. The Nutrition Education and Training Program (NET) was established in 1977, eight years after the 1969 White House Conference on Food, Nutrition, and Health (Maretzki, 1977). Originally funded at $26.2 million per year, or $.50 per child enrolled in schools served by the NSLP, the initial funding was soon slashed (Martin & Oakley, 2007). The Omnibus Reconciliation Act of 1980 resulted in a reduction of child nutrition funding by $400 million, with $15 million remaining for NET. The following year, a second Omnibus Reconciliation Act (of 1981) removed $1.4 billion, or approximately 25% of child nutrition funds to school districts nationwide. Martin & Oakley reported that in addition to the 2 million children who no longer received meal benefits, NET funds were

cut by another $10 million, leaving only $5 million in the program. The $5 million for NET funding remained until 1990. NET was funded at $7.5 in 1991 and $10 million in 1992 through 1996. However, in 1996, NET funding was changed from mandatory to discretionary for 1996-2002; NET was funded only once during that time period, in 1998. NET funds have since been replaced with Team Nutrition funds, but those dollars are only available to state agencies, and rarely are available for direct use at the local school district level, and are not available for direct use by teachers.

Wardle, Parementer, and Waller (2000) suggest that nutrition knowledge increases the likelihood of improved dietary behaviors and food consumption. Nutrition is not a required component, however, of elementary school curricula (Cline & White, 2000; Demas, 2003). Basic nutrition courses are generally not required by state education departments in elementary teacher preparation coursework (Anderson & Thorsen, 1998; Pratt & Wallberg, 1998). A general lack of nutrition knowledge and training increases the likelihood of incorrect information transmission and inappropriate modeling behaviors (Newmark-Sztainer, Story, & Harris, 1999). Teachers who possess little personal knowledge about their own nutritional needs or about child nutrition, or who have a negative attitude toward their school's nutrition program may likewise negatively influence children's attitudes (Crockett & Sims, 1995). A review of research conducted to study teachers and their attitudes and perceived roles relating to child nutrition follows.

Researchers Taylor, Evers, and McKenna (2005) conducted a study to identify what they perceived to be important but had insufficient research related to issues that influence dietary behavior development. Identified knowledge gaps included: (a) the nature and extent of familial influences, including food practices; (b) the impact of the

school environment on healthy eating, including nutrition policies and modeling; (c) effects of mass media on healthy eating; (d) food preferences and nutritional knowledge and skills in children and their impact on behavior change; (e) multiple determinants of healthy eating in children and youth, and their interactions; and, (f) longitudinal monitoring systems to identify national and regional eating behaviors in children. Taylor et al. did note that teacher and peer modeling have been found to increase acceptance of healthy food choices in preschoolers. However, the gap in literature concerning teacher modeling begins in kindergarten, according to the researchers. The effect that modeling might have on children's dietary behavior development and the promotion of healthy school nutrition environments has not been adequately investigated.

One possible explanation or factor for this gap in research may be the timing of the Omnibus Reconciliation Act of 1981. Nutrition, Education, and Training (NET) funding was severely curtailed as a result of this federal decision, which also resulted in the reduction of 3,000 of the 94,300 schools in the National School Lunch Program in 1981 (Eisinger, 1998). NET funding had previously fueled training and research in school nutrition programs throughout the country. The timing of the Omnibus Reconciliation Act, just a decade before concerns arose about the nutritional and overall health of America's youth, is a phenomenon that deserves consideration and further investigation. What is known, however, is that children are in school for six hours or more per day and may be heavily influenced by the environment in which they live and learn. Policies that influence the environment represent key issues to consider in the overall examination of school nutrition environments.

Exosystem. The exosystem is the societal context in which mesosystems exist. The exosystem is an extension of the mesosytem that encompasses other social structures, formal and informal, that do not contain the developing person but affect, intrude upon, or include the immediate setting in which an individual exists. The exosystem may influence or even determine what occurs within a mesosystem (Bronfenbrenner, 1977). The influence of the neighborhood, mass media, governmental agencies, and communication networks include and constitute exosystems. For example, school district local wellness policies are enforced through either the Department of Education or the Department of Agriculture, depending on the state, in local schools within a community. Social systems beyond the school and home exist that can affect individuals and settings through forces, beliefs, values, and political actions (Bubolz & Sontag, 1993; Sallis & Owens, 2002).

External influences on children's nutrition. Food marketers recognize that schools represent a viable target to promote products and convey messages to children during the academic day, and sometimes use that leverage to the disadvantage of children. Levine (1999) cited Coca-Cola and McDonald's "cradle-to-grave marketing" (p. 291) as a relatively inexpensive, but highly productive avenue for the food industry to capitalize on the school environment to influence student consumption. Elementary school environments may be encouraging preferences for foods high in fat, sodium and sugar, putting children at risk for obesity and other chronic diseases, according to Levine. School health professionals must be aware of the external messages that reach children at school. Levine asserts that food coupons and products, school trips to fast food restaurants, and fund raisers that sell unhealthy food items are strategies that food

companies use to influence children at school. Examples include Pizza Hut's "Book It" reading program and McDonald's McSpell It Club that offered administrators and teachers coupons to reward good behavior and achievement, along with a catalogue of nutrition education materials, replete with company name and logo. Less subtle direct marketing strategies include Halloween promotions that contain safety advice and reminders about good behaviors during festivities, complete with product samples and coupons for candy, soft drinks, and other snacks.

A study funded by Stanford University's School of Medicine and the Robert Wood Johnson Foundation had preschoolers sample identical McDonald's foods in name-brand and unmarked wrappers. Preschoolers identified the McDonald's wrapped items as the tastiest foods. Almost 77% of the preschoolers indicated a preference for labeled French fries, and 54% preferred McDonald's wrapped carrots. Fewer that one quarter of the children said both samples tasted the same. Strasburger, an author of the American Academy of Pediatrics policy to limit marketing to children, stated in 1992, "It's an amazing study, and very sad. Advertisers have tried to do exactly what this study is talking about--to brand younger and younger children, to instill in them an almost obsessional desire for a particular brand name product" (p. 150). The pervasive nature and persuasive messages of advertising to even our youngest children warrants immediate attention, according to Stasburger. His comments were published nearly two decades ago.

A study conducted by Ohio State University and Indiana University found that obesity rose more than twice as fast when kindergarten and first-grade students were on summer vacation and not in school (von Hippell, Powell, Downey & Rowland, 2007).

Downey, an Ohio State University sociology professor and co-author of the study, was quoted in the Dayton Daily News on May 3, 2007 in a commentary by Page entitled "School Cafeteria Is Not the Problem" as saying, "When it comes to childhood obesity, schools appear to be more a part of the solution than the problem. The problem of childhood obesity would actually be much worse if children were not in school" (p. 3).

In contrast, findings from the School Health Policies and Programs Study (SHPPS) in 2000 indicated that 49.9% of school districts had exclusive bottling contracts with soft drink vendors. The study, which assessed data from individual schools, districts and states, indicated that 55% of teachers reported using foods as rewards, with the most common food items being candy, pizza, popcorn, soft drinks and ice cream (Wechsler, Brener, Kuester, & Miller, 2001). Although the 2006 SHPPS report indicates some improvement in the past six years, the overall picture has changed very little, despite widespread attention to childhood obesity (O'Toole, Anderson, Miller, & Guthrie, 2007). According to the researchers, wherever the responsibility lies for making a difference, schools remain at the forefront of the debate. Schools are the public and common bond of nearly all children in the United States. Taking responsibility for good decision making as it pertains to the education and health of school children is paramount to a healthy and productive society.

Cho and Nadow (2004) contend that each sector of the school community needs to work through perceived barriers and recognize their role in creating a healthy school environment. Adults in a school system need to address the challenges of implementing an appropriate, supportive environment, and work together to address the barriers for the benefit of the children to whom they have been entrusted. Teac hers, those closest to

students in a school setting, and who routinely collaborate for the educational benefit of children, may be the most logical choice to promote a healthy environment.

Mesosystem. Mesosystems are represented by the relationships and connections between microsystems (Bronfenbrenner, 1977), which may include connections between microsystems such as the neighborhood, school, home, or developing child (Berk, 2003). A mesosystem is a system of microsystems. Mesosystem principles include a consideration of the elements of a setting or the joint impact of two or more settings, or sub-systems that exist across settings, and the magnitude in which the microsystem expands and contracts with transitional role shifts. The influence of the relationships of the home on the child entering school is an example of a mesosystem (Bubolz & Sontag, 1993).

School nutrition environments. Children's dietary patterns evolve within the contexts of the community, the family, and the school environment (Bronfenbrenner, 1977, 1979; Davison & Birch, 2001). Children consume a substantial proportion of their daily intake at school. One study by Wolfe and Campbell found that school lunches provided nearly 40% of the children's basic food group consumptions for the day and 40% of the different types of foods eaten in a day were eaten at school.

School nutrition environments include much more than foods offered and served in the school cafeteria. A healthy school nutrition environment encompasses the classroom, adult and peer modeling, after school functions, and the cafeteria; anywhere food is sold or eaten (Wechsler, Devereaux, Davis, & Collins, 2000). Frank (1994) proposed that schools present an entirely unique environment to monitor and assess foods eaten by children. Standardized recipes and cooking procedures, easily identifiable ingredients, and a

common, controlled environment provide a far greater opportunity for group observation and analysis of foods selected and consumed than at any other time during a child's day. A review of healthy school nutrition environments related to school meal programs is provided.

A study by Rainville (2001) compared school lunches to lunches brought from home in two southeastern Michigan school districts. Rainville intended to assess if a difference existed in total calories, fat, protein, calcium, Vitamin A, and iron between school lunches and lunches brought from home. School lunches were weighed and portion sizes recorded before the lunch period, whereas portion sizes of lunches brought from home were determined by visual observation. Food waste was visually estimated, recorded, and analyzed for nutrient content. Rainville found that lunches brought from home were lower in all measured nutrients, with the exception of fat and calories. School lunches were found to provide more nutrients and greater food variety than lunches from home. Rainville suggested an emphasis on the nutritive quality of school lunches, and that this information should be shared with parents through marketing efforts and publicity campaigns.

Not only is the nutrient content of school meals an important consideration, but the actual time allowed in the school day for students to consume school meals deserves attention. Data collected over a 15-day time period in Ellensburg, Washington, were studied to determine if a difference existed in the time available for students to consume lunches during the school day. Fifty percent of 450 first through third grade students brought lunch from home, and the remainder consumed school meals. The results, as reported by Buergel, Bergman, and Knutson (2002), indicated that students who brought

lunch to school were provided more time to consume their food, as compared to students who purchased a meal or received a free meal, and were therefore required to stand in line to receive the meal. However, students who select school lunches consume higher intakes of nutrients (Gordon, Devaney, & Burghardt, 1995; Gordon & McKinney, 1995; Rainville, 2001), therefore Buergel et al. suggested a minimum amount of time should be determined regarding the length of school lunch periods to encourage participation in the school meal program.

Two important factors that must not be overlooked include the realities of offering a school meal program to over 30.5 million children daily, and the steps that have been taken toward the goals of the School Nutrition Dietary Assessment (Snyder, Lytle, Pellegrino, Anderson, & Selk, 1995). School nutrition personnel recognize the need to offer lower fat, lower sodium, nutritious meals to children. However, participation in the school meal program, unlike most school programs, is not mandatory. Students may choose to opt out of the school meal program if they do not like the foods being served. Many other variables affect students' decisions to participate in the school meal program: quality, value, whether or not their friends participate in the program, and whether or not the program is deemed to be socially acceptable. Snyder et al. (1995) suggest that food selection behaviors and preferences are shaped by parents, other students, and classroom experiences. Parents and other adults are generally more concerned than students about the healthfulness and nutritional content of foods. Students are most interested in taste. The school nutrition program should ensure that quality and value conditions are met, but other environmental factors, such as the home, classroom, peers, and television influence the normative aspect of eating. The environment must be supportive of good nutrition;

absent this support, the school nutrition program will struggle to succeed. Teachers and parents who support and speak positively about the program, and classroom lessons that refer to school meals as examples of good, nutritious, and most importantly (to students) tasty food choices would be helpful in creating an environment more likely to attract student participation.

Snyder et al. (1995) contend that school boards and district administrators voice concern and support for nutritious school meals, but require the school nutrition program to cover its own expenses, usually at prices that are much lower than any restaurant, even though the program must fund negotiated salaries, benefits, and food and supply costs. The school nutrition program is often required to pay monies into the district's general operating budget for direct and indirect costs over which the nutrition program has little to no authority to question. Federal revenues help to defray some costs, but the overhead of running the program is assumed primarily by cafeteria sales.

"The best lunches in the country will not improve the nutritional intake of children if the children do not buy and eat those lunches" (James, Rienzo, & Frazee, 1996, p. 131). The researchers, who conducted a study in the spring of 1995 to examine student attitudes toward school meals programs, and to determine factors that encourage student participation, concluded that too much responsibility for improving the health of America's school children is placed on the schools nutrition programs. Four focus groups, composed of six to eight 9th grade students from a Florida school district, representing diverse economic and ethnic groups, were asked 12 main questions and additional probing questions. The focus group participants indicated that one reason for not participating in the reimbursable school meal program is that "teachers bring their

lunch to school." Students commented that school meals prices are too high, but the students in the focus groups typically did not bring a lunch from home to school. Those who did not select a reimbursable school meal either opted for ala carte food items, or waited until after the school day to eat. As cited by Snyder et al. (1995), the authors of this study reiterated the importance of remembering that participation in school meal programs is not mandatory. Suggestions provided to improve school lunches included improving the taste and appearance of food, offering a wider variety of foods, serving more fresh fruits and vegetables, lowering the price, increasing serving sizes, and providing more condiments. Attempts to provide healthier options, however, are not always successful, as students request greater variety, but tend to eat the same foods each day.

Cho and Nadow (2004) indicate that student preferences for unhealthy foods, coupled with a lack of parental and community involvement make it difficult for school meal programs to achieve sustainable success. Cho and Nadow conducted a qualitative study with responses from 10 superintendents and principals, 18 foodservice directors, and 27 nurses and health educators by the Massachusetts Coordinated School Health Program, a Center for Disease Control and Prevention funded partnership between the Massachusetts Departments of Education and Public Health, to examine the barriers to providing quality lunch programs and nutrition education. The intent of the researchers was to provide a more in-depth and holistic investigation of barriers, specifically related to quality lunch and nutrition education programs. Superintendents, foodservice directors, and nurses/health educators agreed that the two top barriers to providing a quality lunch program were lack of funding and students' preferences for unhealthy foods. Third and

fourth perceived barriers to providing a quality lunch program on the foodservice directors' list were lack of communication with teachers and lack of leadership. Third and fourth items on the nurses/health educators' list was lack of parental support and a lack of communication with foodservice staff. Regarding barriers to the provision of nutrition education, the first response for all groups was a lack of time for coordination between foodservice staff. Superintendents' and nurses/health educators' second response was a lack of facilitating staff, and foodservice directors' second response was a lack of leadership from the administration, which was also the third response from nurses/health educators.

Overall, a lack of communication between school nutrition staff, health educators, and teachers was the primary factor identified in this qualitative study conducted to identify barriers to implementing quality school nutrition programs and nutrition education programs. Cho and Nadow (2004) contend that his lack of communication hinders coordination and promotion of school nutrition programs and school-wide nutrition education opportunities. Support of school and district administration, including all school staff, as well as parents, the community and mass media is needed in order to make meaningful and long-term changes.

A study conducted by Moag-Stahlberg (2003), entitled "What kids say they do and what parents think kids are doing," underscores the importance of adults being informed and taking responsibility for the development of healthy school nutrition environments. An online survey was developed in 2003 and completed by 615 parent members of the Knowledge Network Panel, and 471 students from the same household, 13 to 18 years of age, and telephone interviews with 144 students, ages 10 to 12 years.

One of the findings of this study was that children identified their parents as their most important role models, at a time when family meals and physical activity within the family unit are on a decline. Only 15% of children reported physical activities, such as bike riding or a playing a sport with parents, with boys more likely than girls to report physical activity with a parent. Fifty-seven percent reported television watching with a parent daily, and 42% reported going to a fast-food restaurant or food court as least once a week. Moag-Stahlberg's report indicated that parents reported hunger to be the primary reason for children to eat, at 78.5%, but children reported hunger as the primary issue only 61.8% of the time. Depression and boredom were listed more often by children than by their parents. Parents also underestimated the time children eat in the evening after dinner, while doing homework, and while watching television or playing computer/video games. Since parents are not as informed about their teenagers' food practices as they think, the researchers questioned if schools are faring any better.

Some would counter that schools should not be the primary target of the child nutrition debate. Frank (1994) stated that schools are the most likely places for children to receive a nutritionally balanced meal with appropriate portion sizes of foods served, regardless of household income level. Ayoob, an associate professor in the department of pediatrics at Albert Einstein College of Medicine in New York City stated that schools should be commended for their effort in promoting healthy school nutrition environments. When asked to comment on the Institute of Medicine's recent "competitive foods" recommendations in an ABC interview aired on April 26, 2006, Ayoob responded:

> Anyone who thinks the school food reform will solve the problem of childhood obesity is sadly mistaken. Kids are in school only six hours a day. The school breakfast and lunch are set and calorie-controlled. Now, possibly the other foods sold in schools will be as well. But there's a dirty

> little secret about the obesity epidemic that no one wants to think about: what goes on at home. The obesity epidemic will continue until we address what's happening during the other 18 hours of the day when kids are not in school. That's when kids get the bulk of their calories. After school and at dinner, kids are no longer products of the school system. Rather, they're heavily influenced by the eating environment at home, and what's available. (K. Ayoob, April 26, 2006, personal communication)

Removed from the classroom, but influential in establishing policy, an investigation of superintendents' perceptions of student health issues was conducted by Winnail and Bartee (2002). The researchers reported responses from 40 superintendents from a frontier state who completed three rounds of surveys designed to determine the top 10 concerns of school district superintendents, and where student health issues might fall on the continuum of concerns. The concerns could be classified into one of three major areas: (a) school funding, (b) classroom education and student achievement, and (c) teacher-centered issues. Student health issues, although considered important in a general fashion, were not cited in the top 10 issues listed by school superintendents. Winnail and Bartee remarked that this absence speaks to the "potential futility" of using student health issues alone in gaining administrative support for programming and intervention. Linking administrative concerns from the top 10 list, such as the provision of an adequate nutrition program to its effect on academic performance, may be a more effective way to gain administrative support for school health promotion efforts. Gaining support for the establishment of healthy school environments may have to start elsewhere.

However, studies focused on school principals' and superintendents' perceptions of school nutrition programs have indicated that the more knowledge principals or superintendents have about nutrition, the more likely they are to support school nutrition

programs (Bogden & Vega-Malos, 2000; Brown, Akintobi, Pitt, & Berends, 2004). Cho and Nadow (2004) suggest that this understanding and support increases the likelihood of student acceptance and participation in school nutrition programs. Since principals' and superintendents' attitudes toward school nutrition programs may have a positive effect on students, it is possible that a similar and even stronger effect could be expected between elementary students and their teachers.

The decisions that adults make, including the appropriateness and acceptability of decisions that affect children's health, have far reaching implications on school nutrition environments. A report from the University of Michigan indicated that 13 of 16 middle schools had extensive ala carte programs, which directly compete with the foods available in the National School Lunch Program. Kubik, Lytle, Hannan, Perry, and Story (2003) collected 24-hour dietary recall data from 598 seventh grade students in Michigan. The investigation focused on fruits and vegetables served to students in school meals, foods offered and sold ala carte, and snacks and beverages sold in vending machines and school stores. Schools that did not have ala carte programs reported fruit and vegetable intakes that met or came close to meeting dietary recommendations. The presence of ala carte programs and vending machines in schools was related to decreased intakes of fruits and vegetables. The majority of vended foods items were identified as high in calories and fat. Kubik et al. (2003) maintain that interventions must be focused not only on school food service programs, but all other venues, such as vending and ala carte food sales. All school level environmental factors should be targeted if healthy school nutrition environments are to become a reality.

How adult attitudes and beliefs influence their decisions and the overall school

nutrition environment was apparent in a study conducted by McDonnell, Probart, Weirich, Hartman, and Birkenshaw (2004). The purpose of the study was to identify perceptions and barriers to the initiation and promotion of school breakfast programs in Pennsylvania. Seventy-three school business officials, principals, school food service directors, and parents were divided into nine focus groups. Despite evidence in the literature that links school breakfast programs to academic achievement and improved student behaviors and outcomes (Affenito, 2007; Rampersaud, Pereira, Girard, Adams, & Metzl, 2005), participants in the focus groups identified six major barriers to the implementation of school breakfast programs, including program costs, scheduling, bus schedules, school breakfast programs overstepping the bounds of schools' responsibilities, interference with parental control, and the belief that school breakfast programs are only intended for low income students. Results indicated that school administrators and school food service directors identified parents as strong forces for change within a school, but parents did not identify a role for themselves in the initiation of a school breakfast program. The researchers suggested that the identification of other successful school breakfast programs, strong marketing efforts, and the identification of a key individual in the school district to support the program and act as an advocate are essential to overcoming the barriers to school breakfast program implementation. An omission in the study is that teachers were not included in any of the focus groups.

Another survey of school nutrition professionals assessed the appropriateness of messages directed to children in the school environment. Ninety-seven percent of 417 respondents from members of the American Dietetic Association's School Nutrition Services Dietetic Practice Groups and 339 members of the Society for Nutrition

Education's Division of Nutrition Education for Children agreed that environmental factors at school support, permit, encourage, or discourage certain eating behaviors (Levine & Gussow, 1999). The 61-item questionnaire contained 13 questions about demographics, 23 knowledge questions, and 25 attitude questions. The researchers wanted to know if nutrition professionals perceived an increase in student consumption of a sponsor's product a fair trade-off for educational resources. Eighty-two percent indicated their response would be affected by the nutritional value of the food being promoted. Companies or agencies recognized as most likely to produce high quality nutritional materials included Dole, the National Dairy Council, and the Beef Industry Council. Least respected were candy companies or soft drink companies who provide nutrition education materials to schools. The reputation of a company, and the way in which foods are marketed, do appear to have an influence on nutrition professionals.

Factors that influence food intake. What factors determine children's food preferences and food intakes? Is the determination primarily biological, or are children influenced to a greater extent by the interreationships of the environment in which they live, and the modeling of adults and other children?

That parents influence their children is expected, but when it comes to the development of dietary behaviors, parents impact children in ways that parents themselves might not anticipate. An article published by Anliker, Laus, Samonds, and Bead (1990) noted that specific nutrition information shared with preschool children increases the likelihood that children will understand nutrition concepts. This is a reminder to parents to positively communicate nutrition messages, and to communicate those messages as often as possible. However, in an age of lesser parent involvement, the

role of the teacher in shaping the minds and behaviors of children has been heightened (Campbell & Sanjur, 1992; Escobar, 1999).

Nutritional behaviors of children are formed at a young age, and are largely attributable to environmental factors, including the home and school environments, the media, and the larger community. Children need guidance during early childhood and their first few years of schooling when these nutritional behaviors are being developed and established (Picciano, Smiciklass-Wright, Birch, & Mitchell, 2000). Research indicates that health behaviors established during childhood often prove difficult to modify during adulthood (Centers for Disease Control and Prevention, 2007).

The importance of children's early food preference was underscored by a five-year longitudinal study of children, ages 2 to 8 years (Skinner, Carruth, Bounds, & Ziegler, 2002). Mothers of the children involved in the study were asked to complete a Food Preference Questionnaire for their children at two to three years of age (T1), four years of age (T2), eight years of age (T3), and for themselves at T1 and T3. The parents were well educated and from middle to upper-middle socioeconomic class, and the children were white and healthy at birth. The eight-year olds and their mothers completed a Food Neophobia Scale at T3. Skinner et al. found that children were more likely to taste and accept new foods between T1 and T2 than between T2 and T3. Mothers' and children's food preferences were significantly related. Mothers influence children via their own food preferences, the researchers suggested, in that they may limit access to foods offered to their children to those foods they prefer. The researchers also suggested that mothers may need assistance in teaching children to enjoy a wide variety of foods and should recognize their own role in shaping children's food preferences.

Birch, Johnson, and Fisher (1995) reject the notion that children will dislike or refuse new foods, if that rejection is based solely on an initial refusal. Changes in acceptance of new foods occurs over time, often requiring as many as 10 exposures before changes in acceptance are achieved (Sullivan & Birch, 1990). Often, children do not have the opportunity to eat new foods because parents interpret initial rejection as a food dislike that cannot be changed, and not attempt to serve the food again.

Attempting to address the underlying issues of why children typically eat few fruits and vegetables, an intervention study was funded by the National Cancer Institute as part of the 5-A-Day for Better Health Initiative (Reynolds, Baranowski, Bishop, Farris, Binkley, Nicklas, & Elmer, 1999). A sample of 414 third graders (46% male and 54% female; 86% white, 14% black; 34% eligible for free or reduced-priced school meals) were asked to complete a single 24-hour dietary recall and to complete a simple food preference questionnaire. The questionnaire assessed children's food preferences, nutrition education received, and sources of modeling fruit and vegetable consumption. Preferences were assessed for 20 common fruit and vegetables, and students were asked if they had ever eaten the food items, and whether they like the food a lot, a little, or not at all. Students were also asked how they learned about fruits and vegetables, including specific people and media sources. Finally, the students were asked to indicate the people they see who most often eat fruits and vegetables. Nutrition knowledge appeared to be a predictor of higher fruit and vegetable consumption, but since knowledge and consumption were measured at the same time, Reynolds et al. suggested that children's knowledge may be influenced by their consumption. Children who eat more servings of

fruits and vegetables may possess more knowledge due to their consumption, selection, purchasing, and preparation of fruits and vegetables.

Availability also had a direct influence on consumption. Students who were more often exposed to fruits and vegetables, or who had tasted a greater number of fruits and vegetables were more likely to consume the foods. Predicted relationships with modeling were not found. The frequency of modeling, credibility of models, or types of modeling behavior was not established in this study. Additionally, there was no effect of higher levels of nutrition education on consumption. No measure of the age appropriateness or quality of nutrition education provided was made.

Nutrition messages geared to children must be simple, positive, and developmentally appropriate, according to Lytle, Eldridge, Katz, and Piper (1997), who conducted a study to determine how children understand and use nutrition messages. One hundred and forty-one students in grades K-6 were assigned to one of three age groupings, K to 2nd grade, 3rd and 4th grade, and 5th and 6th grade. Ten focus groups and 15 one-on-one interviews were conducted to determine how well children understood messages used in common nutrition education programs. Questions asked referenced the Food Guide Pyramid and the Dietary Guidelines for Americans, and included such questions as:

- "What do you think you should eat if someone told you to eat a variety of foods?"
- "What do you think it means to maintain a healthy weight?"
- "If someone told you to 'Choose a diet low in fat,' what do you think you should eat?"

Children who participated in the one-on-one interviews were also asked to identify foods into the following categories: foods low in fat, foods high in fat, vegetables, fruits, grain products, foods high in sugar, and foods high in salt.

The researchers hypothesized that abstract nutrition terms and nutrition messages are difficult for children to interpret and to use; significant differences in understanding of abstract terms occurred between the age groupings. Messages that are scientifically correct, but too difficult for children to understand will not be effective. Lytle et al. stated that adults must realize that their attitudes and behaviors influence children more than their spoken statements, encouragement, or coercion, as revealed in the following studies.

Researchers agree that the practice of limiting or withholding foods from children may increase a desire for the restricted foods, accompanied by a decreased desire for those foods strongly encouraged or forced on children (Birch & Fisher, 1998; Birch, Fisher, Grimm-Thomas, Markey, Sawyer, & Johnson, 2001; Fisher, 2002; Kremers, Brug, deVries, & Engles, 2003). A study conducted with 394 parents of 5-year old to 9-year old children (53 girls and 67 boys) enrolled in a primarily Caucasian private school in Denver, Colorado, and 126 parents of 7-year old to 11-year old children (63 girls and 63 boys) enrolled in a primarily Hispanic public school in Denver, Colorado, considered seven factors hypothesized to affect children's eating behaviors (Birch et al., 2001). A Child Feeding Questionnaire was administered to all parents, which investigated the seven factors: perceived feeding responsibilities, perceived parent weight, perceived child weight, concerns regarding child's weight, food restriction, pressure to eat, and food monitoring.

Birch et al. concluded that high levels of parental control may impede children's self-control based on responses to hunger and satiety cues. Forcing children to eat healthy foods decreases interest in eating these foods. Additionally, when controls or limitations are removed after severely limiting access to desired foods, consumption of these "off limit" foods increases significantly. This finding supports an earlier study by Fisher and Birch (2000), which reported that restrictive feeding practices result in increased consumption of foods when restrictions are lifted and a child is allowed the freedom to choose. Variety and moderation, as opposed to restrictive feeding, should be encouraged among parents and their children.

Fisher, Mitchell, Smiciklas-Wright, and Birch (2002) found that parents who eat few fruits and vegetables may exert pressure on their own children to eat these foods. A study of 191 white, non-Hispanic families with 5-year old girls revealed that pressuring children to eat fruits and vegetables decreases their preference for these foods. The children and their parents lived in central Pennsylvania and were participating in the first year of a longitudinal study on the development of eating behaviors, including dieting, across middle childhood. All children in the study consumed fewer than the five recommended servings of fruit and vegetables, but the higher the parents' intake of these food items, the higher the intake of their daughters. According to the researchers, children whose parents routinely consume fruits and vegetables do not have to be coerced into eating the foods because they observe and follow their parents' example.

Participants in another study of 89 mothers of 5-year old to 18-year old children (40 boys and 49 girls) in their first three years of schooling in Adelaide, Australia indicated that they were aware of, concerned about, and did exert control over the food

intake of their children (Tiggemann & Lowes, 2002). Although the level of control was determined to be high for mothers of boys and girls, mothers generally agreed that they made much more effort with their daughters to ensure that they "do not put on too much weight." As noted by Birch et al. (1995), and Fisher and Birch (2000), restriction and control over food intake may have the opposite effect, with an increased desire for and consumption of restricted foods. Mothers who perceive themselves to be overweight tend to exert the most control over their daughter's food intake, regardless of the child's weight. The mother's own concerns about weight, accompanied by her own insecurities about eating, may be manifested in more restrictive feeding practices, suggests Tiggemann and Lowes, who also contend that this level of control provides a vehicle for parental attitude and belief transmission to children.

Parents also influence dietary behaviors of older children, according to a study by Kremers et al., (2003), conducted in the Netherlands. Data were collected at 643 schools of 1771 Dutch 16-and 17-year olds. Students were asked to describe their parent as authoritative, authoritarian, indulgent, or neglectful, according to the following parameters:

Authoritative	high strictness	high involvement
Authoritarian	high strictness	low involvement
Indulgent	low strictness	high involvement
Neglectful	low strictness	low involvement

Kremers et al. were attempting to better recognize poorly understood mechanisms of influence and the impact of social environment in dietary behavior development. After students described parenting styles, they were asked about their personal fruit consumption. Fruit consumption by students was related to parenting styles in this order: authoritative, indulgent, authoritarian, and neglectful. The researchers surmised that

parental involvement is an important predictor of fruit consumption in the population studied. Involved parents are available and accessible to their children, which increases the likelihood of appropriate parent modeling.

Feeding practices that diminish or ignore internal satiety cues, whether through restriction or rationing, should be replaced with modeling and an enjoyment of foods and the environment in which the meal is consumed (Fisher & Birch, 2000). Children do develop food preferences based on an innate taste for sweet or slightly salty foods (Cowart, 1981; Cowart & Beauchamp, 1990), but they are not born with a predisposition for high-fat or calorically dense foods (Birch & Fisher, 1998). Allowing children to follow their own sense of taste and fullness should be the norm, but this is not necessarily so, according to the literature.

A convenience sample of 277 adults were recruited from four public schools in Minneapolis/St. Paul; 85% female, and 70% married (Boutelle, Birnbaum, Lytle, Murray, & Story, 2003). The number of children in the household ranged from one to nine years of age, with the mean number of children 2.6. Variables measured, through a telephone survey, were adult fruit and vegetable intake, fat intake, and perceptions of the mealtime environment. The majority of participants reported that television was frequently turned on during dinner time, and nearly one-third said their family was too busy to eat dinner together. A high frequency of television watching during dinner was associated with a low intake of fruit and vegetables and higher fat consumption. Forty-six percent of adults did not plan meals in advance, but of those who did plan meals in advance, a higher consumption of fruit and vegetables was reported. Arguments during dinner, related to eating behaviors of children, were associated with higher fat intakes of adults. No

mention was made of an association between mealtime television watching and arguments. Boutelle et al. concluded that nutrition messages designed for families must address the family meal environment and adult eating patterns.

Is it possible for schools to be effective in influencing children's dietary behaviors and food choices through nutrition education programs, given the overall environment in which a child first experiences foods, develops preferences for food items, and is affected by parents and other role models? Critics of the traditional "dry" approach to nutrition education, Seaman and Kirk (1995) examined approaches to improve nutrition knowledge, which are often unsuccessful, contrasted with food advertising and marketing techniques designed to create positive images for specific foods and food habits. Nutrition education programs are better received when they are exciting, colorful, or trendy. Seaman and Kirk recommended a social marketing approach; a collaborative effort between nutritionists who understand the science behind nutrition, and social marketers who understand customers and advertising environments.

An identification of why some children choose to eat healthy foods and be physically active may assist parents and teachers in better understanding the motivating factors behind children's health behaviors. O'Dea (2003) conducted a study with a goal of asking children and adolescents to rank perceived benefits of and barriers to healthful eating and physical activity, and to suggest strategies for overcoming barriers. Students in grades 2 through 11, ages 7 to 17, participated in this study from 34 randomly selected schools. Thirty-eight semi-structured, in-depth focus groups were conducted with the 213 participants. Relevant to this review, students listed the benefits of healthy eating: improvement in academic and physical performance, fitness, endurance, psychological

benefits, “feeling good” physically, and energy. Barriers included convenience, taste, and social factors. Students suggested that the barriers could be addressed through support from parents and school staff, better planning and time management, self motivation, and education. The results of this study support the notion that students do look to parents and teachers for support and encouragement, and for involvement in the development of healthful behaviors.

Powers, Struempler, Guarino, and Parmer (2005) studied the effects of a nutrition education program on the dietary behavior and nutrition knowledge of second-grade and third-grade students. Over 1100 second-grade and third-grade students were studied at schools selected by a convenience sample from public schools in Alabama. Children in the treatment group (n=702) participated in a pre-assessment, six weekly nutrition education classes, and a post-assessment. Children in the control group (n=398) were involved in pre-assessment and post-assessment, but did not receive nutrition education. Children in the treatment group exhibited greater improvements in overall dietary behaviors than did children in the control group, which included increased consumption of dairy products, fruits and vegetables. A fact is that children from the treatment groups and control groups were from the same school, and 75% of the children within the school participated in the National School Lunch Program. The researchers suggest that the nutrition education program may have affected behavior change. Children in the treatment group exhibited an increase in nutrition knowledge, including a better understanding of the Food Guide Pyramid, and nutrient-food associations (such as knowing that oranges are high in Vitamin C). Six hours of nutrition education falls far short of the 50 hours suggested by Connell, Turner and Manson (1985), but by

participating in even a limited number of nutrition classes, increases in overall nutrition knowledge and certain behavioral changes are possible.

Canada and the United States are similar in the respect that a research gap exists concerning teacher modeling, starting in the kindergarten classroom and beyond, and the effect that modeling might have on children's dietary behavior development and the promotion of healthy school nutrition environments. Canadian researchers Taylor, Evers, and McKenna (2005) conducted a review of literature to identify research gaps in the area of determinants of healthy eating among children and youth. Economic factors, food security, the content of media nutritional messages, and the issues of flavors, food neophobia, and food preferences were the primary factors investigated. Identified knowledge gaps included: (a) the nature and extent of familial influences, including family food practices; (b) the impact of the school environment on healthy eating, particularly nutrition policies and modeling; (c) effects of mass media on healthy eating; (d) food preferences and nutritional knowledge/skills in children and their impact on behavior change; (e) multiple determinants of healthy eating in children and youth, and their interactions; and, (f) longitudinal monitoring systems to identify national and regional eating behaviors in youth. A comment provided by the researchers was that enthusiastic teacher and peer modeling has been found to increase acceptance of healthy food choices in preschoolers.

Teacher surveys of school nutrition programs. The Teacher/Administrator School Foodservice Survey was developed by Meyer in 2002, who at the time, was a Research Scientist at the National Food Service Management Institute. The purpose of the instrument was to determine teachers' and administrators' satisfaction with school

nutrition programs. Meyer acknowledged that the primary customer for school foodservice and nutrition programs is the student, but secondary customers, such as teachers, may influence the perceptions of students, and possibly student participation in the school meal program.

The Meyer survey was one of five customer service surveys designed for high school, middle/junior high school, upper elementary school, lower elementary school parents, and teachers/administrators. Meyer's original 45-item instrument contained 30 questions that loaded into one of six factors: food quality and preferences, staff, ambience, price, nutrition, and time.

Analysis of variance was conducted to identify differences for teachers and administrators according to grade level, frequency of eating school lunch, length of the school lunch, and years of experience. A significant difference ($p<.005$) was found for grade level among teachers in the kindergarten, elementary, middle, and high schools for overall satisfaction. The same was true for the factors of Food Quality and Preferences, Staff, Price, Nutrition, and Time. Factor mean scores were highest for elementary school teachers and administrators and lowest for middle school teachers and administrators. No difference was found by grade level for the factor Ambience.

Frequency of eating in the school cafeteria impacted all six factors and overall satisfaction. When teachers or administrators ate three to five times per week in the cafeteria, they were significantly more satisfied ($p<.005$) than those who ate less often. A significant difference ($p<.005$) for overall satisfaction was noted for teachers and administrators according to the length of the lunch period among the factors of Food Quality and Preference, Staff, Ambience, and Price. Interestingly, when the lunch period

was longer, the satisfaction with the factor Time did not increase. No significant differences were noted according to years of experience or whether or not they had a duty-free lunch, free of supervisory duties. The scores, however, for the factors of Staff, Nutrition, and Time were higher when teachers possessed three to five years of experience. Teachers scored the factors Staff and Ambience higher when they had a duty-free lunch; the factor Nutrition was higher when they did not have a duty-free lunch.

Focusing on foodservice directors, teachers, and principals, Lambert and Carr (2006) developed two instruments to obtain information regarding perceptions and practices of providing nutrition education to elementary students in Arkansas and Idaho. The first survey contained 28 statements, designed to measure perceptions and practices of foodservice directors and teachers related to providing nutrition education to elementary students, and 14 questions. Six of the 14 questions solicited feedback on how nutrition education was being incorporated into the elementary classroom, seven questions requested demographic information, and the final, open-ended question allowed respondents to provide feedback to issues related to providing nutrition education in elementary classrooms.

The second survey, designed for principals, contained the same 28 questions as did the first survey. The questions were reworded, however, to reflect the position of the principal in responding to perceptions and practices of foodservice directors and teachers in providing nutrition education to elementary school students. Factor analysis of the 28 survey statements produced six factors that were identified by the researchers: parents, nutrition education, self (director, teacher, or principal), National School Lunch Program guidelines, and funding. The study addressed an issue not frequently found in the

literature, being that of the individual's role in promoting, supporting, or directly providing nutrition education.

All groups responded that nutrition education is important and valued at their schools, but that inadequate funding existed to support nutrition education. Principals responded that teachers and foodservice staff needed training to provide nutrition education, while teachers and foodservice staff responded that they were adequately trained to provide instruction. The statement, "nutrition education should be a part of our elementary students' curriculum," revealed agreement among foodservice directors (93%), teachers (93%), and principals (98%). The statement, "nutrition education is a part of our elementary students' curriculum," revealed a lower percentage of agreement; foodservice directors (47%), teachers (71%), and principals (90%). Forty-nine percent of foodservice directors and 76% of teachers indicated that they provide nutrition education to students. Results for teachers are similar to those of Stang, Story, and Kalina (1998), who reported that teachers in Minnesota overwhelmingly supported nutrition education, but 69% actually provided nutrition education in the classroom.

In another study led by Lambert, Raidl, Carr, Safaii, and Tidwell (2007), the researchers investigated school nutrition directors' and teachers' perceptions of the advantages, disadvantages, and barriers to participation in the school breakfast program. Although separate, the related programs of the National School Lunch Program and the National School Breakfast Program are federally funded initiatives of the United States Department of Agriculture. Student participation in the school breakfast program has been shown to support better academic performance, better school attendance, and improved overall dietary intake than non-participating students (Rampersaud, Pereira,

Girard, Adams, & Metzl, 2005). However, student participation in the school breakfast program is much lower than that of the school lunch program (Murphy, Pagano, Nachmani, Sperling, Kane, & Kleinman, 1998).

During the study, Lambert et al. used focus group methods to conduct discussions with school nutrition directors and teachers in one school each, in the states of Utah, New Jersey, and Illinois. Three primary questions, "What are the advantages to students participating in your school's breakfast program?" "What are the disadvantages to students for participating in the school breakfast program?" and "What are the barriers to students participating in the school breakfast program?" were asked of the 27 school nutrition directors and 31 teachers who participated in the seven focus groups conducted.

Six themes emerged from the question about the advantages of school breakfast programs. An emphasis was placed on the social aspects of consuming a breakfast at school, followed by parent benefits, better nutrition, the fact that the school "feeds them," and the fifth theme was school performance, followed only by student preferences. The finding that school performance was fifth of sixth themes listed may indicate that greater exposure should be provided to teachers about the academic benefits of the school breakfast program. The six themes that surfaced from the focus group interviews concerning disadvantages of the school breakfast program were time issues and conflicting events, low nutritional value, a social stigma of being "poor," meal quality, parent concerns, and the social aspects of breakfast at school (which was also listed as the primary advantage of a school breakfast program). Barriers to school breakfast participation centered on the themes of school staff support, time issues and conflicting events, parental influence, social stigma, student preferences, and financial issues.

The researchers concluded that, in order for school breakfast programs to be successful in reaching and serving children, perceived disadvantages and barriers must be addressed. Based upon the feedback received from the school nutrition directors and teachers, recommended strategies include:

1. select teacher representatives to act as liaisons between teachers and foodservice staff;
2. to improve communication;
3. involve teacher representatives in some aspects of meal planning to educate teachers on nutritional and funding requirements for school meals,
4. include teachers in school nutrition advisory councils;
5. pursue creative marketing strategies to improve teacher awareness of foods offered in school breakfast programs;
6. establish a relationship with the school's Parent/Teacher Association to educate parents and gain support for school breakfast programs; and,
7. provide taste testing opportunities for teachers and students, emphasizing foods available in the school breakfast programs.

Kubik, Lytle, Hannan, Perry, and Story (2003) maintain that the school food environment, beyond that of only the foods served in the school's cafeteria, has an effect on the dietary behavior development of young adolescents. A study conducted in 16 schools with 598 seventh graders revealed that as ala carte food selections increased, student consumption of fruits and vegetables decreased, and intake of fats and saturated fats increased. The authors suggested that the decisions made by adults in the school setting, the admissibility and availability of food choices, and the examples set in school,

in the cafeteria and the classroom, have a great effect on overall student dietary behaviors.

From high schools to middle schools and elementary schools, to day care centers, how eating habits are developed, the influence of the school environment, and the influence of adults in these settings, warrants further investigation. Schwartz, a fellow at the Rudd Center for Food Policy and Obesity at Yale University, developed a Caregiver Attitude Scale, used to assess the degree to which caregivers believe children's eating behaviors and food preferences are malleable, and the degree to which they believe preschool is responsible for helping children develop healthy eating behaviors. Schwartz conducted this preliminary research at two preschools in New Haven, Connecticut, but intends to expand the use of this instrument (M. Schwartz, personal communication, July 25, 2007). Since preschool children will enter public schools and participate in the school meals programs, making connections between early childhood to school-aged children's dietary behavior development warrants further investigation.

Microsystem. The microsystem is the immediate setting in which a person lives, with the setting defined as a place with specific features in which the person engages in specific activities for specific periods of time. A microsystem can be described as a set of relationships between and among the factors of place, time, physical features, activity, participant, and role (Bronfenbrenner, 1977, 1979). The microsystem consists of interpersonal interactions in specific settings, which may include family members, social acquaintances, and work groups (Bubolz & Sontag, 1993). Bronfenbrenner (1977) indicated that the principles of reciprocity, recognition, and awareness underlie the microsystem. Reciprocal interactions that have an enduring impact on development,

recognition of the totality of the functional system, and an awareness of the indirect impact of physical factors on a setting comprise the microsystem. A child's home, school, neighborhood, and the individual developing child are examples of microsystems (Berk, 2003).

Nutrition and achievement. The effect of policies, external factors, and the mesosystem, or the relationships between microsystems in a school setting, and how they influence the school nutrition environment have been discussed. How these factors influence the developing child, related to achievement, is examined below.

School nutrition programs are essential to the physical and educational requirements of children during the school day (Contento, Balch, Bronner, & Maloney, 1995). Children who experience hunger during the school day have lower math scores (Alaimo, Olson, & Frongillo, 1993), and run a greater risk of overall behavioral, emotional, and academic problems (Kleinman, Murphy, Pagano, Wehler, Regal, & Jellinek, 1998). Children who experience hunger during the school day are more likely to be hyperactive, and absent or tardy in addition to having more behavioral and attention problems than other children (Murphy, Wehler, Pagano, Little, Kleinman, & Jellinek, 1998).

An understanding of how student health impacts educational outcomes should be a primary concern of all parents and educators (Taras & Potts-Datema, 2005). Alaimo et al. reported that children from food insufficient households experience negative academic and social outcomes, as revealed in the Third National Health and Nutrition Examination Survey (NHANES III). Lower math scores and a greater likelihood of repeating a grade, seeing a school psychologist, and difficulty getting along with other children were evidenced among food insecure children.

Studies indicate that elementary students who participate in school nutrition programs have better test scores, behavior, attitudes and general health than do students who do not participate in organized child nutrition programs (Enns, Mickle, & Goldman, 2002). Winnicki and Jemison (2003) noted that kindergarten students from food insecure households scored lower on initial tests than peers, and made less learning gains over the course of the year. Children from the Early Childhood Longitudinal Study, 1998-1999 Kindergarten Co-hort, a nationally representative sample of nearly 22,000 children enrolled in approximately 1000 kindergarten programs during the 1998-1999 school year, were followed to assessment in first grade in 1999-2000. Researchers Kowaleski-Jones and Dunifron (2006) found that participation in the NSLP initially appears to be related to lower test scores. However, controlling for free and reduced priced meal eligibility as a marker for lower socioeconomic status, boys who consumed school meals had better test scores than boys who did not consume school meals. Similar results were not noted for girls.

One of the original studies investigating linkages between school meal programs and performance outcomes was conducted by Meyers in 1989. The study compared achievement, as measured by test scores, before and after the implementation of the National School Breakfast Program. The study focused on the effects of the initiation of a NSBP, but the relationship between the school-based food assistance program and academic outcomes was evidenced. Higher test scores were found among children who participated in the NSBP, as were improved school tardiness and absenteeism rates.

The National Evaluation of School Nutrition Programs, conducted over 20 years ago, indicated that National School Lunch Program participants had better overall

nutrient intakes than non-participants (Hanes, Vermeersch, & Gale, 1984; Radzikowski, 1984; Cho & Nadow, 2004). Teachers concerned about optimizing student performance should consider the nutritional status of the child an important predictor of academic success.

Numerous studies have been conducted on the impact that the morning meal can have on student behavior and achievement, and the benefits of breakfast for children. Students and parents from two elementary schools in Baltimore, MD and two elementary schools in Philadelphia, PA received a battery of psychosocial, academic, food insufficiency, and hunger measures before the initiation of a school breakfast program. Teachers were asked to complete a standardized behavior problem questionnaire before and after a universal free breakfast program began. In all four schools, the free breakfast program was made available at the beginning of the second semester. Only children in grades 3 and higher were asked to participate in the study, although all children were eligible for a free breakfast. Ninety-four complete parent and child paired interviews in Philadelphia and 110 paired interviews from Baltimore resulted in a total of 204 of a possible 679 pairings. Prior to the free breakfast program, 65% of the children were classified as not hungry, 27% were classified "at risk" for hunger, and 8% were classified as hungry (Murphy, Pagano, Nachmani, Sperling, Kane, & Kleinman, 1998).

Parents reported a higher hunger score associated with increased psychosocial dysfunction. Teachers reported greater emotional, behavioral, and attention problems among children classified as hungry. Additionally, hungry and "at risk" children's absenteeism and tardy rates were twice that of the children classified as not hungry. The researchers stated an obvious but important fact: beyond the increased problems at that occur at school, a child is

less likely to be educated if the child is not present during the school day to receive instruction. After the start of the breakfast program, many of the hunger-related issues subsided. Murphy et al.(1998) emphasized the need for adults who work with children and their families to ensure that parents are aware of programs that exist to provide food and nutrition programs to those who need it most, such as the National School Breakfast Program, the National School Lunch Program, the Supplemental Nutrition Assistance Program (formerly referred to as the Food Stamp Program), and the federal program for pregnant women, mothers and their young children--Women, Infants, and Children (WIC).

Severe food insufficiencies can have a greater effect on children than short-term behavioral and attention problems. An estimated 15% of America's children, despite the availability of federal nutrition programs, are chronically hungry (School Nutrition Association, 2008). Iron deficiency anemia (Gordon, 2003) and zinc deficiency (Black, 2003) have been linked to significantly compromised cognitive abilities. Lack of iron can adversely affect brain development, but confounding factors range from other nutrient deficiencies to overall caloric shortfalls, making it difficult to identify the most important factors in brain development. However, what is certain is that children must have an adequate supply of calories and nutrients to reach their academic and physical potential.

Despite the presence of hunger in America, the issue for many children has shifted from under-nutrition to over-nutrition, and related obesity. While an emphasis on general child nutrition research is important, recent associations between childhood obesity and academic outcomes have become critically important. Does obesity affect student performance or attendance at school? A study of 105 children, ages 5-18, referred by their physicians to a nutrition clinic or gastroenterologist, indicated obese children were absent a

median of one day of school in the preceding month, as compared to zero days for healthy children. The mean number of days absent was 4.2 days for severely obese children and 0.7 days for healthy children (Schwimmer, Burwinkle, & Varni, 2003).

Another study of 104 third and fourth grade children in Philadelphia, PA did not reveal an association between obesity and classroom failure or absenteeism, but researchers reported that obese children were twice as likely to be placed in special education or remedial classes (Tershakovec, Weller, & Gallagher, 1994). Similar findings by Falkner, Neumark-Sztainer, Story, Jeffery, Beurhing, and Resnick (2001) revealed that of 10,000 students in 7th, 9th, and 11th grades, obese girls were 1.5 times more likely to be retained a grade in school and 2.1 times more likely to consider themselves poor students compared to female classmates of average weight. Obese boys were 1.5 times more likely to consider themselves poor students and 2.2 times more likely to drop out of school. Datar, Sturm, and Magnabasco (2004) indicated that kindergarten and first grade students evidence lower math and reading scores than non-overweight students. These statistics underscore the need for greater attention and involvement of all adults concerned about the care and development of children.

A Brazilian study of 65 obese children, ages 8 to 13, compared to a control group of 35 children from the same community who were at normal weight for height, revealed that children of normal weight for height scored significantly higher on an IQ test than those in the obese group (Campos, Sigulem, Morales, Escrivao, & Fisberg, 1996). Non-obese children had a wider range of interests, greater speed and dexterity, and greater social adaptability. A stronger correlation was shown between weight status and IQ test

performance than for income level and test performance, which decreases the apparent impact of socioeconomic status on academic achievement, according to the researchers.

Teacher Attitudes, Influence, Behaviors, and Demographic Characteristics

The following review examines teachers' attitudes and perceived influence on the school nutrition environment, as well as self-reported classroom behaviors to include classroom rewards, followed by teacher characteristics.

Attitudes. A study published in 1983 reported on the knowledge, attitudes, personal practices, and nutrition education practices of 109 kindergarten through 6th grade teachers from 97 schools in Kansas. A 115-item questionnaire contained 55 questions to measure nutrition knowledge, and 60 questions to measure nutrition-related attitudes, and personal and nutrition education practices. (Soliah, Newell, Vaden, & Dayton, 1983). Approximately 40% of the teachers indicated that they sometimes or always ate school meals, about three-quarters indicated the meals tasted good, and 57% agreed the meals were nutritious. However, even among those teachers who reported that school meals were nutritious or good tasting, many indicated that they did not participate because the meal was too expensive, too salty, too high in calories, or that they wanted more or larger servings of vegetables and salads. Almost all of the teachers indicated that nutrition should be taught in the elementary grades, but few taught nutrition concepts in their classroom. Soliah et al. (1983) found that two-thirds of the teachers rarely or never talked with parents about their nutritional needs or eating practices of their children. Those who had taken one or more college courses or nutrition-related continuing education, or who were currently teaching nutrition in the classroom had higher nutrition knowledge, attitudes, and practice scores that those without training or who were not

teaching nutrition. The researchers noted a strong positive correlation between nutrition knowledge scores, and attitudes and practices.

These findings are consistent with the later work of Norton, Falciglia, and Wagner (1997), who reported that Ohio elementary teachers agreed nutrition education should be taught in the classroom, but had no conviction about who should take the leadership role on the issue. Although teachers generally had positive attitudes about nutrition education and indicated a degree of receptivity, the researchers were concerned about the lack of nutrition education actually occurring in the classroom. Primary reasons given for not including nutrition education in the classroom included lack of time, followed by a lack of appropriate nutrition education tools, lack of support from school administration, the subject of nutrition too advanced for elementary students, or an opinion that the responsibility for providing nutrition education resided with the parent. Time, insufficient funds, large class sizes, and lack of appropriate tools were given by the 530 Ohio teachers for not providing nutrition education in the classroom. Of the 99% who thought elementary schools should have a role in promoting nutrition education, two-thirds rated themselves as very or extremely interested in teaching about foods and nutrition, but most did not teach the subject. Teachers did not feel supported by parents, with the teachers indicating that parents typically have a low interest level in teaching or learning about foods and nutrition. The researchers concluded that effective nutrition education interventions require the expertise and understanding of nutrition educators who acknowledge the role, responsibilities, and challenges faced by elementary teachers. Nutrition education activities need to be streamlined and coordinated with teachers to provide the training and skills needed to improve children's diets and health.

Seeking to assess the nutrition knowledge, attitudes, and behaviors among teachers in South Carolina to understand environmental influences on dietary behaviors of children, Rafiroiu and Evans (2005) revealed that teachers correctly answered 63.2% of questions on a nutrition knowledge scale. Nutrient needs, Dietary Guidelines for Americans, healthy meal and snack choices, and nutrition and health were the topics from which questions were derived. In general, teachers knew more about dietary recommendations than specific nutrients. Teachers listed books, newspapers, and television as their major sources for nutrition education. This is an alarming finding, according to the researchers, as the media are more likely to report recent findings and trends than substantiated, scientifically supported information. Most educators in the study reported teaching less than 10 hours of nutrition per year, but 93% indicated that nutrition education should be taught in all grades. Barriers to teaching nutrition included lack of time to plan, coordinate, and implement, as well as too many competing interests, consistent with the findings of Soliah et al. (1985) and Norton et al. (1997). A lack of collaboration between teachers and school nutrition program personnel was noted.

Additionally, about 33% of teachers in the study self-reported being overweight or obese, based on the guidelines provided, which mirrored national statistics (USDHHS, 2001). However, nearly two-thirds expressed concerns about weight, and half were using a method to lose weight. Rafiroiu et al. expressed concern over this finding. If teachers were modeling extreme weight control behaviors to students, this might influence eating disorders in students. However, moderate methods, such as exercising and controlling caloric intake might provide a positive message to students. The researchers commented that this is an area needing further investigation.

Minnesota teachers cited the importance of the topic and their enjoyment of teaching as the two most important reasons for teaching nutrition (Stang, Story, & Kalina, 1998). Results from surveys of 894 elementary and secondary teachers indicated that secondary teachers were more likely to teach about nutrition, and integrated the topic into other subjects, such as math, science, and health classes. Although few of the respondents involved community resources in providing nutrition education, those who did reported using the assistance of Cooperative Extension Service, registered dietitians or nutritionists, public health nurses or educators, non-profit organizations, and grocers. Teachers were much more likely to invite representatives from the community resources to speak in the classroom than they were to ask for assistance or guidance in planning or developing nutrition education lessons. Only a few teachers reported working with foodservice personnel, even though they expressed an interest in doing so. Lack of time to meet with the foodservice staff, lack of time and training of foodservice personnel, and lack of experience in working collaboratively with foodservice personnel were the stated barriers to providing coordinated nutrition education.

Meyer, Conklin, Lewis, Marshack, Cousin, Turnage, and Wood (2000) investigated middle school nutrition environments and the promotion of healthy eating. Reports from three focus groups identified components of and barriers to healthy school nutrition environments. Results from a validated mail survey indicated that 68% of school foodservice personnel, but only 39% of other school personnel placed a high priority on the establishment and promotion of healthy school nutrition environments. The researchers expressed concern about the attitudes of teachers and other school

personnel who do not understand or agree with the need to promote a healthy school nutrition environment.

Responses from 685 surveys mailed to 3,500 school nutrition directors, school nutrition managers, principals, Pre-K teachers, and early education directors were received by research scientists at the National Food Service Management Institute (Nettles, Carr, & Johnson, 2006). Significant differences in serving the nutritional needs of Pre-K children in the public school setting were identified for four of seven practice factors: encouragement, administrative support, nutritious meals and meal experiences, and communication and training. Three of these four factors--encouragement, meal experiences, and communication--may be related to the classroom teacher's attitudes about the importance of student nutrition during the school day.

A survey of 96 food service directors, 482 teachers, and 91 principals were asked to respond to the following statement, "Nutrition education should be a part of our elementary students' curriculum" (Lambert & Carr, 2006). Ninety-three percent of directors, 93% of teachers and 98% of principals responded affirmatively. However, when asked to respond to the statement, "Nutrition education is a part of our elementary students' curriculum," only 47% of directors, 71% of teachers, and 90% of principals agreed that nutrition education was, in fact, a component of elementary school curriculum. This study again underscores the findings that positive attitudes or a belief in nutrition education does not necessarily ensure that nutrition education will be provided.

Similar results were observed by Stang, Story, and Kalina (1998) in a study of 894 elementary and secondary teachers in Minnesota public schools. Ninety-five percent of teachers thought nutrition education was an important topic to teach, with 79% of

teachers reporting that they taught nutrition. Of the reported 79%, 8% replied that they taught nutrition or nutrition concepts daily, 37% once per week, 37% once per semester, and 12% once per year. Considering that the School Health Education Evaluation found that 50 hours of nutrition education were needed to impact behavior, it is doubtful whether the majority of the education provided in the Minnesota study had any real effect on student outcomes (Connell, Turner, & Manson, 1985). Stang et al. (1998) declared that "Teachers must be encouraged to eat meals in the cafeteria on a weekly basis, to share nutrition education materials and ideas with foodservice staff, and to use school menus and the cafeteria as a learning laboratory for food and nutrition lessons." (p. 402).

The main objective of a study of 115 science, health, home economics, and physical education teachers, school nurses, and social workers in 17 schools within a large urban school district was to assess attitudes and beliefs, not about the immediate school nutrition environment, but about perceived contributors to obesity and teacher attitudes toward obese students (Neumark-Sztainer, Story, & Harris, 1999). The information would be used to increase the understanding of subtle messages given to overweight students, and to plan training programs for staff interested in providing obesity prevention programs. Over half of the respondents believed that obesity is caused by individual factors such as overeating, poor eating habits, and lack of physical activity, but also believed that biological factors can contribute to obesity. Approximately 25% of the respondents perceived obese students as more emotional, less tidy, less likely to succeed, having "different personalities" (p. 7), or having more family problems than non-obese students. The researchers concluded that staff may need to be trained on the complexities of obesity and the many factors that influence body weight, including

genetics, behavioral, familial, societal, and psychological factors. Teacher attitudes about individual children or groups of children may affect the overall school nutrition environment.

Influence. Kubik, Lytle, Hannan, Story, and Perry (2002) conducted a study resulting from their concern that no recent published studies examining the influence of food-related role modeling of teachers to students existed. The researchers believed that teachers have the opportunity to influence eating behaviors of youth due to their close proximity and repeated contact. They cited an increase in research regarding the influence of food availability at school, examining such factors as vending and ala carte sales in schools, but indicated that the influence of food-related classroom behaviors of teachers had received little attention. The study of 490 middle school teachers, based on Bronfenbrenner's ecological model, recognized the significance of adult influences on youth behavior development through role modeling, normative practices, and social support. Results revealed that most middle school teachers used foods as rewards, and the foods used were not typically classified as healthy foods. The researchers, who reported high fat intakes among teachers, low perceived personal health of teachers, and low support of a healthy school nutrition environment, concluded that the teachers did not perceive a personal influence on the school nutrition environment and did not model healthy eating at school.

Based upon the findings of the 2002 study, Kubik, Lytle, and Story (2005) conducted a follow-up investigation with middle school teachers and parents. Survey items were developed by the researchers based on available literature, focus groups, and key informant interviews with students, parents, and school personnel. Three hundred

and fifty parents and 490 teachers completed surveys, revealing that both groups believe nutrition and school food programs are important, but do not perceive school nutrition programs to be healthy enough. However, when questioned, 40% of parents and over one quarter of the teachers said that food-related fund raising is acceptable, even though the products are usually high in fat or are chocolate candies. The reasons for the positive responses were typically related to the consensus that students like or prefer these foods. Most parents agreed that parents do influence children's eating practices, but only one-third of teachers agreed that they personally have an influence on student eating behaviors and practices. Most parents and teachers agreed that product advertising influences students to purchase advertised items, but only half of parents and just over three-quarters of the teachers believed that schools should prohibit food-related advertising. The schools' financial needs for fund raising and student preferences for snack and beverage items were given as justifications for advertising. The researchers concluded that teacher and parental beliefs, influence, and support for healthy school nutrition environments are not consistent, and that a dichotomy of beliefs and practices exist.

An earlier study of the sources of nutrition information and beliefs of health and physical education teachers revealed that 66% of teachers felt they had some influence on the dietary practices of students, and 80% had attempted to influence students' practices (Pratt & Wallberg, 1998). Only 28% of the respondents, however, had ever participated in a nutrition class. Most teachers obtained their nutrition information from newspapers and magazines, followed by friends as the next source of information. Even though teachers were generally knowledgeable about fluid needs before, during, and after

training and athletic events, 27% stated that an electrolyte drink, such as Gatorade, was preferable to water. Most teachers agreed that carbohydrate and fat are the main sources for muscular energy, but 35% erroneously indicated protein as the primary source for muscular activity. The researchers concluded that nutrition education is needed for health and physical education teachers to address balanced diets and fluid replacement.

How teachers perceive their influence on school nutrition programs was the topic of a study conducted in the late 1970s. Fifty-three surveys to determine attitudes toward school nutrition programs were mailed in 1978 to 98 elementary teachers at seven schools in a medium-sized Midwestern city; responses were received from 85%. Most teachers ranged in age from 26 to 50, and had taught between 6 and 20 years. The largest percentage of teachers indicated that they ate a school lunch only once a month or never participated in the school meal program, but about one-fourth indicated that they ate lunch at school once a week or more (Perkins, Vaden, & Roach, 1980).

Overall, teachers had a favorable impression of the school nutrition program, but disagreed that it was enjoyable to eat a school lunch. A strong negative response was reported regarding teachers eating with their class. Teachers indicated that they did not believe their presence would influence students' eating habits. Reasons given included needing time away from students and students needing time away from teachers. Some teachers indicated that the lunch period was their only planning period.

A two-way analysis of covariance was computed to determine if significant differences in responses occurred based on grade levels (lower, grades 1-4; upper, grades 5-6). Teachers of upper grade levels expressed more negativity and dissatisfaction with the school nutrition program than did lower grade level teachers. Teachers at all grade

levels disagreed that student participation in the school nutrition program would increase if they ate with their students. A significant difference was found between teachers' perceived view of food quality and student participation. If teachers believed food quality was good, this may have been reflected in their own behavior, and may have positively influenced student participation in the school meal program. Interestingly, teachers with high student meal participation rates in the lunch program expressed the most disagreement about eating with their students. The researchers did not indicate if the higher participation rates were linked to higher percentages of socio-economically needy children, but schools with lower socioeconomic student status are linked to higher student meal participation rates (School Nutrition Association, 2008).

More recently, results from a study of 373 teachers and school personnel from 55 schools in Louisiana indicated that 31% and 40% of the sample were overweight and obese, respectively. Hartline-Grafton, Rose, Johnson, Rice and Webber (2009) expressed concern about reaching out to teachers and personnel, and that further research should be conducted to understand and improve the diets of school employees, given their high rates of overweight and obesity, poor diets, but important role in influencing student health. Changing the overall school environment for the benefit of students and teachers should be a priority.

Behaviors. Despite evidence that school meals are nutritionally superior to meals sent from home (Rainville, 2001), schools do send mixed messages to students, according to Lynn-Garbe and Hoot (2004/2005). Nutrition education programs designed to encourage healthy eating behaviors are countered by teachers who provide high fat and high sugar foods in classroom activities and celebrations, and as rewards for good

behavior or performance. Teachers who consume soft drinks at their desks, who snack on candy while teaching, or who purchase high calorie or high fat foods from vending machines are not setting a good example. Birch and Fisher (1998) maintain that teachers serve as role models for children; their attitudes and behaviors are influential in shaping children's food preferences and behaviors.

A report from the National Food Service Management Institute, entitled *Healthy School Nutrition Environment: Results from a Nationwide Survey of School Personnel* (Rainville, Choi, & Brown, 2003) revealed the following:

- Approximately 73% of over 1200 respondents said their school provided a healthy school nutrition environment;
- Approximately 55% indicated teachers and administrators used foods as rewards; and,
- Fundraisers, featuring candy and baked goods as the most frequently sold items, were used by 99% of the respondents.

When asked whether their schools provide a healthy school nutrition environment for students, 77% of school food service personnel and 70% of other school personnel responded that they agreed or strongly agreed. However, since 87% of high schools, 70% of middle and junior high schools, and 42% of elementary schools reported vending machines as accessible to students, the researchers questioned the understanding of a "healthy school nutrition environment" among the 1222 superintendents, principals, school business officials, teachers, coaches and school food service personnel. Fifty-five percent of respondents reported that teachers and administrators used foods as rewards, and 99% reported fundraisers featuring candy and baked goods as the most prevalent

items sold. The researchers expressed concern about not only improving school nutrition environments, but questioned whether those who believe they are already providing a healthy school nutrition environment would recognize the dichotomy, and be willing to improve school environments. Staff identified barriers to providing healthy school nutrition environments, including inadequate funding for school food service programs, competitive foods including ala carte options, children's peer pressure, television and media, menus, funding for school activities, cafeteria atmosphere, and parental attitudes. Nowhere on the list, according to Rainville et al. (2003) did school staff recognize their potential role, through attitudes or practices, in serving as a barrier to the development of healthy school nutrition environments.

When 73% of respondents claim a HSNE, but 55% acknowledge foods are used as rewards and 99% report foods are routinely used as fundraisers, the questions must be asked, "What is an HSNE, and what does it look like? Who is responsible for promoting the HSNE? Do teachers and other adults at school perceive a role in the development or maintenance of healthy school nutrition environments?" An avowed interest in nutrition by arguably some of the most influential players in children's lives is accompanied by no real sense of urgency, with the responsibility for action typically placed elsewhere.

Story, Newmark-Sztainer, and French (2002) proposed a conceptual model for understanding factors that determine eating behaviors and food choices within an integrated, theoretical framework based on social cognitive theory and an ecological perspective. Eating behavior is conceptualized as a function of individual and environmental influences, with four broad levels of influence: intrapersonal (individual influences), social environmental (interpersonal influences), physical environmental

(community settings), and macrosystem (societal). Multiple factors must always be considered when trying to understand, influence or provide interventions focused on the eating behaviors of children and adolescents (Story, Newmark-Sztainer, & French, 2002). Psychosocial, biological and lifestyle issues (intrapersonal) heavily influence eating behaviors. Less understood, however, and just as powerful, are influences such as the family and peers (interpersonal), school environments, fast food restaurants, the availability of vending machines, convenience stores, and foods available at worksites (community settings), and consumerism, advertising and media (societal). The researchers suggest that further identification of factors predictive of eating behaviors is needed to assess the dietary behaviors of children, adolescents and adults.

Classroom rewards. Academic competition is the driver behind most classroom reward systems (Kohn, 1992), followed by classroom control, such as encouraging students to quietly stand in line. How reward systems affect children, the types of rewards used, and specifically, the use of food rewards is the subject of this review section.

The most effective rewards are intrinsic, or extrinsic, if they are related directly to a behavior, are given promptly after positive behavior occurs, and if they are awarded on a consistent basis, and meet the mission of the classroom (Puhl & Schwartz, 2003). Providing extrinsic rewards unrelated to specific behaviors or the educational mission, to simply incentivize actions have, however, become commonplace (Deci, Koestner, & Ryan, 2001).

Rewarding students for academic achievement or learning gains in the form of merit certificates, credit at the school store, cash, or college-fund contributions have

contributed to improved reading scores across grade levels, although no impact was noted in mathematics performance (Raymond, 2008). A study sponsored by the Center for Research on Education Outcomes at Stanford University found a consistent impact of rewards on achievement gains and achievement tests. However, the long-term benefit of extrinsic rewards is questionable, according to some educators (Lepper, Green, & Nisbett, 1973).

Deci and Ryan (1985) contend that personality characteristics may lead some students to be more self-motivated than others, and therefore intrinsically strive to succeed. However, the proliferation of extrinsic rewards may create a damaging situation in which the self-motivated child becomes reliant on extrinsic rewards, and the child who does not receive the rewards becomes defeated.

A study of the type and choice of reward offered to students, and the effect on subsequent reading among third graders was conducted by Marinak and Gambrell (2008). A study of 800 students in three elementary schools in a large mid-Atlantic suburban school district examined the difference between the type of reward (a book or a token for candy or toys). A second variable was the choice available to actually select the type of reward (book or token) or to receive no reward. Students who were given a book and students who received no reward were more motivated to engage in subsequent reading than students who received a token for candy or toys.

According to Rossiter, Glanville, Taylor, and Blum (2007), teachers need to be aware of the allure and common practice of rewarding children with extrinsic rewards, but especially food items. One hundred and three students enrolled in their last year of a bachelor of education program completed a Teens Eating for Energy and Nutrition at

School teaching staff survey. Sixty-five percent of the respondents had a high fat intake, and 72% had mid-to-low nutrition knowledge. Ninety-three percent believed that a healthy school nutrition environment was important, but two-thirds reported unhealthy classroom food practices. Unhealthy classroom food practices were more prevalent in students planning to teach at the secondary level, those who expressed a high personal health belief, and those who demonstrated less support for a healthy school nutrition environment. The researchers concluded that knowledge, attitudes, and food behaviors of prospective teachers may be barriers to promoting healthy food habits to their students, and that compulsory nutrition education should be included in teacher training curriculum.

Caregivers and children themselves were the focus of research conducted with six Native American Indian nations (Gittlesohn, Toporoff, Story, & Evans, 2000). Cultural norms prevailed, despite the identification of fruits and vegetables as healthy choices by all caregivers. High fat, high sugar meal selections, abundant food rewards in the classroom, rules about finishing all the food on a child's plate, and limited resources to purchase healthier food items present a challenge to making meaningful, sustainable changes in children's diets, and specifically in affecting change in school environments.

Puhl and Schwartz (2003) suggest that regardless of past practice or cultural norms, it is the responsibility of schools to teach and model healthy eating behaviors. Non-food rewards, if extrinsic rewards are offered, should be the only type of incentives available. Classroom rewards that teach children to eat when they are not hungry encourage over-eating, compromise health with low nutritive value foods, and undermine classroom learning.

Teacher characteristics. The Nebraska Department of Education does not require a nutrition course during teacher pre-service, but does require a course from a general health area, with nutrition offered as one of the course options. Responses received from teachers representing 65 of 93 Nebraska counties resulted in 464 completed questionnaires, with two-thirds indicating "some training" in nutrition. Results of the questionnaire, tested by 10 registered dietitians for content validity, and 20 teachers for clarity, indicated that over two-thirds of the teachers believed nutrition should have a high priority in elementary curriculum. However, teachers 50 years and older were much more likely to teach nutrition concepts than younger teachers. The researchers suggested reasons for this observed difference. Younger teachers may feel less comfortable teaching nutrition concepts, and may not have developed the time management skills needed to organize instruction with sufficient time in the school day to provide nutrition education. More experienced teachers may have the opportunity to attend a greater number of nutrition presentations or in-service training programs. Another suggestion presented by the researchers for the differences in teaching nutrition between younger and older teachers centers around the notion that as nutrition becomes more important to the teacher personally, it becomes a greater teaching priority. The question of how to develop a greater personal interest in nutrition among teachers regardless of age, however, remains.

Olson, Devine, and Frongillo (1993) collected data from 1,312 of 2,122 seventh through twelfth grade teachers who had received training conducted by the New York State Department of Education on a curriculum called *Nutrition for Life*, designed for health education and home economics teachers. The researchers found that home

economics teachers were 6.25 times more likely than health education teachers to use the curriculum after receiving training on its use. However, among teachers who taught 11 or more hours from the curriculum, health teachers were 2.39 times more likely to use the curriculum. Teachers in low socioeconomic schools were nearly two times more likely to utilize the curriculum, and teachers from big city schools were only one-third as likely to use the curriculum as were teachers from rural, suburban, or medium to small city schools. As overall teaching experience and years of experience teaching nutrition in the classroom increased, so did the likelihood that teachers used the *Nutrition for Life* curriculum.

Similar results were obtained in a study of 534 elementary teachers from a sample of 1000 teachers, representing 1.6% of all elementary teachers in Ohio (Norton, Falciglia, & Wagner, 1997). Results revealed that the availability of nutrition programs developed for elementary schools alone have minimal impact on children's eating behaviors, but prior experience in teaching nutrition is an important factor in the dissemination of nutrition information by elementary teachers.

A study conducted to measure the success of training delivery included three approaches to teacher training with a set of 125 kindergarten through sixth grade teachers, divided into three experimental groups and three control groups (Shannon, Marbach, Graves, & Sims, 1981). The only difference between the experimental and control groups was that the experimental group provided student instruction for a 10-week period following a pre-assessment and prior to the post-assessment. One experimental and control group received teacher guide materials and curriculum; the second paired group participated in a three-hour inservice that explained the curriculum

materials and suggested teaching approaches. The third paired group participated in a 45-hour postgraduate nutrition course. The study revealed that the 45-hour course had the most positive influence on test scores, but results also indicated that positive changes in attitudes about providing nutrition education in schools correlated with higher student gains in nutrition knowledge. As students showed interest and learned, teachers felt more compelled to teach about nutrition. Shannon et al. (1981) concluded that more research should be undertaken to study the relationships between teacher training and student interest, and teacher training and teacher characteristics.

Eleven years later, Shannon, Mullis, Ervin, and Poeheler (1992) conducted telephone interviews with state agency personnel responsible for state-level nutrition education activities directed to schools to assess the status of school-based nutrition education. All 50 states were included in the study; the District of Columbia did not participate. Nine states responded that they mandated nutrition be taught and another 21 included nutrition as a required topic in mandated subjects. The remaining states did not require nutrition education, but had initiatives to promote school-based nutrition education. An underlying question of the investigators was the issue of which subject area should serve as the best avenue for providing nutrition instruction. It was found that nutrition is typically a topic taught in home economics, but this is an optional course in most states. Additionally, students who elect to enroll in a home economics course do not necessarily do so when the topic of instruction is nutrition. The researchers suggested a more appropriate placement for nutrition instruction would be mandated health education courses. However, the quality and quantity of nutrition education may not be appropriate even in health education courses, and only 20 states required coursework in nutrition for

teacher certification in health education. Health education curricula often contain references to nutrition as it applies to general health, but not necessarily an emphasis on eating habits and eating behaviors. Shannon et al. (1992) indicated that an emphasis on health education teacher preparation, with a focus on practical nutrition education, might serve as an appropriate basis on which to build influence and interest in classroom based nutrition education.

Another perspective was presented on the characteristics of schools instead of individual teachers in relation to overall school health climates. Results were obtained from the Teach Well project, which followed teachers from 16 Atlanta public schools who had access to the *Live for Life* teacher wellness program, comprised of 36 health workshops over the course of a school year, each approximately 30 minutes in length, and teachers from 16 control schools who were not offered the training (Cullen, Baranowski, Baranowski, Hebert, deMoor, Hearn, & Resnicow, 1999). Teachers from schools with high organizational climate scores reported higher fruit and juice intake among teachers than treatment schools with low organizational climate scores. Higher fruit and juice intake, and lowered fat intake was reported by treatment school teachers with high job satisfaction scores, compared with treatment school teachers with low job satisfaction scores. Patterns of fruit, juice, vegetable, and fat intake in control schools were variable. Cullen et al. suggested that the camaraderie provided by attending health promotions may have influence the results. The researchers also suggested that additional research be conducted to determine the influence of teacher wellness programs on student outcomes.

Social Cognitive Theory

Social cognitive theory suggests that behavior is the result of personal and environmental factors that influence each other in a dynamic and reciprocal fashion. Personal factors, including thoughts and feelings, behavioral factors, including knowledge and skills, and environmental factors, including external factors from the social and physical environment, help individuals bridge the gap from intention to behavior, and make desired actions easier to understand and fulfill (Contento, 2007). Social cognitive theory is, therefore, reflective of how our behavior is influenced by our thoughts or beliefs about ourselves. Of particular interest in this study, individuals with a higher degree of self-efficacy can overcome barriers to adopting and maintaining healthy behaviors (Bandura, 2004). The higher the level of perceived self-efficacy, the more effort will be expended to persist in a behavior despite potential challenges or difficulties (Bandura, 1997).

A lack of self-efficacy contributes to lowered nutrition education-related outcome expectancies and outcome values (Fahlman, McCaughtry, Martin, Shen, Flory, & Tischler, 2009). An intervention group of 30 teachers participated in a day-long training to prepare them to teach the Michigan Model for Nutrition Education, designed for grades 7 and 8. The control group was comprised of a similar group of teachers who did not receive training. A 42-item survey contained questions about the person's beliefs about his/her capabilities to perform certain behaviors (self-efficacy), that the behavior would lead to a desired outcome (outcome expectancy), and that the outcome was meaningful (outcome value). An analysis revealed that the in-service training increased the number of lessons the intervention teachers intended to teach, as well as their

confidence in delivering the instruction. This finding is important in the study of nutrition in schools, as teachers' sense of self-efficacy is one of the few characteristics consistently related to student achievement (Cantrell, Young, & Moore, 2003).

Ongoing staff development in nutrition is not a priority for many teachers or school districts, as a lack of time and competing priorities makes the delivery of such training difficult to achieve (Bandura, 2000). A study of 103 seventh-grade teachers in Louisiana, primarily white females, indicated that the teachers were interested in including nutrition as a subject in their classroom (92%), and that they were confident teaching nutrition (93.2%), but only 12% had received staff development in nutrition in the past years (Murimi, Sample, Guthrie, & Landry, 2007). The researchers concluded that teachers determined the importance of nutrition topics to be taught, and may ignore more important nutrition topics not perceived as being as important by the teachers. Self-efficacy may be high, but a lack of nutrition knowledge and education methods may limit the topics taught, making teacher perceptions of important topics the only criteria for nutrition information taught to students. Gross and Cinelli (2004) indicate that teachers may need guidance in developing and strengthening nutrition curricula.

Murimi, Sample, and Hunt (2008) conducted another study in Louisiana with teachers who did (n = 75) or did not (n = 28) have a background in family and consumer sciences. The study compared attitudes and confidence levels regarding classroom nutrition education of seventh grade teachers. Teachers who reported a family and consumer sciences background, which includes courses in nutrition, were significantly more confident teaching nutrition and were more likely to influence student nutrition

behaviors than teachers who did not have the family and consumer sciences background and training.

Researchers investigated the effect of a three-credit health education course on pre-service teachers' confidence in teaching coordinated school health concepts at a large northeastern university (Maney, Monthley, & Carner, 2000). One hundred and seventy education majors pursuing elementary education certification or health and physical education certification significantly improved confidence levels for teaching nutrition, as well as the content areas of mental health, drugs, body systems, and safety. There were no significant differences noted in confidence levels for teaching sexuality, chronic and communicable disease, personal health, consumer health, and environmental health. The researchers suggested that confidence in teaching health issues may be tied to the controversial nature of the content, such as human sexuality or HIV. They also suggested that prior familiarity with the subject and general attitudes toward the subject may influence teaching confidence. Data was not provided to assess the pretest and posttest responses between students pursuing elementary education certification versus health and physical education certification, which may have added depth and detail to the results of this study.

Despite studies that indicate in-service training is an important issue related to the self-efficacy of teachers who deliver classroom nutrition instruction (Maretzki, 1979; Shannon, Mullis, Bernardo, Ervin, & Poehler, 1992), a study that used data from the 1990-92 Hawaii Nutrition Education and Training Program needs assessment (n = 324 elementary teachers) indicated that time spent teaching nutrition was not related to attending in-service training (Britten & Lai, 1998). The researchers found that nutrition

knowledge predicted self-efficacy for teaching nutrition, but a belief that nutrition was important did not predict time spent teaching nutrition. Among elementary teachers, self-efficacy for teaching nutrition had a greater influence on actual delivery of nutrition instruction than did in-service training, and was related to nutrition knowledge and time spent teaching nutrition.

In 1979, Maretzki stated that, in her experience, "Teachers often lack self-confidence about and enthusiasm for nutrition education because they view nutrition as a college-level subject dealing with concepts which they themselves do not fully grasp." (p. 11). Britten and Lai (1998) suggest that teachers' self-efficacy to teach nutrition has not been adequately addressed in nutrition studies, and that nutrition research funding be devoted to developing and assessing innovative approaches to improve teacher self-efficacy.

A Nutrition-Teaching Self-Efficacy Scale (NTSES) was developed by Brenowitz and Tuttle (2003) to investigate time spent teaching nutrition and nutrition self-efficacy of Maryland elementary school teachers. The NTSES instrument was adapted from science and health self-efficacy scales, validated by experts, and pre-tested with elementary teachers. A total of 80 elementary teachers completed the validated and pre-tested instrument to measure self-efficacy of teachers to teach nutrition. The researchers concluded that higher self-efficacy scores were associated with teachers who spent more time teaching nutrition. Brenowitz and Tuttle also suggested that the NTSES may be a useful tool for determining self-efficacy related to teaching nutrition, and recommended the NTSES as part of a nutrition education needs assessment among teachers.

Summary

Teacher attitudes about school nutrition environments and their perceived influence on the environments, is an area that has not been adequately addressed by child nutrition program researchers, despite great interest in the underlying causes of childhood overweight and obesity. Interest has been increasing for over a decade regarding the promotion of healthy school nutrition environments, but how teachers perceive that they influence these environments and the variables that affect the nutrition environment have not been evaluated. There is a dearth of research to connect the issues, namely, teacher attitudes about school nutrition environments, their perceived influence on the nutrition school nutrition environment, and self-reported classroom behaviors.

Background information was provided in this review of literature from an ecological systems theory perspective to underscore the overall trends in school nutrition programs nationwide, including information regarding school nutrition policies. Emphasis was given to the requirement and establishment of Local Wellness Policies in school districts throughout the United States, including their intended purposes, and their actual impacts. Studies of school nutrition environments were also included. Factors that influence food intake were reviewed, which provided an objective view of the challenges school nutrition programs may face in view of shrinking budgets, and increasing demands. Surveys used to gather information about teachers' attitudes or perceptions toward school nutrition programs were reviewed. Studies regarding nutrition and achievement revealed that a link does exist between adequate nutrition and academic success, and that school nutrition programs and the nutrition environment can play a critical role in the support of children's success at school.

Teachers' attitudes, influence, behaviors, and characteristics regarding the school nutrition environment were reviewed. Reward systems in the classroom were also addressed. A discussion of social cognitive theory and specifically, teacher self-efficacy indicated that teachers who felt they could or should provide nutrition education opportunities in the classroom were more likely to follow through with nutrition education. However, the research indicated that teachers generally lacked confidence in providing nutrition education opportunities.

Chapter 3

Methods

The purpose of this study was to determine the attitudes of kindergarten through fifth grade teachers about school nutrition environments, their perceived influence on school nutrition environments, and self-reported classroom behaviors. The specific objectives of this study were to: (a) identify teacher attitudes, perceived influence, and self-reported behaviors related to the school nutrition environment; (b) examine the relationship between elementary school teacher attitudes about school nutrition environments and perceived influence on the environment among kindergarten through fifth grade teachers; (c) examine the relationship between elementary school teachers' attitudes about school nutrition environments and self-reported classroom behaviors; (d) examine the relationship between perceived influence over the school nutrition environment and self-reported classroom behaviors; and, (e) examine the relationship between teachers demographic characteristics and attitudes and perceived influence on school nutrition environments, and self-reported classroom behaviors.

This chapter presents the research methods and procedures used to conduct the study. Specifically, the parts of this chapter include population, instrumentation, collection of data, data analysis, and summary of methods.

Research Design

This correlational study was designed to determine if relationships exist between two or more variables, with teacher attitudes, perceived influence, and self-reported behaviors being the variables of interest. Specifically, the intent was to assess the covariance of the stated variables, and as one variable increased, whether or not another variable increased or decreased.

A survey instrument was developed to elicit responses about the attitudes of kindergarten through fifth grade teachers regarding school nutrition environments, their perceived influence on the nutrition environment, and self-reported classroom behaviors. The following research questions were addressed:

1. What attitudes, perceived influences, and self-reported behaviors do kindergarten through fifth grade teachers identify regarding the school nutrition environment?
2. Are teacher attitudes about school nutrition environments and their perceived influence on the environment related?
3. Are teacher attitudes about school nutrition environments and self-reported classroom behaviors related?
4. Are perceived influences on the school nutrition environment and self-reported classroom behaviors related?
5. Are teacher demographic characteristics related to attitudes and perceived influence on school nutrition environments and self-reported classroom behaviors?

Population

A computer survey-based study was conducted in Sarasota County, a medium-sized school district in Southwest Florida with a student population of 42,000 enrolled in 50 school sites, composed of 39 regular public schools, eight charter schools, and three drop-out prevention sites. Over 5000 instructional, non-instructional, and administrative staff work for the school district. The School Board of Sarasota County, Florida employs over 920 kindergarten through fifth grade teachers in 24 regular elementary schools, who were asked to participate in the study. The number of teachers by elementary grade level, as reported on the Elementary Enrollment County by Class, May 5, 2010, follows: kindergarten n = 142, first grade n = 149, second grade n = 138, third grade n = 142, fourth grade n = 125, fifth grade n = 116, combined grades or teacher of special classes (mixed grades for physical education, music, and art), and others n = 108. Demographic data exist only for all teachers, and was not broken down according to elementary, middle and high school levels.

According to the School District and State Public Accountability Report for 2009-2010, 92.59% of all of the teachers in the school district were white, 3.72% were black, 2.73% were Hispanic, 0.63% were Asian, and 0.33% were identified as Indian. Nearly 80% of all teachers were female. The majority of teachers in the school district were classified as Masters + 45 (32.10%), followed by 31.59% with a Masters degree, 18.50% with a Bachelors + 30, and 15.81% with a Bachelor's degree. Nearly 2% held doctoral degrees.

As of March 3, 2010, 16,945 students were enrolled in 24 regular elementary schools in kindergarten through fifth grades in Sarasota County (School Board of

Sarasota County, Florida Enrollment Report, 2010). Teachers across the school district are responsible for a diverse population of students, with free and reduced meal program enrollment (an indicator of economic need) at a low of 4% to a high of 92% (School Board of Sarasota County Food and Nutrition Services Free and Reduced Priced Meal Summary, March 2010). In 2007, the percentage of students eligible to receive free and reduced priced meals was 33%, which was the norm for Sarasota County for many years. The nation's economic downturn and the seriously affected local economy has had a major effect on free and reduced priced meal eligibility in Sarasota County. The free and reduced percentage rose to 37% in 2008, 42% in 2009, and increased to 46% in 2010. This represents a projected increase of over 5000 students eligible to receive meal benefits in a four year time period. Sixty-seven percent of students in the target county were identified as White, 10% were identified as Black, 14% were Hispanic, 1.75% were Asian, .25% were American Indian, and 6% were reported as multi-racial (School Board of Sarasota County, Florida, Enrollment Report, 2009).

Ten Title One schools received the Fresh Fruit and Vegetable Program grant in the 2009-2010 school year, which allowed the Food and Nutrition Services program to provide snacks of fresh produce to students and staff on a daily basis.

Instrumentation

The instrument used in this study was developed to reflect understandings from the literature, as well as observations, experiences, and concerns of the school district's two previous Nutrition Educators, and the current Nutrition Educator. See Appendix B for the observations made by the Nutrition Educators. The item construction process was also influenced by the author's personal and professional experiences, observations, and

understandings. Survey questions addressed the attitudes teachers have about school nutrition environments, their perceived influence on the school nutrition environment, and self-reported classroom behaviors. The relationship between teachers' demographic characteristics, attitudes, perceived influence, and self-reported classroom behaviors were also examined. Demographic questions contained in the original Teacher/ Administrator School Foodservice Survey were adapted and expanded by the researcher to provide information relevant to this study. See Appendix C for the original version of the Meyer instrument.

Development of the survey. The item construction process for the survey, which explores attitudes, perceived influence, and self-reported classroom behaviors, was influenced by a number of factors:

1. The researcher's personal and professional experiences, observations, interactions, and understandings;

2. A thorough review of the literature and surveys related specifically to the association of the school food environment with dietary behaviors of young adolescents (Kubik, Lytle, Hannan, Perry, & Story, 2003), perceptions of elementary school nutrition education practices by school foodservice directors, teachers, and principals (Lambert & Carr, 2005), and teachers' and administrators' satisfaction with customer service (Meyer, 2002);

3. Input from the school district's previous two Nutrition Educators and the current Nutrition Educator. Their front-line observations and experiences provide an informed perspective in the development of appropriate, meaningful questions (see Appendix B for a listing of their comments). Since 1996, Food and Nutrition Services

has employed a Nutrition Educator. The Nutrition Educator must be a Registered Dietitian, with a minimum of a bachelor's degree in dietetics and nutrition. No formalized funding has existed for this position, but nutrition education has been and continues to be a priority for Food and Nutrition Services and the school district. Nutrition Educators are tasked with delivering direct classroom instruction, with an emphasis on kindergarten through third grades. Three separate individuals have held the position of Nutrition Educator since the inception of the nutrition education program, and all three individuals remain employed by the department.

Observations of the three Nutrition Educators were used in the initial steps for the perception section of the survey instrument. The previous and current Nutrition Educators were interviewed by the researcher separately, then together. Their input was important in the development of meaningful survey questions. When asked to reflect on scenarios they had witnessed or experienced in the classroom as related to the promotion of a healthy school nutrition environment, responses were given based on their direct contact with teachers and students in the classroom. This anecdotal information was useful as a basis for formulating a series of questions for teachers about their perceptions of a healthy school environment.

A multi-step process was used to develop, modify, and validate the instrument, as follows.

Step 1: Questions reflecting personal experiences of the researcher, a thorough literature review, and input of the Nutrition Educators were developed. See Appendix D for the first draft of the instrument and directions.

Step 2: Permission was requested from the National Food Service Management Institute to use the Teacher/Administrator School Foodservice Survey as a part of this study. See Appendix E for the letter requesting permission. See Appendix F for the signed permission letter from the Executive Director of the National Food Service Management Institute.

Step 3: Individuals familiar with the fields of education and/or nutrition, but who do not directly teach children, were asked to complete the survey. Clarity of written directions, questions asked, time required for survey completion, and ease of completing a computer-based survey were the primary concerns. Eleven reviewers, representing elementary school principals, professional development personnel, school district research and assessment personnel, and school nutrition administrators completed the survey and provided their feedback.

Step 4: Revisions were made to the instrument to reflect the input of the individuals who provided the initial review.

Step 5: Selected Food and Nutrition Service directors in Florida and elementary school principals within the School Board of Sarasota County were asked to review the revised instrument. See Appendix G for a copy of the letter requesting the directors and principals to review the survey and provide feedback, and directions for providing feedback. Clarity of written directions, questions asked, time required for survey completion, and ease of completing a computer-based survey were the primary considerations for this review.

Step 6: Revisions were made to the instrument to reflect the input of the directors and elementary school principals.

Step 7: An expert validation team was identified and selected, based upon their expertise in child nutrition and their knowledge of child nutrition research. The expert validation team was requested to review the instrument as part of the process. Among the panel members were Rainville (2003), author of the Healthy School Nutrition Environment survey, and Meyer (2002), author of the Teacher/Administrator School Foodservice Survey. Two of the members were higher education faculty members at the University of Southern Mississippi's National Food Service Management Institute, a national program devoted to child nutrition research and training, and instrumental in developing Local Wellness Policy guidelines. One member of the panel was a current child nutrition practitioner in AZ, who also served as a member of the School Nutrition Research Committee, and one member was a national consultant specializing in child nutrition. All members were active in the field, and most were well-published, current contributors to journals and presenters at professional conferences. Panel members were first contacted by e-mail to determine if they agreed to evaluate the instrument. Each expert contacted agreed to review the instrument and provide feedback. The names of panel members, and their positions, are included in Appendix H

Step 8: The survey was e-mailed to all panel members. A letter of introduction, an explanation of the purpose of the study, as well as directions for completing the survey and providing feedback are included in Appendix I.

Step 9: Revisions were made to the instrument to reflect the input of the expert panel.

Development of demographic and meal participation questions. The Teacher/Administrator School Foodservice Survey was developed by Meyer in 2002,

who at the time, was a Research Scientist at the National Food Service Management Institute, to determine teachers' and administrators' satisfaction with school nutrition programs. Meyer acknowledged that the primary customer for school foodservice and nutrition programs is the student, but secondary customers, such as teachers, may influence the perceptions of students and possibly student participation in the school meal program.

The Meyer survey was one of five customer service surveys designed for high school, middle/junior high school, upper elementary school, lower elementary school parents, and teachers/administrators. Meyer's original 45-item instrument contained 30 questions that loaded into one of six factors: food quality and preferences, staff, ambience, price, nutrition, and time. Responses to the survey were based on a 7-point scale (1 = very strongly disagree, 7 = very strongly agree, with an eighth category = "Do not know").

The original teacher/administrator survey, composed of 45 questions about school foodservice, and 10 demographic and behavioral questions, was generated from a focus group of 14 individual teachers and administrators who were asked about the important characteristics of a school meal program. The methods used to develop the survey included a focus group and a survey. Volunteer food service directors, supervisors, and managers pilot tested the survey as part of the validation process. Surveys were then mailed to other volunteer foodservice directors and supervisors, who were asked to solicit responses from teachers and administrators at one high school, one middle school, and one elementary school in their district. Participants from Maine, Florida, Massachusetts, Texas, Tennessee, Colorado, Illinois, and Louisiana provided input. A return rate of 32%

(558 of 1,737) yielded a total of 473 usable surveys for the pilot testing, received from suburban and rural districts from eight states.

Use of the survey instrument. The Teacher/Administrator Survey was part of a series of five instruments developed by the National Food Service Management Institute, and has been available for use in school districts to survey customer groups. An explanation of the instrument and its use was contained in the Fall, 2002 issue of *The Journal of Child Nutrition & Management.* The survey had not been utilized in any empirical studies. Although the Teacher Administrator School Food Service survey was appropriate and well analyzed for its intended purpose, this researcher wanted to delve further into teacher attitudes and perceived influence on school nutrition environments and self-reported classroom behaviors. Demographic variables considered in this study included the teachers' assigned grade level of students and number of children in the classroom, the name of their school, educational background, gender, race/ethnicity, the number of years spent teaching, and two questions about college coursework in nutrition. The following questions were modified or added to provide richness of detail and information for comparative analysis.

In the original instrument, the options to the following question, "What grade level do you teach?" were kindergarten, elementary school, middle/junior high school, and high school. The revised instrument provides the options of kindergarten, grade 1, grade 2, grade 3, grade 4, and grade 5, as well as Combined grades, Specials (mixed grades such as PE, music, art), and Other. "How many children are in your classroom," "What is the highest degree you have earned," "What is your gender," and questions with an age range, racial/ethnic background, and questions about college coursework in

nutrition were added to this section of the survey. Questions about the frequency and reasons for eating school breakfast and lunch were also adapted from the Teacher/Administrator Survey.

The National Foodservice Management Institute (NFSMI) owns the rights to the survey developed by Meyer. Permission was requested and received from NFSMI to adapt and utilize the demographic portion of the instrument. A permission letter was requested and received from NFSMI to comply with the University of South Florida's Institutional Research Board. See Appendix D for a copy of the request for permission and Appendix E for the signed permission letter.

Field testing. The survey was tested at one randomly selected elementary school, based upon an average representation of ethnicity, and whose student enrollment met the criteria of mid-level free and reduced lunch eligibility. Fourteen of the 33 teachers at the school completed the survey and did not receive the final survey. Teachers responsible for direct instruction of students enrolled in kindergarten through fifth grades only were included in this study. Revisions were made to the instrument based on feedback from the teachers.

Validity. The instrument was validated by a process initiated with reviewers that included elementary principals, professional development personnel, school district research and assessment personnel, and district school nutrition administrators. Following revisions, Food and Nutrition Services directors in Florida and additional principals reviewed the instrument and provided feedback. Additional revisions were made to control for redundancy and resulted in the removal of questions to shorten the survey. An expert validation team provided suggestions that included greater

clarification of the teacher letter that preceded the survey questions and the elimination of customer service questions. Finally, the field test with teachers at the one district school resulted in additional questions being removed from the survey.

Reliability. Respondents were not expected to answer survey items in the same or similar ways, therefore no predictions were made in this study and no reliability scores were calculated or presented. Since the survey did not lend itself to a reliability measure, future studies to vary the situations are planned, which could provide an opportunity to determine reliability.

Collection of Data

The researcher contacted the Director of Research Assessment and Accountability for the Sarasota school district employing the teachers for permission to conduct the study. An application form explaining the purpose of the study, population to be surveyed, survey methods, description of proposed data analysis and time schedule was approved. After school district approval, the proposed study was forwarded to the Institutional Review Board of the University of South Florida.

Following school district and IRB approval, the researcher contacted the remaining 23 elementary principals, notifying them of the upcoming survey. Following principal notification, a letter and the survey instrument, contained in an electronic message attachment, was e-mailed to the principals, with a request to forward the survey instrument to their kindergarten through fifth grade teachers who did not participate in the pilot study. See Appendix J for a copy of the principal notification letter. Teachers completed the survey utilizing Zoomerang, an online survey tool approved for use within the School Board of Sarasota County. See Appendix K for the final survey.

An initial response rate of 186 on Day One was followed by another 49 responses on Day Two. Day Three resulted in an additional 33 returned surveys, so the Executive Director of Elementary Education sent an e-mail to all principals, asking that they remember to forward the survey to teachers. Day Four of survey collection resulted in an additional 72 responses. Day Five of survey collection resulted in an additional 27 surveys, which at the end of the day, totaled 367 returned surveys.

Following Day Five, the researcher received a telephone call from the president of the local teachers' bargaining unit. The president indicated that she had received calls from teachers who were interested in completing the survey, but were concerned that their comments could be traced back to the individual teacher. After being assured that that responses cold not be tracked back to the individual teacher, the bargaining unit president made a number of calls to teachers. Day Six resulted in another 89 completed surveys, for a total of 456 returned surveys.

The Assistant Superintendent of Business and the Food and Nutrition Services Nutrition Educator wrote e-mails to principals to encourage participation to return the surveys at the end of Day Six. Over the next four days, another 45 completed surveys were received. The administration and principals preferred that the survey be discontinued at the end of 10 days, indicating that teachers had been provided sufficient time to respond if they were interested in completing the survey.

Data Analysis Procedures

All of the survey data were extracted from Zoomerang.com in a Microsoft Excel spreadsheet. The data were then uploaded into the SPSS (Version 17.0) data analysis system for analysis. Research question one was addressed by computing the descriptive

statistics for the survey items measuring teacher attitudes, teacher perceived influence, and teacher self-reported behaviors. The linkage between the survey items and each of the three dependent variables is provided in Table 1. However, some of the items listed in Table 1 also had several sub-items.

The items that were nominal were analyzed using percentages. For example, items that asked participants to check all that apply were nominal because the participant either selected it (coded as a value of one) or did not select it (coded as a value of zero).

Table 1

Survey Items Linked to Attitudes, Perceived Influence, and Self-Reported Behaviors

Source	Survey Item Numbers
Attitudes	16, 17, 19, 20, 21, 22, 24, 30, 33, 34a, 35, 36, 37, 38, 39a
Perceived influence	18, 23, 25, 34b, 39b, 39c, 40
Self-reported behaviors	15, 26, 27, 28, 29, 31, 32, 39d, 41

Therefore the percentage of participants selecting the response choice was computed. The Likert scale survey items were descriptively analyzed by computing the percentage of participants selecting each response and by computing a mean value for each item.

The second research question was tested by examining the relationship between the attitude items that were matched to the perceived influence items. When perceived influence was dichotomous (only two possible response outcomes such as selected or not selected), then logistic regression was used (Cronk, 2008; Field, 2009). However, when perceived influence was scaled (Likert scale items), linear regression was used (Cronk,

2008; Field, 2009). The results from the logistic and linear regression analyses were summarized by providing the unstandardized regression coefficients, the corresponding standard errors and the significance values. In addition, an effect size was provided by presenting the odds ratios for the logistic regression models and standardized regression coefficients for the linear regression models. Statistical significance was set at an alpha of .05.

The third research question was tested by examining the relationship between the attitude items that were matched to the self-reported behavior items. When self-reported behavior was dichotomous (only two possible response outcomes such as selected or not selected), then logistic regression was used (Cronk, 2008; Field, 2009). However, when self-reported behavior was scaled (Likert scale items), linear regression was used (Cronk, 2008; Field, 2009). The results from the logistic and linear regression analyses were summarized by providing unstandardized regression coefficients, the corresponding standard errors and the significance values. In addition, an effect size was provided by presenting the odds ratio for the logistic regression models and standardized regression coefficients for the linear regression models. Statistical significance was set an alpha of .05.

The fourth research question was tested by examining the relationship between the perceived influence items that were matched to the self-reported behavior items. When self-reported behavior was dichotomous (only two possible response outcomes such as selected or not selected), then logistic regression was used (Cronk, 2008; Field, 2009). However, when self-reported behavior was scaled (Likert scale items), linear regression was used (Cronk, 2008; Field, 2009). The results from the logistic and linear

regression analyses were summarized by providing the unstandardized regression coefficients, the corresponding standard errors and the significance values. In addition, an effect size was provided by presenting the odds ratios for the logistic regression models and standardized regression coefficients for the linear regression models. Statistical significance was set at an alpha of .05.

The fifth and final research questions was addressed by correlating the ordinal-evel comparison survey items that were found to be statistically significant in research questions two through four. Comparisons based on race and gender were not conducted given that 94% of the sample was female and 95% of the sample was white. Furthermore, for analysis purposes, the number of nutrition classes taken was recoded into three levels (no classes, one class, and two or more classes) because so few of the participants had taken more than two nutrition courses.

Summary of Methods

Chapter 3 described the research methods used in this study. This included an overview of the research design, study population, and a description of the instrumentation developed for use in this study. The instrument was analyzed, sent to an expert validation team for review, and modified to assure the validity of its use with elementary school teachers. The study investigated the relationship between attitudes of kindergarten through fifth grade teachers about school nutrition environments, their perceptions of influence on the school nutrition environment, and self-reported classroom behaviors.

Chapter 4

Findings

The purpose of this study was to determine the attitudes of kindergarten through fifth grade teachers about school nutrition environments, their perceived influence on school nutrition environments, and self-reported classroom behaviors. The specific objectives of this study were to: (a) identify teacher attitudes, perceived influence, and self-reported behaviors related to the school nutrition environment; (b) examine the relationship between elementary school teacher attitudes about school nutrition environments and perceived influence on the environment among kindergarten through fifth grade teachers; (c) examine the relationship between elementary school teachers' attitudes about school nutrition environments and self-reported classroom behaviors; (d) examine the relationship between perceived influence over the school nutrition environment and self-reported classroom behaviors; and, (e) examine the relationship between teachers demographic characteristics, and attitudes and perceived influence on school nutrition environments, and self-reported classroom behaviors.

This chapter presents the demographic characteristics of the teachers who participated in the research and the results of each research question. The following research questions were addressed:

1. What attitudes, perceived influences, and self-reported behaviors do kindergarten through fifth grade teachers identify regarding the school nutrition environment?

2. Are teacher attitudes about school nutrition environments and their perceived influence on the environment related?
3. Are teacher attitudes about school nutrition environments and self-reported classroom behaviors related?
4. Are perceived influences on the school nutrition environment and self-reported classroom behaviors related?
5. Are teacher demographic characteristics related to attitudes and perceived influence on school nutrition environments and self-reported classroom behaviors?

Characteristics of Participants

There were 501 teachers from 23 elementary schools from the School Board of Sarasota County who participated in this study; approximately 885 teachers were eligible to take the survey. The response rate was 57%. Teachers from kindergarten to grade 5 completed the study, as well as teachers who self-identified as teaching "combined grades," "specials," or classified themselves as "other." See Table 2 for a summary of the number and percentages of responders as compared to the total number of teachers, and the percentages from each category that completed the survey.

The greatest numbers of surveys were submitted by kindergarten teachers (n = 72, 14% of 501 respondents), and second grade teachers (n = 68, 14% of 501 responses). Fifty-one percent of all kindergarten teachers completed the survey, and 49% of all second grade teachers completed the survey. Fifth grade teachers submitted the lowest number of completed surveys (n = 43, 9% of 501 respondents) among those

Table 2

Number and Percentage of Elementary Teachers Compared to Survey Responders

	Teachers		Responders	
Grade	*n*	%	*n*	%
K	142	51	72	14
1	149	41	61	12
2	138	49	68	14
3	142	47	67	13
4	125	42	53	11
5	116	37	43	9
Combined grades	NR*		48	10
Specials (mixed grades for PE, music, art)	NR		35	7
Other	NR		54	11
Total			501	100

NR* = None reported on the Elementary Enrollment County by Class, May 5, 2010

categorized as kindergarten through fifth grade teachers, with 37% of all fifth grade teachers submitting a completed survey. Seven percent of completed surveys were submitted by teachers who identified themselves as "specials" teachers (*n* = 35), and whom were provided the opportunity to self-identify as a teacher of "combined grades," "specials," or "other." The actual number and categorization of teachers that may have identified themselves in one of these three categories is not reflected on the Elementary Enrollment Count by Class, May 5, 2010.

Although 35 teachers identified themselves as teaching "specials" (mixed grades for combined grade classes such as PE, music, and art), when asked for a description of their teaching positions, 48 responses were provided. Music (*n* = 11) was the predominant response, with art (*n* = 6), exceptional student education (*n* = 6), physical education/wellness (*n* = 6), science (*n* = 5), and technology (*n* = 5), also eliciting higher response rates. Additional responses included speech and language (*n* = 2), dance (*n* =

1), drama (*n* = 1), English learners of other languages (*n* = 1), horticulture (*n* = 1), varying exceptionalities (*n* = 1), and volunteer coordinator (*n* = 1). One respondent who chose to self-identify him/herself as a teacher of "specials" indicated "not applicable."

Fifty-four teachers identified themselves as "other" for which no applicable category on the survey was provided. Exceptional student education (*n* = 13) was reported most often, followed by Pre-kindergarten (*n* = 6), English learners of other languages (*n* = 5), guidance/counseling (*n* = 5), speech/language (*n* = 5), resource teacher (*n* = 4), support staff (*n* = 4), reading resource (*n* = 3), and K-5 combined grades (*n* = 2). Single responses were received by the following: administrator, autism, fourth and fifth grade combined classes, literacy, technology, and varying exceptionalities.

The majority of teachers had 16 to 20 students in their classroom (*n* = 285, 57%), and held master's degrees (*n* = 288, 57%). The majority of the teachers were female (*n* = 461 of 493 respondents, 94%) and were white (*n* = 463 of 485 respondents, 95%). The teachers had spent from zero to more than 30 years teaching, with a mode of 6 to 10 years (*n* = 127, 25%). Thirty percent (*n* = 149) reported college coursework in nutrition, with 74 of 142 respondents (52%), indicating they had taken at least one college nutrition course. See Table 3 for detailed demographics.

The majority of teachers (*n* = 42, 82%) indicated they *never* participate in the breakfast program, with another 15% indicating that they participate *very infrequently* or on *special occasions only*. Three percent of teachers indicated that they participate in the breakfast program *1 to 3 times per month* or more. However, 42 % of teachers indicated that they participate in the school lunch program *1 to 3 times per month* or more. Sixty percent more teachers indicated participation in the school lunch program than in the

Table 3

Demographic Characteristics of Teacher Responders

	Teacher		Total	
Characteristic	*n*	%	*n*	%
Number of children in classroom			501	100
5 or less	21	4		
6-10	26	5		
11-15	53	11		
16-20	285	57		
21-25	79	16		
26-30	13	3		
31+	24	5		
Highest Degree			501	100
Bachelor	172	34		
Master	288	57		
Specialist	13	3		
Doctorate	5	1		
Other	23	5		
Gender			493	98
Male	32	6		
Female	461	94		
Race/Ethnicity			485	98
White	463	95		
African American/Black	4	1		
Hispanic/Latino	11	2		
Asian	3	1		
Native American Indian	1	0		
Multi-cultural	3	1		
Number of Years Teaching			501	100
0-5	64	13		
6-10	127	25		
11-15	87	17		
16-20	86	17		
21-25	45	9		
26-30	48	10		
More than 30	44	9		
College coursework in nutrition			501	100
Yes	149	30		
No	352	70		
Number of nutrition courses			142	28
1	74	52		
2	48	34		
3-4	14	10		
5 or more	6	4		

school breakfast program, with 22 percent (*n* = 111%) indicating that they *never* participate in the school lunch program. See Table 4 for details on school breakfast and school lunch participation frequencies and percentages.

When asked the reasons for school breakfast participation, the majority indicated *I do not eat school breakfast* (*n* = 404, 35%). *It is convenient* was the second most common response (*n* = 53, 11%). However, *it is convenient* (*n* = 209, 42%) was listed most often as the reason for school lunch participation, with another 27% (*n* = 134) indicating *I do not eat school lunch.*

Results

This section of the chapter provides the results for each research question. Therefore the statistical results are presented in narrative and tabular form for each research question in sequential order. Before the discussion of results to each research question, results of survey questions 11 through 14 are provided regarding teacher participation in school meals programs.

Teacher participation in school meals programs. When asked questions about participation in the school meals program, a difference existed between teachers who ate school breakfast and teachers who ate school lunch. Of the teachers surveyed, 412 (82%) indicated they never ate a school breakfast, with 39 teachers (8%) indicating *very infrequently*, two teachers who ate school breakfast on a daily basis, one teacher who reported eating school breakfast three to four times a week, and six teachers who ate breakfast at school one to two times a week.

Reasons given for participating in the school breakfast program included convenience (*n* = 53, 11%) and good food (*n* = 19, 4%). Additional comments provided

Table 4

Teacher Self-Reported Participation and Reasons for Participation in the School Breakfast and Lunch Programs

Participation/Reason	*n*	%	*n*	%
School breakfast participation frequency			501	100
Daily	2	0		
3-4 times per week	1	0		
1-2 times per week	6	1		
1-3 times per month	8	2		
Very infrequently	39	8		
On special occasions only	33	7		
Never	412	82		
Reasons for school breakfast participation				
The prices are good	11	2		
The food is good	19	4		
I have no other choice	8	2		
It is convenient	53	11		
Other teachers eat there	0	0		
I do not eat school breakfast	404	35		
Other	35	7		
School lunch participation frequency			501	100
Daily	26	5		
3-4 times per week	41	8		
1-2 times per week	65	13		
1-3 times per month	80	16		
Very infrequently	105	21		
On special occasions only	75	15		
Never	111	22		
Reasons for school lunch participation				
The prices are good	68	14		
The food is good	98	20		
I have no other choice	46	9		
It is convenient	209	42		
Other teachers eat there	5	1		
I do not eat school lunch	134	27		
Other	87	17		

by respondents indicated that teachers ate school breakfast when a preferred menu item was served (*n* = 8), such as oatmeal, fresh fruit, or cheese omelets. Six teachers reported that they ate school breakfast when they forget their breakfast at home, and one teacher reported not being aware that teachers could eat a school breakfast. Thirty-five percent of teachers (*n* = 404) indicated *I do not eat school breakfast.*

Participation at the mid-day meal was much higher than breakfast, with 26 teachers (5%) eating school lunch on a daily basis, 41 teachers (8%) eating three to four times a week, and 65 teachers (13%) reporting school lunch participation one to two times a week. Contrasted with the 412 teachers who reportedly never participate in the school breakfast program, a much lower number of teachers (*n* = 111, 22%) never participate in the school lunch program.

The primary reason given for participation in the school lunch program, as for breakfast, was convenience (*n* = 209, 42%), followed by good food (*n* = 98, 20%), good prices (*n* = 68, 14%), and *I have no other choice* (*n* = 46, 9%). Additional comments from respondents indicated teachers ate school lunch when a preferred menu item was served (*n* = 46), such as nachos, certain popular salads, macaroni and cheese, or yogurt parfaits. Seventeen teachers reported that they ate school lunch when they ran out of time at home or forgot to pack a lunch; nine indicated they ate school lunch only on special occasions, such as the annual Thanksgiving Dinner. Three teachers indicated they were interested in the foods their students were eating at lunch or chose to spend time with their students. Another three teachers reported they would not ever select a school lunch due to the types of foods served. A total of 134 teachers (27%) indicated *I do not each school lunch.* Table 4 itemizes the frequencies and reasons for eating school meals.

Variables influencing the school nutrition environment. The first research question asked "What attitudes, perceived influences, and self-reported behaviors do kindergarten through fifth grade teachers identify regarding the school nutrition environment?" The results are broken down by dependent variable: (a) attitudes, (b) perceived influence, and (c) self-reported behaviors.

Attitude descriptive results. Overall, the attitude results indicated that teachers reported no barriers to implementing nutrition into their lessons/curriculum, followed by a lack of time, too many other responsibilities, and inadequate financial resources. The biggest impact on student nutrition resulted from student school meals followed by student lunches from home. The Food and Nutrition Services Department was perceived to be mostly responsible for student nutrition in the school cafeteria and the school as a whole, while teachers were perceived to be mostly responsible for student nutrition in the classroom. Additional results included perceptions that a relatively healthy nutrition environment exists at their school, cafeteria and classroom, and that nutrition had an effect on student learning and performance.

Table 5 provides a descriptive summary of participants' responses to Item 16 on the survey, which asked "What barriers do you think exist for integrating nutrition into lessons?" The results indicate that participants were most likely to select *lack of time* (64%) as a barrier followed by *too many other responsibilities* (39%), *lack of curriculum resources* (29%), and *does not fit into curriculum* (23%). *No barriers exist* (13%) and *inadequate financial resources* (11%) were the items least likely to be selected.

Table 5

Summary of Participants' Responses to Item 16 Regarding Barriers for Integrating Nutrition Education

Barrier	*n*	%
Lack of time	321	64
Too many other responsibilities	195	39
Lack of curriculum resources	145	29
Does not fit into curriculum	115	23
No barriers exist	65	13
Inadequate financial resources	55	11

The participants' summarized responses to survey Item 17 are presented in Table 6. Item 17 asked teachers to select the items that have the most impact on the school nutrition environment. The top three results indicated that *student school meals* have the most impact on the school nutrition environment (84%) followed by *student lunches from home* (50%) and *snacks from home* (46%). *Food/treats in classroom* (35%) followed, with a sharp decrease from *after school snacks* (14%), *student class parties* (12%), *school-wide celebrations* (7%), *adult school meals* (7%), *adult lunches from home* (5%), and *fundraisers* (2%).

Participants' summarized responses to Item 19 are provided in Table 7. Item 19 asked participants to indicate who has the primary responsibility to encourage healthy food choices at their school. The results indicate that 45% of the teachers identified the *Food and Nutrition Services Department* as responsible for encouraging healthy food choices at their school and 25% selected *parents* as those with the primary responsibility.

Table 6

Summary of Participants' Responses to Item 17 Regarding Impact on School Nutrition Environment

Impact	*n*	%
Student school meals	421	84
Student lunches from home	251	50
Snacks from home	230	46
Food/treats in classroom	175	35
After school snacks	70	14
Student class parties	60	12
School-wide celebrations	35	7
Adult school meals	35	7
Adult lunches from home	25	5
Fundraisers	10	2

Table 7

Item 19: Entity with Responsibility to Encourage Healthy Food Choices at School

Entity	*n*	%
Food & Nutrition Services Department	225	45
Parents	123	25
School administration	71	14
Teachers	57	11
Other	22	4
Students	3	1

School administration (14%), *teachers* (11%), *other* (4%), and *students* (1%) were identified less often as the entities with the primary responsibility to encourage healthy food choices at school.

Item 20 asked participants who had the primary responsibility to encourage healthy food choices in the cafeteria. The summarized responses in Table 8 indicated that a large majority selected the *Food and Nutrition Services Department* as having the primary responsibility to encourage healthy food choices in the cafeteria (78%). Only 10% or less of the participants selected other options, to include *parents* (10%), *teachers* (3%), *school administration* (3%), *other* (3%), and *students* (2%).

Table 8

Item 20: Entity with Responsibility to Encourage Healthy Food Choices in Cafeteria

Entity	n	%
Food & Nutrition Services Department	392	78
Parents	52	10
Teachers	17	3
School administration	16	3
Other	13	3
Students	11	2

The summarized responses to Item 21 are presented in Table 9. Item 21 asked participants to indicate who had the primary responsibility to encourage healthy food choices in the classroom. The results indicated that the overwhelming majority selected *teachers* as having the primary responsibility to encourage healthy food choices in the

Table 9

Item 21: Entity with Responsibility to Encourage Healthy Food Choices in Classroom

Entity	n	%
Teachers	411	82
Parents	58	12
School administration	11	2
Food and Nutrition Services Department	10	2
Other	7	1
Students	4	1

classroom (82%). The next highest percentage was *parents* (12%), followed by *school administration* (2%), *Food and Nutrition Services Department* (2%), *other* (1%), and *students* (1%).

Item 22 on the survey asked teachers to indicate their level of agreement (strongly disagree = 1; strongly agree = 5) that a healthy nutrition environment exists in their school, school's cafeteria, and classroom. The results in Table 10 indicated that teachers were most likely to agree that a healthy nutrition environment existed in their classroom (M = 4.02) and least likely to agree that a healthy nutrition environment existed in their school's cafeteria (M = 3.41). Teachers were more likely to show some level of agreement than they were to show some level of disagreement for all three sources.

Item 24 on the survey asked participants to indicate how negative (very negative = 1) or positive (very positive = 5) the influence of having candy or other sweets as rewards in the classroom was on student behavior and students' overall eating behaviors. The summarized responses in Table 11 indicated that on average, teachers believed that

Table 10

Item 22: Healthy Nutrition Environment in School, School's Cafeteria, and Classroom

Source	*Strongly Disagree* %	*Disagree* %	*Do Not Know* %	*Agree* %	*Strongly Agree* %	Mean
School	3.0	20.2	3.6	59.3	14.0	3.61
School's cafeteria	6.6	24.0	3.2	54.1	12.2	3.41
Classroom	1.4	7.0	3.4	64.7	23.6	4.02

Table 11

Item 24: Influence of Having Candy or Sweets as Rewards in the Classroom

Influence	*Very Negative Influence* %	*Negative Influence* %	*Do Not Know* %	*Positive Influence* %	*Very Positive Influence* %	Mean
Student classroom behavior	3.0	20.2	3.6	59.3	14.0	3.61
Students' overall eating behaviors	1.4	7.0	3.4	64.7	23.6	4.02

passing out candy or sweets as a reward had a mostly positive impact on student classroom behavior (M = 3.61) and a positive impact on students' overall eating behaviors (M = 4.02).

Item 30 asked participants which factors determined student rewards in the classroom. The summarized responses in Table 12 indicated that teachers were most likely to select cost (56%) followed by *student preference* (42%) and *convenience* (35%). Only 6% of teachers said that no rewards in the form of candy or sweets were provided.

Table 12

Item 30: Factors Determining Student Rewards Provided in the Classroom

Factor	*n*	%
Cost	281	56
Student preference	210	42
Convenience	175	35
Availability	155	31
No rewards provided	30	6

Item 33 asked participants to state their level of agreement (strongly disagree = 1; strongly agree = 5) that their school's culture *promotes teacher input* on issues such as healthy school nutrition environments, and the teacher had been given *opportunities to impact* the nutrition environment at his/her school. The summarized results in Table 13 indicated that the teachers were more likely to disagree than they were to agree that their school's culture *promotes teacher input* on issues such as healthy school nutrition environments (M = 2.69) and that they had been given *opportunities to impact* the nutrition environment at their school (M = 2.55). The majority of teachers disagreed (42.1%) that *teacher input* was promoted, and also disagreed (47.9%) that teachers had an *opportunity to impact* the school nutrition environment. However, 29.1% of teachers agreed that *teacher input* was promoted, and 26.1% agreed that they had *opportunities to impact* the school nutrition environment.

Item 34a asked participants to indicate the level of influence (no influence = 1; major influence = 5) that teachers should have as role models for healthy eating behavior development for students. The mean response to the Likert scale was 4.26, indicating

Table 13

Item 33: Teacher Provided Opportunity for Input and Impact on Nutrition Environment

Nutrition Environment	*Strongly Disagree* %	*Disagree* %	*Do Not Know* %	*Agree* %	*Strongly Agree* %	Mean
Teacher input promoted	13.4	42.1	11.2	29.1	4.2	2.69
Opportunities to impact	15.6	47.9	6.6	26.1	3.8	2.55

that the level of influence as a role model was high. The responses indicated that teachers believed that they should have *some influence* (59.5%) to a *major influence* (35.3%) as role models for healthy eating behavior development for students. The lowest categories, *no influence* (.6%), *little influence* (3.2%), and *do not know* (1.4%), only accounted for 5.2% of the total.

Item 35 asked teachers to determine how difficult (very difficult = 1; very easy = 5) it was to provide a healthy nutrition environment at their school and in their classroom. The summarized results in Table 14 indicated that teachers tended to rate the level of difficulty at their school as *difficult* (44.3%), but tended to rate the level of difficulty in their classroom as *easy* (49.3%). In addition, teachers were not likely to provide extreme ratings such as extremely difficult or extremely easy.

Item 36 asked teachers what barriers existed, if any, in providing a healthy nutrition environment at their *school*. The summarized responses in Table 15 indicated that participants were about equally likely to say *too many other responsibilities* (34%) and *lack of time* (34%). In addition, as many as 30% of teachers said that *inadequate financial resources* were a barrier in providing a healthy nutrition environment at their

school. Additional responses included *no opportunity for input* (22%), *lack of curriculum resources* (21%), *no barriers exist* (16%), and *lack of interest* (10%).

Table 14

Item 35: Level of Difficulty Providing Nutrition Environment in School and Classroom

Nutrition Environment	*Very Difficult* %	*Difficult* %	*Do Not Know* %	*Easy* %	*Very Easy* %	Mean
At your school	10.2	44.3	13.0	28.3	4.2	2.72
In your classroom	2.6	24.4	5.2	49.3	18.6	3.57

Table 15

Item 36: Barriers to Providing a Healthy Nutrition Environment at School

Barrier	*n*	%
Too many other responsibilities	175	35
Lack of time	170	34
Inadequate financial resources	150	30
No opportunity for input	110	22
Lack of curriculum resources	105	21
No barriers exist	80	16
Lack of interest	50	10

Item 37 asked which barriers, if any, existed in providing a healthy nutrition environment in their *school's cafeteria*. Summarized results in Table 16 indicated that 37% of the teachers said that *no opportunity for input* was a barrier in providing a healthy

Table 16

Item 37: Barriers to Providing a Healthy Nutrition Environment in the Cafeteria

Source	*n*	%
No opportunity for input	185	37
No barriers exist	110	22
Inadequate financial resources	105	21
Lack of time	80	16
Too many other responsibilities	80	16
Lack of interest	35	7
Lack of curriculum resources	25	5

nutrition environment in their school's cafeteria followed by 22% of teachers saying that *no barriers exist* and 21% saying *inadequate financial resources* are barriers. *Lack of time* and *too many other responsibilities* were both reported by 16% of teachers, followed by *lack of interest* (7%) and *lack of curriculum resources* (5%).

Item 38 asked teachers what barriers existed, if any, in providing a healthy nutrition environment in their *classroom*. The summarized results in Table 17 indicated that teachers were about equally likely to say that *no barriers* exist (35%) as they were to say that a *lack of time* was a barrier (34%), followed by *too many other responsibilities* (28%), *inadequate financial resources* (19%), and *lack of curriculum resources* (19%). Only 3% of teachers indicated *no opportunity for input* and *lack of interest.*

Item 39a on the survey asked teachers to indicate their level of agreement (strongly disagree = 1; strongly agree = 5) that nutrition and healthy eating had an impact on a child's ability to learn and perform during the day. More than 96% of the

Table 17

Item 38: Barriers to Providing a Healthy Nutrition Environment in the Classroom

Source	*n*	%
No barriers exist	175	35
Lack of time	170	34
Too many other responsibilities	140	28
Inadequate financial resources	130	26
Lack of curriculum resources	95	19
No opportunity for input	15	3
Lack of interest	15	3

teachers either agreed or strongly agreed with the statement.

Perceived influence descriptive results. The perceived influence results indicated that teachers perceived that they had some influence over student nutrition and student eating habits, with the biggest influence being directly in the classroom and the smallest influence in the school cafeteria.

Item 18 asked teachers to determine the top three factors in which they have the most influence. The summarized responses in Table 18 indicated that teachers were most likely to select *food/treats in the classroom* (76%) as a something that they had the most influence over followed by *student class parties* (63%) and *snacks from home* (48%). A noticeable decrease occurred after the first three items reported, to include, in descending order, *adult lunches from home* (30%), *student school meals* (15%), *student lunches from home* (9%), *school wide celebrations* (6%), *adult school meals* (6%), *after school snacks* (5%), and *fundraisers* (2%).

Table 18

Item 18: Top Three Factors in Which Teachers Have the Most Influence

Factor	*n*	%
Food/treats in classroom	381	76
Student class parties	316	63
Snacks from home	240	48
Adult lunches from home	150	30
Student school meals	75	15
Student lunches from home	45	9
School-wide celebrations	30	6
Adult school meals	30	6
After school snacks	25	5
Fundraisers	10	2

Item 23 asked teachers to indicate the degree to which they agree (strongly disagree = 1; strongly agree = 5) that they have an influence on the nutrition environment in their school, their school cafeteria, and their classroom. The summarized responses in Table 19 indicated that teachers were most likely to disagree (49.1%) that they had an influence on the nutrition environment at their *school* followed by agree (26.1%). They were also most likely to disagree that they had an influence on the nutrition environment in their *school's cafeteria* (52.1%) followed by strongly disagree (26.7%). Finally, teachers were most likely to strongly agree that they had an influence on the nutrition environment in their *classroom* (50.7%) followed by agree (45.3%).

Table 19

Item 23: Teacher Influences Nutrition Environment at School, Cafeteria, and Classroom

Source	*Strongly Disagree %*	*Disagree %*	*Do Not Know %*	*Agree %*	*Strongly Agree %*	Mean
School	15.8	49.1	5.8	26.1	3.2	2.52
School's cafeteria	26.7	52.1	6.6	12.6	2.0	2.11
Classroom	0.4	1.0	2.6	45.3	50.7	4.45

Item 25 asked teachers to indicated their level of agreement (strongly disagree = 1; strongly agree = 5) that they influenced the snack choices in their classroom and they influenced the candy or other sweets available in their classroom. The results in Table 20 indicate that teachers were most likely to agree (46.9%) followed by strongly agree (37.9%) that they *influence the snack choices* in their classroom. In addition, teachers were most likely to strongly agree (46.7%) followed by agree (43.1%) that they *influence the candy or other sweets* available in their classroom.

Table 20

Item 25: Teacher Influence on Snack Choices and Sweets Available in Their Classrooms

Influence	*Strongly Disagree %*	*Disagree %*	*Do Not Know %*	*Agree %*	*Strongly Agree %*	Mean
Influence on snack choices	1.8	10.2	3.2	46.9	37.9	4.09
Influence candy or sweets	3.4	4.4	2.4	43.1	46.7	4.25

Item 34b asked teachers to indicate the level of influence (no influence = 1; major influence = 5) that teachers had in promoting healthy eating behaviors with their students. The majority of the teachers said that they had *some influence* in promoting healthy eating behaviors with their students (61.7%), whereas 19.8% indicated *major influence*. Seventeen percent of teachers indicated they had *little influence* (15.2%) or *no influence* (1.8%) on healthy eating behaviors of students, with 1.6% indicating *do not know.*

Item 39b and 39c on the survey asked teachers to indicate their level of agreement (strongly disagree = 1; strongly agree = 5) that children imitate teachers' eating and those

Table 21

Items 39b and 39 c: Children Imitate Others and Teachers Should Model Healthy Eating

Source	*Strongly Disagree* %	*Disagree* %	*Do Not Know* %	*Agree* %	*Strongly Agree* %	Mean
Children imitate eating behaviors	2.8	12.8	4.0	42.1	38.3	4.00
Teacher should model healthy eating	2.2	7.8	2.0	46.1	41.9	4.18

of others around them and that teachers had a responsibility to model healthy eating behaviors to students in their classrooms. The summarized responses in Table 21 indicated that teachers were most likely to agree (42.1%) or strongly agree (38.3%) that *children imitate eating habits* of teachers and those around them. In addition, teachers were most likely to agree (46.1%) or strongly agree (41.9%) that they had a responsibility to *model healthy eating behaviors* to students in their classroom.

Finally, Item 40 asked teachers to state their level of agreement (strongly disagree = 1; strongly agree = 5) that they can make a difference in providing a healthy nutrition environment at their school, in their school cafeteria and in their classroom. The summarized results in Table 22 indicated that teachers were most likely to agree that they can make a difference in providing a healthy nutrition environment at their school (42.1%), although as much as 30.5% disagreed. In addition, teachers were most likely to disagree that they could make a difference in providing a healthy nutrition environment in their *school's cafeteria* (42.5%), although 24.6% agreed. Finally, teachers were most likely to agree (50.7%) or strongly agree (41.3%) that they can make a difference in providing a healthy nutrition environment in their *classroom* (*M* = 4.29).

Table 22

Item 40: Teacher Can Make a Difference in Providing a Healthy Nutrition Environment

Source	*Strongly Disagree* %	*Disagree* %	*Do Not Know* %	*Agree* %	*Strongly Agree* %	Mean
School	4.6	30.5	12.4	42.1	10.4	3.23
School's cafeteria	15.0	42.5	11.4	24.6	6.6	2.65
Classroom	0.6	3.0	4.4	50.7	41.3	4.29

Self-reported behavior descriptive results. The self-reported behavior results indicated that teachers believed that while teachers sometimes provided candy or sweets as rewards or during celebrations, in general, they tried to promote healthy eating habits of students and they had a good or very good personal approach to healthy eating.

Item 15 asked teachers to indicate the frequency to which (never = 1; often = 5) they made menu suggestions to their students or discussed the menu prior to lunch, sat with or ate with their students during lunch or other meal times, discussed food-related topics in their classroom and integrated nutrition into their lessons. The summarized results in Table 23 indicated that teachers were most likely to say that they *never* (34.7%) or they *rarely* (22.4%) made menu suggestions to their students or discussed the menu

Table 23

Item 15: Teacher Behaviors Related to Making Menu Suggestions, Eating with Students, Discussing Food-Related Topics in Classroom and Integrating Nutrition into Lessons

Behavior	*Never* %	*Rarely* %	*Do Not Know* %	*Sometimes* %	*Often* %	Mean
Make menu suggestions	34.7	22.4	1.8	21.2	20.0	2.69
Sit or eat with students	36.5	32.3	1.2	23.6	6.4	2.31
Discuss food-related topics	7.2	15.2	1.4	48.9	27.3	3.74
Integrate nutrition into lessons	11.2	26.1	1.0	47.1	14.6	3.28

prior to lunch; although 21.2% said *sometimes* and another 20.0% said *often*. Teachers were also most likely to say that they *never* (36.5%) or *rarely* (32.3%) sat or ate with their students during lunch or other meal times; although as many as 23.6% said *sometimes*. With regard to discussing food-related topics in their classroom, teachers were most likely to say that they *sometimes* (48.9%) discussed food-related topics in

their classroom. Finally, teachers were most likely to say that they *sometimes* (47.1%) integrated nutrition into their lessons.

Item 26 asked teachers to indicate how often they rewarded students using food and/or candy in their classroom. The summarized results in Table 24 indicated that teachers were not likely to rewarded students with food or candy in the classroom given that the majority of teachers reward students with food or candy *1-3 times per month* or less. Item 27 on the survey asked teachers to indicate which food item was provided most often for student rewards or recognitions in their classroom. The responses in Table 25 indicated that teachers were most likely to select *candy* (38%) followed by *crackers* (18%).

Table 24

Item 26: Frequency of Student Rewards Consisting of Food or Candy in Classroom

Frequency	Frequency	Percent
Daily	34	7%
3-4 times per week	21	4%
1-2 times per week	78	16%
1-3 times per month	66	13%
Very infrequently	99	20%
On special occasions only	146	29%
Never	57	11%

Item 28 asked teachers how often celebrations included food and/or candy in their classroom. The summarized responses in Table 26 indicated that teachers were not likely

Table 25

Item 27: Single Food Item Provided Most Often for Student Rewards in the Classroom

Food item	*n*	%
Candy	190	38
Crackers	89	18
Cookies	55	11
Fruit	36	7
Cake or cupcakes	27	5
Vegetables	18	4
Dairy items	8	2
Nuts	5	1

Table 26

Item 28: Frequency to Which Celebrations Include Food and/or Candy in the Classroom

Frequency	*n*	%
Daily	2	0
3-4 times per week	1	0
1-2 times per week	8	2
1-3 times per month	81	16
Very infrequently	101	20
On special occasions only	279	56
Never	29	6

to include food and/or candy in the classroom during celebrations given that the majority of the teachers said that they *very infrequently* includedfood or candy as part of their classroom celebrations (20%) or they only did it on *special occasions* (56%). Six percent said that they *never* included food and/or candy in their classrooms during celebrations.

Item 29 asked teachers to indicate the single food item provided most often for celebrations in their classroom. The results in Table 27 indicated that teachers were most likely to select *cake or cupcakes* (44%) followed by *cookies* (24%) and *fruit* (11%). Item 31 asked teachers to indicate the rewards that they provided most often in their classrooms. The results in Table 28 indicated that the majority of the teachers said that they used *stickers* (61%) *or pencils/writing tools* (55%) as a reward source most often.

Table 27

Item 29: Single Food Item Provided Most Often for Celebrations in the Classroom

Source	*n*	%
Cake or cupcakes	221	44
Cookies	118	24
Fruit	53	11
Crackers	33	7
Vegetables	28	6
Candy	26	5
Dairy items	11	2
Nuts	2	0

Another 41% of teachers indicated *permission for a popular activity*, and 30% of the teachers indicated that they used *food* as a reward most often. *Colorful papers or notebooks* (16%) and *small stuffed animals* (15%) were the least likely to be used as classroom rewards.

Table 28

Item 32: Rewards Provided Most Often in the Classroom

Reward	n	%
Stickers	307	61
Pencils or other writing tools	276	55
Permission for a popular activity	206	41
Food rewards	150	30
Colorful papers or notebooks	81	16
Small stuffed animals	73	15

Item 39d asked teachers to indicate their level of agreement (strongly disagree = 1; strongly agree = 5) that they modeled healthy eating habits to their students. The vast majority of teachers *agreed* (48.1%) or *strongly agreed* (41.3%) that they modeled healthy eating habits to their students.

Finally, Item 41 on the survey asked teachers to rate their own approach to healthy eating from very poor (value of one) to very good (value of five). The vast majority of the teachers said that they modeled *good* (54.7%) or *very good* (38.9%) healthy eating behaviors.

Relationship of attitudes and perceived influence. The second research question asked "Are teacher attitudes about school nutrition environments and their perceived influence on the environment related?" In order to address this research question, simple logistic regression and simple linear regression were used whereby each pair of attitude and perceived influence items on the survey were analyzed to determine the direction and degree or strength of the relationship between teachers' attitudes and their perceived influence with regard to the nutrition environment.

The results for research question two indicate that there was a relationship between teacher attitudes about school nutrition environments and their perceived influence on the environment among kindergarten through fifth grade teachers. In general, the higher the degree to which teachers felt various nutritional factors in the school environment effect or impact students, the higher their perceived influence on those factors.

The first set of analyses examined the relationship between Item 17 and Item 18 on the survey. Item 17 asked teachers to select their top three choices from a list of 10 factors that had the most impact on the school nutrition environment and Item 18 asked teachers to select the top three factors in which they had the most influence. The summarized results in Table 29 indicated that six of the 10 relationships were statistically significant ($p < .05$).

Specifically, the results indicate that teachers who selected *after school snacks* as one of the top three factors influencing the school nutrition environment were 2.907 times more likely to say that they have the most influence over after school snacks ($B = 1.607$, $p = .017$); teachers who selected *student lunches from h*ome were 3.73 times more likely

to say that they have the most influence over student lunches from home ($B = 1.316$, $p < .001$); teachers who selected *snacks from home* were 1.903 times more likely to say that they have the most influence over snacks from home ($B = 0.643$, $p < .001$); teachers who selected *food/treats in the classroom* were 2.541 times more likely to say that they have

Table 29

Items 17 and 18: Top Three Factors Impacting School Nutrition Environment and Perceived Teacher Influence

Source	*B*	*SE B*	*OR*	*p*
Student school meals	0.497	0.396	1.643	0.210
After school snacks	1.607	0.446	2.907	0.017
Student lunches from home	1.316	0.373	3.730	< .001
Snacks from home	0.643	0.182	1.903	< .001
Food/treats in classroom	0.933	0.248	2.541	< .001
Student class parties	0.416	0.297	1.515	0.161
School-wide celebrations	0.788	0.569	2.200	0.166
Fundraisers	1.699	1.104	5.466	0.124
Adult school meals	1.329	0.494	3.778	0.007
Adult lunches from home	1.645	0.421	5.182	< .001

Notes: OR = odds ratio.

the most influence over food/treats in the classroom ($B = 0.933$, $p < .001$); teachers who selected *adult school meals* were 3.778 times more likely to say that they have the most influence over adult school meals ($B = 1.329$, $p = .007$); and teachers who selected *adult lunches from h*ome were 5.182 times more likely to say that they have the most influence

over adult lunches from home ($B = 1.645$, $p < .001$). Therefore teachers were more likely to say that they had the most influence on factors in which they felt they indicated the most impact on the school nutrition environment.

The next set of relationships tested were between Items 22 and 23 on the survey. Item 22 asked teachers to indicate the degree to which they agreed that a healthy nutrition environment existed in their school, their school's cafeteria and their classroom. Item 23 asked teachers to then indicate the extent to which teachers felt that they had an influence on the nutrition environment in their school, their school's cafeteria, and their classroom. The summarized results in Table 30 indicated that all three relationships tested were statistically significant ($p < .05$). Specifically, teachers' perceived influence was moderately and positively associated with the degree to which teachers agreed that a healthy nutrition environment existed in their school ($\beta = .438$, $p < .001$) in that stronger agreement that a healthy nutrition environment existed in their school was associated with stronger agreement that teachers had an influence on the nutrition environment in their school. Similarly, teachers' perceived influence was moderately and positively associated with the degree to which teachers agreed that a healthy nutrition environment

Table 30

Items 22 and 23: Degree to Which Healthy Nutrition Environment Exists and Perceived Teacher Influence

Source	*B*	*SE B*	*β*	*p*
School	0.472	0.043	0.438	< .001
School cafeteria	0.325	0.036	0.378	< .001
Classroom	0.229	0.033	0.295	< .001

exists in their school's cafeteria ($\beta = .378$, $p < .001$) in that stronger agreement that a healthy nutrition environment existed in their school's cafeteria was associated with stronger agreement that teachers had an influence on the nutrition environment in the school's cafeteria. Finally, teachers' perceived influence was weakly and positively associated with the degree to which teachers agreed that a healthy nutrition environment existed in their classroom ($\beta = .438$, $p < .001$) in that stronger agreement that a healthy nutrition environment existed in their classroom was associated with stronger agreement that teachers had an influence on the nutrition environment in their classroom.

The next set of relationships that were examined included survey Items 24 and 25. Item 24 pertained to using candy or other sweets as rewards in the classroom affecting student classroom behavior and students' overall eating behaviors. Item 25 pertained to teachers' level of agreement that they influenced the candy or other sweets available in their classroom. The results in Table 31 indicated that one of the two relationships tested was statistically significant ($p < .05$). Specifically, the degree to which teachers agreed that candy or other sweets affected student classroom behavior was weakly and negatively associated with their perceived influence on the candy and other sweets available in their classroom ($\beta = -.089$, $p = .047$) in that the stronger the agreement that candy or other sweets affected student classroom behavior, the weaker the agreement that the teacher had an influence on candy or other sweets available in the classroom. However, the association was statistically significant.

The final relationship tested for research question two pertained to survey Items 34a and 34b. Item 34a asked teachers to indicate the extent to which teachers should have an influence as role models for healthy eating behavior and development for

students while Item 34b asked teachers to indicate the extent to which teachers actually had an influence in promoting healthy eating behaviors with their students. The results indicate that the relationship was positive, moderate, and statistically significant in that the more teachers felt that they should influence students as role models for healthy eating behavior, the more teachers felt that they actually had an influence in promotion healthy eating behavior ($\beta = .426$ $p < .001$).

Table 31

Items 24 and 25: Impact of Candy or Other Sweets on Student Behavior and Eating Habits and Perceived Teacher Influence

Impact of candy	*B*	*SE B*	*β*	*p*
Student classroom behavior	-0.070	0.035	-0.089	0.047
Student overall eating habits	-0.064	0.046	-0.062	0.167

Relationship between attitudes and self-reported classroom behaviors. The third research question asked "Are teacher attitudes about school nutrition environments and self-reported classroom behaviors related?" In order to address this research question, simple logistic regression and simple linear regression were used whereby each pair of attitude and self-reported behavior items on the survey were analyzed to determine the direction and degree or strength of the relationship between teachers' attitudes and their self-reported behavior with regard to the nutrition environment.

The results for research question three indicated that a relationship existed between teacher attitudes about school nutrition environments and teacher self-reported classroom behaviors. Specifically, teachers who believed that specific barriers to

integrating nutrition into the lessons existed (e.g., lack of time, does not fit into curriculum, too many other responsibilities) are less likely to integrate nutrition into their lessons than teachers who believed that no barriers exist. In addition, when teachers felt that certain nutritional aspects impact student learning and performance, they tried to do more to model healthy eating habits and behaviors.

The first set of analyses examined the relationship between Item 15d and Item 16a through 16f on the survey. Item 15d asked teachers to indicate how often they integrated nutrition into their lessons (predicted or dependent variable). Items 16a through 16f asked teachers to select barriers that they thought existed for integrating nutrition into the lessons (predictors or independent variables). Each sub-item (16a, 16b, 16c, 16d, 16e, and 16f) represented a specific barrier in which the teachers could either select or not select. The results in Table 32 indicate that four of the six barriers were statistically

Table 32

Items 15d and 16a, b, c, d, e, and f: Barriers to Integrating Nutrition into Lessons and Degree to Which Teacher Integrates Nutrition into the Lessons

Barrier	*B*	*SE B*	*β*	*p*
Lack of curriculum resources	0.066	0.128	0.023	0.608
Inadequate financial resources	0.241	0.183	0.059	0.187
Lack of time	-0.310	0.121	-0.114	0.010
Does not fit into curriculum	-0.643	0.136	-0.208	< .001
Too many other responsibilities	-0.364	0.118	-0.137	0.002
No barriers exist	0.662	0.168	0.174	< .001

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significant associated with the degree to which teachers integrated nutrition into their lessons. Specifically, whether or not teachers selected lack of time as a barrier was weakly and negatively associated with the degree to which they integrated nutrition into their lessons (β = -.114p = .010) in that teachers who selected a lack of time as a barrier were less likely to integrate nutrition into their lessons. Whether or not teachers indicated that nutrition did not fit into the curriculum was weakly and negatively associated with the degree to which they integrated nutrition into their lessons (β = -.208 p < .001) in that teachers who indicated that nutrition did not fit into the curriculum were less likely to integrated nutrition into their lessons. Whether or not teachers indicated that they had too many other responsibilities was weakly and negatively associated with the degree to which they integrate nutrition into their lessons (β = -.137 p = .002) in that teachers who said that they had too many other responsibilities were less likely to integrate nutrition into their lessons. Finally, whether or not teachers said that no barriers existed was weakly and positively associated with the degree to which they integrated nutrition into their lessons (β = .174 p < .001) in that those who said that no barriers existed were more likely to integrate nutrition into their lessons.

The next set of relationships tested pertained to Items 35a and b, and Item 41. Items 35a and 35b asked teachers to indicate the extent to which it was difficult to provide a healthy nutrition environment at their school and in their classroom. Item 41 asked teachers to rate their own approach to healthy eating. The results in Table 33 indicated that neither of the relationships tested reached statistical significance (p > .05) and therefore no relationship existed between the extent to which teachers believe it was difficult to provide a healthy nutrition environment at their school and in their classroom

Table 33

Items 35a and b, and 41: Difficulty in Providing a Healthy Nutrition Environment in School and Classroom and Teacher Approach to Own Healthy Eating

Source	*B*	*SE B*	*β*	*p*
School	-0.026	0.067	-0.018	0.693
Classroom	0.124	0.067	0.082	0.067

and their rating of their own approach to healthy eating.

The final relationship tested for research question three pertained to Item 39a and 39d. Item 39a asked teachers to indicate the extent to which they agreed that nutrition and healthy eating had an impact on a child's ability to learn and perform during the day.

Item 39d asked teachers to indicate the extent to which they agreed that they modeled healthy eating habits to their students. The relationship was positive, moderate, and statistically significant ($\beta = .346$ $p < .001$) in that the more teachers agreed that nutrition and healthy eating had an impact on a child's ability to learn and perform during the day, the more they agreed that they modeled healthy eating habits to their students.

Relationship between perceived influence and self-reported classroom behaviors. The fourth research question asked "Are perceived influences on the school nutrition environment and self-reported classroom behaviors related?" In order to address this research question, simple logistic regression and simple linear regression were used whereby each pair of perceived influence and self-reported behavior items on the survey were analyzed to determine the direction and degree or strength of the relationship between teachers' perceived influence and their self-reported behavior with regard to the nutrition environment.

The results for research question four indicated that there was a relationship between perceived influence on the school nutrition environment and teacher self-reported classroom behaviors. In general, the more teachers believed that they had an influence on the nutritional environment, the more likely they were to offer menu suggestions to their students, sit or eat with students during meal times, discuss food-related topics in class, and integrate nutrition into their lessons.

The first set of relationships tested pertained to Items 15a through 15d and Items 23a through 23c. Item 15 asked teachers to indicate the extent to which they make menu suggestions to their students or discussed the menu prior to lunch, they sat or ate with their students during lunch or other meal times, they discussed food-related topics in their classroom, and they integrated nutrition into their lessons. Item 23 asked teachers to indicate the extent to which they agreed that they had an influence on the nutrition environment at their school, their school's cafeteria and in their classroom.

The relationships between making menu suggestions prior to lunch and teacher perceived influence on the nutrition environment at the school, in the school cafeteria, and in their classroom is provided in Table 34. The results indicated that all three relationships were statistically significant ($p < .05$).

Specifically, perceived influence of the nutrition environment at the school was weakly and positively associated with the degree to which the teacher made menu suggestions prior to lunch ($\beta = .155$, $p < .001$) in that the more the teacher agreed that he/she had an influence, the more often the teacher made menu suggestions to students. In addition, perceived influence of the nutrition environment in the school cafeteria was weakly and positively associated with the degree to which the teacher made menu

Table 34

Item 15a and 23: Teacher Discusses Menu Prior to Lunch and Perceived Teacher Influence

Source	*B*	*SE B*	β	*p*
School	0.218	0.062	0.155	< .001
School cafeteria	0.282	0.070	0.178	< .001
Classroom	0.295	0.111	0.118	0.008

suggestions to students prior to lunch (β = .178, p < .001) in that the more the teacher agreed that he/she had an influence, the more often the teacher made menu suggestions to students. Finally, perceived influence of the nutrition environment in the classroom was weakly and positively associated with the degree to which the teacher made menu suggestions to students prior to lunch (β = .118, p < .001) in that the more the teacher agreed that he/she had an influence, the more often the teacher made menu suggestions to students.

The results examining the relationships between teacher perceived influence in the school, cafeteria, and classroom and the extent to which teachers sat with or ate with students during lunch time or other meals are provided in Table 35. The results indicated that none of the relationships reached statistical significance (p > .05) and therefore no relationship existed between the extent to which teachers sat and ate lunch with their students and the extent to which they agreed that they had an influence over the nutrition environment in their school, school's cafeteria, or their classroom.

Table 35

Items 15 b and 23: Teacher Sits or Eats with Students During Lunch and Perceived Teacher Influence

Source	*B*	*SE B*	*β*	*p*
School	0.060	0.053	0.051	0.257
School cafeteria	0.032	0.060	0.024	0.596
Classroom	0.174	0.094	0.083	0.065

The results examining the relationships between teacher perceived influence in school, cafeteria, and classroom and the extent to which teachers discussed food-related topics in their classroom are provided in Table 36. The results indicated that two of the three relationships tested were statistically significant ($p < .05$). Specifically, the extent to which teachers discussed food-related topics in their classroom was weakly and positively associated with the extent to which they agree that they have an influence on the nutrition environment at the school ($\beta = .105$, $p = .018$) in that teachers who agreed more that they had an influence discussed food-related topics in their classroom more

Table 36

Items 15 c and 23: Teacher Discusses Food-Related Topics in Classroom and Perceived Teacher Influence

Source	*B*	*SE B*	*β*	*p*
School	0.113	0.048	0.105	0.018
School cafeteria	0.082	0.054	0.068	0.130
Classroom	0.409	0.083	0.215	< .001

often. In addition, the extent to which teachers discussed food-related topics in their classroom was weakly associated with the extent to which they agreed that they had an influence on the nutrition environment in their classroom ($\beta = .215$, $p < .001$) in that teachers who agreed more that they had an influence discussed food-related topics in their classrooms more often.

The results examining the relationships between teacher perceived influence in school, cafeteria and classroom and the extent to which teachers integrated nutrition into their lessons are provided in Table 37. The results indicated that two of the three relationships tested were statistically significant ($p < .05$).

Table 37

Items 15 d and 23: Teacher Integrates Nutrition into Lessons and Perceived Teacher Influence

Source	*B*	*SE B*	*β*	*p*
School	0.111	0.051	0.096	0.031
School cafeteria	0.073	0.058	0.056	0.208
Classroom	0.351	0.090	0.172	< .001

Specifically, the extent to which teachers integrated nutrition into their lessons was very weakly and positively associated with the extent to which they agreed that they had an influence on the nutrition environment at the school ($\beta = .096$, $p = .031$) in that teachers who agreed more that they had an influence integrated nutrition into their lessons more often. In addition, the extent to which teachers integrate nutrition into their lessons was weakly associated with the extent to which they agreed that they had an

influence on the nutrition environment in their classroom ($\beta = .172$, $p < .001$) in that teachers who agreed more that they had an influence integrated nutrition into their lessons more often.

Teachers' responses to Item 15 were also correlated with their responses to Item 25a and 25b. Item 25 asked teachers to indicate the extent to which they agreed that they influenced the snack choices in their classroom and they influenced the candy or other sweets available in their classroom.

The results examining the relationship between the degree to which teachers made menu suggestions or discussed the menu with students prior to lunch and teachers' perceived influence over snack choices, candy, and other sweets available in their classroom are presented in Table 38. The results indicated that one of the relationships tested reached statistical significance ($p < .05$). Specifically, teachers' perceived influence on snack choices in their classroom was weakly and positively associated with the extent to which teachers made menu suggestions to students ($\beta = .169$, $p < .001$) in that the more teachers agreed that they have an influence, the more likely they were to discuss menu options.

Table 38

Items 15a and 25a and b: Teacher Makes Menu Suggestions Prior to Lunch and Teacher Influence over Snack Choices, Candy, and Sweets in the Classroom

Influence	*B*	*SE B*	*β*	*p*
Influence on snack choices	0.273	0.071	0.169	< .001
Influence on candy or sweets	0.136	0.074	0.082	0.068

The results examining the relationship between the degree to which teachers sit and eat lunch with students and teachers' perceived influence over snack choices, candy, and other sweets available in their classroom are presented in Table 39. The results indicated that both of the relationships tested reached statistical significance ($p < .05$). Specifically, teachers' perceived influence on snack choices in their classroom was weakly and positively associated with the extent to which teachers sat and ate lunch with students ($\beta = .136$, $p = .002$) in that the more teachers agreed that they had an influence, the more likely they were to sit and eat lunch with their students. In addition, teachers' perceived influence on candy or other sweets available in their classroom was weakly and positively associated with the extent to which teachers sat and ate lunch with students ($\beta = .107$, $p = .016$) in that the more teachers agreed that they had an influence, the more likely they were to sit and eat lunch with their students.

Table 39

Items 15b and 25a and b: Teacher Sits and Eats Lunch with Students and Teacher Influence over Snack Choices, Candy, and Sweets in the Classroom

Influence	*B*	*SE B*	*β*	*p*
Influence on snack choices	0.185	0.060	0.136	0.002
Influence on candy or sweets	0.151	0.063	0.107	0.016

The results examining the relationship between the degree to which teachers discussed food-related topics in their classrooms and teachers' perceived influence over snack choices, candy and other sweets available in their classroom are presented in Table 40. The results indicated that both of the relationships tested reached statistical

significance ($p < .05$). Specifically, teachers' perceived influence on snack choices in their classroom was weakly and positively associated with the extent to which teachers discussed food-related topics in their classroom ($\beta = .200$, $p < .001$) in that the more teachers agreed that they have an influence, the more likely they were to discuss food-related topics. In addition, teachers' perceived influence on candy or other sweets available in their classroom was weakly and positively associated with the extent to which teachers discussed food-related topics in their classroom ($\beta = .107$, $p = .016$) in that the more teachers agree that they had an influence, the more likely they were to discuss food-related topics in their classroom.

Table 40

Items 15c and 25a and b: Teacher Discusses Food-Related Topics in the Classroom and Teacher Influence over Snack Choices, Candy, and Sweets in the Classroom

Influence	*B*	*SE B*	*β*	*p*
Influence on snack choices	0.246	0.054	0.200	< .001
Influence on candy or sweets	0.147	0.057	0.116	0.010

The results examining the relationship between the degree to which teachers integrated nutrition into their lessons and teachers' perceived influence over snack choices, candy, and other sweets available in their classroom are presented in Table 41. The results indicated that both of the relationships tested reached statistical significance ($p < .05$). Specifically, teachers' perceived influence on snack choices in their classroom was weakly and positively associated with the extent to which teachers integrated nutrition into their lessons ($\beta = .221$, $p < .001$) in that the more teachers agreed that they

had an influence, the more likely they were to integrate nutrition into their lessons. In addition, teachers' perceived influence on candy or other sweets available in their classroom was weakly and positively associated with the extent to which teachers integrated nutrition into their lessons ($\beta = .132$, $p = .003$) in that the more teachers agreed that they had an influence, the more likely they were to integrate nutrition into lessons.

Table 41

Item 15 d and 25 a and b: Teacher Integrates Nutrition into Lessons and Teacher Influence over Snack Choices, Candy, and Sweets in the Classroom

Influence	*B*	*SE B*	*β*	*p*
Influence on snack choices	0.291	0.057	0.221	< .001
Influence on candy or sweets	0.180	0.060	0.132	0.003

The next set of relationships pertained to the Item 15 questions and Item 34b. Item 34b asked teachers to indicate the extent to which they had an influence in promoting healthy eating behaviors with their students. Table 42 provides the results based on the relationship between the extent to which teachers perceived that they had an influence in promoting healthy eating behaviors with their students and the four behaviors outlined in Item 15. The results indicated that all of the relationships were statistically significant ($p < .05$).

Specifically, the extent to which teachers believed that they had an influence in promoting healthy eating behaviors with their students was positively associated with the degree to which they made menu suggestions ($\beta = .221$, $p < .001$); the degree to which they sat or ate with students during meals ($\beta = .124$, $p = .005$); the degree to which they

discussed food-related topics in their classroom ($\beta = .265$, $p < .001$); and the degree to which they integrated nutrition into their lessons ($\beta = .242$, $p < .001$). In all cases, the more they believed that they had an influence, the more likely they were to say that they engaged in the behavior.

Table 42

Items 15a, b, c, d, and 34b: Teacher Perceived Influence Related to Making Menu Suggestions, Eating with Students, Discussing Food-Related Topics, and Integrating Nutrition into Lessons

Behavior	*B*	*SE B*	β	*p*
Makes menu suggestions	0.361	0.071	0.221	< .001
Eats with students	0.170	0.061	0.124	0.005
Discuss fool-related topics	0.330	0.054	0.265	< .001
Integrates nutrition into lessons	0.322	0.058	0.242	< .001

The next set of relationships pertained to the Item 15 questions and Item 39c. Item 39c asked teachers to indicate the extent to which they agreed that they had the responsibility to model healthy eating behaviors to students in their classroom. The results in Table 43 indicate that all of the relationships were statistically significant ($p < .05$).

Specifically, the extent to which teachers believed that they had a responsibility to model healthy eating habits was weakly and positively associated with the degree to which they made menu suggestions ($\beta = .101$, $p = .023$); the degree to which they sat or ate with students during meals ($\beta = .120$, $p = .007$); the degree to which they discussed

food-related topics in their classroom ($\beta = .215$, $p < .001$); and the degree to which they integrated nutrition into their lessons ($\beta = .224$, $p < .001$). In all cases, the more they believed that they had a responsibility to model healthy eating habits, the more likely they were to say that they engaged in the behavior.

Table 43

Items 15a, b, c, d, and 39c: Teacher Responsibility to Model Healthy Eating Related to Making Menu Suggestions, Eating with Students, Discussing Food-Related Topics, and Integrating Nutrition into Lessons

Behavior	*B*	*SE B*	*β*	*p*
Makes menu suggestions	0.168	0.074	0.101	0.023
Eats with students	0.169	0.062	0.120	0.007
Discuss fool-related topics	0.272	0.055	0.215	< .001
Integrates nutrition into lessons	0.303	0.059	0.224	< .001

The final set of relationships consisted of the four behaviors from Item 15 and Item 40a through 40c. Item 40 asked to teachers to indicate the extent to which they thought they could make a difference in providing a healthy nutrition environment in their school, their school's cafeteria, and their classroom. The results based on the degree to which teachers provided menu suggestions to students and the extent to which teachers thought they could make a difference in providing a healthy nutrition environment in their school, their school's cafeteria, and their classroom are provided in Table 44. The results indicate that all three relationships were statistically significant ($p < .05$).

Specifically, the extent to which teachers thought they could make a difference in providing a healthy nutrition environment in their school was weakly and positively

associated with the degree to which they made menu suggestions to students (β = .147, p = .001); the stronger the agreement that they could make a difference, the more often

Table 44

Items 15a and 40: Teacher Makes Menu Suggestions Prior to Lunch and Teacher Can Make a Difference in Providing a Healthy Nutrition Environment

Source	*B*	*SE B*	β	*p*
School	0.207	0.062	0.147	0.001
School cafeteria	0.187	0.059	0.140	0.002
Classroom	0.277	0.096	0.129	0.004

teachers were to make menu suggestions to students. In addition, the extent to which teachers thought they could make a difference in providing a healthy nutrition environment in their school cafeteria was weakly and positively associated with the degree to which they made menu suggestions to students (β = .140, p = .002) in that the stronger the agreement that they could make a difference, the more often teachers were to make menu suggestions to students. Finally, the extent to which teachers thought that they could make a difference in providing a healthy nutrition environment in their classroom was weakly and positively associated with the degree to which they made menu suggestions to students (β = .129, p = .004) in that the stronger the agreement that they could make a difference, the more often teachers were to make menu suggestions to students.

The results based on the degree to which teachers sat or ate with students during meal times and the extent to which teachers thought that they could make a difference in

providing a healthy nutrition environment in their school, their school's cafeteria, and their classroom are provided in Table 45. The results indicated that two of the three relationships were statistically significant ($p < .05$).

Table 45

Items 15b and 40: Teacher Sits or Eats with Students during Meals and Teacher Can Make a Difference in Providing a Healthy Nutrition Environment

Source	*B*	*SE B*	*β*	*p*
School	0.137	0.053	0.115	0.010
School cafeteria	0.094	0.050	0.084	0.061
Classroom	0.201	0.081	0.110	0.013

Specifically, the extent to which teachers thought that they could make a difference in providing a healthy nutrition environment in their school was weakly and positively associated with the degree to which they sat and ate with students during meals ($\beta = .115$, $p = .010$) in that the stronger the agreement that they could make a difference, the more often teachers sat or ate with students during meals. In addition, the extent to which teachers thought that they could make a difference in providing a healthy nutrition environment in their classroom was weakly and positively associated with the degree to which they sat or ate with students during meals ($\beta = .110$, $p = .013$) in that the stronger the agreement that they could make a difference, the more often teachers sat or ate lunch with students during meals.

The results based on the degree to which teachers discussed food-related topics in their classroom and the extent to which teachers thought that they could make a

difference in providing a healthy nutrition environment in their school, their school's cafeteria, and their classroom are provided in Table 46. The results indicated that two of the three relationships were statistically significant ($p < .05$).

Table 46

Items 15c and 40: Teacher Discusses Food-Related Topics in Classroom and Teacher Can Make a Difference in Providing a Healthy Nutrition Environment

Source	*B*	*SE B*	β	*p*
School	0.159	0.048	0.147	0.001
School cafeteria	0.070	0.046	0.069	0.123
Classroom	0.259	0.073	0.158	< .001

Specifically, the extent to which teachers thought that they could make a difference in providing a healthy nutrition environment in their school was weakly and positively associated with the degree to which they discussed food-related topics in their classroom ($\beta = .147$, $p = .001$) in that the stronger the agreement that they could make a difference, the more often teachers discussed food-related topics. In addition, the extent to which teachers thought that they could make a difference in providing a healthy nutrition environment in their classroom was weakly and positively associated with the degree to which they discuss food-related topics in their classroom ($\beta = .158$, $p < .001$) in that the stronger the agreement that they could make a difference, the more often teachers discussed food-related topics in their classroom.

Finally, the results based on the degree to which teachers integrated nutrition into their lessons and the extent to which teachers thought that they could make a difference

in providing a healthy nutrition environment in their school, their school's cafeteria, and their classroom are provided in Table 47. The results indicated that two of the three relationships were statistically significant ($p < .05$).

Table 47

Items 15d and 40: Teacher Integrates Nutrition into Lessons and Teacher Can Make a Difference in Providing a Healthy Nutrition Environment

Source	*B*	*SE B*	*β*	*p*
School	0.155	0.051	0.135	0.003
School cafeteria	0.085	0.049	0.078	0.081
Classroom	0.349	0.077	0.199	< .001

Specifically, the extent to which teachers thought that they could make a difference in providing a healthy nutrition environment in their school was weakly and positively associated with the degree to which they integrated nutrition into their lessons ($\beta = .135$, $p = .003$) in that the stronger the agreement that they could make a difference, the more often teachers integrated nutrition into their lessons. In addition, the extent to which teachers thought that they could make a difference in providing a healthy nutrition environment in their classroom was weakly and positively associated with the degree to which they integrated nutrition into their lessons ($\beta = .199$, $p < .001$) in that the stronger the agreement that they could make a difference, the more often teachers integrated nutrition into their lessons.

Relationship between teacher characteristics, attitudes, perceived influence, and self-reported classroom behaviors. The fifth research question asked "Are teacher

demographic characteristics related to attitudes and perceived influence on school nutrition environments and self-reported classroom behaviors?" In order to address this research question, demographic factors were correlated with attitudinal, perceived influence, and self-reported behavior survey items.

Teacher demographic factors and teacher attitudes. The relationships between teacher demographics and teacher attitudes indicated that some relationships exist. Teachers from higher grade levels were more likely to think that barriers existed to integrating nutrition into lessons; teachers with more experience perceived fewer barriers and teachers with more nutrition classes were associated with fewer perceived barriers. In addition, teachers with more experience were associated with more positive perceptions of the nutrition environment at the school; they were also more likely to view the influence of candy and other sweets as less positive on student behavior and they thought that it was less difficult to provide a healthy nutrition environment than teachers with less experience. Furthermore, teachers with larger class sizes were more likely to feel that the influence of candy or sweets was less positive or more negative on students. Finally, teachers with more nutrition classes rated a healthy nutrition environment as having more of an influence on student learning and performance during the day than did teachers with fewer (zero or one) nutrition classes.

The correlational results between the demographic variables and Item 16, which pertained to barriers that existed for integrating nutrition into lessons, are provided in Table 48. The results indicated that grade level was statistically significantly related to whether or not teachers selected a lack of time as a barrier ($r_s = .105$, $p = .044$); whether or not teachers selected a lack of fit into the curriculum as a barrier ($r_s = .138$, $p = .009$);

and whether or not they indicated that no barriers exists (r_s = -.110, p = .036). Specifically, teachers from higher grade levels were more likely to select the barriers while teachers from lower grade levels were more likely to say that there were no barriers. However, all of the relationships were weak.

None of the relationships between class size and teachers' attitudes about barriers regarding integrating nutrition into lessons were significant. Furthermore, none of the relationships between educational attainment and teachers' attitudes about barriers regarding integrating nutrition into the lessons were significant. Therefore no relationships are assumed to exist.

Table 48

Demographic Characteristics and Item 16 Regarding Barriers to Integrating Nutrition Education

Demographic Characteristics	16a Lack of curriculum resources	16b Inadequate financial resources	16c Lack of time	16d Does not fit curriculum	16e Too many other responsibilities	16f No barriers
Grade level	.004	-.082	.105*	.138**	.075	-.110*
Class size	-.063	-.011	.021	.041	.012	-.011
Education	.038	-.068	-.002	.030	-.034	-.019
Years teaching	-.084	-.107*	-.102*	-.062	.014	.093*
Nutrition courses	-.030	.058	.012	-.103*	-.088*	-.004

*p < .05; ** p < .01.

With regard to number of years teaching, some significant relationships emerged. Number of years teaching was statistically significantly associated with the selection of inadequate financial resources as a barrier (r_s = -.107, p = .017); the selection of lack of

time as a barrier (r_s = -.102, p = .023); and the perception that no barriers exist (r_s = .093, p = .038). Specifically, teachers with more experience were less likely to select barriers and more likely to say that no barriers exist. However, all of the relationships were weak.

Finally, the number of nutrition courses taken by teachers (none, one and two or more) was significantly associated with the perception that *nutrition does not fit into the curriculum* (r_s = -.103, p = .021) and the perception that they had *too many other responsibilities* (r_s = .088, p = .049). Specifically, teachers with a fewer number of nutrition courses were more likely to select the barriers. However, the relationships were weak.

The correlational results between the demographic factors and Item 17 are presented in Table 49. Item 17 asked teachers to select the factors that they believed had the most impact on the school nutrition environment (17a = *student school meals*, 17b = *after school snacks*, 17c = *student lunches from home*, 17d = *snacks from home*, 17e =

Table 49

Demographic Characteristics and Item 17 Regarding Impacts of School Nutrition Environment

Demographic Characteristics	17a	17b	17c	17d	17e	17f	17g	17h	17i	17j
Grade level	.052	.012	.047	.108*	-.081	-.079	-.141**	.022	-.017	.006
Class size	.005	-.056	-.025	-.054	-.063	.060	-.029	.042	.025	.001
Education	-.083	-.053	.041	-.049	-.018	-.023	-.015	.037	-.038	-.005
Years teaching	.000	-.026	.015	-.061	-.017	.026	-.019	.078	-.026	.030
Nutrition courses	-.052	.079	-.016	.016	-.020	.015	.027	-.072	.018	.008

*p < .05; ** p < .01.

food/treats in the classroom, 17f = *student class parties*, 17g = *school-wide celebrations*, 17h = *fundraisers*, 17i = *adult school meals*, 17j = *adult lunches from home*). Results indicated grade level was significantly associated with teachers selecting *snacks from home* (r_s = .108, p = .039) and teachers selecting *school-wide celebrations* (r_s = -.141, p = .007). Teachers from older grade levels were more likely to select snacks from home while younger grade levels were more likely to select school school-wide celebrations.

Class size, educational attainment of the teacher, number of years teaching, and number of nutrition courses taken were all found to be non-significant and therefore no relationship was assumed to exist between class size, teacher educational attainment, number of years teaching, number of nutrition classes taken, and teachers' beliefs about factors that had the most impact on the school nutrition environment.

The correlational results between the demographic factors and Item 22 are presented in Table 50. Item 22 asked teachers to indicate their level of agreement that a healthy nutrition environment existed in their school, school cafeteria, and classroom.

Table 50

Demographic Characteristics and Item 22 Regarding Healthy Eating

Demographic Characteristics	Items 22a	22b	22c
Grade level	-.031	-.016	-.056
Class size	-.064	-.088	-.039
Education	-.013	-.061	-.056
Years teaching	.056	.114*	.033
Nutrition courses	-.019	-.079	.018

*p < .05.

The results indicated that the only significant relationship was between number of years of teaching and the degree to which teachers agreed that there was a healthy nutrition environment in their school's cafeteria (r_s = .114, p = .011). Specifically, more teaching experience was associated with stronger agreement that the school cafeteria was a healthy nutrition environment. Therefore no relationship was assumed to exist between grade level, class size, education, number of nutrition courses taken, and teachers' perceptions of their school's nutrition environment.

The correlational results between the demographic factors and Item 24 are provided in Table 51. Item 24 asked teachers to determine the degree of positive influence that candy or other sweets provided to students in the classroom as rewards had on student classroom behavior and students' overall eating behaviors. The results indicated that class size was statistically significantly associated with the extent to

Table 51

Demographic Characteristics and Item 24 Regarding Influence of Candy or Sweets as Rewards in the Classroom

Demographic Characteristics	Item 24a	24b
Grade level	.044	.058
Class size	-.099*	-.073
Education	-.064	-.070
Years teaching	-.140**	-104*
Nutrition courses	-.058	-.071

*p < .05; ** p < .01.

which teachers believed that candy or other sweets provided in the classroom as rewards had a positive influence on student behavior (r_s = -.099, p = .026) in that teachers with larger class sizes were less likely to say that it had a positive influence on student behavior.

However, the relationship was weak. In addition, number of years teaching was significantly associated with the extent to which teachers believed that candy or other sweets reported a positive influence on student classroom behavior (r_s = -.140, p = .002) and students' overall eating behaviors (r_s = -.104, p = .020). Specifically, more teaching experience was associated with less positive influence ratings (or more negative influence ratings).

Since no significant relationships were found between grade level, educational attainment, or number of nutrition courses taken and teachers responses to Item 24, no relationship was assumed to exist between those demographic factors and teachers' attitudes about the influence of candy or other sweets provided to students as rewards on student classroom behavior and students' overall eating behaviors.

The correlational results between the demographic factors and Item 35 are presented in Table 52. Item 35 asked teachers to indicate the degree of difficulty in providing a healthy nutrition environment at their school and in their classroom. The results indicated that the only significant relationship found was between number of years teaching and teachers' difficulty ratings pertaining to providing a healthy nutrition environment in their classroom (r_s = .091, p = .042). Specifically, teachers with more teaching experience rated it as less difficult; however, the relationship was weak.

Table 52

Demographic Characteristics and Item 35 Regarding Level of Difficulty in Providing a Healthy Nutrition Environment

Demographic Characteristics	35a	35b
Grade level	-.007	-.005
Class size	-.006	-.002
Education	-.082	-.043
Years teaching	.033	.091*
Nutrition courses	-.078	.073

*$p < .05$.

Grade level, class size, educational attainment and number of nutrition courses taken were not found to be statistically significantly related to Item 35 in any way and therefore those demographic characteristics were not assumed to be related to teachers' perceptions of the level of difficulty that existed in providing a healthy nutrition environment at their school or in their classroom.

The last set of correlations relating to teacher demographics and teacher attitudes was conducted based on teachers' responses to Item 39a, which asked teachers to indicate their level of agreement that nutrition and healthy eating had an impact on a child's ability to learn and perform during the day. The results in Table 53 indicated that the only significant relationship found was between number of nutrition courses taken and teachers' level of agreement that nutrition and healthy eating had an impact on a child's ability to learn and perform during the day ($r_s = .104$, $p = .020$). Specifically, teachers with more nutrition courses were more likely to agree that nutrition and healthy eating

Table 53

Demographic Characteristics and Item 39a Regarding Impact of Nutrition and Healthy Eating on Child's Ability to Learn and Perform

Demographic Characteristics	39a
Grade level	-.061
Class size	-.006
Education	-.011
Years teaching	-.011
Nutrition courses	.104*

*$p < .05$.

had an impact on a child's ability to learn and perform during the day. However, the relationship was weak.

Grade level, class size, educational attainment, and number of years teaching were not found to be statistically significantly associated with teachers' level of agreement that nutrition and healthy eating had an impact on a child's ability to learn and perform during the day and therefore no relationship was assumed to exist between those demographic factors and teachers' responses to Item 39a.

Teacher demographic factors and teacher perceived influence. The results between teacher demographic factors and their perceived influence indicated that teachers with more education tended to believe that they had less of an influence on student eating behaviors or the nutritional environment while teachers with more nutrition courses and/or more teaching experience tended to believe that they had more of an influence.

The correlational results between teacher demographic factors and Item 18 are provided in Table 54. Item 18 asked teachers to select the factors in which they had the most influence. The results indicated that teachers from higher grade levels were statistically significantly more likely to select student lunches from home (r_s = .108, p = .039) and snacks from home (r_s = .109, p = .038) than teachers from younger grades. In addition, teachers with larger class sizes were less likely to select food/treats in the classroom (r_s = -.151, p = .001) and student class parties (r_s = -.102, p = .022) than were teachers with smaller class sizes.

However, educational attainment, number of years teaching, and number of nutrition courses taken were not found to be statistically significantly related to teachers' responses to Item 18 and therefore no relationship was assumed to exist between those demographic factors and teachers' perceived influence.

Table 54

Demographic Characteristics and Item 18 Regarding Factors Teachers Most Influence

Demographic Characteristics	18a	18b	18c	18d	18e	18f	18g	18h	18i	18j
Grade level	-.042	.006	.108*	.109*	-.095	-.060	-.011	.018	-.051	-.037
Class size	-.042	.029	.071	.084	-.151**	-.102*	-.008	.086	.015	-.010
Education	-.034	-.054	-.005	-.035	-.011	.010	.041	.071	.017	.011
Years teaching	.001	-.013	-.034	.028	-.029	.009	-.074	.043	.016	-.020
Nutrition courses	.068	-.038	.065	.006	.036	-.020	-.025	-.046	-.039	-.046

*p < .05; ** p <.01.

The correlational results between teacher demographic factors and Item 23 are provided in Table 55. Item 23 asked teachers to determine their level of agreement that they had an influence on the nutrition environment in their school, school cafeteria, and their classroom. The results indicated that larger class sizes were associated with weaker agreement that teachers had an influence on the nutrition environment in the school cafeteria (r_s = -.134, p = .003) than smaller class sizes; teachers with higher educational attainment were associated with weaker agreement that teachers had an influence on the nutrition environment in their school cafeteria (r_s = -.129, p = .005); and teachers with a higher number of nutrition courses were associated with a stronger agreement that teachers had an influence on the nutritional environment in their classrooms (r_s = .107, p = .017). However, all of the relationships were weak.

Table 55

Demographic Characteristics and Item 23 Regarding Teacher Influence on Nutrition Education

Demographic Characteristics	23a	23b	23c
Grade level	-.039	-.004	-.077
Class size	-.049	-.134**	.020
Education	-.082	-.129**	.005
Years teaching	-.009	-.040	.009
Nutrition courses	-.006	-.081	.107*

*p < .05; ** p <.01.

Grade level and number of years teaching were not significantly associated with teachers' level of agreement that they had an influence over the nutrition environment in their school, school cafeteria, or their classroom. Therefore no relationship was assumed to exist between those two demographic factors and teachers' responses to Item 23.

The correlational results between the demographic factors and teachers' responses to Item 25 are provided in Table 56. Item 25 asked teachers to indicate their level of influence on students' snack choices and on candy or other sweets available in their classroom. The results indicated that teachers with more teaching experience were associated with statistically significantly higher perceived influence (r_s = .091, p = .043) than teachers with less teaching experience. However, the relationship was weak.

The results in Table 56 also indicated that grade level, class size, educational attainment and number of nutrition courses taken were not statistically significantly

Table 56

Demographic Characteristics and Item 25 Regarding Teacher Influence on Snack Choices and Sweets Available in Classrooms

Demographic Characteristics	25a	25b
Grade level	.004	.005
Class size	.030	.065
Education	.028	.054
Years teaching	.091*	.066
Nutrition courses	.087	.071

*p < .05.

associated with teachers' perceived levels of influence on students' snack choices or the candy or other sweets available in their classroom. Therefore no relationship was assumed to exist between those demographic factors and teachers' responses to Item 25.

The correlational results between the demographic factors and teachers' responses to Item 34b are provided in Table 57. Item 34b asked teachers to indicate their perceived level of influence with regard to promoting healthy eating behaviors with their students. The results indicated that teachers with more nutrition courses were associated with a stronger perceived influence (r_s = .142, p = .001) than teachers with fewer nutrition courses; although the relationship was weak.

Table 57

Demographic Characteristics and Item 34b Regarding Teacher Influence in Promoting Healthy Eating Behaviors In Students

Demographic Characteristics	34b
Grade level	-.069
Class size	-.029
Education	.004
Years teaching	.021
Nutrition courses	.142*

*p < .01.

Grade level, class size, educational attainment and number of years teaching were not found to be significantly related to teachers' perceived influence with regard to

promoting healthy eating behaviors with their students and therefore no relationship was assumed to exist between these demographic factors and teachers' responses to Item 34b. The correlational results between the demographic factors and teachers' responses to Items 39b and 39c are presented in Table 58. Item 39b and 39c asked teachers to indicate their level of agreement that children imitated their eating habits and those of others around them, and that teachers had a responsibility to model healthy eating behaviors to students in their classroom. The results indicated that teachers with more nutrition courses were more likely to agree that they had a responsibility to model healthy eating behaviors to their students in their classroom (r_s = .132, p = .003) than teachers with fewer nutrition courses. However, the relationship was weak.

Table 58

Demographic Characteristics and Item 39b and 39c Regarding Children Imitate Eating Behaviors and Teachers Should Model Healthy Eating

Demographic Characteristics	39b	39c
Grade level	-.037	.021
Class size	.014	.066
Education	-.054	-.037
Years teaching	-.021	.003
Nutrition courses	.062	.132*

*p < .01.

The results also indicated that grade level, class size, educational attainment, and number of years teaching were not significantly related to teachers' perceived influence and therefore no relationship is assumed to exist between these demographic factors and teachers' responses to Item 39b and 39c.

The last set of correlational results was conducted based on teachers' responses to Item 40. Item 40 asked teachers to determine the degree to which they agreed that they could make a difference in providing a healthy nutrition environment at their school, their school cafeteria, and their classroom. The results in Table 59 indicated that teachers with higher educational attainment had weaker agreement that they could make a difference in providing a healthy nutrition environment in their school cafeteria (r_s = -.111, p = .015) than teachers with lower educational attainment. In addition, teachers with more

Table 59

Demographic Characteristics and Item 40 Regarding Teachers Can Make a Difference in Providing a Healthy School Nutrition Environment

Demographic Characteristics	40a	40b	40c
Grade level	-.030	-.031	-.034
Class size	.037	-.058	-.074
Education	-.053	-.111*	.024
Years teaching	-.024	-.034	-.042
Nutrition courses	.102	-.045	.119**

*p < .05; ** p <.01.

nutrition courses had stronger agreement that they could make a difference in providing a healthy nutrition environment in their classroom (r_s = -.119, p = .008) than teachers with fewer nutrition courses. However, both relationships were weak.

The results also indicated that grade level, class size, and number of years teaching were not significantly related to teachers' perceptions of their ability to provide a healthy nutrition environment in their school, the school cafeteria, or in their classroom. Therefore, no relationship was assumed to exist between those demographic factors and teachers' responses to Item 40.

Teacher demographic factors and self-reported behaviors. The results based on the relationship between teacher demographic characteristics and their self-reported behaviors indicated that teachers from younger grade levels were more likely to make menu suggestions to their students, discuss food-related topics in class, and integrate nutrition into their lessons. In addition, teachers from larger class sizes were less likely to offer menu suggestions to their students, sit or eat with their students during meals, and integrate nutrition into their lessons. Furthermore, teachers with more teaching experience were less likely to sit or eat with students during meals, but more likely to discuss food-related topics and integrate nutrition into their lessons. Finally, teachers with more nutrition courses were more likely to sit or eat with students during meals, discuss food-related topics in class, integrate nutrition into their lessons, and model healthy eating habits/behaviors to their students.

The correlational results between the demographic variables and Item 15 are provided in Table 60. The results indicated that grade level was statistically significantly related to the extent to which teachers offered menu suggestions to students (r_s = .-.287, p

< .001); the extent to which teachers discussed food-related topics in the classroom (r_s = -.249, p < .001) and the extent to which teachers integrated nutrition into their lessons (r_s = -.260, p < .001). Specifically as grade level increased, the extent to which teachers engaged in such behaviors decreased.

The results in Table 60 also indicated that class size was statistically significantly related to the extent to which teachers offered menu suggestions to students (r_s = -.123, p = .006); the extent to which teachers sat or ate with students during meals (r_s = -.124, p = .005); and the extent to which teachers integrated nutrition into their lessons (r_s = -.090, p = .045). Specifically, as class size increased, the extent to which teachers engaged in such behaviors decreased.

In addition, number of years teaching was statistically significantly associated with the extent to which teachers sat or ate with students during meals (r_s = -.092, p

Table 60

Demographic Characteristics and Item 15 Regarding Teacher Behaviors Related to Making Menu Suggestions, Eating with Students, Discussing Food-Related Topics in the Classroom and Integrating Nutrition into Lessons

Demographic Characteristics	15a	15b	15c	15d
Grade level	-.287***	.000	-.249**	-.260**
Class size	-.123**	-.124**	-.049	-.090*
Education	-.024	.011	-.007	-.008
Years teaching	.058	-.092*	.121**	.154**
Nutrition courses	.032	.102*	130**	.125**

*p < .05; ** p < .01; ***p < .001.

=.039); the extent to which teachers discussed food-related topics in the classroom (r_s = -.121, p = .007); and the extent to which teachers integrated nutrition into their lessons (r_s = .154, p = .001). Specifically, teachers with more experience were less likely to sit or eat with students during meals, but teachers with more experience were more likely to discuss food-related topics in their classrooms and integrate nutrition into their lessons.

Finally, the number of nutrition courses taken was statistically significantly associated with the extent to which teachers sat or ate with students during meals (r_s = .102, p = .022); teachers discussed food-related topics in the classroom (r_s = .130, p = .004); and the extent to which teachers integrated nutrition into their lessons (r_s = .125, p = .005). Specifically, as the number of nutrition classes increased, the extent to which teachers engaged in such behaviors also increases.

The correlation results between teacher demographic factors and Item 39d are provided in Table 61. Item 39d asked teachers to indicate their level of agreement that they modeled healthy eating habits to their students. The results indicated teachers with

Table 61

Demographic Characteristics and Item 39d Regarding Teachers Modeling Healthy Eating Habits to Their Students

Demographic Characteristics	39d
Grade level	-.046
Class size	-.011
Education	-.015
Years teaching	-.001
Nutrition courses	.116*

more nutrition courses were associated with higher agreement that they modeled healthy eating habits to their students (r_s = .116, p = .009). However, the relationship was weak.

The results also indicated grade level, class size, educational attainment, and number of years teaching were not found to be significantly related to teachers' level of agreement that they modeled healthy eating behaviors to their students. Therefore those demographic factors were not assumed to be related to teachers' responses to Item 39d.

The last set of correlational results was based on teachers' responses to Item 41, which asked teachers to rate their own approach to healthy eating from very poor to very good. The results in Table 62 indicated that none of the relationships tested reached statistical significance (p > .05) and therefore no relationship was assumed to exist between teacher demographic characteristics and the teachers' own approach to healthy eating.

Table 62

Demographic Characteristics and Item 41 Regarding Teachers Own Approach To Healthy Eating

Demographic Characteristics	41
Grade level	-.021
Class size	-.063
Education	-.022
Years teaching	-.038
Nutrition courses	-.027

Teacher responses to open-ended questions. Teachers were provided an opportunity to share additional remarks in a category marked "other" on 19 of the 47 survey questions. The responses conveyed additional insights into what teachers were thinking, and provided depth and richness to the study. Although not an exhaustive list of feedback, overall themes are presented, as well as specific statements that explain teachers' attitudes, perceived influence, and behaviors. See Appendix L for a listing of responses.

A number of comments were made which indicated that teachers had too little time to discuss food-related topics or too little time to integrate nutrition into classroom lessons or activities. Many comments reflected teachers' views that promoting a healthy school nutrition environment was difficult, time consuming, and possibly, not their responsibility.

Teachers appeared to be divided on the appropriateness of food, especially candy, other snacks, or cupcakes as classroom rewards or celebration foods. However, the school cafeteria was often noted as providing a barrier to a healthy school nutrition environment at the school and in the school cafeteria.

Responses revealed that teachers believed parents should take more responsibility in promoting nutrition and providing nutrition education at home. The Fresh Fruit and Vegetable Program was often cited as making a difference in the school nutrition environment. Some teachers indicated that they did not have an influence on the school nutrition environment, yet others indicated that everyone at school has a role and responsibility in promoting a healthy school nutrition environment.

Observations from the study. Observations noted during the study are reported in relation to response rates of teachers, increased interest in the school district's Local Wellness Policy and classroom behaviors following the survey, and administrative support for and during the study.

The role of the principal was critical to this study. The researcher worked in the school district and had access to and familiarity with the principals who were requested to distribute the survey to teachers. Following the initial request sent to principals, follow-up reminders were sent to principals from the Executive Director of Elementary Schools, the Assistant Superintendent of Business Support Services, and the Nutrition Educator from Food and Nutrition Services. Many principals responded with enthusiasm after the initial request was made, indicating an interest in the study and a desire to review the findings. A timely communication from the president of the school district's collective bargaining unit, and an assurance from the researcher that results would be kept confidential, appeared to result in additional teacher responses.

A response rate of 501 completed surveys from an eligible pool of 885 teachers indicates a relatively high response rate of 57%. The number of comments made by teachers to open-ended questions indicated an interest in the issues being investigated. Following the survey, interest among teachers, principals, and school district administrators appeared to heighten. Interest in the school district's Local Wellness Policy prior to the study had been limited to a few individuals who maintained that the school district's Local Wellness Policy should be followed and enforced by the school district, and specifically the Superintendent and school board. The school district's approach had been to encourage change and adherence to the policy by providing options

and suggestions to teachers, rather than legislating changes in the classroom, and to recognize that behavioral changes do not occur as a result of legislation. Additionally, some students, parents, and teachers have not been in favor of "healthy changes" made to the school district's school lunch menu, and suggested alternatives such as "cupcake-free" birthday parties. Administration also cited competing priorities for principals' and teachers' time, and a lack of monitoring and timelines as reasons why the Local Wellness Policy lacked strength and significance.

Overall, the Teacher Attitude Survey on School Nutrition Environments appeared to prompt teachers and school administrators to think about their own role in the establishment and maintenance of healthy school nutrition environments. Changing long-standing traditions regarding treats and foods as classroom rewards, food as a focal point of school celebrations and fundraising, and food as a motivator even in classroom lessons, will continue to take time to implement; however, this survey appeared to heighten interest regarding the relationship of teacher attitudes, perceived influence, and classroom behaviors related to the overall school nutrition environment.

Observations on the survey instrument. Four issues emerged as having an effect on the survey: the use of the word "belief" for a question about attitudes, the length of the survey, redundancy, and potential anonymity issues. Questions 17 stated, "I believe the following have the most impact on the school nutrition environment." Since attitudes are judgments and can change as a function of experience and beliefs are related to core values, a more appropriate wording for Question 17 would have been, "The following have the most impact on the school nutrition environment." Similarly, Question 22 stated, "I believe a healthy nutrition environment exists in my: school, school's cafeteria,

and classroom." Since this question is not related to a teacher's core values, but is a matter of judgment and could be changed as a function of experience, a more appropriate wording for Question 22 would have been, "A healthy nutrition environment exists in my: school, school's cafeteria, and classroom."

The survey instrument, at 47 questions, was too long. Comments received by teachers who responded to open-ended questions indicated an interest in providing feedback, but a reluctance to complete the survey, starting at Question 42. Wording on questions 17 and 18 was too similar, which may have resulted in some confusion among the respondents.

Some of the survey questions were unnecessary. For example, question asked: *Do you have any other comments that you feel are important? If so, please take this opportunity to provide your thoughts.* This question did not result in additional responses that contained new information. Question 46 asked: *Would you like to receive a copy of the results of this survey? If so, please indicate your name and school below, and a copy will be forwarded to you at the conclusion of the study.* Very few teachers responded that they wanted copies of the survey results. Question 47 asked: *Would you be willing to serve on a committee to address healthy school nutrition environments? If so, please indicate your name and school site.* Since both questions 46 and 47 requested teachers to provide contact information, concerns about the anonymity of the survey were raised. Question 48 asked: *Do you have any ideas or comments that would help improve the Food and Nutrition program at your school?* This question could have also been omitted since so few responses and new information was provided.

Finally, a question should have been asked about the teachers' familiarity with the school district's Local Wellness Policy, since the intention of the Local Wellness Policy has been to affect and modify the overall school nutrition environment.

Summary

This chapter described the characteristics of the 501 teacher participants. A demographic profile of the participants was provided. Linkages between survey items and each of the three variables, teacher attitudes, perceived influence, and behaviors, were identified.

A demographic profile of the study participants was provided. Frequencies and means were provided for each of the research questions regarding demographic information, teacher attitudes, perceived influence, and self-reported behaviors. Research question one results were assessed through descriptive statistics. Research questions two, three, and four were assessed by examining the relationships between attitude and perceived influence, attitude and self-reported behaviors, and perceived influence and self-reported behaviors. Logistic regression was used for dichotomous responses and linear regression was used for scaled responses. The results from the logistic and linear regression analyses were summarized by providing unstandardized regression coefficients, corresponding standard errors, and significance values. An effect size was provided by presenting the odds ratio for the logistic regression models and standardized regression coefficients for the linear regression models. Research question five was addressed by correlating the ordinal level comparison survey items found to be statistically significant in research questions two through four.

Results from the study indicate that there is a relationship between teacher attitudes about school nutrition environments and their perceived influence on the environment, and on self-reported classroom behaviors. Likewise, a relationship exists between perceived influence on the school nutrition environment and self-reported classroom behaviors. Relationships also exist between certain teacher demographic characteristics and teacher attitudes and perceived influence on school nutrition environments, and self-reported behaviors.

This chapter provided the data analysis results and addressed the five research questions associated with the study. Chapter 5 provided a discussion of these results with a focus on the conclusions and implications of the findings. In addition, recommendations for future research are provided.

Chapter 5

Summary, Conclusions, Implications, and Recommendations

The purpose of this study was to determine the attitudes of kindergarten through fifth grade teachers about school nutrition environments, their perceived influence on school nutrition environments, and self-reported classroom behaviors. The specific objectives of this study were to: (a) identify the perceived factors that influence the school nutrition environment; (b) examine the relationship between elementary school teacher attitudes about school nutrition environments and perceived influence on the environment; (c) examine the relationship between elementary school teachers' attitudes about school nutrition environments and self-reported classroom behaviors; (d) examine the relationship between perceived influence over the school nutrition environment and self-reported classroom behaviors; and, (e) examine the relationship between teachers demographic characteristics, and attitudes and perceived influence on school nutrition environments, and self-reported classroom behaviors.

The following research questions were examined in this study:

1. What attitudes, perceived influences, and self-reported behaviors do kindergarten through fifth grade teachers identify regarding the school nutrition environment?
2. Are teacher attitudes about school nutrition environments and their perceived influence on the environment related?
3. Are teacher attitudes about school nutrition environments and self-reported classroom behaviors related?

4. Are perceived influences on the school nutrition environment and self-reported classroom behaviors related?
5. Are teacher demographic characteristics related to attitudes and perceived influence on school nutrition environments and self-reported classroom behaviors?

Summary of the Study

The school nutrition environment has been investigated in public school systems to determine the attitudes and influence of superintendents, principals, and child nutrition directors on the environment (Brown, 2004; Rainville, 2003). However, limited research existed to address teacher attitudes and perceived influence on school nutrition environments, and related self-reported classroom behaviors. No instrument had been developed to survey or measure attitudes and influence on the school nutrition environment, and related self-reported classroom behaviors prior to this study.

The instrument designed for and used in this study was the Teacher Survey on School Nutrition Environments. A few demographic questions and questions regarding teacher participation in the National School Lunch and National School Breakfast Programs were adapted from the Teacher/Administrator School Food Service Survey (Meyer, 2002). The comprehensive and detailed process of developing questions for the instrument and overall review of the instrument included reviews by public school administrators, university researchers with expertise in child nutrition, and public school teachers. Meyer reviewed and provided feedback on the Teacher Survey on School Nutrition Environments instrument.

In 2010, the instrument was administered in 23 elementary schools with 501 kindergarten through fifth grade teachers responding to the survey. Zoomerang survey software was utilized. The majority of teachers were female and white. The demographic characteristics revealed a range of years of teaching experience, college coursework in nutrition, and the number of nutrition courses taken.

The results from the study revealed that teachers felt barriers to promoting a healthy school nutrition environment exist, and that they had little influence beyond their own classroom. Relationships between teacher attitudes about school nutrition environments, their perceived influence on the environment, and self-reported classroom behaviors were identified. Specifically, the more teachers believed they had an influence on the nutrition environment, the more likely they were to try to employ behaviors consistent with impacting the environment, revealing a sense of self-efficacy. Demographic characteristics were found to be related to teacher attitudes, perceived influence on the school nutrition environment, and self-reported behaviors.

Conclusions

The conclusions for the study are discussed below. The results for each research question as determined by the study are also provided.

Attitudes, perceived influence, and self-reported behaviors. Research question number one was: What attitudes, perceived influences, and self-reported behaviors do kindergarten through fifth grade teachers identify regarding the school nutrition environment?

Teachers identified the Food and Nutrition Services department as having the greatest impact on the school nutrition environment, followed by student lunches sent

from home and snacks sent from home. Many responses to open-ended questions identified parents as problematic in the development of a healthy school nutrition environment.

Teachers felt that the Food and Nutrition Services department and parents should have the primary responsibility for encouraging healthy food choices at school, followed by school administration, then teachers. They agreed that teachers should have the primary responsibility for encouraging healthy food choices in the classroom, and that food and treats in the classroom are influenced by the teacher. However, teachers reported that candy or sweets as classroom rewards can have a positive effect on classroom behaviors and overall eating habits. Candy was reported as the single food item most often provided as a student reward, but according to the results, these rewards are provided less than 1 to 3 times per month. This finding was inconsistent with observations made by nutrition educators in the classrooms.

Teachers felt that a healthy school nutrition environment existed in their own classroom, but not necessarily in the school cafeteria. They seemed to disagree that they had an opportunity to provide input or could impact the school nutrition environment, and reported difficulty in providing an overall healthy school nutrition environment. It appeared that teachers felt that they had no voice, and possibly, no role outside the classroom in affecting the overall school nutrition environment.

Attitudes and perceived influence. Research question number two was: Are teacher attitudes about school nutrition environments and their perceived influence on the environment related?

There was a relationship between teacher attitudes and their perceived influence on the school nutrition environment. In general, the higher the degree to which teachers felt various nutrition issues in the school nutrition environment affected or impacted students, the higher their perceived influence on those issues. Teachers who felt that a healthy school nutrition environment existed in their school cafeteria were more likely to perceive an influence on the cafeteria. Similarly, teachers who felt that a healthy environment existed in their classroom had a stronger perceived influence on the classroom environment, both of which indicated teacher self-efficacy.

Regarding candy used as a classroom reward, the more teachers reported candy as having an effect on student classroom behavior, the lower their reported perceived influence. However, the more teachers felt they should influence students eating behaviors, the more likely they were to perceive an influence in promoting healthy student eating behaviors.

Attitudes and self-reported classroom behaviors. Research question number three was: Are teacher attitudes about school nutrition environments and self-reported classroom behaviors related? Teachers who believed that barriers existed to integrating nutrition into lessons (e.g., lack of time, does not fit into curriculum, too many other responsibilities) were less likely to integrate nutrition into their lessons than teachers who perceived that no barriers existed. Teachers who felt that student learning and performance was affected by nutrition tried to do more to model healthy eating habits and behaviors. The teachers' sense of self-efficacy, or their confidence about the degree of personal responsibility they should have with their students, appeared to be a moderating factor regarding self-reported classroom behaviors.

Perceived influence and self-reported classroom behaviors. Research question four was: Are perceived influences on the school nutrition environment and self-reported classroom behaviors related? The more teachers believed that they influenced the nutrition environment, the more likely they were to offer menu suggestions to their students, sit or eat with students during meal times, discuss food-related topics in class, and integrate nutrition into their lessons. As a teacher's perceived influence increased, self-reported classroom behaviors were manifested in their responses. Self-efficacy, or the belief that they could make a difference with their students, and actually made the effort to do so, was apparent.

Demographic characteristics, attitudes, perceived influence, and self-reported classroom behaviors. Research question five was: Are teacher demographic characteristics related to attitudes and perceived influence on school nutrition environments and self-reported classroom behaviors?

Demographic characteristics were found to be related to teacher attitudes and perceived influence on the school nutrition environment, and self-reported classroom behaviors. Teachers with more experience perceived fewer barriers to integrating nutrition into lessons, as did teachers who had taken more college nutrition courses. Teachers from higher grade levels were more likely to think that barriers existed to integrating nutrition into lessons, primarily associated with lack of time.

Teachers with more experience had more positive perceptions of the nutrition environment at their school, and thought it was less difficult to provide a healthy school nutrition environment than teachers with less experience. They were also more likely to view the influence of candy and other sweets as less positive on student behavior.

More education among teachers was negatively associated with an influence on student eating behaviors, but teachers with more nutrition courses and/or more teaching experience tended to believe they had more influence on student eating behaviors. Teachers with more teaching experience were less likely to sit or eat with students during meal times, but more likely to discuss food-related topics and integrate nutrition into their lessons. Younger grade level teachers were more likely than their counterparts with older students to make menu suggestions to their students, discuss food-related topics in class, and integrate nutrition into their lessons. The greater the number of college nutrition courses taken by teachers, the more likely they were to sit or eat with students during meals, discuss food-related topics in class, integrate nutrition into their lessons, and model healthy eating habits and behaviors to their students.

Implications

This section discusses implications of the study for teachers, child nutrition personnel, school and district administrators, and parents interested in promoting a healthy school nutrition environment. The study also has implications for involving teachers in the implementation and evaluation of Local Wellness Policies.

Implications for teachers and teacher preparation. Teachers have the potential to serve as influencers and models within their environments (Bronfenbrenner, 1979). Teachers, therefore, have the opportunity to affect children's eating behaviors, both in the classroom, and potentially, beyond the classroom. Although teachers typically view the foodservice department as having the primary responsibility to affect the school nutrition environment, an increased understanding and acknowledgement of the role of the classroom teacher needs to occur.

Teachers who feel removed from the overall school nutrition environment need to be encouraged to recognize the impact they can have, in their classroom, in their school cafeteria, and in their overall school. Teachers who do not have a positive view of the overall school nutrition environment may transmit their attitudes and behaviors to students, which have the potential to be adopted by their students. Teachers who have a more positive view of the school nutrition environment, and who feel that they can make a difference in their environments, need to be encouraged to exercise their influence (Contento, 2007).

Classroom rewards and celebrations influence not only the classroom, but the overall school nutrition environment by establishing what is "acceptable." Classroom rewards that reinforce the educational process should replace food-related rewards. Teachers should also consider the effectiveness of intrinsic rewards versus extrinsic rewards and how reward systems and the selection of the type of rewards offered may motivate, and in some cases, de-motivate students. A discussion with children may reveal that praise, increased responsibilities, or more computer time, play time, or general free time is preferred by students (Kohn, 1992).

Teachers who feel that they have little influence on the selection of fundraising activities at their school could take a more active role in expressing their concern to their school's administration, including making suggestions for alternative fundraising strategies.

The interrelatedness of school and home, and the behaviors that result as a function between a person and their environment need to be acknowledged (Bronfenbrenner, 1979). Teachers concerned about meals and snacks provided by

parents may want to talk with parents and provide ideas for healthy options. However, an acknowledgement of what is acceptable at home and may not be acceptable at school should be made, recognizing the societal, cultural, and familial influences that affect the school nutrition environment.

Teachers should be asked what they think and how they feel they influence the school's nutrition environment (Bandura, 2000), instead of making assumptions based on school district administrators' or child nutrition directors' input. A respect for the role of the classroom teacher and recognition of their critical role in the lives of children may contribute to the development and maintenance of a healthy school nutrition environment.

Finally, considering the positive effect that exposure to college nutrition courses has on teacher attitudes, perceived influence, and classroom behaviors, self-efficacy, and ultimately, on their students, nutrition could be a required course in teacher preparation.

Implications for child nutrition personnel. Child nutrition personnel play an important role in the development and maintenance of a healthy school nutrition environment. Since teachers view the school cafeteria as the primary determinant of a healthy school nutrition environment, care must be taken to provide effective communication and information, to serve as a resource for nutrition-related issues, and to solicit teacher feedback.

Child nutrition directors and their staff members must also recognize the integral role of the classroom teacher. Child nutrition directors may be challenged by teachers and school administrators who have differing ideas of what constitutes a healthy school nutrition environment and healthy eating. Nutrition and food choices are highly

subjective and very personal. A high calorie diet for an active, athletic teacher may be the appropriate diet for that individual, whereas a lower calorie diet is more appropriate for a more sedentary teacher. Teachers who range from omnivore to vegan may choose to participate in their school's foodservice program, and an attempt needs to be make to satisfy their needs.

Child nutrition personnel are also tasked with the challenge of identifying and presenting foods that students will select and consume, at an age where food neophobia is prevalent. The question, "Yes, it is healthy, but will kids eat it?" is an issue that cannot be ignored.

Directors of school foodservice operations are expected, in many cases, to manage a financially self-supporting program, and in some cases, a revenue producer, for the school district. Concommitantly, they should serve as the morning and mid-day restaurant, and attempt to identify and satisfy a divergent student and staff population with myriad expectations, food likes and dislikes, and preconceived notions of what constitutes a healthy or acceptable meal. The requirements to follow local, state, and federal pressure to optimize the nutritional content of meals is increasing with each passing year, without additional funding. Any and all of these responsibilities may conflict with each other unless teachers, parents, administrators, school district leadership, and the government recognize the evolving nature of school-based child nutrition programs.

Finally, child nutrition personnel must continue to identify effective methods to communicate with their diverse audiences, and provide a school cafeteria environment that supports and enhances the overall school nutrition environment. Critical to this

communication is the classroom teacher who may affect the attitudes and behaviors of an entire classroom of students.

Implications for school and school district administrators. As the official leader of the school, principals need to be encouraged to develop and maintain a healthy school nutrition environment at their school. Teachers could be encouraged to make appropriate decisions regarding classroom rewards and celebrations. Principals could encourage parents and parent groups to select fundraising activities that support education and the mission of the school. They need to also maintain an open line of communication with the foodservice provider at their school and in their district. This communication alone could make a real difference in assuring that a healthy school nutrition environment exists at the school.

Resistance from school administrators will sometimes thwart efforts to improve the overall school nutrition environment. Whether a popular food-related fundraising opportunity is allowed to take place, or a school-wide resistance to changing the school nutrition environment exists, popular traditions must be addressed. Bringing issues to the attention of all players at a school, even through the administration of a survey designed to solicit feedback, may be an appropriate vehicle to effect change.

Implications for parents. The influence of the home on the school environment has been established (Bronfenbrenner, 1979). Food choices made at school have always been impacted by family and cultural norms. A major shift in responsibility, however, has occurred in the past few years, "blaming" the school nutrition environment and school foodservice programs for the childhood obesity epidemic. Children have approximately five years' of dietary habits established before they reach school age.

Children who participate daily in the school lunch program receive only about 18% of the meals they consume in a year at school. Consideration must be made for the effect of the home environment on the school environment.

Teachers afraid to supersede what they perceive as parental rights may be hesitant to speak up or make recommendations to parents, despite their concerns about the foods children bring to school. Respect for the rights of parents may make it difficult to promote healthy eating in the school cafeteria and in the classroom. Communicating expectations to parents and helping parents make better decisions that affect the home and school environment could be a joint effort between teachers, parents and parent organizations. Parent organizations that opt for high fat, high calorie, high profit food items may need to rethink fundraising strategies to benefit the school nutrition environment and the children in the environment.

Implications for Local Wellness Policy implementation. How to effectively communicate information about wellness policies and how to implement the prescribed changes continues to be a challenge for school districts. Behaviors that no longer make sense or are no longer appropriate in the school setting need to be identified. Voices from one end of the spectrum to the other, including those who call for immediate and absolute change, and those whose indifference is crippling, need to be acknowledged and an attempt made to find the common ground needed to focus on realistic, attainable, and sustainable changes.

The 2004 Child Nutrition Reauthorization which called for the creation of Local Wellness Policies throughout the United States, has contributed to the confusion and lack of effective implementation, based on a mandate that lacked specific guidelines,

timelines, monitoring, or ramifications. Nutrition education, which should be a component in the promotion of a healthy school nutrition environment, remains unfunded. It is hoped that subsequent Child Nutrition Reauthorizations will provide the financial support, direction, and tools necessary to effectively foster change and energize key stakeholders.

Recommendations for Further Research

The recommendations presented in this section relate to areas that future researchers may want to consider in studying teachers and healthy school nutrition environments. An expansion of the survey to a broader audience and an investigation of programs and policies that affect the school nutrition environment are suggested.

This study was conducted exclusively with kindergarten through fifth grade teachers to gather data on teacher attitudes, perceived influence, and self-reported classroom behaviors. The research could be expanded to include middle school and high school teachers. Research expanded to the secondary level may identify relationships between attitudes, perceived influence, and behaviors not identified at the elementary school level. The study could also be expanded to investigate attitudes, perceived influence, and behaviors of parents and students related to the school nutrition environment.

Research for this study was conducted exclusively at one mid-size school district in Florida. Additional research is needed to determine if the results in other school districts throughout Florida are similar to the results contained herein. Additional research could be extended to a regional or national level.

The majority of responders in this research were white females. Additional research is needed to determine if males and minorities report similar attitudes, perceived influence, and self-reported behaviors. Since the study relied on self-reported classroom behaviors, additional observational studies to verify respondent reporting are an option. The self-reporting technique does not allow for a verification of behavior. A study to observe teachers' behaviors could determine if the behaviors a teacher reports actually occur. Another study might involve a personal profile of teacher eating habits, especially when they are with their students.

Children could be surveyed to determine if they want to receive classroom rewards, how they want to be rewarded, and what rewards would be most motivating. The issues of teachers who reported that candy or sweets were appropriate for classroom rewards could be further studied. Likewise, teacher expectations regarding the school nutrition environment in the classroom, school cafeteria, and overall school, and the disconnect in variables that teachers identify as constituting a healthy school nutrition environment warrant further investigation.

Since teachers felt they influenced their classrooms, but to a much smaller degree, the overall school nutrition environment, additional studies could investigate the disposition and personality of teacher groups related to perceived influence in other issues that impact schools. The importance of teachers' self-efficacy was evident in this study, therefore an identification of strategies to help improve teachers' confidence in developing and promoting a healthy school nutrition environment could be conducted. A qualitative study to determine how and why attitudes are developed, and a more in-depth investigation of the determinants of perceived influence could also be undertaken.

The effect of the Fresh Fruit and Vegetable Program, mentioned by many respondents as having a positive effect on the overall school nutrition environment, to include an improved perception of the overall school meals program, could be studied. Research could investigate the improvements observed in promoting healthy school nutrition environments within individual schools, and between schools that participate in the Fresh Fruit and Vegetable Program versus those school that do not participate.

The effect of the Omnibus Reconciliation Act of 1981, which effectively removed nutrition education from schools, to include nutrition education provided to teachers, and the related timeline to national increases in childhood obesity rates, could be explored.

Finally, the degree to which local wellness policies have prompted changes to the school nutrition environments could be investigated. A longitudinal study regarding the variables, influences, and relationships that affect the development, implementation, maintenance, and evaluation of local wellness policies could also be conducted.

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Appendices

Appendix A

Local Wellness Policy Frequently Asked Questions

1. What is the Local Wellness Policy?

The Local Wellness Policy requirement is established by Section 204 of the Public Law 108-265, the Child Nutrition and WIC Reauthorization Act of 2004. It requires each local education agency (LEA) or school district participating in the National School Lunch Program and/or School Breakfast Program to develop a local wellness policy that promotes the health of students and addresses the growing problem of childhood obesity.

2. Why does a school district need a Local Wellness Policy?

The Local Wellness Policy is important because it:

- Reaches beyond USDA-funded meal programs to influence children's health;
- Acknowledges local community responsibility to support or build on government efforts;
- Provides an opportunity for school districts to create an environment conducive to healthy lifestyle choices; and
- Recognizes the critical role of schools in curbing the epidemic of childhood overweight and obesity.

3. What does the policy require from school districts?

According to the Local Wellness Policy, school districts must, at a minimum:

- Set goals for nutrition education;
- Set goals for physical activity;
- Set nutrition guidelines for all foods and beverages available on school campuses during the school day;
- Ensure that local guidelines for reimbursable school meals meet the program requirements and nutrition standards set forth by federal regulations;
- Set goals for other school-based activities designed to promote student wellness;
- Involve a broad group of members of the community (see question #6) draft a plan to measure the implementation of policies; and
- Designate Wellness Contacts at each school.

4. What would a "plan to measure the implementation process" entail?

Evaluation and feedback are very important in maintaining a local wellness policy. It is also important to assess student, parent, teacher, and administration satisfaction with the new policies. You may want to document any financial impact to the school foodservice program, school stores, or vending machine revenues. A good evaluation plan does not need to be extensive, formal or put additional undue burdens on staff that is involved in the process. Through the

evaluation process, you will be able to answer some basic questions that are very important to policymakers, students, school staff, parents, and the general public. Did the policy and implementation address the issues identified in the needs assessment?

For example:

- Is it making a difference?
- What's working?
- What's not working?
- How can the impact of the policy be increased to enhance its effect on student health and academic learning?

5. What avenues does the requirement, "nutrition guidelines for all foods and beverages available on school campuses during the school day" include?

Nutrition guidelines should be set for foods sold in the a la carte program, vending machines, fundraiser, student stores, snacks, school parties/celebrations/meetings. Concessions do not need to be included unless they are sold during the school day.

6. Who needs to be involved?

A team of community members must be involved in the development of each local wellness policy. Parents, students, and representatives of the school food authority, the school board, school administrators, and the public must be a part of the development process.

7. What are the deadlines?

Working with local wellness policies is ongoing. They should be continuously implemented, evaluated, and updated.

8. What is the monitoring process for this policy?

The State Agency (SA) will be responsible for determining compliance through the regular Coordinated Review Effort, School Meals Initiative review or any other type of on-site visit. In the case that a local educational agency (LEA) does not have a wellness policy in place when it is reviewed, the SA should require the LEA to take corrective action. The SA has no obligation, however, to review and evaluate the content of a local wellness policy since the policy is a local decision.

9. Where can I get more information and technical support?

USDA has developed wellness web-resources, as apart of the Team Nutrition website at www.teamnutrition.usda.gov. The Local Wellness Policy web pages are a clearinghouse for information, the web pages on policy requirements, sample policy language, examples of existing State and district policies in various wellness topics, the local process (i.e. how to create and implement a local wellness policy), reference materials, and links to more resources.

Answers are based on guidance from USDA and the 2004 Child Nutrition and WIC Reauthorization Act.

Appendix B

Nutrition Educator Observations

Nutrition Educator #1:

1. Classes always went a lot smoother when teachers were involved with the nutrition education activity. Students were always more willing to try tasting (tasting parties with fresh fruits and vegetables) when teachers participated, especially when the groups were new to the program.
2. Teachers had a great impact on the student participation (in the nutrition education programs) in both the positive and negative (sense).
3. A 2nd grade teacher at (name of school) did not really like vegetables, but committed to the importance of nutrition. She tasted the vegetables with us and stayed positive the entire time. Cool thing was – she discovered that she liked the vegetables she tasted now, including green peppers. She shared her story with the students and then after the nutrition education program, continued to eat the vegetables!
4. A team at (name of school) did a food play about healthy eating to follow up with what they learned during the FNS nutrition education. The students read additional books on nutrition, designed a script, and performed the "Healthy Eating Play".
5. A teacher at (name of school) who was in the middle of severe morning sickness tasted (fruits and vegetables) the entire time in spite of the need to gag because of food aversions from pregnancy. Her students were always willing to participate in the program.
6. This was just recent. I observed (name of a dietetic intern) teaching a class I had taught way back when. The teacher was absent during the lesson, checking e-mails, etc. The students were less engaged with the nutrition education – the same experience I had years ago. The only thing that was constant was the teacher. I thought this was extremely interesting.
7. I wish I could have asked teachers a lot of questions. Most of them I found to be very approachable, and I asked a lot of things, but I wondered some times if they ever thought about:
   a.) the importance of nutrition in the students' lives (health, academic, overall performance),
   b.) what they felt their role was in shaping eating habits,
   c.) their role in shaping body image perceptions and how their own issues with body image may have affected students, and
   d.) their influence in developing eating behaviors among their students.

Nutrition Educator #2:

1. On several occasions I have arrived at a classroom at the scheduled time only to realize that they (students and teacher) are in the middle of a celebration of some sort with cupcakes and/or candy.
2. During the lesson, several teachers have been unwilling to participate, and sat at their desks eating cookies or cake and drinking soda. This is while the students are supposed to be tasting vegetables during a tasting party.

Appendix B (Continued)

3. Teachers provide candy as a reward for various things.
4. During a tasting party, teachers have made faces and/or negative comments regarding the items. They would say things like, "I wouldn't eat that!"
5. At one school in particular, the teachers are notorious for gathering together at the back of the classroom to talk during the entire presentation, which shows their lack of interest or concern for the various topics being discussed. Other teachers use it as a planning period to catch up on their own work or to do personal things.

Nutrition Educator #3:

1. There was a teacher that participated in all of the nutrition education lessons. During the final tasting party, there was a student that refused to try the foods. The teacher informed me that the student would not try anything new. With some encouragement, we got him to try the foods. He did not like it, but it was a significant step.
2. In many classes I have taught, during the vegetable tasting party, some of the kids like enjoy the vegetables so much, they have second and third helpings. The teachers, on several occasions, have told the children that now that we know we enjoy these foods, they would make wonderful snacks to bring to the classroom. Essentially, the teachers and I encourage the children to bring healthier choices to share with the class.
3. (Name of school) – I saw a first grade teacher rewarding students with their choice of candy bars. She instructed them to put the candy away and take it home. When I came in (the classroom), she said (to me), "Don't pay attention to this. I know it is not good, but the kids like it."
4. Many teachers have large containers of candy on their desks or in their room, or have soda cans on their desk.
5. I have had many teachers come up to me and question the lunch menu, asking why we don't serve healthier choices. I had a teacher from (name of school) ask me why we did not offer more choices that are healthy for elementary kids, like baked chips as a vegetable. FNS does not offer elementary kids potato chips as a vegetable choice! The teacher said that FNS was not doing "enough" to promote good nutrition in the cafeteria.

Appendix C

Teacher/Administrator School Foodservice Survey
(Meyer, 2002)

Please answer the following questions about your school foodservice and nutrition program whether you eat school meals or not.

Completely fill in the circle of your answer. Use a #2 pencil.

		Strongly Disagree			Neither Agree Nor Disagree		Strongly Agree		I Don't Know
1.	Overall, I am happy with the school foodservice.	1	2	3	4	5	6	7	8
2.	Food serving lines are clean.	1	2	3	4	5	6	7	8
3.	The menu includes food I like	1	2	3	4	5	6	7	8
4.	I like the aroma of the food.								
5.	The atmosphere in the dining area is cheerful.	1	2	3	4	5	6	7	8
6.	Nutritious food is available daily.								
7.	Foodservice staff is friendly.	1	2	3	4	5	6	7	8
8.	The serving lines move quickly.	1	2	3	4	5	6	7	8
9.	The price of the food is reasonable for the portions served.	1	2	3	4	5	6	7	8
10.	Tables in the dining area are clean.	1	2	3	4	5	6	7	8
11.	A variety of food is available daily.	1	2	3	4	5	6	7	8
12.	I like the taste of the food.	1	2	3	4	5	6	7	8
13.	The noise level in the dining area is OK.	1	2	3	4	5	6	7	8
14.	Low fat items are offered.	1	2	3	4	5	6	7	8
15.	Foodservice staff is courteous.	1	2	3	4	5	6	7	8
16.	Time available to eat once I have received my food is adequate.	1	2	3	4	5	6	7	8
17.	The price of meals fits into my weekly budget.	1	2	3	4	5	6	7	8
18.	Spills and trash in the dining area are cleaned quickly.	1	2	3	4	5	6	7	8
19.	The choices of food available allow me to meet my religious needs.	1	2	3	4	5	6	7	8
20.	Food on the serving line is attractively presented.	1	2	3	4	5	6	7	8
21.	The number of seats in the dining area is comfortable.	1	2	3	4	5	6	7	8
22.	Tables in the dining area are comfortable.								
23.	Serving sizes are adequate.	1	2	3	4	5	6	7	8
24.	Foodservice staff smile and greet me when I am served.	1	2	3	4	5	6	7	8
25.	The number of serving lines is adequate.	1	2	3	4	5	6	7	8
26.	Meal component/ala carte items are available for my purchase.	1	2	3	4	5	6	7	8
27.	The floors in the dining area are clean.	1	2	3	4	5	6	7	8
28.	The choices of food available allow me to meet special dietary needs.	1	2	3	4	5	6	7	8

Appendix C (Continued)

		Strongly Disagree				Neither Agree Nor Disagree		Strongly Agree		I Don't Know
29.	I like the quality of the brands offered.	1	2	3	4	5	6	7	8	
30.	Nutrition information on food products is posted.			1	2	3	4	5	6	7	8
31.	Foodservice staff answer my questions.			1	2	3	4	5	6	7	8
32.	Overall, time given for meals is adequate.	1	2	3	4	5	6	7	8	
33.	The dining area is clean.	1	2	3	4	5	6	7	8	
34.	I like the quality of the hot entrees.	1	2	3	4	5	6	7	8	
35.	Information on calories contained in food is available.			1	2	3	4	5	6	7	8
36.	Foodservice staff treat me with respect.	1	2	3	4	5	6	7	8	
37.	No question 37 was listed.	1	2	3	4	5	6	7	8	
38.	I like the quality of the salads.	1	2	3	4	5	6	7	8	
39.	Information on fat contained in foods is available.			1	2	3	4	5	6	7	8
40.	Meal component/ala carte items are priced reasonably.			1	2	3	4	5	6	7	8
41.	I like the quality of the cold sandwiches.	1	2	3	4	5	6	7	8	
42.	Hot food is served hot and cold food is served cold.			1	2	3	4	5	6	7	8
43.	A choice of beverages is offered.	1	2	3	4	5	6	7	8	
44.	I have a place to eat my meal without interruption.			1	2	3	4	5	6	7	8
45.	The menu meets my special dietary needs (diabetes, low fat…).			1	2	3	4	5	6	7	8

We want to know more about you:

46. The number one reason I eat school breakfast is:
    1. The prices are good.
    2. The food is good.
    3. I have no other choice.
    4. It is convenient.
    5. Other teachers eat there.
    6. I do not eat school breakfast.
    7. Other_____

47. The number one reason I eat school lunch is:
    1. The prices are good.
    2. The food is good.
    3. I have no other choice.
    4. It is convenient.
    5. Other teachers eat there.
    6. I do not eat school breakfast.
    7. Other_____

48. How many times a week do you eat school breakfast?
    0 1 2 3 4 5

Appendix C (Continued)

49. How many times a week do you eat school lunch?
    0 1 2 3 4 5

50. How many times a week do you bring your lunch or leave campus?
    0 1 2 3 4 5

51. The length of our lunch period is?
    1. 20 minutes or less
    2. 21 to 30 minutes
    3. 31 to 45 minutes
    4. 46 to 60 minutes

52. I have a duty free lunch period?
    1. yes
    2. no

53. In what grade level do you teach?
    1. kindergarten
    2. elementary school
    3. middle/junior high school
    4. high school

54. How many years have you taught school?
    1. Less than 2
    2. 3 to 5
    3. 6 to 10
    4. more than 10

55. If you are a school admininstrator or staff, in what school category do you teach?
    1. elementary school
    2. middle/junior high school
    3. high school

Appendix D

Draft of Teacher Survey on School Nutrition and Healthy School Nutrition Environments

Teacher Survey on School Nutrition and Healthy School Nutrition Environments

Thank you for your interest in this survey. Your responses and opinions are very important to us!

1 * What grade level(s) do you teach?

- KG
- Grade 1
- Grade 2
- Grade 3
- Mixed grades

2 * How many children are in your classroom?

5 or less	6-10	11-15	16-20	21-25	26-30	More than 31
1	2	3	4	5	6	7

3 What is the name of your school?

4 * What is the highest degree you have earned?

- Bachelors
- Masters
- Specialist
- EdD
- PhD

5 * What is your gender?

- Male
- Female

6 * What is your racial/ethnic background? (optional)

Appendix D (Continued)

White
African American/Black
Hispanic/Latino
Asian
Native American Indian
Multi-Cultural
Other, please specify

7 What is your age?

8 * Have you taken college coursework in nutrition?

9 If you answered yes to the previous question, please indicate the number of course(s)?

10 *** Please answer the following questions about your school's Food and Nutrition Services program.**

	1 Strongly Disagree	2 Disagree	3 Agree	4 Strongly Agree	5 Do not know
The menu includes food I like.					
I like the aroma of the food.					
A variety of food is available daily.					
I like the taste of the food.					
Low fat items are offered.					
Food on the serving lines is attractively presented.					

Appendix D (Continued)

Nutrition information on food products Is posted.

Information on calories contained in food is available.

Information on the fat content of foods is available.

Meals are served promptly.

Time available to eat once I have received my food is adequate.

Overall, time given for meals is adequate.

11 * How often do you eat a school breakfast?

- Daily
- 3-4 times per week
- 1-2 times per week
- 1-3 times per month
- Very infrequently
- On special occasions only
- Never

12 * The reason I eat school breakfast is (please check all that apply):

- The prices are good
- The food is good
- I have no other choice
- It is convenient
- Other teachers eat there
- I do not eat school breakfast
- Other, please specify

13 * How often do you eat school lunches?

Appendix D (Continued)

Daily
3-4 times per week
1-2 times per week
1-3 times per month
Very infrequently
On special occasions only
Never

14 * The reason I eat school lunch is (please check all that apply):

The prices are good
The food is good
I have no other choice
It is convenient
Other teachers eat there
I do not eat school lunch
Other, please specify

15 * How often do you bring your lunch or leave campus for lunch?

Daily
3-4 times per week
1-2 times per week
1-3 times per month
Very infrequently
On special occasions only
Never
Other, please specify

16 * How often do you accompany your students to lunch?

Daily
3-4 times per week

Appendix D (Continued)

1-2 times per week

1-3 times per month

Very infrequentl

On special occasions only

Never

17 * I discuss nutrition topics in my classroom.

Never	Rarely	Sometimes	Often	Do Not Know
1	2	3	4	5

18 * I integrate discussions of nutrition into my lessons.

Never	Rarely	Sometimes	Often	Do Not Know
1	2	3	4	5

19 * I sit with or eat with my students during lunch or other meal times.

Never	Rarely	Sometimes	Often	Do Not Know
1	2	3	4	5

20 * Which of the following areas do you feel influence a healthy school nutrition environment?

School meals

After school snacks

Lunches from home

Snacks from home

Food/treats in classroom

Student class parties

School-wide celebrations

Fundraisers

Adult school meals

Adult lunches from home

Other, please specify

Continue

Survey Page 1

Teacher Survey on School Nutrition and Healthy School Nutrition Environments

22 To what extent do you exert influence over the areas you selected in Question #20?

	1 Very Little Influence	2 Little Influence	3 Some Influence	4 Major Influence	5 Do Not Know
School meals					
After school snacks					
Lunches from home					
Snacks from home					
Food/treats in classroom					
Student class parties					
School-wide celebrations					
Fundraisers					
Adult school meals					
Adult lunches from home					

23 * Who has the responsibility to encourage healthy food choices at your **school**? Please check all that apply.

School administration

Food & Nutrition Services Department

Parents

Appendix D (Continued)

Teachers

Other

24 * Who has the responsibility to encourage healthy food choices in the **cafeteria**? Please check all that apply.

School administration

Food & Nutrition Services department

Parents

Teachers

Other, please specify

25 * Who has the responsibility to encourage healthy food choices in the **classroom**? Please check all that apply.

School administration

Food & Nutrition Services department

Parents

Teachers

Other, please specify

26 * A healthy school nutrition environment exists in my

	1 Strongly Disagree	2 Disagree	3 Agree	4 Strongly Agree	5 Do Not Know
School					
School's cafeteria					
Classroom					

27 * I have some influence on the nutrition environment in my

	1 Strongly Disagree	2 Disagree	3 Agree	4 Strongly Agree	5 Do Not Know

Appendix D (Continued)

School

School's cafeteria

Classroom

28 * I use food as a reward or incentive in my classroom.

Never	Rarely	Sometimes	Often	Do Not Know
1	**2**	**3**	**4**	**5**

29 * Please respond:

1 Strongly Disagree	2 Disagree	3 Agree	4 Strongly Agree	5 Do Not Know

Using food as a reward or incentive has an impact on student behavior.

Using food as a reward or incentive has an impact on a child's overall eating habits.

30 * Please respond:

1 Very negative influence	2 Negative influence	3 Positive influence	4 Very positive influence	5 Do Not Know

The influence that candy or other treats provided as classroom rewards have on student behavior.

The influence that candy or other treats provided as classroom rewards have on a student's overal eating behaviors.

31 * How often do student rewards or recognitions including food, and/or candy, occur in your classroom?

Daily

3-4 times per week

1-2 times per week

1-3 times per month

Appendix D (Continued)

Very infrequently

On special occasions only

Never

32 * How often do parties/celebrations with food items occur in your classroom?

Daily

3-4 times per week

1-2 times per week

1-3 times per month

Very infrequently

On special occasions only

Never

33 * Please answer the following questions:

	1 Strongly Disagree	2 Disagree	3 Agree	4 Strongly Agree	5 Do Not Know
I can influence the snack choices in my classroom.					
I can influence the candy or other treats available in my classroom.					
I do influence the snack choices that are allowed in my classroom.					
I feel that foods/drinks consumed in the classroom have an influence on students.					
Our school's culture promotes teacher input on issues such as healthy school nutrition environments.					
I have the authority to **provide input** regarding my **school's** nutrition environment.					
I have the authority to **influence** my **school's** nutrition environment.					

Appendix D (Continued)

I have the authority to influence my school **cafeteria's** school nutrition environment.

I have the authority to influence my **classroom's** school nutrition environment.

I have been given opportunities to influence the school nutrition environment at my **school**.

I have been given opportunities to influence the school nutrition environment in the **cafeteria**.

I have been given opportunities to influence the school nutrition environment in my **classroom.**

34 * How much influence do you have in promoting healthy behaviors with your students?

Very Little influence	Little Influence	Some Influence	Major Influence	Do Not Know
1	2	3	4	5

35 * Please respond:

1 Strongly Disagree	2 Disagree	3 Agree	4 Strongly Agree	5 Do Not Know

I am able to assume the responsibility for creating a healthy nutrition environment in my school.

I have influence in creating a healthy nutrition environment at my school.

36 * Please respond:

1 Very Difficult	2 Difficult	3 Easy	4 Very Easy	5 Do Not Know

How difficult is it to provide a healthy school environment at your school?

How difficult is it to provide a healthy school environment in your classroom?

Appendix D (Continued)

37 What barriers, if any, exist to providing a healthy school environment at your **school**? Please indicate your response in the space provided.

38 What barriers, if any, exist to providing a healthy school nutrition environment in your school's **cafeteria**? Please indicate your response in the space provided.

39 What barriers, if any, exist to providing a healthy school environment in your **classroom**? Please indicate your response in the space provided.

40 * Nutrition and healthy eating have an influence on a child's ability to learn and perform during the school day.

Strongly Disagree	Disagree	Agree	Strongly Agree	Do Not Know
1	2	3	4	5

41 * How influential are parents as role models for healthy eating behavior development among your students?

Very Little influence	Little Influence	Some Influence	Significant Influence	Do Not Know
1	2	3	4	5

Continue

Survey Page 2

Teacher Survey on School Nutrition and Healthy School Nutrition Environments

42 * Please respond:

1 Strongly Disagree	2 Disagree	3 Agree	4 Strongly Agree	5 Do Not Know

Children imitate my eating habits and those of others around them.

I have a responsibility to model healthy eating habits to students in my classroom.

I model healthy eating habits to my students.

43 * At what grade do you believe children's eating habits and food preferences are formed or established?

KG - 3rd grade	4th - 7th grade	8th - 12th grade
1	2	3

44 * How important is healthy eating to you?

Unimportant	Somewhat Unimportant	Important	Very Important	Do Not Know
1	2	3	4	5

45 * How influential are teachers, in general, as role models for healthy eating behavior development?

Very Little Influence	Little Influence	Some Influence	Significant Influence	Do Not Know
1	2	3	4	5

46 * I think I can make a difference in providing a healthy school nutrition environment

1 Strongly disagree	2 Disagree	3 Agree	4 Strongly Agree	5 Do Not Know

at my school.

in my school's cafeteria.

in my classroom.

47 * My overall approach to personal nutrition could be classified as:

Very Poor	Poor	Good	Very Good	Do Not Know
1	2	3	4	5

48 * Would you be willing to serve on a committee to address healthy school nutrition environments?

49 If you would like to make any other comments that you feel are important, please take this opportunity to provide your thoughts:

Continue

Survey Page 3

Appendix E

Draft of Copy of NFSMI Permission Letter

(Address)
(City, State, Zip)

Date

Dr. Charlotte Oakley, Executive Director
National Food Service Management Institute
(Street)
(City, State, Zip)

Dear Dr. Oakley,

I am a doctoral candidate at the University of South Florida, and I would like to use the National Food Service Management Institute's Teacher/Administrator School Food Service Survey in my doctoral study. The university requires that I have your permission to use the instrument. Please sign the enclosed letter and return it to me in the stamped envelope, if I have your permission. Thank you for considering this request.

Sincerely,

Beverly L. Girard, Doctoral Candidate
University of South Florida

Appendix F

Signed Permission Letter

Dr. Charlotte Oakley, Executive Director
National Food Service Management Institute 6
Jeanette Phillips Drive P.O. Drawer 188
University, MS 38677-0188

November 6, 2009

Beverly L. Girard 1507
Robbins Road

Nokomis, FL 34275

Dear Ms. Girard,

Thank you for your interest in the Teacher/Administrator School Foodservice Survey. You have my permission to use the questionnaire as part of your dissertation work regarding teacher attitudes toward school nutrition programs and their perceived influence on healthy school nutrition environments, at the University of South Florida.

Sincerely,

Dr. Charlotte Oakley, Executive Director
National Food Service Management Institute

Appendix G

Directions for Validation and Usability of Instrument by Elementary Principals and School Food Service Directors

E-mail address

Date

Dear (Name),

As a leader who is interested in promoting good nutrition practices in schools, your input on the instrument I am developing for my dissertation at the University of South Florida is critical. The Teacher Survey on School Nutrition Environments instrument assesses teachers' perceived importance about nutrition-related policies and practices, as well as the teachers' perceptions of their own influence school nutrition environments.

It is very important to me that I receive your feedback. The first attachment contains a copy of the instrument, which I would like you to take. Before you complete the survey, however, please print off and review the scoring sheet in the second attachment, which asks specific questions about the clarity of written directions, questions that should be omitted or reworded, the overall length of the survey, time required to complete the survey, and the ease of completing the survey. Please feel free to provide as much detail as you believe is necessary.

If you have any questions, please send me an e-mail, and I will attempt to contact you immediately. Thank you for your assistance and your time.

Sincerely,

Beverly L. Girard
PhD Candidate

Appendix G (Continued)

Scoring Sheet for the Teacher Survey on School Nutrition Environments

Thank you again for taking time from your busy schedule to review the Teacher Survey on School Nutrition Environment instrument. As you complete the survey, please keep the following questions in mind. Please return a copy of your responses to the questions to me at Beverly_Girard@sarasota.k12.fl.us as soon as you are able.

1. Are the directions for completing the instrument clear?
2. Did you read any questions or statements that should not be included in the instrument, or which require rewording? If so, please indicate the questions or statements.
3. Do you have any suggestions for improving the clarity of the overall instrument or specific question/statements?
4. How long did it take you to complete the survey?
5. How long do you think it would have taken you to complete the survey if you were not also providing feedback on the design?
6. Do you think the survey is of reasonable length?
7. Was this survey relatively easy to complete?
8. Do you have any suggestions for improving the overall quality of the survey?

Appendix H

Names of Expert Panel Members

Expert	Position/Expertise	Institution
Kathy Glindmeier	Director of Food and Nutrition Services, Director of Dietetic Internship, and member of School Nutrition Association Research Committee	Paradise Valley Unified School District, AZ
Dayle Hayes	President of Nutrition for the Future, and incoming Chair of the School Nutrition Services Dietetic Practice Group of the American Dietetic Association	Independent Consultant
Dr. Mary Kay Meyer	Author of Teacher/Administrator School Foodservice Survey and former Research Scientist	AL Department of Education; formerly with the National Food Service Management Institute
Dr. Mary Frances Nettles	Director of Applied Research Division at the National Food Service Management Institute	National Food Service Management Institute at the University of Southern Mississippi
Dr. Charlotte Oakley	Executive Director of National Food Service Management Institute	National Food Service Management Institute at the University of Mississippi
Dr. Alice Jo Rainville	Professor and author of Healthy School Nutrition Environment Survey	University of Central Michigan

Appendix I

Directions for Validation and Usability of Instrument by Expert Panel

E-mail address

Date

Dear (Name),

As a recognized leader in child nutrition, your input on the instrument I am developing for my dissertation at the University of South Florida is critical. The Teacher Survey on School Nutrition Environments instrument assesses teachers' perceived importance about nutrition-related policies and practices, as well as the teachers' perceptions of their own influence school nutrition environments.

It is very important to me that I receive your feedback. The first attachment contains a copy of the instrument, which I would like you to take. Before you complete the survey, however, please print off and review the scoring sheet in the second attachment, which asks specific questions about the clarity of written directions, questions that should be omitted or reworded, the overall length of the survey, time required to complete the survey, and the ease of completing the survey. Please feel free to provide as much detail as you believe is necessary.

If you have any questions, please send me an e-mail or call me at my office at 941-486-2199, and I will attempt to contact you immediately. Thank you for your assistance and your time.

Sincerely,

Beverly L. Girard
PhD Candidate

Appendix I (Continued)

Scoring Sheet for the Teacher Survey on School Nutrition Environments Survey

Thank you again for taking time from your busy schedule to review the Teacher Survey on School Nutrition Environments instrument. As you complete the survey, please keep the following questions in mind. Please return a copy of your responses to the questions to me at Beverly_Girard@sarasota.k12.fl.us as soon as you are able.

1. Are the directions of completing the instrument clear?
2. Did you read any questions or statements that should not be included in the instrument, or which require rewording? If so, please indicated the questions or statements.
3. Do you have any suggestions for improving the clarity of the overall instrument or specific questions/statements?
4. How long did it take you to complete the survey?
5. How long do you think it would have taken you to complete the survey if you were not providing feedback on the design?
6. Do you think the survey is of reasonable length?
7. Was this survey relatively easy to complete?
8. Do you have any suggestions for improving the overall quality of the survey?

Appendix J

Principal Notification Letter

Dear Principal,

I know this is a busy time of year for you and your teachers! I am asking you to please take a few minutes to forward this letter with the included survey link to your kindergarten through fifth grade teachers. The introductory letter on the first page of the survey was developed to explain that the survey asks teachers about their attitudes, influence, and behaviors related to school nutrition environments.

Teachers' participation in this survey will contribute to the knowledge base on attitudes and influence on school nutrition environments. The responses are anonymous and the data are confidential. The estimated time to take the survey is 10 minutes. As an incentive for completing the survey, the school with the highest number of eligible participants will be treated to a party at your school, complete with healthy foods, free massages, and other surprises.

An identification of teachers' attitudes, perceptions of influence, and behaviors may assist school nutrition administrators and nutrition educators in learning how to more effectively communicate with teachers, and develop, promote, and maintain healthier school nutrition environments.

The link to the survey is: http://www.zoomerang.com/Survey/WEB22APCAM36XP

If you have any questions, please contact me.

Thank you very much for your participation at _____ School.

Sincerely,

Beverly L. Girard

Beverly L. Girard, MBA, MS, RD, LD
Director of Food and Nutrition Services
School Board of Sarasota County, Florida

Appendix K

Teacher Survey on School Nutrition Environments

Dear Teacher,

We hear a lot about nutrition at school, but teachers are rarely asked for feedback concerning their attitudes and influence on school nutrition environments. Your input is vital to the success of this study.

The survey is confidential. The school name is the only identifier. Individual results cannot be traced back to the survey taker unless you provide permission to contact you with survey results. Toward the end of the survey, you will be asked if you would like to receive a copy of the results.

The survey will take approximately 10 minutes to complete. As an incentive for completing the survey, the school with the highest percentage of eligible participants will be treated to a Party at your school, complete with healthy food, free massages, and other surprises. Thank you in advance for your participation.

Sincerely,

Beverly L. Girard
Director of Food and Nutrition Services

***Directions: Please check one response for each item unless otherwise indicated.**

1. What grade level do you teach?
   - Kindergarten
   - Grade 1
   - Grade 2
   - Grade 3
   - Grade 4
   - Grade 5
   - Combined grades
   - Specials (mixed grades such as PE, music, art)
   - Other, please specify:
     _____

2. If you indicated that you teach a Special in Item 1, please specify area:

   _____

Appendix K (Continued)

3. How many children are in your classroom?

5 or less	6-10	11-15	16-20	21-25	26-30	More than 31

4. What is the name of your school?

_____

5. What is the highest degree you have earned?

Bachelors
Masters
Specialist
Doctorate
Other, please specify:

_____

6. What is your gender?

Male
Female

7. What is your racial/ethnic background?

White
African American/Black
Hispanic/Latino
Asian
Native American Indian
Multi-Cultural

8. Number of years teaching (at all levels):

0 to 5 years
6 to 10 years
11 to 15 years
16 to 20 years
21 to 25 years
26 to 30 years
More than 30 years

9. Have you taken college coursework in nutrition?

_____

10. If you answered yes to the previous question, please indicate the number of courses:

_____

Appendix K (Continued)

11. How often do you eat a school breakfast?
    - Daily
    - 3-4 times per week
    - 1-2 times per week
    - 1-3 times per month
    - Very infrequently
    - On special occasions only
    - Never

12. The reason I eat school breakfast is (please check all that apply):
    - The prices are good
    - The food is good
    - I have no other choice
    - It is convenient
    - Other teachers eat there
    - I do not eat school breakfast
    - Other, please specify:
      _____

13. How often do you eat a school lunch?
    - Daily
    - 3-4 times per week
    - 1-2 times per week
    - 1-3 times per month
    - Very infrequently
    - On special occasions only
    - Never

14. The reason I eat school lunch is (please check all that apply):
    - The prices are good
    - The food is good
    - I have no other choice
    - It is convenient
    - Other teachers eat there
    - I do not eat school breakfast
    - Other, please specify:
      _____

Appendix K (Continued)

15. Please indicated your response to the following statements:

Never	Rarely	Sometimes	Often	Do Not Know

I make menu suggestions to my students or we discuss the menu prior to lunch.

I sit with or eat with my students during lunch or other meal times.

I discuss food-related topics in my classroom.

I integrate nutrition into my lessons.

16. What barriers do you think exist for integrating nutrition into lessons? Please check all that apply:

Lack of curriculum resources
Inadequate financial resources
Lack of time
Does not fit into curriculum
Too many other responsibilities
No barriers exist
Other, please specify:
_____

17. I believe the following have the most impact on the school nutrition environment. Please check your top 3 choices:

Student school meals
After school snacks
Student lunches from home (brown bag)
Food/treats in classroom
Student class parties
School-wide celebrations
Fundraisers
Adult school meals
Adult lunches form home (brown bag)
Other, please specify:
_____

Appendix K (Continued)

18. Which of the following do you most influence? Please check your top 3 choices:
    - Student school meals
    - After school snacks
    - Student lunches from home (brown bag)
    - Food/treats in classroom
    - Student class parties
    - School-wide celebrations
    - Fundraisers
    - Adult school meals
    - Adult lunches form home (brown bag)
    - Other, please specify:

    _____

19. Who has the primary responsibility t encourage healthy food choices at your school?
    - School administration
    - Food & Nutrition Services Department
    - Parents
    - Students
    - Teachers
    - Other, please specify:

    _____

20. Who has the primary responsibility to encourage healthy food choices in the cafeteria?
    - School administration
    - Food & Nutrition Services Department
    - Parents
    - Students
    - Teachers
    - Other, please specify:

    _____

21. Who has the primary responsibility to encourage healthy food choices in the classroom?
    - School administration
    - Food & Nutrition Services Department
    - Parents
    - Students
    - Teachers
    - Other, please specify:

    _____

Appendix K (Continued)

22. I believe a healthy nutrition environment exists in my:

Strongly Disagree	Disagree	Agree	Strongly Agree	Do Not Know
School				
School's cafeteria				
Classroom				

23. I have an influence on the nutrition environment in my:

Strongly Disagree	Disagree	Agree	Strongly Agree	Do Not Know
School				
School's cafeteria				
Classroom				

24. Candy or other sweets provided as classroom rewards have the following effect on:

Very negative influence	Negative influence	Positive influence	Very positive influence	Do Not Know
Student classroom behavior				
Students' overall eating behaviors				

25. Please indicate your response to the following statements:

Strongly Disagree	Disagree	Agree	Strongly Agree	Do Not Know
I influence the snack choices in my classroom.				
I influence the candy or other sweets available in my classroom.				

Appendix K (Continued)

26. How often do student rewards or recognitions include food and/or candy in your classroom?

Daily
3-4 times per week
1-2 times per week
1-3 times per month
Very infrequently
On special occasions only
Never

27. Which single food item is provided most often for student rewards or recognitions in your classroom?

Candy
Cake or cupcakes
Cookies
Crackers
Dairy items (such as cheese)
Fruit
Nuts
Vegetables
Other, please specify:
_____

28. How often do celebrations include food and/or candy in your classroom?

Daily
3-4 times per week
1-2 times per week
1-3 times per month
Very infrequently
On special occasions only
Never

29. Which single food item is provided most often for celebrations in your classroom?

Candy
Cake or cupcakes
Cookies
Crackers
Dairy items (such as cheese)
Fruit
Nuts
Vegetables
Other, please specify:
_____

Appendix K (Continued)

30 What factors determine student rewards provided in your classroom? Please check all that apply:

Cost
Availability
Student preference
Convenience
No rewards provided
Other, please specify:
_____

31. The rewards I provide most often in my classroom (please check all that apply):

Food rewards
Pencils or other writing tools
Colorful papers or notebooks
Stickers
Small stuffed animals
Permission for a popular activity
Other, please specify:
_____

32. Please indicate your response to the following statement:

Never	Rarely	Sometimes	Rarely	Do Not Know

How often do you provide coupons for fast food or treats to your students?

33. Please indicate your response to the following statements:

Strongly Disagree	Disagree	Agree	Strongly Agree	Do Not Know

Our school's culture promotes teacher input on issues such as healthy school nutrition environments.

I have been given opportunities to impact the nutrition environment at my school.

34. Please indicate your response to the following statements:

No Influence	Little Influence	Some Influence	Major Influence	Do Not Know

What influence should teachers have as role models for healthy eating behavior development for students?

How much influence do you have in promoting healthy eating behaviors with your students?

Appendix K (Continued)

35. How difficult is it to provide a healthy nutrition environment?

Very Difficult	Difficult	Easy	Very Easy	Do Not Know

At your school?

In your classroom?

36. What barriers, if any, exist in providing a healthy nutrition environment at your school? Please check all that apply:
    Lack of curriculum resources
    Inadequate financial resources
    Lack of time
    Too many other responsibilities
    No opportunity for input
    Lack of interest
    No barriers exist
    Other, please specify:
    _____

37. What barriers, if any, exist in providing a healthy nutrition environment in your school's cafeteria? Please check all that apply:
    Lack of curriculum resources
    Inadequate financial resources
    Lack of time
    Too many other responsibilities
    No opportunity for input
    Lack of interest
    No barriers exist
    Other, please specify:
    _____

38. What barriers, if any, exist in providing a healthy nutrition environment in your classroom? Please check all that apply:
    Lack of curriculum resources
    Inadequate financial resources
    Lack of time
    Too many other responsibilities
    No opportunity for input
    Lack of interest
    No barriers exist
    Other, please specify:
    _____

Appendix K (Continued)

39. Please indicate your responses to the following statements:

Disagree	Agree	Strongly Disagree	Strongly Agree	Do Not Know

Nutrition and healthy eating have an impact on a child's ability to learn and perform during the day.

Children imitate my eating habits and those of others around them.

I have the responsibility to model healthy eating behaviors to students in my classroom.

I model healthy eating habits to my students.

40. I think I can make a difference in providing a healthy nutrition environment:

Disagree	Agree	Strongly Disagree	Strongly Agree	Do Not Know

At my school.

In my school's cafeteria.

In my classroom.

41. My own approach to healthy eating could be classified as:
    Very Poor
    Poor
    Good
    Very Good
    Do Not Know

42. Do you have any ideas for discussing food-related topics in the classroom?

43. Do you have any ideas for integratring nutrition into lessons or activities?

44. Do you have any other comments that you feel are important? If so, please take this opportunity to provide your thoughts:

45. Would you like to receive a copy of the results of this survey? If so, please indicate your name and school below, and a copy will be forwarded to you at the conclusion of this study.

46. Would you be willing to serve on a committee to address healthy school nutrition environments? If so, please indicate your name and school site.

Appendix K (Continued)

47. Do you have any ideas or comments that would help to improve the Food and Nutrition program at your school?

Appendix L

Teacher Responses to Open-Ended Questions

Question 16. What barriers do you think exist for integrating nutrition into lessons?

The 29 responses received as barriers for integrating nutrition into lessons focused on three primary themes: lack of time, competing priorities (such as FCAT testing and preparation for testing), and attitudes about nutrition not fitting into the elementary curriculum, with the possible exception of science or specific lessons, such as dental health or human body systems. Some teachers responded that their teaching assignment, such as resource teacher or music teacher, had no relationship to nutrition. Others cited a lack of knowledge, no pervious inclination to integrate nutrition, and, "I'm just not doing it. It needs to be intentional."

Statements indicating that nutrition should be taught at home by parents, students and parents do not support healthy eating habits, and the ability level of students, were suggested as barriers to integrating nutrition into lessons. These statements were balanced by comments that explained how barriers can be addressed, such as the Fresh Fruit and Vegetable Program, school gardens, and "teachable moments about choices."

Question 17. I believe the following have the most impact on the school nutrition environment.

Teachers were given a list of options to indicate the items that most impact the school nutrition environment. Ten of the 43 teachers who responded to this question indicated that the question was confusing, or did not make sense. Seven teachers indicated that the habits learned at home have the most influence on the children's dietary habits and the expectations and learned behaviors that children bring to school. The availability of the Fresh Fruit and Vegetable Program was reported by nine teachers as having a positive impact on the school nutrition environment. Attitudes of foodservice employees, both positive ("the effervescent personalities of the lunchroom staff who encourage my kids to try new things") and negative, were reported as influencing the school nutrition environment. Seven teachers commented on the quality of school meals and the availability of unhealthy options, while two others commented about healthy choices in the lunchroom and the availability of alternative choices. Individual teachers provided insight that reflected their attitudes about impacts on the school nutrition environment. One teacher indicated that access to food and our culture have an impact at school, whereas another cited the expense of healthy eating. Additional comments about impacts on the school nutrition environment included:

"Teachers reward with junk all the time, and it needs to stop."

"I believe that all the above have an impact on the school nutrition environment and that junk food has no business in any part of these areas, including teacher lunches if they are eating in front of the students."

Question 18. Which of the following do you most influence?

The list of options to answer question 18 was identical to the options presented in question 17. Although ten teachers indicated that they did not understand question 17, only two teachers indicated that they did not understand this question. Nine teachers indicated that they had no influence upon the school nutrition environment. Seven

responses regarding healthy snacks and the Fresh Fruit and Vegetable Program indicated that this program made it possible for them to have a greater influence on the school nutrition environment. Three responses commented that they had influence on the availability of food choices, and a single response was provided regarding the teacher's attitude about the importance of breakfast.

Question 19. Who has the primary responsibility to encourage healthy food choices at your school?

Although teachers were asked to select the entity with the primary responsibility to encourage healthy food choices at school, eleven teachers indicated that "everyone" shares the responsibility. Four teachers responded that it is the responsibility of the foodservice department to encourage healthy choices at school, while two teachers indicated that it should be the responsibility of the classroom teacher.

Question 20. Who has the primary responsibility to encourage healthy food choices in the cafeteria?

"Everyone" was reported by four teachers as having the primary responsibility to encourage healthy food choices in the cafeteria. Four teachers responded that the primary responsibility lies with foodservice, with one teacher indicating that "Our lunches are highly processed and filled with junk." One teacher commented that poor district, state, and federal guidelines for health were a problem, and one teacher commented, "Just because it [a school lunch] has what a child needs does not mean that a child will like it or eat it."

Question 21. Who has the primary responsibility to encourage healthy food choices in the classroom?

Five responses of seven to this question indicated that the responsibility to encourage healthy choices in the classroom is shared between the teacher and parents. One teacher indicated that the responsibility belongs to "Whoever is supervising the students," and one teacher indicated that the level of responsibility is dependent upon knowledge of nutrition.

Question 27. Which single food item is provided most often for student rewards or recognitions in your classroom?

Seventeen of 173 respondents indicated that candy was used as a reward or recognition in the classroom, although the majority said that they limit the candy to one to three M&M candies or other small candies. Eighteen responded that ice cream or popsicles were provided as a reward. Other food items, such as popcorn, pretzels, crackers, chips, fruit juice, and cereal, were reported as being used by 44 teachers. Pizza as a reward was reported by ten teachers. One teacher commented, "I have resorted to giving treats as a reward for behavior. This is a result from pressure from my principal to have all of my students behaving perfectly."

Sixty-one teachers reported "never" or "almost never" using food as a reward, or indicated that only non-food rewards are available in their classrooms. Additional responses included, "There have been two instances where only 60% of the students were rewarded by cupcakes. These forms of rewards are limited to 4 times maximum per year," and "Parents usually send in cupcakes for birthdays. I reward with a variety of these for each event, not just one; I like to teach choices and balance when MY

STUDENTS plan a party."

Five teachers reported foods such as cupcakes, are available on special occasions only, such as birthdays, and one teacher indicated that fruits and vegetables are used for planned celebrations. Four teachers said they reward students with chewing gum.

Question 29. Which single food item is provided most often for celebrations in your classroom?

In response to this question, pizza was reported by 30 teachers, popcorn by 22 teachers, 18 teachers indicated ice cream, freeze pops, doughnuts, or bagels, and 17 reported that the food item depended on the situation (birthday celebrations), or that the food items varied. Comments included:

"Kindergarteners love cupcakes on their birthdays, but I try to discourage this."

"Cake (is provided) if coming from parents, and other if from me. My class loves vegetables and fruit if they are provided. They chose a soccer game over a pizza party as a reward."

"I don't provide things. The students bring in items and it is usually chips/cookies/fruit punch. I suggest healthy things but junk is usually what I get."

Question 30. What factors determine student rewards provided in your classroom?

Fourteen teachers of 73 respondents answered this question by stating, or restating, that food is not used as a reward, and three teachers offered that candy is not used as a reward. Sixteen teachers indicated that food parents send in, or the type of celebration determines student rewards. Ten teachers indicated that nutrition and "health" help determine the rewards, while six indicated that the teacher determines the reward. "I try to minimize junk, but some is available at (a) cost that should keep junk to once per week," "I usually buy my own rewards and they are generally not food related," and "I spend much of my own time and money getting these items." Five teachers responded that stickers are the reward of choice.

Question 31. The rewards I provide most often in my classroom.

Twelve teachers reported "verbal praise" or classroom encouragement as the rewards provided most often in the classroom, with two teachers sharing a special reward includes "eating lunch with the teacher," and one teacher reporting, "a note to parents in (the) agenda book." One teacher explained, "I do not provide extrinsic rewards."

Tokens, trinkets, and treasures were reported as the rewards provided most often by 62 of the 140 teachers who provided details for this question. Seven teachers indicated that food items were the rewards provided most often. School supplies, such as books, were reported as rewards by nine teachers, whereas a homework pass was reported by ten teachers. Seven responses were received indicating extra computer time, game time, or preferred activity time. Two teachers indicated that the reward provided most often in their classroom was for additional time at recess, or physical activity.

Question 36. What barriers, if any, exist in providing a healthy nutrition environment at your school?

The most frequently cited barrier to providing a healthy school nutrition environment at school was parental influence, and meals or snacks brought from home, according to 24 of 69 teachers. One teacher stated, "Some parents resent 'crossing the

line.' They think it is their job, and I agree."

The foodservice program was cited as a barrier by 19 teachers, with responses ranging from, "School lunches served are ALL CARBS! Very little non-starchy vegetable choices offered," to "I don't set the breakfast or lunch menu. Giving elementary kids raw broccoli is a waste of time…skip the middleman and just throw a couple of cases in the dumpster."

Four teachers shared that the Fresh Fruit and Vegetable Program had lessened the barriers to providing a healthy school nutrition environment, with one teacher commenting, "It was the best nutrition model ever!" The expense of providing healthier foods was noted by three teachers. Another three teachers indicated inadequate or unavailable refrigeration made it impossible to offer perishable food items.

Five teachers indicated that teachers themselves can be barriers to the promotion of a healthy school nutrition environment, with one noting, "Teachers who do not agree with promoting healthy eating habits, i.e., alternative birthday celebrations instead of 20 birthdays a school year of cupcakes and cookie cakes."

Four teachers reported competing interests, lack of personal knowledge about nutrition, or not knowing where to start. However, another four teachers opined that it is not their responsibility or under their control to provide a healthy school nutrition environment, with one teacher suggesting, "The children respond best to food treats."

Question 37. What barriers, if any, exist in providing a healthy school nutrition environment in your school's cafeteria?

Thirty-four of 79 teachers indicated that foods provided by the foodservice department serve as barriers to a healthy school nutrition environment in the cafeteria, whereas government regulations or lack of funding are cited by seven teachers. Another six teachers indicated that parental influence and foods brought from home serve as a barrier to a healthy environment in the school cafeteria. Three teachers indicated that student food preferences serve as a barrier to a healthy school nutrition environment, with one commenting, "Children prefer unhealthy choices," and another stating, "Students will only eat what they like (and) learn from home." Nineteen teachers indicated that they did "not know" what barriers existed.

Two teachers indicated that school meals seem to be healthy, with one commenting, "Our cafeteria does a wonderful job of providing a healthy nutrition environment for our students. The healthy snack program this year was a great success and I hope it continues."

Question 38. What barriers, if any, exist in providing a healthy nutrition environment in your classroom?

Parental influence and foods brought from home were cited as the primary barrier to a healthy nutrition environment n the classroom by 48 of 65 responders. Specific comments included:

"Parents are asked to send in healthy snacks, yet send in cookies, chips, sodas, or other junk food."

"When parents send in snacks, etc., that are not healthy snacks, I do not feel right declining a snack that has been sent in when they spent their money on it. I do send a

note at the beginning of the year stating that we want healthy snacks and make suggestions but as the year goes on they often send in what they want."

"I do not provide snacks. Students will bring snacks from home. I believe I have no authority to dictate what they eat. It is the parents' responsibility, and they are accountable, NOT teachers or the school."

"Traditionally, kids eat cake for their birthday…why would I want to change that? Parents should keep their kids active and involved…sports are cut to save money, then people complain that kids are fat."

Two teachers commented that students are unwilling to try new foods. Three teachers indicated that barriers to a healthy school nutrition environment are not applicable in the classroom, with one stating, "There are no barriers in my classroom related to a nutrition environment, because I do not feed the children lunch each day.. their nutrition is provided only by the cafeteria and influenced by food services." One comment was made about the positive effect of the Fresh Fruit and Vegetable Program, and the challenge of not having this program in the future. "Without the Healthy Snack Program…inadequate financial resources…too many responsibilities…if teachers are made to do it, they will do it at no cost to the teacher."

Question 42. Do you have any ideas for discussing food-related topics in the classroom?

Sixty-seven of the 128 suggestions made were related to integrating nutrition into science, math, art, stories, songs, school gardening activities, guest speakers, and the nutrition education program provided by the Food and Nutrition Services department. One teacher commented that the integration of nutrition into curriculum should be mandatory at all grade levels. Comments about better utilization of existing technology, such as ActivBoards and Safari Montage, a real-time instructional program that can be broadcast to multiple sites, were also offered. The Fresh Fruit and Vegetable Program was again cited as providing an appropriate venue for initiating discussions about healthy foods by three teachers.

One teacher said that the discussion of food-related topics in the classroom must start with parents, "[At] Open House, I talk to parents how important sleep and nutrition are to their child's ability to function in the classroom each day. I do a mini-nutrition unit during the first weeks of school and we talk about 'brain food' and food that does NOTHING for us. WE make collages, watch movies, and read books to learn how to give our bodies the best energy level we can."

Additional expressions of concern about discussing food-related topics in the classroom follow:

"Before we can adequately teach students about healthy eating and nutrition, we need to stop giving student junk food and promoting going to fast food restaurants after school, and stop selling junk food to raise money, and stop providing junk food at school events or classroom parties."

"Hard to fit in our curriculum. The parents have the greatest impact. Children's habits are well established before they walk into the class. The healthy snacks provided are great, but those with poor eating habits were less apt to eat a healthy snack, choosing the less healthy snack from home instead."

"No, I think my job is academics, not nutrition. I think nutrition should fall on the families."

"We are teaching every second of the day. Rarely do I have the time to talk about food. What the children eat in the cafeteria will affect their eating habits for the rest of their lives. Children learn by doing, not by hearing. A sermon seen has more impact than a sermon heard!"

"We already have enough to do. Can't solve all of society's problems."

Question 43. Do you have any ideas for integrating nutrition into lessons or activities?

Responses to question 43 were similar to those received for question 42. Little new information was presented. However, a few statements were made that provided additional insights to the challenges teachers face:

"I'm not sure how to integrate nutrition into the curriculum that I currently use. We are so focused on topics related to FCAT that it's easy to forget about nutrition. We do talk about the foods that help us learn and test best for FCAT."

"No. No. No. The children learn by what they eat in the cafeteria. You must be kidding. We barely have enough time to teach all the subjects required. The only way it could be integrated would be in the reading program."

Other teachers made recommendations that work in their classrooms or schools: "Our cafeteria manager does a great job of entertaining students with games, facts, and contests about food and nutrition during lunchtime. It would be nice if she able to do it more often, but she's a busy lady so the extra effort is appreciated! Our school news program also does a pretty good job of spotlighting healthy fruits and vegetables from time to time, and our PE teacher recognizes 'Fit Kids of the Month' and reminds them about healthy eating and exercise habits."

"I would recommend utilizing Nutrition Detectives program by Dr. Katz in computer labs. We should also remember that there are alternatives to food and that celebrations and rewards do not have to include food. Some classes celebrate birthdays by reading a book that the birthday child selects in his/her honor. They sing Happy Birthday and that is it. No junk food and no expense!"

Question 44. Do you have any other comments that you feel are important?

An array of feedback was provided to this question. Again, the Fresh Fruit and Vegetable Program was heralded as making a difference in the overall school nutrition environment. Teachers were very supportive of the continuation of this program, with one teacher stating, "This year of providing a fresh food snack for every day has really changed the school nutrition climate. Children have an understanding of how the food tastes better, is full of crunch, juice, texture, flavor, and variety. They prefer fresh food now. The Gocio garden can continue to be a learning lab for important understanding of where food comes from and the effort and reward that comes with producing it."

However, even with the provision of the Fresh Fruit and Vegetable Program, teachers reported difficulty encouraging children to try new foods, "Many children would not even try to eat the healthy snack. They would rather go hungry than eat some of the items that were provided."

Some teachers point to the expense of healthy foods as a stumbling block to the

maintenance of a healthy school nutrition environment. Others suggested an overhaul of the child nutrition program at their school, citing flavored milk, a la carte dessert items, and second helpings of food as culprit against healthy eating.

A concern continued to be expressed about the role of parents and the effect of the home environment on the school nutrition environment. Some teachers indicated that parents must be reached and educated if there is to be a meaningful change at school, but a divergence of views existed about who should own the responsibility to create a healthy school nutrition environment.:

"I believe our school has done a god job in taking the first step in promoting a healthier environment. We have a school-wide policy that says students may not be rewarded with candy or food. For the most part, I see this policy being taken seriously. In addition, healthier choices of food are given food special nights/celebrations at school. This has been a great start. However, I feel were are now ready to take a closer look at all the times that students are offered a treat, i.e., birthdays, classroom celebrations, etc. Some younger grades seem to have a lot of food involved at the end of the year. We do have a wellness committee that has been established, but to my knowledge, the group has not met this year. I would also like to see the parents educated. It is frustrating to see what some parents send in for a "healthy snack break."

"The schools are NOT the problem. The lunch provided is the best that some have all day. We need to get into the HOMES and retrain the parents with junk food/meals. WE need a cultural revolution."

"Children eat one to two meals at school. The majority of their nutrition is at home. This is the parents' job. If you are trying to make changes, work with parents, NOT teachers. Also, try having a tasty lunch. My own children rarely eat school lunch."

"This is a very rough battle - parents are not promoting healthy eating at home. I have had students show up having sugared cereal and soda for breakfast."

"It is not the teacher's job to model healthy eating. It is a family/parent job. Schools and teachers have no control what parents send in for lunches."

Despite the concerns and challenges presented, some teachers expressed their own awakening of personal responsibility:

"Taking this survey has really made me think about how I use 'food' in my classroom. I try to make an effort to provide healthy items but have to admit that I rely on the unhealthy too much. I am seriously going to revamp this next year."

"I will be more proactive next year when guiding parents in their choices as to what to send in for snacks and party treats. That could make a huge difference in healthy eating in my classroom. I can also provide more healthy treats for special events and rewards in my classroom."

Finally, one teacher summarized, succinctly, with an expression of gratitude for being asked for feedback, "Thanks for asking. This is the first time anyone's asked."

Question 45. Would you like to receive results of this survey?

Eighteen teachers indicated that they wanted results of the survey by providing their and school location. Although the question specifically requested the teachers' names and school location eight teachers responded with a "yes" that they did want a copy of the survey results, but failed to include contact information. One teacher

questioned, "Is this survey really going to cause change?"

Question 46. Would you be willing to serve on a committee to address healthy school nutrition environments?

Twenty-two teachers indicated that they would serve on a committee to address healthy school nutrition environments. Five of the teachers who responded favorably to receiving results of the survey from question 45 also expressed interest in serving on a committee.

Question 47. Do you have any ideas or comments that would help improve the Food and Nutrition program at your school?

Results ranged from "To me there seems to still be a lot of unhealthy choices and too much processed food," to "How? I am just a teacher. This is WAY too big for me. This is the government serving processed food to our kids in order to make/save money," to "Praise the good work, patience, and energy that our employees provide to our students. Stop the negative talk and look to the real problems. School lunch is the least of our students' problems!" and "Actually, I think you serve a very good balance of food in the cafeteria. Children at our school eat good nutritious food – at least from the cafeteria."

Again, specific examples of foods that teachers indicate should be removed or limited in the cafeteria were provided, with the elimination of ice cream, flavored milk, and processed food the most commonly cited. Many teachers acknowledged the challenges parents face in the home environment, and how student food preferences are affected in the school nutrition environment. One teacher made a compelling argument that underscores the mesosystemic relationship between home and the school, "In today's society and economy, families may not see this as a priority. They may not realize the long term impacts of how they feed their families. Some are just getting by and the only goal is to feed them something. Healthy menus are not as important. Also, with both parents working, a healthy menu plan may not be considered. If the families were somehow shown the difference of student performances based on the food they send from home, healthier choices may be provided. Brain food versus sugary treats on a constant basis, fruit and veggies as a staple with a cookie and sandwich or juice, instead of many sweets and sodas in student lunches from home. I'm sure the nutrition program has already provided this, so it really is up to the families."

About the Author

Beverly L. Girard received a Bachelor of Science in Nutrition from Purdue University in 1981, a Master of Science in Dietetics and Nutrition from Florida International University in 1986, and a Master of Business Administration from Nova University in 1991.

Beverly worked in clinical dietetics and was an Area Supervisor for Palm Beach County Schools before becoming the Director of Food and Nutrition Services for the School Board of Sarasota County in 1991, where she remains to date. Mrs. Girard has served numerous state and national child nutrition organizations. She was the first Action for Healthy Kids "Healthy Schools Hero," the FAME 1996 Silver Rising Star and 2004 Golden Star, the National Restaurant Association's Silver Plate, and is a Purdue University Distinguished Alumnus.

Beverly is a vocalist, plays the flute, and enjoys travel, her church work, nieces and nephews, and the dietetic interns she mentors each year.