
In the US, obesity is a serious health issue that affects people of all ages, including preschool-aged children (i.e., children 3- to 5-years-old). One of the major causes of early childhood obesity is believed to be energy imbalance (i.e., energy consumed is greater than energy expended). To help reduce this energy imbalance in preschoolers and to address early childhood obesity, researchers have attempted to assess factors influencing preschoolers’ physical activity and healthy eating habits. A preschool mealtime environment can be an ideal setting to help preschoolers develop sound eating habits by exposing them to healthy foods, providing nutrition education, and interacting with the adults in a classroom (e.g., teachers). In spite of the potential that a preschool mealtime environment has to help foster children’s healthy eating habits, little is known about how preschool teachers influence preschoolers’ healthy eating, particularly their fruit and vegetable (FV) consumption at mealtimes. Additionally, though the importance of preschool teachers’ possessing skills and knowledge to create a positive mealtime environment (PME) has been recognized, the definition of a PME and how to establish a classroom PME have yet to be discussed. The lack of a clear definition of a PME prevents researchers from assisting teachers in establishing a classroom PME through teacher training and interventions. Therefore, the overall purpose of this dissertation was to qualitatively assess preschool teachers’ perceptions of a mealtime environment in a preschool setting. In study 1, researchers conducted face-to-face individual interviews with 28 Head Start teachers in central NC and asked teachers how they get their students to eat FV. Investigators found 6 dominant emergent themes and
applied them to the Information-Motivation-Behavioral Skills model. The proposed IMB model, consisting of key constructs, will help nutrition educators to develop education materials and interventions focused on increases in preschoolers’ FV consumption. In study 2, researchers interviewed 65 Head Start teachers across the US and asked how they defined a PME. Investigators developed a theoretical framework that represents a PME. The five key components were: the people, positive emotional tone, operations of a PME, and positive outcomes in children. Our findings may help future researchers develop effective interventions to assist preschool teachers in establishing a classroom PME. Lastly, in study 3, utilizing the same data in study 2, investigators explored Head Start teachers’ views of barriers and needs to create a PME and suggested potential solutions to challenges faced when creating a PME. The model proposed three future interventions, targeting preschool teachers, kitchen staff, and parents of preschoolers. The model may be useful for future researchers, especially extension agents, when developing effective interventions that help teachers create a classroom PME. The findings from this dissertation added explanatory value to the existing literature related to a preschool mealtime environment and helped researchers understand the complexity of a preschool mealtime. Outcomes will also help future investigators develop effective interventions and training protocols for preschool teachers, preschoolers, parents, and preschool staff members so that preschool teachers can effectively create a PME in the classrooms. It is the hope of the investigators that teachers’ PME creation will support preschoolers’ healthy eating habits that can carry into adulthood and will help them to lead healthier lives.
Assessing Perceptions of Preschool Mealtime Environment

by
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A dissertation submitted to the Graduate Faculty of
North Carolina State University
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requirements for the degree of
Doctor of Philosophy

Nutrition

Raleigh, North Carolina

2015

APPROVED BY:

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Chair of Advisory Committee
DEDICATION

I dedicate this dissertation work to my family in Japan. To my father, Yasunobu Chika, for giving me a chance to pursue my academic career far from my hometown and for encouraging me to achieve my goals. To my mother, Keiko Chika, for continuous encouragement and endless support as well as for her belief in me. To my sister, Hiroko Chika, for her love, endless support, and encouragement. I also dedicate this to my parents-in-law in Japan, Rikiya and Hiroko Mita for their continuous support and encouragement. Also, to my grandparents, Chota and Masako Chika, and Hatsuo and Fusako Sato, thank you for being with me and cheering me on. This dissertation is also dedicated to my daughter, Akiko Carolina Mita for cheering me on throughout my academic journey. Finally, I dedicate this dissertation to my wonderful husband, Seiji Mita, for believing in me as well as providing support, encouragement, and guidance throughout the entire doctorate program. I would not have been able to achieve my academic goals without you.
BIOGRAPHY

Satoko Chika Mita was born April 3, 1979, Kitakata City in Japan. She attended University of Aizu, obtaining a Bachelor’s of Science in Computer Science and Engineering in March 2002. After receiving her Bachelor’s degree in Japan, she moved to Stillwater, OK to pursue a Master’s degree in Computer Science at Oklahoma State University in August 2002. While she was working as a Master’s student, Mrs. Mita served as a teaching assistant in Computer Science and assisted in grading exams and assignments. She received a Master of Science in Computer Science in 2007. In fall 2007, Mrs. Mita started a Master’s program in Human Nutrition at Washington State University, Pullman, WA. She worked as a teaching, as well as a research assistant and helped grade exams and assignments and conducted her research. She received a Master of Science in Human Nutrition in December, 2009. As she was completing her Master’s thesis, in fall 2009, Mrs. Mita started her doctoral program in the Department of Food, Bioprocessing, and Nutrition Science at the College of Agriculture and Life Science at North Carolina State University. Under the direction from her major advisor, Dr. L. Suzanne Goodell, Mrs. Mita worked with Head Start teachers, not only in NC, but also around the US to investigate mealtime environments at preschool. As a graduate research mentor, Mrs. Mita also worked with nearly 20 undergraduate research assistants at NC State University who helped her collect and analyze dissertation research data. Additionally, Mrs. Mita supervised honors students enrolling in honors research in Agriculture and Life Sciences and gave guidance on their projects that were presented at the Undergraduate Research Symposium at NC State University.
ACKNOWLEDGMENTS

Foremost, I would like to sincerely thank my committee chair, Dr. L. Suzanne Goodell for her advice, guidance, kindness, patience, and encouragement. She provided continuous support since I started this program, and I would never have been able to achieve my academic goals without her support. Throughout my academic life at NC State University, she taught me the joy of working with preschoolers and conducting qualitative research.

I also thank my committee members, Drs. Jonathan C. Allen, Sara Bowen, and Julia Storberg-Walker for challenging me throughout my education at NC State University to become a better researcher and a critical thinker by enriching my ideas. Your knowledge and encouragement motivated me throughout my dissertation process.

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Additionally, my sincere thanks also goes to all the study participants and volunteers for generously sharing their valuable views and time with us and to preschool administrators for helping us recruit potential study participants. We learned so many valuable insights from you. Future researchers will benefit from our findings to assist preschool teachers in establishing a positive mealtime environment and in helping preschoolers develop healthy eating habits.
I also express my sincere gratitude to former and current lab members: Dr. Virginia Carraway-Stage, Dr. Natalie Cooke, Jennifer McMillen, Hibah Alsulami, and Edwin Siyame. I truly appreciate your continuous support, encouragement, and feedback throughout my academic life at NC State University. I felt very lucky to have known such wonderful researchers like you and to have had the opportunity to work with you. I could not have survived the dissertation roller coaster ride without your support.

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In addition, thank you to Dr. Hisako Murakawa, who gave me a supportive push to pursue my PhD program in the US. I would not have been here without your encouragement. I am grateful for your continuous support and encouragement.

I also would like to gratefully acknowledge financial support provided by our department (Department of Food, Bioprocessing, and Nutrition Sciences) and the Graduate School at NC State University.

Finally, I thank my family for their continuous support. To my parents, thank you for believing in me and providing me with the opportunities to pursue a Ph.D. in the US. Mom, I really appreciate your 2-month stay with us and taking care of my baby. Dad, thank you for letting Mom stay with us for such a long period of time. To my daughter, Akiko, thank you for cheering me up during the most challenging time. Your smile always encouraged me. To my husband, Seiji, I cannot find words to say “Thank you.” Without you, I would not be able
to reach my goals. Your experiences as a Ph.D. student always encouraged and motivated me, and your advice and support are really appreciated.
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CHAPTER 1: LITERATURE REVIEW

INTRODUCTION

Obesity is one of the most significant public health issues in the US. The prevalence of obesity is alarmingly high, and this includes preschool children. Obesity, believed to result from multi-factorial causes, has had an adverse effect on both the national health and economy. Moreover, obese children are more likely to remain obese as adults. Therefore, researchers believe it is important to build healthy eating habits at an early stage of life.

Aiming at addressing early childhood obesity, more attention has been paid to helping preschool-aged children develop healthy eating habits. This trend may reflect the fact that more than half of preschool-aged children in the US receive care at center-based programs (e.g., preschool and Head Start). While parents of preschoolers are primary caregivers, their roles as caretakers are often times shared with preschool teachers. However, less attention has been paid to teachers’ practices at mealtimes than to those of parents. Additionally, the preschool mealtime environment is not fully understood, particularly how preschool teachers, who are key personnel in a classroom, perceive the mealtime environment. The purpose of this dissertation was to qualitatively assess preschool teachers’ perceptions related to a preschool mealtime environment to further explore the preschool mealtime environment and teachers’ roles as well as practices at preschool mealtime (Chapter 2, 3, and 4). Chapter 1 provides a review of the literature that relates to early childhood obesity, the preschool mealtime environment (including preschool teachers’ practices) and reviews a qualitative methodology, which was applied for studies in Chapter 2 through 4. Chapter 2 discusses how preschool teachers get their students to eat fruits and vegetables (FV). Both Chapters 3 and 4
focus on preschool teachers’ perceptions of a positive mealtime environment (PME) in a preschool. Specifically, Chapter 3 explores how preschool teachers define a PME. Chapter 4 investigates preschool teachers’ perceived barriers and needs to create a PME and suggests possible solutions for the challenges that preschool teachers face. Throughout this dissertation, preschoolers are defined as those who are age 3 to 5 and enrolled in a center-based program (e.g., day care or Head Start), and preschool-aged children who are 3 to 5 years old but not necessarily enrolled in a center-based program. In addition, early childhood obesity is defined as obesity among 3- to 5-year-old children. Lastly, the terms childcare staff, caregivers, and preschool teachers are used interchangeably.

EARLY CHILDHOOD OBESITY

Prevalence of Early Childhood Obesity in the US and North Carolina (NC)

Obesity is a disease of epidemic proportions in the US, affecting people of all ages. Data from the National Health and Nutrition Examination Surveys (NHANES) indicate an increase in prevalence of obesity among children aged 2 to 5 years from 5.0% (NHANES I 1971-1974) to 12.1% (NHANES 2009-2010) in the last three decades (summarized in Figure 1.1). Although recent NHANES data show a significant decrease from 12.1% in 2009-2010 to 8.4% in 2011-2012, the prevalence of obesity among preschool-aged children is still high, and in fact, some states have a higher prevalence than others. NC is one of the states in which at least 15% of children aged 2 to 4 years are obese: 16.2% of children aged 2 to less than 5 years are overweight, and 15.5% are obese. As data support, obesity is a public health challenge in the US, and more attention should be paid, especially to low-
income and minority preschool children; obesity is more prevalent among minority and economically disadvantaged preschool-aged children than peers with other races/ethnicities and from higher socioeconomic families.\textsuperscript{14}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure1.png}
\caption{Prevalence of Obesity Among Children 2–5 Years Old in the US, NHANES\textsuperscript{a} Data\textsuperscript{10,11,15}}
\end{figure}

**Definition of Early Childhood Obesity**

Health care professionals and researchers have argued about an appropriate proxy for body fat percentage,\textsuperscript{16-18} but the use of Body Mass Index (BMI) is the widely accepted practice to categorize weight status among preschool-aged children.\textsuperscript{19} In early childhood, weight status is determined in 2 steps: (1) calculating BMI and then (2) determining BMI-for-age. The first step uses the following standard formulas to calculate BMI:

\begin{flushleft}
\textsuperscript{a} NHANES: National Health and Nutrition Examination Surveys
\end{flushleft}
For Metrics\textsuperscript{20}:

$$BMI = \frac{weight\ (kg)}{[height\ (m)]^2}$$

For Pounds and Inches\textsuperscript{20}:

$$BMI = \frac{weight\ (lb)}{[height\ (in)]^2 \times 703}$$

As the second step, the value obtained from either of these formulas is then applied to the Centers for Disease Control and Prevention (CDC) gender-specific BMI-for-age growth charts\textsuperscript{21} to determine BMI-for-age. Preschool-aged children are categorized as obese if their BMI-for-age is greater than or equal to the 95\textsuperscript{th} percentile.\textsuperscript{22} Preschool-aged children whose BMI-for-age is at or above the 85\textsuperscript{th} but less than the 95\textsuperscript{th} percentile are categorized as overweight.\textsuperscript{22} Table 1.1 summarizes weight status categories.

**Table 1.1. Weight Status Categories in Early Childhood\textsuperscript{19,22}**

<table>
<thead>
<tr>
<th>Weight Stats Category</th>
<th>Percentile Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight</td>
<td>&lt; 5\textsuperscript{th} percentile</td>
</tr>
<tr>
<td>Healthy weight</td>
<td>5\textsuperscript{th} percentile to less than the 85\textsuperscript{th} percentile</td>
</tr>
<tr>
<td>Overweight</td>
<td>85\textsuperscript{th} to less than the 95\textsuperscript{th} percentile</td>
</tr>
<tr>
<td>Obese</td>
<td>Equal to or greater than the 95\textsuperscript{th} percentile</td>
</tr>
</tbody>
</table>

**Causes and Consequences of Early Childhood Obesity**

Causes of early childhood obesity are complex and multifactorial. Harrison and colleagues represent its complexity using the Six-Cs model for causes of obesity (Figure 1.2).\textsuperscript{23} The six Cs are: cell, child, clan, community, country, and culture. The contributors at the first level (cell) are genetic-related causes. However, its contribution to obesity may not
be well established: Researchers believe that 6% to 85% of people are obese due to genetics.\textsuperscript{24} The child level represents contributors of obesity within a child (e.g., self-regulation\textsuperscript{25}). The clan level represents the family-related factors (e.g., maternal food preferences\textsuperscript{26}). The community level identifies a child’s social relationships in the community (e.g., peers’ food consumption\textsuperscript{27}), including preschools (e.g., preschool environment\textsuperscript{28}) and a child’s relationships with preschool teachers (e.g., teachers’ feeding practices\textsuperscript{29}). The country level emphasizes organizations at both state and federal level that could impact individual behaviors as well as choices. Lastly, the culture level describes culture-related factors that a certain group of people values and thinks important (e.g., large portion sizes\textsuperscript{30}).\textsuperscript{23} Based on the work by Harrison et al.,\textsuperscript{23} potential causes of early childhood obesity are reviewed at each C level in Table 1.2.

\textbf{Figure 1.2.} The Six-Cs Model for Causes of Obesity\textsuperscript{23}
Table 1.2. Causes of Early Childhood Obesity

<table>
<thead>
<tr>
<th>Level</th>
<th>Causes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cell</td>
<td>Child’s genetic characteristics (^{31-34})</td>
</tr>
<tr>
<td>Child</td>
<td>Self-regulation, (^{25}) media use, (^{35}) lack of sleep (^{36-38})</td>
</tr>
<tr>
<td>Clan</td>
<td>Maternal depression, (^{39}) maternal eating pattern (^{26})</td>
</tr>
<tr>
<td>Community</td>
<td>Misdiagnosis of obesity by health professionals, (^{40}) a child’s peers food consumption, (^{27,41,42}) teachers’ feeding practices, (^{7,29,43}) preschool environment (^{28,44})</td>
</tr>
<tr>
<td>Country</td>
<td>Economic recession (^{45})</td>
</tr>
<tr>
<td>Culture</td>
<td>Large portion sizes, (^{30}) misconception about healthy child size (^{46})</td>
</tr>
</tbody>
</table>

Early childhood obesity is a preventable disease \(^{47}\); however, if it is not prevented, preschool-aged children are likely to experience consequences resulting from childhood obesity \(^{48}\) such as cardiovascular disease, \(^{49,50}\) metabolic disease, \(^{51}\) pulmonary issues, \(^{52}\) gastrointestinal disorders, \(^{53}\) joint problems, \(^{54}\) and psychosocial issues. \(^{55,56}\) Further, obese preschool children are more likely to become obese when they get older, \(^{2}\) potentially adversely impacting children’s entire lives. For example, obese children are at an increased risk of developing adverse health consequences of adulthood obesity such as heart disease, \(^{57,58}\) type 2 diabetes, \(^{59-61}\) various cancers (e.g., breast cancer \(^{62}\)), hypertension, \(^{63,64}\) stroke, \(^{57,65}\) and breathing problems. \(^{66-68}\)

Developing healthy eating behaviors at an early stage of life may be a key factor in addressing and preventing early childhood obesity. In order for preschool-aged children to develop healthy eating behaviors that can carry into adulthood, they need adults’ support because the adults are important gatekeepers for food (e.g., shopping, cooking, and serving). Researchers should particularly explore how adults can influence a child’s healthy eating habits within different contexts in the Six-Cs model (Figure 1.2 and Table 1.2).
THE ROLE OF PRESCHOOL SETTING IN EARLY CHILDHOOD OBESITY PREVENTION

A preschool setting holds potential as a venue for addressing and preventing early childhood obesity because a large number of preschool-aged children spend their waking hours at a preschool. In 2007, more than half (55%) of children, defined as those ages 3 to 6 years and not enrolled in kindergarten, received care in center-based programs such as Head Start, day care, or preschool. For a preschool program to achieve the goal of addressing and preventing early childhood obesity, there are three primary roles that a program should play: providing children with (1) nutrition education, (2) healthy, well-balanced meals and snacks, and (3) a supportive mealtime environment. In the sections below, each role is reviewed in detail.

(1) Nutrition Education

Nutrition education is believed to be one of the important components of the curriculum at a preschool. To assist teachers in conducting nutrition education in their classrooms, researchers have developed various nutrition-related programs, interventions, and curricula. Most of these programs are developed to provide positive influences on nutrition and physical activity in preschoolers, parents, and/or teachers. Of the nutrition-related programs, the majority are designed to help promote positive behavioral changes (e.g., eating more healthy foods) and/or to increase nutrition-related knowledge in preschoolers. For example, “I Am Moving, I Am Learning,” is a nutrition education program developed by the Office of Head Start in 2005, focused on addressing early
childhood obesity through healthy eating and physical activity.\textsuperscript{77} While positive outcomes are associated with these nutrition-related programs (e.g., improved a child’s food choices), researchers found that teachers face difficulties in conducting nutrition education in a classroom because of their lack of nutrition-related training\textsuperscript{78-80} and limited time for implementing and planning nutrition education.\textsuperscript{79-81} As an alternative approach to integrate nutrition education into the daily routine at preschool, teachers can utilize mealtimes as an opportunity to teach informal nutrition education.\textsuperscript{70,79} Unfortunately, however, the potential for mealtimes to deliver nutrition education to preschoolers has not been well recognized.\textsuperscript{70}

(2) Healthy, Well-balanced Meals and Snacks

**Recommended Daily Food Consumption**

What preschool-aged children eat at both home and outside the home should contribute to meeting their daily nutrient requirements. According to the *Dietary Guidelines for Americans 2010*, the recommended calorie intake for children aged 3 years is 1,000 – 1,200 kcal, and 1,200 – 1,400 kcal for children aged 4 to 5 years (Table 1.3).\textsuperscript{82} The Guidelines recommend that 45 – 65\% of the diet of preschool-aged children should be from carbohydrates. Three-year olds are recommended to consume 5 – 20\% and 30 – 40\% of their diet from protein and fat, respectively. For children aged 4 to 5 years, 10 – 30\% of their diet should be from protein, and 25 – 35\% should be from fat (Table 1.3).\textsuperscript{82} Suggested servings from each food group for the target age range (3-5 year olds) are shown in Table 1.3.\textsuperscript{83}

To meet daily recommended nutrition for children, the food being served at mealtimes in a preschool should be nutritious and well-balanced with a variety of
foods. As a meal guideline, the Child and Adult Care Food Program (CACFP) by the US Department of Agriculture (USDA) provides preschool programs with detailed information on meal patterns at childcare centers, including the type and amount of foods children should receive at each meal and snack, depending on the age. For those preschoolers who receive part-time care at center-based programs, the guidelines by CACFP and the Academy of Nutrition and Dietetics (Formerly, American Dietetic Association) recommend that they receive at least one third of their daily nutrient needs from meals and snacks at the programs. Additionally, preschoolers who receive full-time care at center-based programs are recommended to consume one-half to two-thirds of their daily nutrient needs from meals and snacks at the programs. While childcare centers are responsible for following the guidelines to provide appropriate foods in terms of quality and quantity, CACFP-participating centers should meet the guidelines to receive CACFP reimbursement, depending on each child’s eligibility (free, reduced price, or paid).
Table 1.3. Recommended Daily Calories, Macronutrient, and Serving Size for Major Food Groups\textsuperscript{82,83}

<table>
<thead>
<tr>
<th></th>
<th>3 years</th>
<th>4-5 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calories (kcal)</td>
<td>1,000 – 1,200\textsuperscript{b}</td>
<td>1,200 – 1,400\textsuperscript{b}</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>45 - 65%</td>
<td>45 – 65%</td>
</tr>
<tr>
<td>Protein</td>
<td>5 – 20%</td>
<td>10 – 30%</td>
</tr>
<tr>
<td>Fat</td>
<td>30 – 40%</td>
<td>25 – 35%</td>
</tr>
<tr>
<td>Milk/Dairy (Cup)</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Lean meat/beans (oz)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Fruits (Cup)</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Vegetables (Cup)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td>Grains (oz)</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Oils (g)</td>
<td>14</td>
<td>17-18</td>
</tr>
</tbody>
</table>

Actual Consumption among Preschoolers

Based on the CACFP meal guidelines, a preschool program is required to plan menus to support preschoolers' growth and development, as well as to foster sound eating habits. Menus are planned to meet nutritional requirements\textsuperscript{84} and are recommended to be evaluated by a nutritionist or registered dietitian two or more times a year.\textsuperscript{89} In spite of the meal guidelines, preschoolers’ daily food intake is not always well-balanced\textsuperscript{90} even at childcare centers\textsuperscript{91} and Head Start programs.\textsuperscript{92} For example, on average, children in childcare centers in NC consumed only 12.8% of the daily recommendations for whole grains, 21.3% of the daily recommendations for fruits, and 16.7% of the daily recommendations for vegetables.

\textsuperscript{b} Physical Activity Level: Sedentary
Notably, the amount of dark green and orange vegetables consumed by preschoolers on average was relatively low, meeting only 7% of MyPyramid recommendations. A lack of nutrients, particularly FV, in a preschool-aged child’s diet is problematic because low FV consumption may hinder healthy eating and increase health risks (e.g., cancer, heart disease, and stroke), including early childhood obesity. In fact, to prevent early childhood obesity, the Centers for Disease Control and Prevention advises to increase FV consumption because FV intake can influence satiety, possibly resulting in lower calorie food consumption and overeating.

The lack of FV consumption in preschool-aged children is a concern in the US—few preschool children in the US consume the recommended amounts of FV. On a typical day, 50.2% of children aged 2 to 5 years old did not meet MyPyramid fruit recommendations, and 78.3% of them did not meet MyPyramid vegetable recommendations. In NC, according to the 2011 NC Statewide Child Health Assessment and Monitoring Program survey, only 28.4% of children aged younger than 5 consumed greater than 3 servings of vegetables (excluding French fries), and 32.5% of them consumed 2 servings of fruits on a typical day. In order for preschool programs to help preschoolers increase their FV consumption and to prevent early childhood obesity, researchers should investigate factors that influence preschoolers’ FV consumption in a preschool classroom.
(3) Supportive Mealtime Environment

Preschool Mealtime

To prevent and address early childhood obesity in a preschool, nutritious food should be provided in a supportive environment. The mealtime environment is not necessarily in a classroom\(^{103}\); some centers provide meals in a cafeteria. For this review, the author will discuss mealtimes in a classroom.

In a preschool, a mealtime is a complex environment in terms of the teacher to child ratio and with children from different backgrounds. To help make mealtime environments more supportive for children’s healthy growth and development, five major organizations or agencies have issued nutrition-related guidelines at mealtimes. These organizations or agencies are (1) CACFP of the USDA Food and Nutrition Service, (2) the US Department of Health and Human Services, (3) the National Association for the Education of Young Children, (4) the Academy of Nutrition and Dietetics, and (5) the American Academy of Pediatrics/American Public Health Association/National Resource Center for Health and Safety in Child Care and Early Education (jointly development). These five organizations/agencies state mealtime-related recommendations that can be classified into three topics: (a) mealtime structure and environment, (b) child-centered mealtime environment, and (c) adults’ roles at mealtimes. Each topic is discussed in the following sections.

This mealtime structure and environment category summarizes what a mealtime environment should look like and how the meals should be served. First, a mealtime environment should be clean, safe, calm, and enjoyable. The joint guidelines by American Academy of Pediatrics, American Public Health Association, and National Resource Center for Health and Safety in Child Care and Early Education state establishing a pleasant mealtime environment is important to help children digest well and socialize with others. Within a relaxed mealtime environment, some agencies and organizations recommend family-style eating, that provides children an opportunity to develop skills (e.g., social and self-feeding skills) to control the type and amount of foods they eat and to try new foods.


Mealtime should offer children opportunities to acquire skills and knowledge associated with the food while socializing with others (i.e., peers and adults) in the classroom. For a preschool program to provide such opportunities, some of the aforementioned guidelines suggest that the mealtime environment should be child-centered. In this review, the writer defines a child-centered mealtime as a mealtime that focuses on the child’s interests and attentions toward eating. As mentioned earlier (i.e., family-style serving), a child serving him/herself is one of the recommendations for a child-centered mealtime environment. Practicing self-serving gives children an opportunity to decide what and how much they want to eat. To support a child’s self-serving, guidelines
suggest that children use equipment (e.g., chairs and tables) and utensils that are age-appropriate. This helps preschoolers be comfortable remaining sitting while eating\textsuperscript{108} and supports children’s development of eating skills.\textsuperscript{108,109} Because a child’s appetite varies from day to day and a child to child, childcare centers should allow children to have second helpings\textsuperscript{85,86} and give adequate time for children to eat their meals.\textsuperscript{84,85}

c. Adults’ Roles at Mealtimes.

Adults in the classroom are responsible for leading the mealtime and supporting a child’s sound eating habits as well as development of skills associated with eating (e.g., motor skills). This category summarizes adults’ roles for effective practices to support a child’s development at mealtimes. A few guidelines recommend that adults sit with children,\textsuperscript{84,89} and model healthy behaviors during mealtimes.\textsuperscript{70,85} In Hendy’s work, modeling is defined as adults consuming foods (≥ 2 bites) at least two times during mealtimes.\textsuperscript{110} Adult modeling is recommended because a child seeing adults consuming the same foods might encourage the child also to eat the food.\textsuperscript{110,111} Additionally, adults should not force children to eat,\textsuperscript{70,84,85} which might result in shaping long-term, negative food preferences with the foods that the adults are attempting to encourage children to eat.\textsuperscript{85} Adults also should not punish or reward with food\textsuperscript{85} because these practices might pressure children to finish all of their food, potentially leading to overeating and later obesity, as well as the development of unhealthy eating habits.\textsuperscript{105,107,112} The development of healthy eating in children cannot be achieved without an adult’s support. To assist preschool teachers in effectively leading a mealtime for their students’ growth and development, teachers constantly should be given
up-to-date research-based information, and their mealtime-related practices should be regularly evaluated.

**Mealtime Environment Study**

To provide meals in a supportive environment that helps foster a child’s healthy eating habits, researchers have investigated the mealtime environment in a preschool.\textsuperscript{103,113-117} Of note, the term, “mealtime environment,” is a broad term, and some researchers call it “feeding environment.”\textsuperscript{113} To the reviewer’s knowledge, a clear definition of a mealtime environment or what a mealtime environment consists of is varied among researchers. For example, when assessing a positive mealtime environment (PME), Golley, Bell, Matwiejczyk, and Hartley quantitatively assessed teachers’ mealtime practices and perceptions.\textsuperscript{114} The researchers asked teachers how they create a PME; if a child is allowed to self-serve; and how staff manage a child’s food refusal.\textsuperscript{114} Another example of mealtime environment research quantitatively explored the feeding environment in 4 states (California, Colorado, Idaho, and Nevada) such as mealtime characteristics (e.g., how the food is prepared, number of staff and children, length of mealtimes, age-appropriate equipment) and teachers’ practices (e.g., teaching topics, use of foods as rewards, how to get their students to try new foods).\textsuperscript{103,113}

In addition to the inconsistency of the definition of a mealtime environment, there is a lack of standard mealtime assessment tools to evaluate preschool mealtime. Researchers developed a mealtime assessment tool that consists of broad and concise check points, including if a menu includes FV; a center has soft-drink vending machines; drinking water is
available outside and inside; teachers’ practices are supportive; nutrition-related training is available to staff; and nutrition education is available to children and parents.\textsuperscript{116,118,119} This tool is designed to evaluate by observation and document reviews (e.g., menus). Another mealtime environment tool worth noting is Building Mealtime Environments and Relationships: An Inventory for Feeding Young Children in Group Settings (BMER).\textsuperscript{108} This inventory was developed for managers, including supervisors, lead teachers, and health professionals (i.e., nutrition or health consultants) to evaluate mealtime in childcare programs (e.g., Head Start). The BMER, an observational tool, is not intended to be used in family childcare center. Ideally, the inventory should be applied only to traditional lunch mealtimes, rather than snack times or lunchbox meals. While the BMER offers detailed check points to evaluate a mealtime environment, the statistical reliability and validity of the inventory have not been assessed; thus users should utilize the inventory cautiously.\textsuperscript{108} Because of a lack of clear definition of mealtime environment and standard mealtime assessment tools, there is a gap to fill in the current understanding of a preschool mealtime environment.

**Teachers’ Practices during Mealtimes**

Of the adults in classroom mealtimes, preschool teachers are responsible for leading and overseeing a mealtime while supporting their students’ development and growth and also maintaining a safe environment. Because they are the major facilitators of leading mealtime, researchers have attempted to investigate qualitatively and quantitatively teachers’ mealtime-related attitudes, beliefs, and practices for fostering preschoolers’ healthy eating habits. For example, Freedman and Alvarez quantitatively investigated childcare providers’ attitudes and
beliefs (pre- and post-class) related to their feeding practices. Examples of statements include “I make the children eat foods I think are good for them” (attitudes) and “Children are able to decide how much they need to eat at a meal” (knowledge). As qualitative approaches, researchers investigated caregivers’ perceptions related to portion size and caregivers’ practices related to a child’s hunger and satiety cues. Additionally, researchers have attempted a better understanding of the relationships between teachers’ practices and their students’ food consumption. In this study, the findings revealed that teachers’ role modeling with verbal encouragement (“Mmm! I love mangos!”) may help children accept new foods. However, a recent study found that positive messages associated with food (e.g., healthy and yummy) may not help preschool-aged children to consume more of the food. Further research is needed for teachers to effectively support their students’ development of healthy eating habits.

While researchers are trying to explore teachers’ effective practices at mealtimes, there are established facts that researchers believe are supportive of the development of their students’ sound eating habits (e.g., family-style meal). However, previous studies show that childcare staff’s practices are not always supportive of a child’s healthy eating development. For example, childcare staff reported that they do not eat meals with children together; they believed that children should eat all of the food on their plate, and they used foods as a reward, which are all considered as non-supportive practices. Preschool teachers’ non-supportive practices and perceptions could result from a lack of standardized guidelines or policies at federal level about healthy eating among preschoolers. In fact, childcare programs are regulated by each state and District of Columbia, and the regulations vary from
state to state. In addition to a lack of standardized guidelines, regulations at the state level do not specify details about nutrition and feeding practices at childcare programs compared to other areas such as safety and hygiene. Another factor of teachers’ non-supportive practices and perceptions could also result from limited training on healthy eating among preschoolers. A study of childcare center directors and staff in California, Colorado, Idaho, and Nevada found less than 24% of childcare staff received yearly child feeding-related training.

Giving the facts that preschool teachers are spending as much time as parents, researchers have focused more on how preschool teachers can impact preschoolers’ eating, including child’s FV consumption and how they interact with children to support preschoolers’ development of healthy eating habits. In spite of the efforts, attention to a preschool mealtime environment is still needed to establish standardized nutrition-related guidelines and training associated with nutrition and feeding practices.

QUALITATIVE RESEARCH

Research methodology is commonly divided into two approaches: (1) quantitative and (2) qualitative research. Based on the work by Johnson and Christensen, qualitative and quantitative research are summarized in Table 1.4. Quantitative research is often used when researchers have hypotheses to test. As the term “quantitative” implies, this method manipulates numerical data or data that are convertible to numerical data to analyze statistically. During statistical analysis, researchers apply descriptive statics and/or inductive statistics. The strengths of quantitative research includes the ease of establishing credibility
(K. S. U Jayaratne, personal communication, Mar 15, 2012); however, quantitative research does not provide the “why” to understand certain situations, conditions, or circumstances because it is not exploratory (K. S. U Jayaratne, personal communication, Mar 15, 2012).
<table>
<thead>
<tr>
<th>Table 1.4. Qualitative and Quantitative Research</th>
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<tbody>
<tr>
<td><strong>Scientific Method</strong></td>
<td><strong>Quantitative Research</strong></td>
</tr>
<tr>
<td></td>
<td>• Deductive</td>
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<tr>
<td><strong>View of human behavior</strong></td>
<td>• Predictable</td>
</tr>
<tr>
<td><strong>Most common research objectives</strong></td>
<td>• Explanation and prediction</td>
</tr>
<tr>
<td><strong>Focus</strong></td>
<td>• Hypothesis testing</td>
</tr>
<tr>
<td><strong>Nature of observation</strong></td>
<td>• Under controlled conditions, researchers examine study participants’ behavior</td>
</tr>
<tr>
<td><strong>Nature of reality</strong></td>
<td>• Objective</td>
</tr>
<tr>
<td><strong>Type of Data</strong></td>
<td>• A set of values (variables)</td>
</tr>
<tr>
<td><strong>Data Analysis</strong></td>
<td>• Descriptive statistics • Inductive statistics</td>
</tr>
<tr>
<td><strong>Results</strong></td>
<td>• Results from a sample population can be applied to the population (Generalizability).</td>
</tr>
<tr>
<td><strong>Final Report</strong></td>
<td>• Report with statistical data</td>
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</table>
All methods utilized in this dissertation research (Chapter 2, 3, 4) are qualitative. In social science, researchers are likely to conduct qualitative research in order to assess (1) behaviors of the target audience in natural settings; (2) how people or groups of people perceive things differently; (3) an individual’s experiences and perceptions that cannot be explained by numbers; and (4) certain behaviors, possibly resulting in developing a new framework. The strengths of qualitative research include that it is exploratory, and its findings help investigators understand why and how particular circumstances or conditions occur (K. S. U Jayaratne, personal communication, Mar 15, 2012). Additionally, qualitative research collects additional data to supplement already existing findings; to generate preliminary findings in order to develop a high-quality questionnaire; to help understand the complexity of the target audience for checking validity; to help understand the findings from quantitative studies. Qualitative research is also used when assessing the target audience’s views, attitudes, behaviors, and beliefs on certain topics/issues, products, or services. Yet, qualitative researchers may have difficulty in achieving credibility of findings (K. S. U Jayaratne, personal communication, Mar 15, 2012), and findings from qualitative research may not be applicable to other populations (generalizability). Other limitations in qualitative research include social desirability (i.e., study participants may answer questions in a manner that is socially acceptable and desirable); potentially inaccurate findings because of lack of naturalistic settings and/or influences by a moderator/interviewer; and the requirement for the intensive process of data collection and analysis. To conduct exploratory research, methodologies that
researchers commonly use in qualitative research are (1) individual interviews and (2) focus groups, which are discussed below.

**Individual Interviews**

Individual interviews are defined as a method of an interviewer’s collecting information from a respondent (interviewee) regarding research topics. Depending on the way questions are asked, this individual interview approach is categorized into three types: structured, semi-structured, and unstructured interview. In a structured interview, the interviewer asks a series of questions in the same order for each interview session. In semi-structured interviews, an interviewer asks a series of questions prepared in advance, in addition to probes to acquire more deep and detailed information. Unstructured interviews are another approach to collect interviews where an interviewer does not have a set of questions in advance. Instead, an interviewer asks questions based on respondents’ answers while staying focused on their topics of interests. For nonprobability sampling, researchers are recommended to collect data until they reach the point when no new information emerges (i.e., saturation). However, it is likely that individual interviews reach saturation as early as 12 interviews. In addition to the aforementioned advantages in qualitative research, researchers use individual interviews when their goal is to collect information about sensitive topics, and/or when researchers want study participants to discuss certain topics more openly. Among individual interview approaches, face-to-face or telephone interviews are commonly used approaches to collect individual interviews.
Focus Groups

Focus groups are defined as small group interviews (usually, 8–12 individuals/group) where a trained researcher leads the discussion related to research topics. Usually, 10 focus groups are considered to be sufficient, but instead of looking for the number of sessions, researchers should collect data until they reach the saturation in the same manner as individual interviews. Depending on the complexity of questions to be asked in focus groups, the length of discussion is usually 90 – 120 minutes. This methodology is particularly useful when collecting rich data about a research question efficiently and quickly. Another advantage to be noted is that participants in a focus group can facilitate other participants by sharing their views. In that sense, researchers should be cautious when research questions are sensitive topics. Disadvantages of employing this approach include challenges to recruiting enough study participants, and participants’ too low or high involvement.

Trustworthiness and Rigor

In quantitative research, investigators show that their results are reliable and valid to ensure their quantitative research is meaningful. However, qualitative researchers have a tendency to use the terms rigor and/or trustworthiness to describe the quality of the work instead of the terms reliability and validity. According to Denzin, rigor is defined as researchers’ effort to make “data and explanatory schemes as public and replicable as possible.” Lincoln and Guba define that trustworthiness is “the findings of an inquiry are worth paying attention to, worth taking account of.” Based on the work by Guba and
Lincoln and Guba,\textsuperscript{153} Krefting lists four strategies (credibility, transferability, dependability, confirmability) and criteria under each strategy to achieve trustworthiness.\textsuperscript{146} Table 1.5 summarizes the strategies and criteria using Krefting’s work. It is important to note that all the criteria are not necessarily applied to every qualitative research to achieve trustworthiness.\textsuperscript{146}

Throughout this dissertation, investigators applied some of the criteria shown in Table 1.5 to increase trustworthiness. First, before conducting data collection, to reduce researcher bias, all research members completed Collaborative Institutional Training Initiative training (training on ethics related to research with human subjects) and received intensive training on qualitative research, including how to remain open, unbiased, and non-judgmental when collecting data. During interview sessions, a standardized interview guide was used to maintain consistency among research members ("interview technique" in Table 1.5).\textsuperscript{146} Interviewers summarized what an interviewee reported at the end of each interview to confirm if interviewers interpreted accurately ("member checking" in Table 1.5).\textsuperscript{146,153} Throughout each research process, methodologies and findings from each study were discussed with an expert in qualitative research ("peer examination" in Table 1.5).\textsuperscript{146} Additionally, two or more research members were involved in the data analysis to reduce researcher bias. After each data analyst independently analyzed the data, the analyst’s work was compared to other research members ("stepwise replication" in Table 1.5).\textsuperscript{146,153}
### Table 1.5. Strategies and Criteria to Establish Trustworthiness

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Criteria</th>
<th>Explanation</th>
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<tbody>
<tr>
<td><strong>Credibility</strong></td>
<td></td>
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</tr>
<tr>
<td>(= validity,</td>
<td>Prolonged and varied field experience</td>
<td>Spend adequate time with study participants so that researchers can determine repeated themes.</td>
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<tr>
<td>accuracy)</td>
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<td></td>
<td>Time sampling</td>
<td>Set a time window to observe the phenomenon (e.g., 1 min). Researchers need ensure that they observe the phenomenon under all possible situations (e.g., time of the year, time of day, different social contexts).</td>
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<tr>
<td>Reflexivity</td>
<td>Record information to reflect what/how/where/when researchers did, perceptions of the field experiences, findings, and any problems/questions introduced</td>
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<tr>
<td>(field journal)</td>
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<tr>
<td><strong>Triangulation</strong></td>
<td>Strategy to confirm the findings. There are four types:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1. <em>Triangulation of data methods</em>: Using different types of data collection methods to confirm the findings</td>
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<tr>
<td></td>
<td>2. <em>Triangulation of data sources</em>: Using various data sources in terms of time, setting, groups of people</td>
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<td></td>
<td>3. <em>Theoretical triangulation</em>: Use various theories in different disciplines (e.g., psychology, sociology)</td>
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<td></td>
<td>4. <em>Triangulation of investigators</em>: Having more than two trained researchers conduct data collection and data analysis</td>
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<tr>
<td>Member checking</td>
<td>Member=informants (study participants)</td>
<td>Continuously check with member if researchers represent study participants’ perceptions correctly throughout the research process (e.g., data, analyzed data, and conclusion).</td>
</tr>
<tr>
<td>Peer examination</td>
<td>Continuously discuss research process (e.g., methods, analytic categories) with other researchers who have qualitative research experiences</td>
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<tr>
<td><strong>Interview</strong></td>
<td>Ask interview questions differently and repeat questions</td>
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<tr>
<td>technique</td>
<td>Researchers = a measurement tool</td>
<td></td>
</tr>
<tr>
<td>Establishing</td>
<td>Data and its interpretations are consistent. If not, there should be a reason behind it.</td>
<td></td>
</tr>
<tr>
<td>authority of</td>
<td></td>
<td></td>
</tr>
<tr>
<td>researcher</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Referential</strong></td>
<td>Identify materials to represent the findings</td>
<td></td>
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<tr>
<td>adequacy</td>
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</tbody>
</table>

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Table 1.5. Continued

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Criteria</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Transferability</strong></td>
<td>Nominated sample</td>
<td>Using one or two judges to identify study participants of a group(^{158})</td>
</tr>
<tr>
<td>((=)generalizability)</td>
<td>Comparison of sample</td>
<td>As research proceeds, make comparisons of informants to their demographic information to find what characteristics (e.g., age) of people are missing in the profile.</td>
</tr>
<tr>
<td></td>
<td>to demographic data</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time sample</td>
<td>See explanation above</td>
</tr>
<tr>
<td></td>
<td>Dense description</td>
<td>Provide enough information about the study participants and research settings</td>
</tr>
<tr>
<td><strong>Dependability</strong></td>
<td>Dependability audit</td>
<td>Demonstrate whole research process so that others can depend on the researchers</td>
</tr>
<tr>
<td>((=)reliability, rigor)</td>
<td>Dense description of</td>
<td>Provide enough information about research methods</td>
</tr>
<tr>
<td></td>
<td>research methods</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Stepwise replication</td>
<td>Research teams divide the data, work independently, and compare the results.</td>
</tr>
<tr>
<td></td>
<td>Triangulation</td>
<td>See explanation above</td>
</tr>
<tr>
<td></td>
<td>Peer examination</td>
<td>See explanation above</td>
</tr>
<tr>
<td></td>
<td>Code-recode procedure</td>
<td>Code part of data, wait at least two weeks, recode the same data, and compare the results.(^{146})</td>
</tr>
<tr>
<td><strong>Confirmability</strong></td>
<td>Confirmability audit</td>
<td>Check the research process by an auditor who is not involved in the research to examine the process(^{146})</td>
</tr>
<tr>
<td>((=)replicable)</td>
<td>Triangulation</td>
<td>See explanation above</td>
</tr>
<tr>
<td></td>
<td>Reflexivity</td>
<td>Recognize that researchers’ background (e.g., perceptions, interests, beliefs, knowledge) could influence the research process(^{159}) Researchers play a central role.</td>
</tr>
</tbody>
</table>
SUMMARY AND CONCLUSION

Childhood obesity is a significant public health issue in the US. Obese children are more likely to become obese adults, and some consequences of adult obesity include: hypertension, diabetes, coronary heart disease, and stroke. Because more than half of preschool-aged children spend their time at center-based childcare sites, more attention should be paid to preschool settings, the preschool mealtime environment, and preschool teachers’ roles to address and prevent early childhood obesity.

The overall goal for this dissertation was to conduct exploratory research to understand the current situation related to preschool teachers’ perceptions regarding the mealtime environment. Using the findings from this dissertation work, we hope to develop nutrition educational materials to help preschool teachers create a PME in order for preschoolers to develop healthy eating habits.

OVERVIEW OF DISSERTATION CHAPTERS

This dissertation includes five chapters. Chapter 1 focuses on background on early childhood obesity, a preschool role of early childhood obesity prevention, and what is known about preschool mealtime environments. Chapters 2 through 4 present the dissertation research. In this dissertation, due to the exploratory nature of the research topic, researchers employed qualitative methods, and the investigators chose individual interviews to understand complicated phenomenon in depth and detail. Chapter 5 summarizes dissertation research findings and research significance from Chapter 2, 3, and 4, and
discusses future research resulting from this work. The following sections describe each research purpose, methodologies, and research significance in Chapters 2 through 4.

**Chapter 2.** This qualitative research assesses Head Start teachers’ perceived barriers, facilitators, motivators, and needs to get preschoolers to eat FV. To answer this research question, investigators conducted in-depth, face-to-face individual interviews with Head Start teachers in central NC. Researchers asked teachers open-ended questions along with probes about their views related to preschoolers’ FV consumption. Investigators utilized this approach because this provided privacy, and it allowed choosing a time and location for the interview that was most convenient to potential study participants. This exploratory research will provide important information to develop educational materials and interventions for preschool teachers to help increase preschoolers’ FV consumption.

**Chapters 3 and 4.** Chapters 3 and 4 come from one project, investigating how Head Start teachers in the US define a PME, and what their perceived barriers, facilitators, motivators, and needs are to create a PME. Chapter 3 focuses on Head Start teachers’ perceptions on how they define a PME, and Chapter 4 examines Head Start teachers’ perceived barriers and needs to create a PME at preschool. In Chapter 4, utilizing the interview data, researchers suggest potential solutions for barriers that prevent teachers from trying to establish a PME. Research members conducted individual phone interviews with Head Start teachers around the US and asked open-ended questions. In both chapters, the researchers conducted phone interviews which enabled researchers to reach geographically dispersed respondents. This research will help understand preschool teachers’ perceptions
about a PME and will add to the current literature regarding future training and interventions
to assist teachers in creating a classroom PME.
CHAPTER 2: A QUALITATIVE INVESTIGATION OF TEACHERS’ INFORMATION, MOTIVATION, AND BEHAVIORAL SKILLS FOR INCREASING FRUITS AND VEGETABLES CONSUMPTION IN PRESCHOOLERS

Abstract

Objective: Using the Information-Motivation-Behavioral Skills (IMB) model as a framework, researchers qualitatively assessed preschool teachers’ perceived motivation, facilitators, and barriers related to getting preschool children to eat fruits and vegetables (FV).


Results: Participants reported the need for FV-related information (Information) to improve FV consumption in children, perceived themselves to be parents at school (Motivation), and reported using conditional rewards and punishment statements to get preschoolers to eat FV (Behavioral Skills).

Conclusions and Implications: Nutrition educators may use the IMB model to develop education materials targeting increases in preschoolers’ FV consumption. To motivate preschool teachers who see themselves as parents at school (Motivation), nutrition educators can provide teachers with FV-related information that was reported as their needs (Information), and supportive feeding practices (Behavioral Skills) to get preschoolers to consume FV.

This chapter was submitted as a manuscript for publication with Eileen Li, BS, and L. Suzanne Goodell, PhD, RD.
Introduction

Few preschool children (3- to 5-year-olds) in the US consume adequate fruits and vegetables (FV).\textsuperscript{100} An even greater need may exist among preschoolers from low-income families, as lower-income individuals are less likely to meet the daily FV recommendations.\textsuperscript{161} This poor consumption during early childhood can pose problems that should be addressed through evidence-based interventions because the preschool period is a critical stage for forming lifelong eating habits\textsuperscript{3} and because FV consumption has been associated with diet-related chronic diseases.\textsuperscript{94} A number of factors shape preschool children’s FV intake, including repeated exposure to foods, food neophobia (“unwillingness to eat novel foods”\textsuperscript{162}), and parental food preference.\textsuperscript{162-164} For children attending preschool, peer consumption\textsuperscript{41,165} and teacher feeding practices\textsuperscript{29,125} also influence preschoolers’ FV consumption and acceptance.

As more than half of children spend their waking times at center-based preschools,\textsuperscript{69} parents often share their role as caretaker and mealtime managers with preschool teachers. In response to this trend, researchers and nutrition educators have attempted to improve the way teachers interact with children, encouraging the development of healthy eating habits.\textsuperscript{4-7} In spite of these efforts, teachers’ practices are not always supportive of building healthy eating habits,\textsuperscript{113,116} which can be counterproductive (e.g., contributing to a child’s dislike of FV or unwillingness to try new foods). These counterproductive practices could result from a lack of standardized guidelines about\textsuperscript{28,44,121,122} and limited training for teachers that support healthy eating among preschoolers. In a study of 4 Western states, less than 24% of staff from preschools included in the study received yearly training related to child feeding, with
the majority receiving their training from Child and Adult Care Food Program personnel who focus their efforts on program compliance rather than establishing an eating environment that models and encourages healthful eating behaviors.\textsuperscript{113}

While much attention is paid to parental influence on child FV consumption,\textsuperscript{166-171} little is known about the impact teachers have on preschoolers’ FV intake and the factors that mediate their influence.\textsuperscript{29,125} The ultimate goal of this project was to develop theory-based educational intervention to assist preschool teachers in increasing preschoolers’ FV consumption during mealtimes, particularly teachers that serve children from low-income families. To achieve the overall goal of this project, the first step and the purpose of this study was to assess Head Start teachers’ perceptions related to increasing preschoolers’ FV consumption using the Information-Motivation-Behavioral Skills model (IMB) as the theoretical framework. Head Start is a federally-funded preschool program serving children from low-income families.

The IMB model originated in Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome research\textsuperscript{172,173} and has more recently been applied to the nutrition field.\textsuperscript{174} Figure 2.1 represents the IMB model in general. Each construct (Information, Motivation, and Behavioral Skills) of the model includes subconstructs that could impact an individual behavior, resulting in the desired health outcome. Information is comprised of facts, heuristics, and implicit theories. Motivation consists of personal motivation and social motivation. The Behavioral Skills construct is divided into two subconstructs: abilities and self-efficacy. The Information and Motivation constructs directly influence the Behavioral Skills construct and directly or indirectly impact Behavior. The
Behavioral Skills construct directly impacts the Behavior construct. By articulating factors that teachers perceive to influence preschool children’s FV consumption to the IMB model, the researchers are able to build part of the framework for the aforementioned intervention.

**Figure 2.1.** Information-Motivation-Behavioral Skills Model with Subconstructs

**Methods**

**Research Design**

To explore teachers’ perceptions related to increasing preschoolers’ FV consumption, researchers conducted in-depth, face-to-face individual qualitative interviews with Head Start teachers. North Carolina State University’s Institutional Review Board approved the methods included in this study.
Sampling and Recruitment

The investigators used a convenience sample\textsuperscript{176} to recruit 28 Head Start preschool teachers from 7 centers serving predominately African American and Hispanic children in central North Carolina. To be included in this study, participants had to be preschool teachers or teacher assistants, be over the age of 18, work with 3- to 5-year-olds, and be present with preschool children during mealtimes. Researchers recruited teachers during staff meetings and in individual classrooms.

Measurement Instruments

To increase consistency in data collection, in all interview sessions interviewers used a standardized interview guide, including major questions along with probes. The principal investigator and researchers with community nutrition expertise drafted the questions in the interview guide. Research lab members edited the guide to improve the clarity and the appropriateness of language in questions for the target audience. Table 2.1 lists the main questions in the interview guide. To improve the credibility of the data,\textsuperscript{146} prior to data collection the interviewers completed training on ethics related to research with human subjects and how to remain open, unbiased, and non-judgmental during the interview process. As part of the training, interviewers also conducted a pilot as a mock interview with observer feedback.
Table 2.1. Main Questions in the Preschool Teachers’ Interview Guide$^d$

<table>
<thead>
<tr>
<th>Topic</th>
<th>Questions</th>
</tr>
</thead>
</table>
| Motivators | • What are some reasons why you would want preschoolers to eat fruits and veggies?  
• Can you tell me what are some reasons why you or someone wouldn’t want preschoolers to eat fruits and veggies?  
• When you're trying to get preschoolers to eat fruits and veggies, how does it make you feel? |
| Barriers | • What are some challenges to getting preschoolers to eat fruits and veggies? |
| Behavior Skills (Facilitators) | • How do you get preschoolers to eat fruits and veggies?  
• What are some tricks/strategies/tactics/rules that parents should not use to get their child to eat fruits and veggies?  
• If you could have anything at all to help you get preschoolers to eat fruits and veggies, what are things you might need?  
• What are things you might want to learn about how to get preschoolers to eat fruits and veggies?  
• If any, what are some things you might want to know how to do to get preschoolers to eat fruits and veggies? |

Data Collection Procedures

Two trained graduate research assistants with no prior relationship with the preschools or the teachers conducted one-on-one interviews with 28 Head Start teachers. In the first phase of data collection and analysis, researchers conducted 24 interviews, at which time they believed they had reached theoretical saturation. A second round of 4 interviews confirmed all major findings from the first wave of data collection, and thus data collection was terminated. The researchers collected the data between January and October 2011 at the participants’ place of employment. Prior to the interview, researchers provided each potential

$^d$ Questions are not presented in the order found in the interview guide.
participant with a copy of the consent form, reviewed the document with them, and provided opportunity to answer any questions that arose. After obtaining signed, informed consent, the interviewer began the interview session with a series of warm-up questions to help participants feel more comfortable speaking to the interviewer. The questions became progressively more focused, inquiring about preschool teachers’ perceptions related to increasing preschoolers’ FV consumption.

To increase trustworthiness of the results, at the end of the interview the interviewers summarized the participants’ statements and then asked for confirmation and clarification of the findings. After the interview, participants completed a demographic survey. The interviews lasted 26 minutes on average, depending on the length of the participant’s response to each question. All but two interview sessions were recorded in a digital audio format. Two recordings were not available due to a technical malfunction of the audio recorder. After each interview session, the interviewer recorded in a field notebook details about what the participant discussed in the interview.

Analysis

All audio recordings were transcribed verbatim and entered into QSR NVivo software package (NVivo version 9, QSR International, Melbourne, Australia, 2010). As each transcript was produced, the primary author reviewed its contents to determine when theoretical saturation had occurred. After termination of data collection, a coding manual was developed by cursorily reviewing 10 transcripts and identifying common codes. Then, researchers edited the coding manual to clarify definitions of each code. Two analysts coded
one transcript together and discussed outcomes to clarify operational definitions for each
code. Then, these analysts independently coded 5 transcripts, comparing codes and resolving
discrepancies after each transcript to evaluate initial coding reliability. Researchers used a
Kappa coefficient\textsuperscript{177} from QSR NVivo software as a measure of reliability. Once an overall
inter-rater reliability of 0.80 was obtained for the first 5 coded transcripts, the pair equally
divided the remaining transcripts and coded them independently. Five of the remaining 20
transcripts were coded by both analysts. The final inter-rater reliability among 10 transcripts
ranged from a Kappa coefficient of 0.76 to 0.88 within the 5 major coding categories
(Barriers, Facilitators, Negative facilitators, Motivators, and Needs). A Kappa coefficient of
0.75 or higher is categorized as “excellent agreement” between the data analysts.\textsuperscript{178} During
the coding process, the analysts employed consensus building when discrepancies arose in
the coding process.

Once coding was complete, the two researchers analyzed the quotes within the codes
to determine dominant emergent themes using directed content analysis.\textsuperscript{179} Then, they
articulated those dominant emergent themes to the IMB model, identifying whether each
theme fit into the Information, Motivation, and/or the Behavioral Skills constructs or whether
it fit into none of them. A third researcher critically evaluated the pair’s findings and
compared them with the coded transcripts to confirm that the outcomes reflected the data and
to identify areas needing additional reflection and analysis within the group.
Results

The study participants were all female with an average age of 35.6 ± 10.6 years old and an average years of work experience in preschool childcare of 7.5 ± 6.3 years. All participants had a degree from some college or technical school at least. Sixty-one percent of teachers were Black or African American, 29% were White, and 11% were other. During analysis, 6 major themes emerged that could be categorized under at least one component in the IMB model. In the Information construct, teachers perceived they lacked facts about FV. In Motivation, teachers believed themselves to be parents at school and discussed both intrapersonal and interpersonal factors in the children that would impact a teacher’s ability to successfully increase children’s FV consumption. Lastly, in the Behavioral Skills construct, teachers discussed the strategies and skills they used to encourage children to eat FV, as well as their self-efficacy related to successfully increasing children’s FV consumption.

Lack of Facts (Information)

Overall, the participants perceived that eating FV among preschoolers is linked to the children’s positive health outcomes. Teachers reported that they used FV-related information (e.g., where an apple comes from) to get preschoolers to eat FV during mealtimes. Study participants also stated that they encourage their students to eat FV by saying, “FV are good for you” or “oh, you’re going to be so big and strong.” The majority of teachers, however, emphasized their lack of knowledge and the need for information about health benefits to preschoolers for eating FV. For example, teachers wanted to know which FV are good for
what part of the body. One teacher said, “...how the fruits and vegetables can be good for their body health, I want to learn more about that.”

Among study participants, children’s rejection of eating FV was perceived as the most common challenge that teachers face during mealtimes. Teachers discussed the negative feelings (e.g., sad, frustrated, upsetting, exhausted) they experience when their students reject FV, but they did not discuss “food neophobia” and its role in a child’s acceptance of new foods. An example to represent this is “Only if I have tried many and many times and the child will still say no, they don’t want to try, then that’s the only time I’ll have some bad feelings.”

**Parents at School (Motivation)**

Researchers found that teachers perceived themselves to be parents at school. They saw themselves as responsible for their students’ health and happiness, not just their academic success. In the interviews, some teachers referred to their students as “my kids,” as opposed to “my students.” As positive motivators, the majority of teachers mentioned that they wanted to expose preschoolers to healthy food at school. Teachers in the study also mentioned that they wanted to help their students develop healthy eating habits for a child’s development and growth because their students may not be exposed to healthy food at home. A teacher said, “...[children] are with me 8:30 until 2:30 and they need some type of vegetables or fruits in their body to keep them going through the day.”
Intrapersonal Factors (Motivation)

Teachers mentioned a child’s intrapersonal factors as barriers that prevent teachers from trying to get their students to eat FV. Intrapersonal factors are those barriers or challenges that occur within an individual (preschooler) self. Researchers found two types of barriers under this theme. The first type is children’s rejection, which was previously noted in the Lack of Facts theme. The majority of teachers mentioned that children reject eating FV because of the texture (e.g., mushy FV) and appearance (e.g., black spots on bananas) of FV or that children refuse to eat FV without obvious reasons. According to the teacher, “Just one kid, if there is something he doesn’t like, he tells me he doesn’t like peaches and I ask him to try them, he says I already did, then I don’t really know what to say.” Discussed less frequently, children’s negative physical outcomes are the second type of intrapersonal factor acting as a barrier. According to the teachers, examples of this type of barrier include children’s allergic reactions to certain types of FV (e.g., strawberries).

Interpersonal Factors (Motivation)

Researchers also identified interpersonal barriers to teachers getting their students to eat FV. On the interpersonal level, teachers perceive barriers between a child and individuals around the child (e.g., parents or other children). Teachers reported lack of parental support for getting children to eat FV, saying that young children are not exposed to FV at home because their parents do not eat FV. In addition, teachers reported that parents easily give up when trying to get their child to eat FV. According to teachers, because parents do not encourage their children to eat FV at home, children are less open to trying FV at school:
“Challenges are sometimes [parents] won’t eat with [their children] at home, their families won’t eat [FV], it’s something new that’s being introduced to them, so trying to get them to at least try it, that’s a major challenge.”

Other children can also create barriers or become facilitators for teachers trying to get preschoolers to eat FV. If a child’s friends are eating FV, then he or she is likely to try it. Conversely, if a child’s friends say something negative about FV, then the child is likely to hesitate to try it. A teacher reported “…one of their peers says ‘I don’t like that!’ and the next one will say, ‘I don’t like that either!’ It’s a snowball effect.” Peers in the classroom can influence a child’s FV consumption both positively and negatively; therefore, peers can be a facilitator or barrier to getting preschoolers to eat FV at mealtime.

Ways to Encourage Children to Eat FV (Behavioral Skills)

Study participants reported several ways they get preschoolers to eat FV during mealtimes. One of the common ways teachers encouraged preschoolers to eat FV was by using a conditional reward or punishment statement. The conditional reward or punishment statements included “if you eat A (or clean your plate), then you can get B (e.g., seconds, sticker)” and “if you do not eat A, you cannot get B (e.g., child’s favorite food item).” A in these statements is FV. One of the study participants said, “...I told him he couldn’t have more of the fruit until he tried the vegetable and he ate the whole thing because he ended up liking it. So that’s always encouraging.” Teachers also discussed the role modeling strategies they employed to get preschoolers to eat FV during mealtimes. Teachers said they recognized the importance of being a role model by sitting at the table and eating the same food with
children. As presented in the Lack of Facts theme, teachers also reported providing children with FV-related information to get preschoolers to eat FV, for example, where FV grow, health benefits of consuming FV, and sensory expressions of FV (e.g., taste, smell, texture, and sound).

**Self-Efficacy (Behavioral Skills)**

Most of the participants mentioned that they tell children “Just try it [FV]” to encourage children to eat FV. The majority of teachers recognized they should not force children to eat FV and also noted that children might not like eating FV if they push too hard; yet, some teachers reported uncertainty about appropriate ways to get preschoolers to eat FV and wanted to know additional strategies. According to one teacher, “I’m trying to encourage them. I don’t want to run them away from either, you know, I feel like there is a fine line... if you push too hard... depending on the child they may not be accepting of that...”

**Discussion**

Using qualitative analysis, researchers assessed preschool teachers’ perceptions related to increasing FV consumption in preschoolers and articulated the results to the IMB model. Participants’ perceptions provided valuable insights for developing education materials that use the IMB model as a theoretical framework.

Overall, the study participants were aware of the importance of getting preschoolers to eat FV, similar to reports studying parents of preschoolers. Although teachers seemed
to recognize the health benefits of consuming FV, teachers discussed that they wanted more FV-related information, including health benefits to consuming FV and daily recommendations for FV for preschoolers, as well as viable strategies to get young children to eat FV. Evidence suggests that if teachers both model and verbally encourage FV consumption for their students, preschooler FV intake at mealtime can increase.\textsuperscript{29} Future work could investigate how teachers use the health benefit information received through educational interventions in their classrooms and how this usage impacts child FV consumption.

The study’s results are consistent with previous research showing that children’s food refusal is a challenge among preschool staff when trying to foster healthy eating in preschoolers.\textsuperscript{126} The study participants reported that teachers felt negative feelings (e.g., frustration and sadness) when the students in their classroom refused to eat FV. This negative experience may prevent teachers from encouraging their students to eat or try FV. Food neophobia is an important developmental mechanism for young children to accept new foods.\textsuperscript{182} Teachers in the study appeared to be familiar with the challenges associated with food neophobia but were discouraged when dealing with children who were learning to like new foods. Learning how children learn to like new foods and learning strategies for overcoming food neophobia might mitigate teachers’ negative feelings toward their students when the children do not want to eat FV.

According to the IMB model, preschool teachers’ motivation plays a key role in getting preschoolers to eat FV. Study participants perceived themselves as parents at school, portraying an intrinsic desire to positively impact their students’ current and future health and
wellbeing. As with parents of preschoolers, teachers wanted preschoolers to eat FV for the health benefits of consuming FV. Nonetheless, as supported by previous work, teachers faced challenges at both the intrapersonal (i.e., within a child) and interpersonal (i.e., individuals around a child) levels that discouraged them from getting their students to eat FV. To overcome these perceived challenges, a comprehensive nutrition education program about healthy eating should target parents, teachers, and preschoolers. Some nutrition-related curricula, interventions, and programs have been designed to help children develop healthy eating, try new foods, or increase their nutrition-related knowledge. However, few nutrition-related interventions involve parents/families, teachers, and preschoolers. To overcome the challenges that the study participants reported, nutrition education programs should be modified to include comprehensive healthy eating programs that target all these groups (parents, teachers, and preschoolers).

In the IMB model, preschool teachers’ behavioral skills theoretically impact preschoolers’ FV consumption. Although teachers encouraged children to eat FV by sitting and eating the same food with children (i.e., role model) as recommended, teachers also reported using conditional reward and punishment statements to get preschoolers to eat FV, which are considered by nutrition experts to be “nonsupportive practices” to prevent obesity in early childhood. These findings provide clear direction and need for teacher training.

There were a number of limitations associated with this study. Because this formative study investigated teacher perceptions in central North Carolina, reduced geographic scope may limit generalizability of this study to other states in the US. Additionally, semi-structured interviews can be subject to social desirability bias. Thus, participants may have
skewed their answers toward more positive responses about FV consumption among preschoolers. However, during the interview process, the two interviewers tried to minimize this bias by remaining open, unbiased, and non-judgmental as well as by emphasizing that they were not looking for right or wrong answers. Despite these limitations, researchers believe that this study expands the understanding of preschool teachers’ perceptions regarding increasing FV consumption in preschoolers.

**Implications for Research and Practice**

This qualitative research study assessed teachers’ perceptions related to preschoolers’ FV consumption at school and applied the IMB model to the results. Nutrition educators may use the constructs within the IMB model to develop education materials and interventions for preschool teachers targeting increases in preschool children’s FV consumption. While capitalizing on the notion that preschool teachers see themselves as parents at school, nutrition educators should provide teachers with their reported needs, including FV-related information such as health benefits of eating FV, FV serving size for preschool children, and various strategies for overcoming food neophobia and getting young children to eat FV. Because the teachers in this study identified parents as important influencers to encouraging FV consumption in preschool children, nutritionists should involve parents as well as teachers in education when implementing interventions. Future research should include a qualitative study applying the IMB model to assess parents of preschoolers’ perceptions related to getting their children to eat FV at home and quantitative investigations assessing the generalizability of these findings to larger populations.
CHAPTER 3: AN EXPLANATORY MODEL OF TEACHERS’ PERCEPTIONS OF A POSITIVE MEALTIME ENVIRONMENT IN A PRESCHOOL SETTING*

Abstract
Preschools and preschool teachers can play a vital role in helping children promote lifelong sound nutrition habits. As acknowledged by the Academy of Nutrition and Dietetics, providing a positive mealtime environment (PME) may be key to fostering a child’s healthy eating habits in the classroom. However, the Academy has not provided a specific definition of a PME, the components of a PME, or directions on how to create it. The purpose of this study, therefore, was to explore Head Start teachers’ perceptions related to a PME and create a model representing these perceptions. To achieve this purpose, researchers conducted 65 in-depth phone interviews with Head Start teachers around the US. Applying principles of grounded theory, researchers developed a model depicting teachers’ perceptions of PME, consisting of five key components: (1) the people (i.e., teachers, kitchen staff, parent volunteers, and children), (2) positive emotional tone (e.g., relaxed and happy), (3) rules, expectations, and routines (e.g., family-style mealtime), (4) operations of a PME (i.e., eating, socialization, and learning), and (5) both short- and long-term outcomes of a PME. With this PME model, researchers may be able to enhance the effectiveness of nutrition interventions related to a PME, focusing on the factors in the model as well as barriers associated with achieving these factors.

* This chapter was submitted as a manuscript for publication with Samuel A Gray, BS, and L. Suzanne Goodell, PhD, RD.
Introduction

More than half of preschoolers, who are aged 3 to 6 years and not enrolled in kindergarten, receive some type of care at center-based programs. Attending a preschool center may help children establish important skills and essential knowledge that promote a healthy lifestyle. To identify how preschool centers help preschoolers develop sound nutrition habits, researchers are focusing on many aspects of preschool life, including the practices preschool teachers use to support their students’ development of healthy eating habits.

Included within preschool teachers’ practices at mealtimes, providing a positive mealtime environment (PME) may be key to developing lifelong healthy eating habits in children. In a position paper about nutrition in preschool centers, the Academy of Nutrition and Dietetics (the Academy) acknowledged the importance of the preschool teachers’ role in creating a PME, stating: “[c]hild-care providers should be knowledgeable about…strategies for creating a positive mealtime environment….” However, the Academy did not provide a specific definition of a PME, the components of a PME, or directions on how to create it. This lack of clear and consistent guidelines at the national level could cause inconsistency between staff members and volunteers at preschool, administrators, and researchers, resulting in the creation of an unsupportive mealtime environment. Thus, there is a need to add to the existing quantitative studies related to mealtime environment by qualitatively exploring constructs of a PME, particularly by investigating how preschool teachers perceive the complexity of a PME.
The purpose of this study, therefore, was to elucidate Head Start teachers’ perceptions related to a PME and to create a model representing these perceptions, thus conceptualizing the complexity of mealtimes at preschools and illustrating the factors that influence a PME. To accomplish this goal, researchers interviewed Head Start teachers across the US, asking them to define a PME in a preschool setting and to identify the factors that influence the creation of a PME. Researchers will use the findings from this study to develop educational materials to assist preschool teachers in establishing a PME and supporting the development of long-term healthy eating habits in their preschool-aged children.

Material and Methods

Research design

Applying principles of grounded theory\textsuperscript{185,186} to explore Head Start teachers’ perceptions of a PME, researchers conducted 65 in-depth phone interviews with Head Start teachers in the US between March 2012 and February 2013. While recognizing the importance of conducting the present study with all preschool teachers regardless of who they serve, researchers targeted teachers at Head Start (i.e., the federally funded preschool program for children from low-income families) because these teachers work with low-income children who are at greater risk for obesity\textsuperscript{187} and low intake of some of the essential nutrients.\textsuperscript{92} North Carolina State University’s Institutional Review Board approved the methods included in this study.
Sampling and recruitment

Head Start preschool teachers in the US were recruited from centers serving different proportions of ethnic groups (e.g., African American, Caucasian, Hispanic, Asian, and Native American). To be included in the study, participants were required to be either Head Start preschool teachers or teacher assistants, be over the age of 18, work with three- to five-year-olds, and be present with preschool children in a classroom (not in a cafeteria) during mealtimes. Investigators combined a nationwide sampling technique with snowball sampling for recruitment. First, using the guidance of Census Regions and Divisions of US, researchers aimed to recruit 20 study participants per region (i.e., West, Midwest, Northeast, and South). Researchers searched Head Start information, such as name and address, using the Head Start Locator tool provided by US Department of Health and Human Services to obtain contact information for Head Start center directors and administrators. Then, investigators asked administrators and center directors to forward a recruitment email to teachers and/or to aid in identification of teachers who might be willing to participate in the project. Additionally, to aid in recruitment, at the end of each interview researchers asked study participants to help recruit other teachers they knew might be interested in participating in the study. Interviewers and researchers had no established relationships with participants or their centers prior to data collection. Administrators and center directors were not told which of their teachers, if any, participated in the study; the research confidentiality plan, along with other parts of the consent form, was explained to participants before verbal consent was given.
Measurement instruments

To insure consistency in data collection, interviewers used a standardized interview guide, which included open-ended major questions and probes, in all the interview sessions. The interview questions were preceded by a series of warm-up questions designed to help teachers feel more comfortable speaking with the interviewer. The questions then became more focused as the interview progressed, eliciting Head Start teachers’ perceptions related to a PME. The lead author drafted the guide, and the research team critically reviewed the interview guide questions to improve the clarity and appropriateness of the language for the target audience. Table 3.1 summarizes the main questions in the guide.

To improve the credibility of the data, interviewers received extensive training prior to data collection, including training in ethics related to research with human subjects; how to remain open, unbiased, and non-judgmental during the interview process; and how to summarize the participant statements at the end of the interview. Before data collection, each interviewer pilot-tested the guide with at least one person from the research team and one non-Head Start preschool teacher. After each pilot, the interviewer received constructive criticism about his or her interviewing skills from the lead author.
Table 3.1. Key questions in the Head Start Teachers’ Interview Guide

<table>
<thead>
<tr>
<th>Definition</th>
<th>How do you define a positive mealtime environment?</th>
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</thead>
<tbody>
<tr>
<td>Facilitators</td>
<td>Who is involved in creating a positive mealtime environment?</td>
</tr>
<tr>
<td></td>
<td>What is your role as a teacher in creating a positive mealtime environment?</td>
</tr>
<tr>
<td></td>
<td>What do you do to create a positive mealtime environment?</td>
</tr>
<tr>
<td></td>
<td>What is your co-teacher’s role in creating a positive mealtime environment?</td>
</tr>
<tr>
<td></td>
<td>What are the children’s roles in creating a positive mealtime environment?</td>
</tr>
<tr>
<td>Motivators</td>
<td>What are some reasons, if any, why you or other teachers would want to create a positive mealtime environment?</td>
</tr>
</tbody>
</table>

Data collection procedures

Five trained research assistants (4 female and 1 male) conducted phone interviews with 65 Head Start teachers. The interviewers encouraged potential study participants to find a quiet, secluded place to sit during the interview. Prior to starting the interview, interviewers reviewed the previously e-mailed consent form with potential participants and provided participants the opportunity to ask questions concerning the interview process. After obtaining verbal informed consent, the interviewers asked participants demographic questions, ice-breaker questions, and then a series of questions in five categories related to a PME, including: definition, facilitators, motivators, barriers, and needs assessment. To increase overall trustworthiness of the data, interviewers summarized participant answers at the conclusion of the interview. The interviewer then requested feedback from the participants to increase the accuracy of the interviewers’ interpretation, as well as to give interviewees an opportunity to add anything that the interviewers may have missed. Each

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1 Questions in the guide were not asked in this order.
phone interview lasted an average of 50 minutes (range: 31-109 minutes). After each interview, interviewers wrote a summary of participant answers and recorded field notes about the teacher’s demeanor (e.g., How open was the teacher about the topics discussed?). All interview sessions were digitally audio-recorded and transcribed verbatim.

Analysis

Researchers entered all the transcripts into QSR NVivo to manage the data (QSR International, 2010). While collecting the data, the lead author conducted an initial analysis of the interviews to determine when researchers had reached theoretical saturation. This analysis was based upon discussions from weekly research meetings, transcripts of the interviews, and interview notes. Once saturation was reached, data collection was terminated.

Following a grounded theory approach, data analysis included the following phases: (1) open coding, (2) axial coding, and (3) selective coding. During the open coding phase, the lead author read all 65 transcripts and reflected on the data by adopting a memoing technique. Then, the lead author developed a coding manual by critically reviewing the notes from initial analyses, preliminary findings, and memos recorded during open coding phase. During weekly meetings, five data analysts, including the lead author and one interviewer, edited the coding manual to clarify the definitions for each code. An expert in qualitative research with a background in community nutrition critically reviewed the coding manual, and researchers used her feedback to finalize the manual.

Next, to improve the coding process by establishing each data analyst understood the operational definitions for each code in the same manner as all of the other analysts, all five
data analysts coded one transcript together. To further establish consistency in coding, all five data analysts coded another transcript independently, and then met as a group to compare codes and discuss discrepancies.

After the data analysts had coded two transcripts and the lead author believed consistency in independent coding had been established, full consensus coding began. The remaining 63 transcripts were divided between four of the analysts for independent coding. The lead author coded all of the transcripts independently and then met with each analyst separately to compare transcript codes. During this meeting, the lead author determined if the analyst coded the transcript in the same way as she did through verbal consensus.\textsuperscript{186} When discrepancies arose in this process, the two analysts discussed whether or not a particular code should be assigned to a quote. In cases when the two analysts could not agree on a code for a quote, these discrepancies were presented in a group meeting, and the five analysts determined the final code as a group.

Once coding was complete, the lead author transitioned to axial coding: inductively and deductively finding relationships among the codes identified in open coding. The goal in this phase was to determine casual conditions, strategies, contextual and intervening conditions, and consequences\textsuperscript{186,191} associated with the central phenomenon (PME). In the last phase of data analysis, selective coding, researchers selected a core category (i.e., central phenomenon: PME) and then developed a theoretical framework from the core category.\textsuperscript{186,191} In this phase, an initial model consisting of five major elements (central phenomenon, casual conditions, strategies, conditions and context, and consequences) was then revised through an iterative process; the lead author condensed and modified the model
multiple times based on the feedback from the four data analysts and discussions with the qualitative research expert.

**Results**

Among the 65 Head Start teachers, the average length of working experience with preschool children was 14.4 ± 9.8 years, and the average age was 40.7 ± 12.1 years. Almost all of our study participants were female (97%) and predominately Caucasian (66%) or African American (22%). The majority (95%) had at least an associate degree from a technical school or college.

*A Model for Positive Mealtime Environment*

Figure 3.1 depicts a model of Head Start preschool teachers’ definition of a PME, including the general outcomes resulting from a PME. The following sections cover components of a PME in Figure 3.1: (1) the people, (2) positive emotional tone, (3) rules, expectations, and routines, (4) operations of a PME, and (5) outcomes of a PME.
According to our participants, two important groups of people help to create a PME at preschool: adults and children. Adults include teachers, kitchen staff, and parent volunteers, and their main roles are to help children eat and practice their social skills (Figure 3.1). As the main facilitator, teachers lead and are always present at mealtimes. Kitchen staff and parent volunteers are not always present at mealtimes, but when they are, they can play a

**Figure 3.1.** Model of Head Start Preschool Teachers’ Definition of a Positive Mealtime Environment
critical role in supporting teachers in creating a PME. Children are to participate in the mealtime by eating, socializing with adults and peers, and learning (Figure 3.1).

*Positive Emotional Tone*

According to teachers, the children and adults involved in mealtimes can both positively and negatively influence the creation of a PME through setting the emotional tone. One teacher in our study described the importance of emotional tone and its impact on mealtime: “If you think about it as an adult, if your waiter gives you bad service, or you hear someone yelling, or someone yells at you, you don’t really want to eat, and it’s definitely the same with the kids.” Participants stated that a PME includes a positive emotional tone (Figure 3.1), a collective of emotions that makes an entire mealtime atmosphere positive, wherein adults and children feel relaxed, happy, fun, safe, comfortable, and calm. Under certain rules, expectations, and routines (Figure 3.1), adults facilitate setting a positive emotional tone through their positive behavior (e.g., tone of voice, positive reinforcement, and enthusiasm). As a result, three operations (eating, socialization, and learning) in Figure 3.1 function favorably, leading to positive feelings in both adults and children and then establishing a positive emotional tone. One teacher summarized the effect of a positive emotional tone, saying that in a PME everyone is “… very relaxed. And when I mean relaxed, I mean one where the children are engaging in conversation with each other and the teachers, where the children are trying new food, experiencing new things.”
Rules, Expectations, and Routines

In a PME, teachers and other adults in the classroom set certain rules, expectations, and routines, helping children anticipate and prepare for the interactions that are to take place before, during, and after the meal. One teacher said, “The children know what’s going to happen before meal time, during meal time, and after meal time...the children think of it as security, in that everything is the same [each meal] and I think that’s really important.” These rules, expectations, and routines differed from classroom to classroom; however, teachers often emphasized one commonly utilized and rather important routine: family-style mealtime. One teacher said family-style mealtime is important because it embodied all of the components of a PME: “...carrying on a lot of rich conversation with open ended questions and encouraging children to try new foods, modeling, trying new foods...Our big thing is family-style.” Teachers discussed that the rules, expectations, and routines help set a positive emotional tone, mitigating negative outbursts from the children and facilitating the three key operations of a PME (eating, socialization, and learning) (Figure 3.1).

Operations of a Positive Mealtime Environment

According to the teachers, there are three main operations of a PME: eating, socialization, and learning (Figure 3.1). Each operation has inherent outcomes attached to it (not shown in Figure 3.1). These inherent outcomes are immediate outcomes, expected to be achieved during mealtimes.

The first operation of a PME is eating. As shown in Figure 3.1, both adults and children are expected to eat in a PME. According to the teachers, adults should eat the same
food as children to give their students a role model. One teacher said, “[My eating] serves as a role model, so that if the children see me drinking milk and eating carrots, they’ll be more likely to try it themselves.” Teachers also expressed the importance of children eating in a PME, so that they can receive nutrients required for that day. Teachers said their students should eat at school because preschoolers with whom they are working may not receive adequate nutrition at home. One teacher said, “You never know which child eats at home. You don’t know when was the child’s last meal. You don’t know whether it’s the first meal. So, you want to encourage healthy eating habits number one, because they possibly don’t have the best environment [at home].” Teachers also expressed their students should try new foods in a PME because they may not be exposed to a variety of foods at home:

“...introducing them to new foods and allowing them to try different things that they might not get at home, which is important I think.” As a result, eating helps make a child’s body and mind happy (inherent outcomes) as one teacher commented: “...when kids are full and their tummies are satisfied then they are more happy children.”

The second operation within a PME is socialization. As defined by the teachers, socialization is the interactions among the people present at a PME and can be facilitated by both adults and children through basic sharing or asking questions. Teachers said they discussed many topics during a PME, ranging from questions about the children’s daily lives (e.g., “What did you do last night?”) to food-related conversation (e.g., shape, color, smell). One teacher said, “...a positive mealtime environment includes talking. We have conversation while we’re eating, whether it be about what we’re eating, the different fruits and vegetables, our food...what they did at home, sometimes it’s good to talk and enjoy the meal as a
…Our participants indicated that this socialization provides an important time for strengthening relationships between adults and children, as well as among children (inherent outcomes): “As we build the bond with the children, we become a mini classroom family...”

Finally, the third operation of a PME is learning. As defined by our participants, learning is when a child gains skills or knowledge as a result of setting rules, expectations, and routines and/or through eating and socialization in a PME. Teachers discussed four different yet overlapping categories of skills and knowledge gained while learning in a PME: language, social, motor, and cognitive skills. In addition to these skills, a PME provides opportunities for children to learn about various subjects, according to teachers. One of our study participants described this as a cross curricular environment: “…[children are] learning about colors of food...textures of food, they’re learning vocabulary, social skills, math, I could just could go on and on...mealtime is like cross curricular activity, because it goes across all the curriculum.” Another teacher perceived a PME as one of the most important learning opportunities in a day: “Some of the best learning time is when you’re sitting at the table, eating lunch with the children or breakfast. There’s a wide variety of things you can discuss with [children].”

Of note, the three operations described above contain overlap. For example, one teacher commented “Most of the time, our cooks are just in the kitchen, but when they do come out, they do interact with the children and talk to [the children] and get to know [the children] and encourage [the children] to try new things. Sometimes [cooks] talk to the kids about how [they] prepared their food and what different things are in [the food].” In this example, the kitchen staff interacts and discusses with children the meals the staff made that
day (socialization) while children are eating (eating), resulting in increased knowledge of the food they eat (learning).

Outcomes of a Positive Mealtime Environment

As a consequence of a PME, teachers believed that positive changes occur in children over both short and long periods of time. These outcomes are different from inherent outcomes attached to the operations of a PME in that these short- and long-term outcomes are likely to occur outside of mealtimes. The most commonly discussed short-term outcome from establishing a PME was “a better day” (Figure 3.1). A teacher expressed this as “… [children] learn better when their stomachs are full… they’re better at social skills. Your day goes so much more smoothly because your meal plans are so calm and positive…the rest of the day just flows with it.” Another teacher also commented that creating a PME is important “…because it’s how the tone of the rest of your day would go…. [children] start out really happy, and then interact in a positive way with [children’s] friends and then with the teachers.”

Teachers also reported that a PME helps children develop long-term healthy eating habits (Figure 3.1) by increasing their knowledge of healthy eating and openness to trying new foods. One teacher said, “[A] child will [gain] good nutrition from here. It’s a lifelong skill… Sometimes I ask kids, what do you remember the most, and they’ll say, I remember being the lunch helper and I remember you told me to try the green beans and I liked them.” As this teacher described, teachers in our study believed in the importance of establishing a PME at preschool so that children can create positive relationships with food for their later
life. As explained earlier, providing a PME is significant because some children may not receive one at home: “Children need to eat for nourishment because it is a lot of hurried lives. Children are thrown in front of a TV and fast food, and we try to create an environment where children can all sit down and eat like a family.”

In summary, according to our study participants, each component in Figure 3.1 is crucial for creating a PME. Of the multiple factors in Figure 3.1, adults are key to facilitating a PME by setting a positive emotional tone in an environment where rules, expectations, and routines are embedded. Through interactions (eating and socialization) among the people (i.e., adults and children), children learn cross-curricular content. According to the teachers, this complexity not only makes the mealtime environment positive, but also leads to positive outcomes in children outside mealtimes, impacting both their day and their long-term eating habits.

**Discussion**

In a preschool, teachers play the principal role in leading a mealtime. In this qualitative study, researchers targeted Head Start teachers around the US to gain insight into their perceptions of a PME and developed a model representing a PME. The model not only provides the components of a PME, but also depicts the complexity of how each component is interrelated to create a PME. As shown in the model, the results suggest that teachers believe creating a PME leads to positive outcomes in children. Given the reduced number of shared family meals at home, a preschool classroom can play a vital role in providing a PME to help promote lifelong healthy nutrition habits. In addition to these long-term
outcomes, according to the teachers a PME may help children have a better day (short-term outcomes), resulting in quality time among teachers and children that day. Researchers may utilize the proposed model to develop interventions or educational materials that assist teachers in establishing a PME and determine the impact on these desired outcomes.

Our study participants expressed three key operations for creating a PME at preschool: eating, socialization, and learning. Our findings are supported by guidelines and previous studies emphasizing the importance of performing these operations at mealtimes for a child’s growth and development.7,70,84,89,110 While recognizing the existence of these established guidelines and evidence related to the operations, previous studies have shown that teachers’ practices at mealtimes are not always supportive of fostering a child’s healthy eating habits.113,116 Teachers may use these undesirable feeding practices because they lack appropriate mealtime training.113 To improve teachers’ use of these mealtime practices, researchers and nutrition educators may use the proposed model as a motivational tool, emphasizing how these practices impact the operations and outcomes that are important to teachers. For example, preschool teachers’ role modeling (eating) and verbal encouragement of their students to eat fruits and vegetables (socialization) can positively impact fruit and vegetable consumption in preschoolers (eating and learning healthy foods).29

Rules, expectations, and routines set by the adults present at the meal are the core of a PME, according to our study participants. Though a family-style mealtime was a commonly discussed routine, rules, expectations, and routines—a common language at mealtimes—are different from state to state44 and from classroom to classroom.193 Though our study participants did not specify details about who created mealtime rules, expectations, and
routines, as previously discussed, these rules might have been established based on inadequate knowledge of more desirable feeding practices. In the future, this research team will investigate the consistencies of mealtime rules, expectations, and routines between preschool teachers, other staff, classroom volunteers, and preschool administrators.

Head Start teachers in our study said the people in the classroom strongly influenced the mealtime environment. Previous guidelines\textsuperscript{70,84-86,89} identified both teachers and children as key players during mealtimes; however, we found teachers believe that classroom volunteers and other staff members also play an important role in creating a PME. While these volunteers and staff members are believed to influence a PME, few have focused research efforts on these groups.\textsuperscript{103,113} Thus, future research should more closely investigate volunteers and other staff members’ practices at mealtimes, particularly their practices related to eating, socializing, and helping a child’s learning, determining how these outside adults impact PME and child eating outcomes.

\textit{Limitations}

The present study has limitations that should be acknowledged. First, our qualitative study may not be generalizable to non-Head Start teachers or other Head Start teachers who did not participate in this study. Because of the way we recruited teachers (i.e., asking teachers who were interested in talking to us about mealtimes at their preschool), our study participants may have had differing opinions from those who did not participate in this study. Researchers tried to minimize these limitations by recruiting geographically diverse study participants around the US. Second, social desirability bias—participants’ tendency to
respond in a favorable way to others—may have impacted our results due to the nature of the qualitative methodology. Therefore, teachers’ responses may have been positively biased toward a PME. To limit this bias, each interviewer was trained to remain open, unbiased, and non-judgmental during an interview session, encouraging participants to share their thoughts and feelings (e.g. “You are the expert on this subject.”). Lastly, five interviewers were involved in this study, which could have led to difficulty in maintaining consistency throughout the data collection. However, we attempted to increase the trustworthiness of our findings by providing interviewers with intensive training on qualitative interviews with recurring feedback from the lead author and an expert in qualitative research throughout the data collection.

Conclusions

The findings of the present study fill a gap in the literature related to preschool mealtime environment by conceptualizing the complexity of preschool mealtimes and providing a framework to understand the factors that preschool teachers believe influence the creation of a PME. With our PME model, researchers may be able to enhance the effectiveness of interventions related to a PME focusing on the factors in the model as well as through identifying barriers associated with acting on the factors. Researchers may also use the proposed model to develop reliable and validated tools to evaluate a preschool mealtime environment by focusing on the key constructs identified in the model. Our PME model is one step toward a better understanding of a preschool mealtime. Future research should include qualitatively assessing a variety of participants’ (e.g., administrators,
volunteers) perceptions related to a PME, followed by quantitatively comparing and contrasting perceptions of a PME among the different groups. Researchers should also conduct a longitudinal study by exploring how a PME, or a lack thereof, impacts a child’s eating habits.
CHAPTER 4: WHAT CAN EXTENSION PROFESSIONALS DO TO HELP
PRESCHOOL TEACHERS CREATE A POSITIVE MEALTIME ENVIRONMENT?*

Abstract

Preschool mealtimes can be ideal opportunities to provide nutrition education to preschoolers by creating a positive mealtime environment (PME). Through in-depth interviews with Head Start teachers around the US (n = 65), researchers explored teachers’ perceived barriers and needs to establishing a PME and developed a model depicting points for intervention that could help teachers overcome their PME-related challenges. Applying the proposed model, extension agents could develop and implement PME-related interventions focusing on teachers, kitchen staff, and parents, theoretically leading to the development of sound eating habits in preschoolers.

Keywords: qualitative research, mealtime, preschool, teachers, nutrition

Introduction

Extension professionals target and teach many audiences, including preschoolers (i.e., 3- to 5-year olds) and preschool teachers, to help people foster healthy eating habits. One of the ways to help preschoolers learn healthy eating behaviors is to expose them to nutrition education. Because more than half of preschoolers spend their waking time at center-based childcare, a preschool can support children in establishing healthy eating habits through nutrition education. Researchers and educators have developed numerous nutrition-related preschool curricula and interventions targeting children’s eating habits. In spite

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* This chapter was submitted as a manuscript for publication with Samuel A Gray, BS, and L. Suzanne Goodell, PhD, RD.
of these efforts, integrating nutrition education into the daily preschool curriculum seems to be associated with various challenges, including teachers’ perceived lack of knowledge, skills, time, and resources necessary to teach nutrition in the preschool classroom.\textsuperscript{79}

As an alternative to structured activities (e.g., circle time), a preschool mealtime can be an ideal setting to provide nutrition education\textsuperscript{70,79} by establishing a positive mealtime environment (PME).\textsuperscript{195} According to Mita et al., there are three key operations (eating, socializing, and learning) in a PME, which theoretically lead to the development of healthy eating habits in preschoolers.\textsuperscript{195} This theory purports that a child’s learning can be facilitated through the acts of eating and socializing (e.g., asking questions) at mealtimes and that this learning can be extended to many different disciplines, including nutrition.\textsuperscript{195}

The potential of a preschool mealtime as a place to support a child’s healthy eating has been recognized in the past. The attention has been directed toward teachers’ mealtime practices,\textsuperscript{4-6,8,29,125,196} meals served at centers,\textsuperscript{197,198} and mealtime structure.\textsuperscript{103} Additionally, while some is known about possible barriers and solutions to facilitating effective nutrition education through a PME, no model identifying specific targets for extension intervention currently exists. Therefore, the purposes of this study were to explore preschool teachers’ perceived barriers and needs related to the creation of a PME and to develop a model depicting points of interventions for extension professionals to help teachers overcome said barriers. Using the results from this study, researchers plan to develop PME-related training for preschool teachers to assist them in creating a PME, ultimately aiming to foster healthy eating habits in preschoolers.
Methods

Research Design

To investigate preschool teachers’ barriers and needs in the creation of a PME, researchers conducted semi-structured, in-depth phone interviews employing the concepts of grounded theory.\(^{185,199}\) Because children from low-income families have poorer eating habits than their peers\(^{200}\) and are at greater risk for childhood obesity,\(^ {187}\) investigators chose to work with Head Start teachers from across the US. NC State University’s Institutional Review Board approved the procedures and protocol for this study.

Participants/Recruitment

To be included in the study, each participant was required to (1) be either Head Start teachers or teacher assistants, (2) be over the age of 18, (3) be present in a classroom during mealtimes (as opposed to a cafeteria), and (4) have worked with 3- to 5-year-old students. To recruit a geographically diverse population of Head Start teachers, researchers targeted 20 teachers per region (Northeast, Midwest, South, and West) from the US Census Regions and Divisions map.\(^ {189}\)

Investigators applied both snowball\(^ {188}\) and nationwide sampling techniques involving multiple steps. First, researchers identified contact information of key personnel (e.g., center directors and administrators) for Head Start centers across the US by using the Head Start Locator tool.\(^ {190}\) Next, investigators asked these key personnel to aid with recruitment by forwarding a recruitment email to teachers at their centers and/or providing potential study participants’ contact information. Additional potential participants were identified at the
conclusion of each interview through snowballing, wherein interviewers asked study participants if they could help recruit other teachers by forwarding a recruitment email to their friends.

**Tools and Instruments**

The lead author drafted the interview guide and modified it in an iterative process, using feedback from research team members and an expert in qualitative research. The interview guide consisted of warm-up questions and core questions, as well as probing questions for eliciting further description. Core questions were aimed at several topics centering around a PME, including teachers’ perceived barriers and needs to creating a PME, for example: “What are the challenges, if any, you or other teachers face to create a PME?” (barriers) and “What can we do to help you or other preschool teachers make it easier to create a PME?” (needs).

**Data Collection**

To ensure data credibility, prior to this study five interviewers completed intensive training that included online ethical research training with human subjects, the basic concepts of qualitative research, summarization technique, and at least two mock interviews—one with a lab member and the other with a non-Head Start teacher in the local area—along with observation feedback by the lead author. Researchers interviewed Head Start teachers from March 2012 to February 2013. At the beginning of data collection, the interviewer obtained
oral informed consent, asked basic demographic questions, and then transitioned to the series of warm-up and core questions.

During data collection, the interviewer audio-recorded each interview session and took notes on interviewees’ answers. To ensure trustworthiness of the findings, after asking all questions in the guide, the interviewer summarized the interview, asked for confirmation and clarification of the findings, and provided an opportunity to add anything related to the research topics. After each interview session, the interviewer recorded post-interview notes, summarizing the answers in the guide and noting conditions of the interview (e.g., interviewee openness to the questions). Interview time ranged from 31 to 109 minutes, averaging 50 minutes. Researchers collected data until saturation was reached (i.e., no new themes appeared). In total, 65 Head Start teachers from 28 states participated in this study.

Data Analysis

Researchers transcribed interviews verbatim and used QSR NVivo qualitative analysis software to manage the data (QSR International, 2010). As researchers collected data, they conducted an initial analysis by identifying key themes based upon discussions from weekly meetings, transcripts of interviews, and post-interview notes. The lead author also utilized this initial analysis to determine when data saturation had been achieved. After completing data collection, the lead author reviewed all transcripts using a memoing technique and conducted open coding. Then, using the codes generated from the open coding process, the research team, including an expert in qualitative research, developed a
coding manual, which included codes, code categories, operational definitions, and example quotes.

The lead author, one interviewer, and three other research assistants participated in coding. During coder training, all data analysts coded one transcript together to familiarize themselves with operational definitions of each code. The analysts then coded another transcript independently and compared coding as a group, further refining the definitions of the codes. Next, the remaining 63 transcripts were divided among the 4 research assistants, and they coded transcripts independently. The first author coded all 63 transcripts, met individually with each data analyst, and compared the codes in their assigned transcripts.

After coding all transcripts, the lead author conducted axial coding (e.g., how codes relate to each other) and selective coding (e.g., a narrative answering the question of “What are teachers perceived barriers and needs to creating a PME?”).\textsuperscript{185,186,191} Then, based on the narrative created in the selective coding phase, the research team developed and refined a model depicting three points of interventions for extension professionals to help teachers create a classroom PME.

**Results and Discussion**

Our study participants were predominantly female (97%) and Caucasian (66%) and African American (22%). Their work experience with preschoolers ranged from 2 to 44 years (14.4 ± 9.8 years), and their age averaged 40.7 years ($SD = 12.1$). Three-fourths of study participants had a four-year college degree or advanced degree. Figure 4.1 depicts the model that identifies three points of intervention for extension professionals to help teachers create a
PME: (1) teachers, (2) kitchen staff, and (3) parents. Employing community-based interventions at these three levels may assist preschool teachers in effectively creating a classroom PME, thus positively influencing the development of preschoolers’ healthy eating habits.

**Teacher Training**

The first point for intervention depicted in the model is teachers (Figure 4.1). When asking Head Start teachers their training-related needs (e.g., topics, frequency, and means), they indicated different expectations of mode and frequency of training. For example, when describing the preferred mode of training, one teacher commented “I prefer to receive [training via] an email. That would save my time.” While this teacher expressed his/her interests in passive training via email, another teacher noted that he/she was interested in receiving training through an active learning approach: “I think I gain a lot by hearing other teachers’ experiences, so having discussion groups, or panels of teachers for question and answers.” Additionally, teachers reported varying levels of confidence in creating a PME. One factor that appeared to influence teachers’ levels of confidence in PME-related practices was their previous work experience with preschoolers. For example, one teacher expressed his/her confidence by saying: “I’ve been teaching for 12 years... [I] feel like I know what to do.” In contrast, a teacher with 2 years of work experience said, “I guess [I want to learn] more and more [about]...how we can bring [a PME to a classroom], model [a PME], and bring [a PME] to home.” While some teachers preferred more passive training and/or
desired little additional training, professional development is likely to be more effective if interventions are based on learner-centered curricula that employ experiential learning.201,202

Figure 4.1. Potential Solutions for Creating a PME in a Preschool Setting

The idea of experiential learning (e.g., Kolb’s Learning Style203) has been applied to many extension programs,204,205 including professional development programs for teachers.206 Modifying the principles of experiential learning to assist teachers in creating a
classroom PME, investigators propose that teacher training should consist of a three-part cycle: teacher training, practice (trying to create a PME in the classroom), and teacher evaluation (Figure 4.1). Additionally, teacher training should occur on a continual basis because the traditional one-time workshop or training for professional development will not likely positively impact teachers’ behaviors. At the same time that teachers participate in training, teachers should be provided opportunities to participate in self-reflection, as well as outside evaluation. In theory, through this reflection and/or evaluation process, learners will be able to identify areas for improvement, hone their knowledge, and increase their self-efficacy.

### Kitchen Staff Training

In the current study, Head Start teachers discussed barriers to creating a PME that they cannot control, including the food served at the meal. According to the study participants, how and where the food was prepared varied from site to site. Some centers had a kitchen on site where staff prepared the food. In other centers, food was prepared outside the facility and brought to the site. Though some teachers expressed satisfaction with the food served at their centers, many others reported the food was often of poor quality, was of insufficient quantity, was not served at appropriate temperature, and/or was not age-appropriate. For example, one teacher described the lack of quality in the food served to his/her classroom in this way: “I know that technically [the food] meets the [Child and Adult Care Food Program] requirements, but ... it’s not always the most attractive food.” Another teacher described the importance of serving eye-appealing food because it could affect
children’s appetite: “Sometimes [with] the turkey stroganoff, we have the turkey instead of the beef stroganoff, and sometimes that just doesn’t look really appealing to some children…. [children] just say no thank you.”

The challenges associated with poor quality and quantity food at mealtimes in Head Start preschools have been reported previously, including similar references to teachers’ disgust of food appearance. Additionally, the actual food served at centers is not always consistent with the menus, implying that the food served to preschoolers may not be nutritionally adequate. Despite the importance of providing nutritious food to preschoolers and this room for improvement in the food served to preschoolers, little is known about factors influencing how kitchen staff members prepare the food. Further research should examine kitchen staffs’ barriers to serving nutritious and appealing food, a key factor in creating a PME. Using these results, extension agents should provide kitchen staff with the same opportunity for experiential learning as teachers. The experiential learning cycle should consist of training tailored to the needs of the kitchen staff, application of training through food preparation using menus created and evaluated by a registered dietitian, and food evaluation (Figure 4.1).

**Parent Training**

Our study participants reported child-related issues that prevent teachers from creating a PME in their classrooms. One of the major challenges that teachers reported was picky eaters. Teachers mentioned that their students reject certain foods served at their centers because these students may not have been exposed to eating a variety of foods at
home. In the classroom, picky eaters can negatively impact other peers and subsequently affect the entire mealtime environment. For example, one teacher reported, “There are some of the challenges when [children] see foods they have never seen before or stuff they don’t like. I think when [picky eaters create] a negative environment, you have a whole table that are like ‘I don’t like any of this food, I’m not going to sit here and eat this!’”

Our teachers suggested that the child-related issues might have resulted from inconsistent rules or expectations at mealtimes between home and preschool. Previous studies involving parents of preschoolers indicate that parents also face difficulties in managing their children’s behavioral issues at mealtimes, including picky eating. So that children can smoothly transition from home to preschool mealtime settings, the model for PME intervention (Figure 4.1) emphasizes that extension professionals should develop PME-related educational materials for parents and their children (Figure 4.1). Furthermore, while continual reflection and evaluation are often difficult to implement in a home setting, an adaptation of Kolb’s experiential learning theory would suggest that within the curriculum, parents should be offered opportunities to learn, reflect, and try new ideas in order to improve the outcomes of the intervention.

Limitations

The current study is not without limitations. Because investigators targeted only Head Start teachers, our results may not be applicable to other teachers in non-Head Start programs, including those who are in private preschools and family care settings. Additionally, due to social desirability bias, some teachers may have believed they should be
confident in their practices (because it is their job) and therefore might have underreported their perceived needs and barriers in creating a PME. To try to limit these biased responses, interviewers emphasized to participants that there were no right or wrong answers and encouraged participants to share their views (e.g., “You are the expert on this subject.”). Finally, five trained interviewers collected the data throughout this project. While use of multiple interviewers can impact consistency during the data collection, to minimize this potential limitation and increase study validity, all research members involved in this study received intensive training on qualitative research.

Conclusion

In this qualitative study, investigators explored Head Start teachers’ perceived barriers and needs in the creation of a PME and developed a model identifying three points of interventions (teachers, kitchen staff, and parents). At each intervention point, extension agents should create curricula that integrate experiential learning (e.g., learn, practice, reflect) into the lessons to increase the likelihood of successful behavior change. Through these interventions, extension agents may effectively assist preschool teachers in creating a PME in their classrooms, possibly leading to preschoolers’ promoting healthy eating habits.
CHAPTER 5: SUMMARY, FUTURE RESEARCH AND CONCLUSIONS

A Qualitative Investigation of Teachers’ Information, Motivation, and Behavioral Skills for Increasing Fruits and Vegetables Consumption in Preschoolers (Chapter 2)

Summary

The purpose of this study was to assess preschool teachers’ perceived motivation, facilitators, and barriers when getting their students to eat fruits and vegetables (FV). Researchers identified six dominant emergent themes and articulated these themes to the Information-Motivation-Behavioral Skills (IMB) model. Overall, Head Start teachers seemed to recognize their significant roles as “parents at school,” and they reported they wanted to help their “kids” (i.e., students) develop healthy eating habits that they can take into adulthood. In spite of their motivation as “parents at school,” teachers faced some challenges that prevented them from getting their students to eat FV. Their challenges included children’s rejection of FV and lack of parental support for promoting children’s FV consumption. The teachers’ perceived challenges might have come from the inconsistent views toward preschoolers’ FV consumption between parents and teachers. To help preschoolers increase FV consumption, nutrition educators may use our proposed IMB model to develop nutrition-related education materials and/or interventions, targeting preschoolers, parents, and teachers.

Future research

To assist preschool teachers in helping their students increase FV consumption, our findings create a framework for nutrition educators to develop education materials and/or
interventions using the IMB model. Our study participants said that parents of preschoolers also influence their child’s FV consumption. Thus, researchers should consider conducting qualitative research employing the IMB model to investigate how parents of preschoolers get their children to eat FV in a home setting. Future research should also explore in more depth the practices that teachers utilize when getting their students to eat FV, for example, how teachers learned the practices they use at mealtimes (e.g., policies, training, own experiences). In addition, future researchers should conduct quantitative research to determine whether or not our findings are applicable to larger populations, including caregivers in day care and family care.

An Explanatory Model of Teachers’ Perceptions of a Positive Mealtime Environment in a Preschool Setting (Chapter 3)

Summary

The purpose of this study was to examine preschool teachers’ perceptions related to a positive mealtime environment (PME) and to develop a model representing teachers’ perceptions and conceptualizing the complexity of mealtimes at preschools. As suggested by the term positive, Head Start teachers perceived that a PME consists of positive atmosphere such as a happy, relaxed, and calm environment—Positive Emotional Tone in the model. This Positive Emotional Tone cannot be established without the efforts of the people in a classroom (i.e., teachers, kitchen staff, volunteers, and children), particularly teachers. Under certain rules, expectations, and routines, the adults may control the success of the creation of Positive Emotional Tone and a PME by interacting with children through eating and
socializing. These adult interactions with children are likely to facilitate children’s learning, possibly resulting in positive impacts on the rest of the day for the children and on the development of healthy eating habits in their future. By applying our proposed model and focusing on key components in the PME model, researchers may be able to enhance the effectiveness of PME-related interventions.

**Future Work**

The study outcomes revealed five key components that could influence the creation of a classroom PME: (1) the people, (2) positive emotional tone, (3) rules, expectations, and routines, (4) operations of a PME, and (5) outcomes of a PME. To help develop a child’s healthy eating, our findings suggest several directions to explore further as future research. First, given the fact that mealtime rules, expectations, and routines are the core in a PME, future investigators should explore if these rules, expectations, and routines are consistent among preschool teachers, other staff, classroom volunteers, and preschool administrators. Another area of future research would involve examining volunteers’ and other staff members’ (e.g., kitchen staff) practices related to eating, socializing, and helping preschoolers’ learn at preschool mealtimes. For example, future investigators should examine how these adults from outside of classroom (i.e., volunteers and staff members) influence a PME and children’s eating. To assess a mealtime environment, researchers should also develop reliable and validated evaluation tools for examining the key components in the PME model. The present research targeted only Head Start teachers. Future investigators should include a wider variety of people (e.g., administrators and volunteers) in preschools.
and other early childhood programs (e.g., private preschool, day care, and family care) to assess their perceptions of a PME and quantitatively compare and contrast PME-related perceptions among caregivers from different types of early childhood programs. As a longitudinal study, future researchers may be interested in exploring how a PME or a lack of a PME could impact a child’s eating habits.

What Can Extension Professionals Do to Help Preschool Teachers Create a Positive Mealtime Environment? (Chapter 4)

Summary

The purposes of this study were (1) to explore Head Start teachers’ perceived barriers and needs to creating a PME and (2) to suggest potential solutions for overcoming teachers’ perceived barriers. Our potential solutions, represented in a model, consist of three points of interventions that target (1) teachers, (2) kitchen staff, and (3) parents. While recognizing various nutrition-related interventions and training for preschool teachers, these educational opportunities are likely to be one-time events, resulting in a lack of sustainability. In fact, one-time workshop/training may not be the best way to positively change learners’ behaviors, and sustainable professional development is the key to positively influencing teachers’ practices. Considering that traditional workshop/training may lack sustainability, our model incorporates the ideas of experiential learning and offers sustainable interventions, giving learners continuous learning opportunities through practice and reflection/observation. Applying the proposed model, extension agents may develop
interventions that could effectively help preschool teachers establish a classroom PME and eventually influence the development of sound eating habits in preschoolers.

**Future Work**

In this study, participants reported barriers to and needs for creating a classroom PME. To better understand a preschool mealtime and to develop interventions assisting teachers in the creation of a PME, further research should focus on (1) teachers, (2) administrators, (3) kitchen staff, and (4) parents. First, though not discussed in the manuscript (Chapter 4), our study participants reported that they wanted to learn nutrition to create a classroom PME in spite of the existence of numerous nutrition-related resources. Future researchers should explore factors that prevent teachers from utilizing the existing nutrition-related resource. As administrators are also key personnel influencing a preschool mealtime environment, future investigators should conduct qualitative research assessing their perceived barriers to and needs for establishing a PME as well as creating and following menus at a preschool. Furthermore, according to Head Start teachers, the food served at their centers was a key barrier to creating a PME. Future researchers should conduct qualitative examinations of kitchen staff members’ barriers to and needs for preparing for healthy meals, as well as observational evaluations of their food preparation practices. Lastly, as our study participants implied that their challenges (e.g., picky eating) might have resulted from inconsistent rules and expectations between school and home, researchers should qualitatively assess parents’ barriers and needs in creating a PME at home.
Research Significance & General Conclusions

This dissertation entitled, “Assessing Perceptions of Preschool Mealtime Environment,” fills a gap in the literature related to a preschool mealtime environment by qualitatively investigating Head Start teachers’ perceptions of a mealtime environment. The dissertation consists of three manuscripts: assessing Head Start teachers’ perceptions of (1) getting their students to eat fruits and vegetables, (2) a definition of a PME, and (3) barriers and needs of creating a PME. In conclusion, our research findings added significant value to the existing literature related to preschool mealtime by presenting frameworks derived from formative research. Throughout this dissertation research, there were three major outcomes that were related to future interventions, training, and education materials: (1) it suggests the nutrition-related topics that should be included in future interventions and training for preschool teachers, kitchen staff, and parents of preschoolers, (2) it describes factors that influence a PME and thus should be further investigated for teachers to effectively create a classroom PME, and (3) it proposes ideas for future interventions/training in order for teachers to help their students to develop sound nutrition habits. Utilizing the outcomes from this dissertation research, the writer summarized ideas for future research as well as training/interventions in Table 5.1 and Table 5.2 respectively. This dissertation is one step toward the better understanding of a preschool mealtime environment. Investigators believe that by applying our proposed models, future researchers can develop educational materials, interventions, and/or training for preschool teachers to effectively establish a classroom PME and to help preschoolers establish sound eating habits that will keep children healthy throughout their entire lives.
Table 5.1. Summary of Future Research

<table>
<thead>
<tr>
<th>Target Population</th>
<th>Future Research</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preschool teachers</td>
<td>• How do preschool teachers learn about feeding and educational practices at mealtimes? (Qualitative)</td>
</tr>
<tr>
<td>Teachers/Caregivers working with preschoolers</td>
<td>• How do teachers and caregivers get their students to eat FV? (Quantitative)</td>
</tr>
<tr>
<td></td>
<td>• How do teachers and caregivers perceive a PME? (Quantitative)</td>
</tr>
<tr>
<td></td>
<td>• How do perceptions of a PME differ among caregivers from different early childhood programs (e.g., Head Start and family care)? (Quantitative)</td>
</tr>
<tr>
<td></td>
<td>• What are barriers to utilizing the existing nutrition education materials? (Qualitative)</td>
</tr>
<tr>
<td>Staff and volunteers</td>
<td>• Assessing staff’ and volunteers’ practices related to a PME (Qualitative)</td>
</tr>
<tr>
<td>Administrators</td>
<td>• Assessing administrators’ perceptions related to a PME (Qualitative)</td>
</tr>
<tr>
<td></td>
<td>• Assessing administrators’ barriers and needs to creating and following menus? (Qualitative)</td>
</tr>
<tr>
<td>Kitchen staff</td>
<td>• What are kitchen staff’s barriers and needs to following the menus and creating healthy meals at preschool? (Qualitative)</td>
</tr>
<tr>
<td></td>
<td>• How does kitchen staff prepare the meals at preschool? (Observational study)</td>
</tr>
<tr>
<td>Preschool teachers, administrators, staff, and classroom</td>
<td>• How do preschool teachers, administrators, staff members, and classroom volunteers perceive expectations, rules, and routines at mealtimes? Are their perceptions consistent? (Qualitative)</td>
</tr>
<tr>
<td>volunteers</td>
<td>Preschoolers</td>
</tr>
<tr>
<td></td>
<td>• How can a PME impact preschoolers’ eating habits? (Longitudinal, quantitative study)</td>
</tr>
<tr>
<td>Parents of preschoolers</td>
<td>• How parents of preschoolers get their children to eat FV, applying the IMB model? (Qualitative)</td>
</tr>
<tr>
<td></td>
<td>• Assessing parents’ barriers and needs to creating a PME at home (Qualitative)</td>
</tr>
<tr>
<td>N/A</td>
<td>• Development of a PME assessing tool</td>
</tr>
</tbody>
</table>
### Table 5.2. Summary of Ideas of Future Training/Interventions

<table>
<thead>
<tr>
<th>Target Population</th>
<th>Training/Interventions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preschool Teachers</td>
<td>Future training/interventions should include the following.</td>
</tr>
<tr>
<td></td>
<td>• Introducing a PME framework</td>
</tr>
<tr>
<td></td>
<td>o Definition of a PME</td>
</tr>
<tr>
<td></td>
<td>o How to establish a PME in a classroom?</td>
</tr>
<tr>
<td></td>
<td>• Roles of preschool teachers</td>
</tr>
<tr>
<td></td>
<td>o “Parents at School”</td>
</tr>
<tr>
<td></td>
<td>• Topics covered</td>
</tr>
<tr>
<td></td>
<td>o Basic nutrition and FV related information</td>
</tr>
<tr>
<td></td>
<td>▪ Health benefits of eating FV</td>
</tr>
<tr>
<td></td>
<td>▪ FV serving size for preschoolers</td>
</tr>
<tr>
<td></td>
<td>▪ Nutrition values of food served</td>
</tr>
<tr>
<td></td>
<td>▪ Food neophobia</td>
</tr>
<tr>
<td></td>
<td>o Strategies</td>
</tr>
<tr>
<td></td>
<td>▪ How to overcome food neophobia and how to get children to eat FV?</td>
</tr>
<tr>
<td></td>
<td>▪ Handling picky eaters</td>
</tr>
<tr>
<td></td>
<td>▪ Conversation topics at mealtimes</td>
</tr>
<tr>
<td></td>
<td>▪ How to explain students why some peers have allergies and eat a special meal?</td>
</tr>
<tr>
<td>Kitchen Staff</td>
<td>Future training/interventions should cover the following topics:</td>
</tr>
<tr>
<td></td>
<td>• Nutrition</td>
</tr>
<tr>
<td></td>
<td>• What are healthy foods?</td>
</tr>
<tr>
<td></td>
<td>• Food preparation</td>
</tr>
<tr>
<td></td>
<td>o The importance of following the menus</td>
</tr>
<tr>
<td></td>
<td>o How to make healthy food and appealing food that meet nutritional recommendations?</td>
</tr>
<tr>
<td>Parents</td>
<td>Future interventions should cover the following topics:</td>
</tr>
<tr>
<td></td>
<td>• How to create a PME at home?</td>
</tr>
<tr>
<td></td>
<td>o Rules, expectations, and routines</td>
</tr>
<tr>
<td></td>
<td>o Eating: How to prepare healthy meals?</td>
</tr>
<tr>
<td></td>
<td>o Socializing: Conversation topics at mealtimes</td>
</tr>
<tr>
<td></td>
<td>o Learning: How to help preschoolers learn skills and knowledge for their growth and development?</td>
</tr>
<tr>
<td></td>
<td>• Strategies</td>
</tr>
<tr>
<td></td>
<td>o How to help preschoolers develop healthy eating habits?</td>
</tr>
<tr>
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<td>o How to overcome food neophobia and how to get children to eat FV?</td>
</tr>
<tr>
<td></td>
<td>o Handling picky eaters</td>
</tr>
<tr>
<td>Teachers, parents, and children</td>
<td>Nutrition education about FV</td>
</tr>
</tbody>
</table>

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38. Taheri S. The link between short sleep duration and obesity: We should recommend more sleep to prevent obesity. *Arch Dis Child.* 2006;91(11):881-884.


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Appendix A. Study 1 Participant Recruitment Protocol

Outline to be discussed with teachers during recruitment

- Purpose of the study: How teachers get preschool children to eat fruits and vegetables
- Questions to be asked in the interview: How teachers get preschool children to eat fruits and vegetables, the challenges they face, and how getting preschool children to eat fruits and vegetables makes them feel.
- About the interview
  - Duration: 30 to 60 minutes
  - Compensation: $20 gift card to a local merchant to purchase supplies for study participants’ classroom
- Places, date, and time for the interview

Outline to be discussed with directors

- Purpose of the study: How teachers get preschool children to eat fruits and vegetables
- Questions to be asked in the interview: How teachers get preschool children to eat fruits and vegetables, the challenges they face, and how getting preschool children to eat fruits and vegetables makes them feel.
- About the interview
  - Duration: 30 to 60 minutes
  - Compensation: $20 gift card to a local merchant to purchase supplies for study participants’ classroom
- Places, date, and time for the interview

1) Recruiting at a Staff Meeting

Good Morning! (or Good Afternoon!) I’m from NC State and am a graduate student majoring Nutrition. I came here today to find volunteers who could help with our research. The purpose of the study is for us to learn about how teachers get preschool children to eat fruits and vegetables. It’s going to be a one-on-one interview. In the interview, we will ask participants how they get preschool children to eat fruits and vegetables, the challenges they face, and how getting preschool children to eat fruits and vegetables makes them feel. I’m looking for teachers or assistant teachers who are over the age of 18, who work with 3-5 year-old children, and who are with children during mealtimes. You will receive a $20 gift card to purchase supplies for your classroom after completing a 30-60 minute interview. If you think you meet the criteria and are interested in participating in this study, please let me know after this. Thank you for your time and consideration. Have a nice day!

2) Face-To-Face Recruitment

Hello, it is very nice to meet you! My name is [research member’s name]. (Brief, friendly introduction. E.g., I am a graduate student at NCSU majoring Nutrition). I’m looking volunteers who might be interested in participating in our study. The purpose of the study is for us to learn about how teachers get preschool children to eat fruits and
vegetables. It’s going to be a 30 to 60 minutes one-on-one interview. Anyone who completes the study will receive a $20 gift card to purchase supplies for your classroom. In the interview, we will ask participants how they get preschool children to eat fruits and vegetables, the challenges they face, and how getting preschool children to eat fruits and vegetables makes them feel. Would you be interesting to hear more about this study?

- **(Yes)** Great! *(Go to *)
- **(No)** OK! Do you know any teachers or assistant teachers who might be interested in participating in the study?

* Unfortunately, not all staff will qualify for this study at this time. May I ask you a few questions to see if you qualify?

- **(Yes)** Great! *(Go to Questions)*
- **(No)** OK! Do you know any teachers or assistant teachers who might be interested in participating in the study?

**Questions**

1. Are you over the age of 18?
2. What is your job title?
3. What is the age of the children you currently work with?
4. Where are you usually during mealtime at your child care site?

When he/she meets the criteria: Thank you! You qualify for this study. We expect the interview to last 30 to 60 minutes. When are you available? Can I have your name, phone number, and/or e-mail address so that I can remind you about the interview beforehand?

When he/she doesn’t meet the criteria: Unfortunately, your group has already filled up. Can I contact you when we have another study in the future?

- **(Yes)** Thank you! Can I have your name, phone number, and/or e-mail address? Thank you so much for your time! Have a nice day!
- **(No)** OK. Thank you for your time. Do you know any teachers who might be interested in participating in this study?
Appendix B. Study 1 Screening Tool

1. Are you over the age of 18?
2. What is your job title?
3. What is the age of the children you currently work with?
4. Where are you usually during mealtime at your child care site?
Appendix C. Study 1 Consent Form

North Carolina State University

INFORMED CONSENT FORM for RESEARCH

Title of Study: How do teachers get preschool children to eat fruits and vegetables?

Principal Investigator: Satoko Chika
Faculty Sponsor: Suzie Goodell

What are some general things you should know about research studies?
You are being asked to take part in a research study. Your participation in this study is voluntary. You have the right to be a part of this study, to choose not to participate or to stop participating at any time without penalty. Your choices to participate in this study, or not, will not affect your relationship with your work site or NCSU. The purpose of research studies is to gain a better understanding of a certain topic or issue. You are not guaranteed any personal benefits from being in a study. Research studies also may pose risks to those that participate. In this consent form you will find specific details about the research in which you are being asked to participate. If you do not understand something in this form it is your right to ask the researcher for clarification or more information. A copy of this consent form will be provided to you. If at any time you have questions about your participation, do not hesitate to contact the researcher(s) named above.

What is the purpose of this study?
We hope to learn how teachers get preschool children to eat fruits and vegetables.

What will happen if you take part in the study?
If you agree to participate in this study, you will be interviewed and asked questions about how you get preschoolers to eat fruits and vegetables, the challenges you face, and how getting preschool children to eat fruits and vegetables makes you feel. We anticipate the interview will last 30 minutes to 1 hour. We will take notes and record the interview session. The interview will be held in a private place at your site or at a public facility (e.g., the local public library, community center, or church). You will be asked to fill out the demographic survey.

Risks
We will ask you questions about how you get preschoolers to eat fruits and vegetables, the challenges you face, and how getting preschool children to eat fruits and vegetables makes you feel. This process may make you uncomfortable by sharing personal experiences and feelings with an interviewer. You do not have to answer any questions that you do not wish to answer. If you want to end the interview, you can do so at anytime, without penalty.

Benefits
You may not receive direct benefits from participating in this project. However, we expect that the project findings will be used to develop educational materials that will help increase the fruit and vegetable intake in preschoolers.
Confidentiality
The information in the study records will be kept confidential. Data will be stored electronically on the departmental server, the Principal Investigator’s research computer, and an external hard drive. All computers and servers are password protected and available only to authorized personnel. Hard copies of interview transcripts will be kept in locked file cabinets in a lock room in Schaub Food Science Building at NCSU. Within ten years after the conclusion of the study, the audio recordings of the interview will be erased and demographic questionnaires will be destroyed. We will talk about what we learned during the interview with other researchers. This could happen research meetings and in written reports. The demographic data will only be used to describe the characteristics of the study participants in oral or written reports. No reference will be made in oral or written reports which could link you to the study.

Compensation
For participating in this study, you will receive a $20 gift card for a local merchant to purchase supplies for your classroom. If you completed the interview but withdraw before the interview transcription review is done, you will get to keep the compensation. If you withdraw from the study prior or during the interview session, you will not be receiving any compensation.

What if you have questions about this study?
If you have questions at any time about the study or the procedures, you may contact the researcher, Satoko Chika, at 206 Schaub Food Science Building, NC State University, or [XXX-XXX-XXXX].

What if you have questions about your rights as a research participant?
If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Deb Paxton, Regulatory Compliance Administrator, Box 7514, NCSU Campus (919-515-4514).

Consent To Participate
“I have read and understand the above information. I have received a copy of this form. I agree to participate in this study with the understanding that I may choose not to participate or to stop participating at any time without penalty or loss of benefits to which I am otherwise entitled.”

Subject's signature____________________________________ Date _________________
Investigator's signature________________________________ Date _________________
Appendix D. Study 1 Interview Guide

Opening

(Introduction) My name is [name of interviewer]. (Briefly introduce self). I’m from Japan. I’m still working on English. I will try to speak as clearly as possible, but please let me know at anytime if you cannot understand my English.

(Purpose of this study) You were asked to talk to us today because you work with preschool children. I’d like to hear from you your thoughts about how teachers get preschoolers to eat fruits and veggies. Please remember that we’re not looking for right or wrong answers to our questions; we’re just interested in hearing your thoughts.

(Confidentiality) Your responses will remain anonymous in order to maintain your confidentiality. What we learn today from you will be shared with other researchers at meetings and in reports. However, your name will not be used at all in oral or written reports and no one should be able to find out that you were a part of this study.

(Use of audio recorder) I’d like to use an audio recorder during the interview session so that I can refer back to the interview when I write the report. To protect your privacy, only authorized researchers will have access to the records. Any names used during the interview will be changed in the transcript and your name will never be linked to your response. Do you mind if this interview session is recorded?

(NO) Thank you! (Start recording) If at any time you begin to feel uncomfortable being recorded, please let me know. This audio recording and transcription of the recording will be destroyed within 10 years after the project is completed to assure your anonymity. And please allow me to take notes during this interview.

(YES) OK. Can we still talk and take notes during this interview?

(Time Line) The interview should take about 30 minutes to an hour. Do you have any questions before we begin?

(NO) This is the consent form. (Remember to give two copies; one is for us, and one is for the participant to keep.) Please read and sign the consent form if you’re willing to participate in this study. Let me know if you have questions on the consent form.

(Transition): I’d like to get to know you a little better before we get too far into the discussion.

(Warm-up questions):
• What were your favorite fruits and veggies when you were a child?
• What are your favorite fruits and veggies now?
1. **Body**

*(Transition): Thank you! I love [name of fruits/veggies], too! Next, I’d like to ask you about fruits and vegetables consumption by preschool children during their mealtimes. Many preschool teachers may try to get preschoolers to eat fruits and veggies, while others may not. Then…*

**A. (Topic: Motivators)**

(a). General questions
- What are some reasons why you would want preschoolers to eat fruits and veggies?
- (Probe, if necessary): Why would you want to give preschoolers fruits and veggies?
- What GOOD things might come from getting preschoolers to eat fruits and veggies?

*(Transition): As I said before, some preschool teachers may not want to give preschoolers fruits and veggies.*

- Can you tell me, if any, what are some reasons why you or someone wouldn’t want preschoolers to eat fruits and veggies?
- (Probe, if necessary): Why would not you/someone want to give preschoolers fruits and veggies?
- What BAD things might come from getting preschoolers to eat fruits and veggies?

*(Transition): Thank you! Now I’d like to ask you more about how you feel when you are trying to get preschoolers to eat fruits and veggies.*

(b). Feelings
- When you're trying to get preschoolers to eat fruits and veggies, how does it make you feel?
- (Required Probe): What are positive or good feelings you might have when trying to get preschoolers to eat fruits and veggies?
- (Required Probe): What are negative or bad feelings you might have when trying to get preschoolers to eat fruits and veggies?
- (Probe, if necessary): Can you tell me a time you felt bad when trying to get preschoolers to eat FV?
- (Probe, if necessary): When was a time you felt difficult in getting preschoolers to eat fruits and veggies? How you felt?
(Transition to the next topic): Thank you for sharing with me! I assume that you’re responsible for taking care of more than one preschooler during mealtimes. For the next question, think about the time when you have sat with preschoolers during their mealtimes.

B. (Topic: Barriers)
- What are some challenges, if any, to get preschoolers to eat fruits and veggies?
- (Alternative): What makes it difficult to get preschoolers to eat fruits and veggies?

(Transition to the next topic): Thank you for your responses! I understand how challenging it can be to take care of several preschoolers during mealtimes. Now, I’m going to change things up a little bit. I’d like to ask you about the ways you’ve actually gotten preschoolers to eat fruits and veggies.

C. (Topic: Facilitators)
   (a). General questions
   - How do you get preschoolers to eat fruits and veggies?
   - (Alternative): If parents ask you ways to get their child to eat fruits and veggies, what would you tell them?
   - (Clarification Probe, if necessary): What process do you go through?
   - (Clarification Probe, if necessary): What steps do you take?
   - (Required Probe): Are there any [.....] you’re using to get preschoolers to eat more fruits and veggies?
     o Tricks
     o Strategies
     o Tactics
     o Rules
   - (Required Probe): You mentioned tricks/strategies/tactics/rules that you or parents can use to get their child to eat fruits and veggies. What are some tricks/strategies/tactics/rules that parents should NOT use to get their child to eat fruits and veggies?
   - (Alternative): What are some things that should NOT be done to get kids to each fruits and veggies?

(Transition): We’re almost done! Let me ask you more about how you might get preschoolers to eat fruits and veggies if you had every resource at your disposal.

   (b). Assessing needs
   - If you could have anything at all to help you get preschoolers to eat fruits and veggies, what are things you might need?
   - (Required Probe): What are things you might want to learn about?
   - (Required Probe): If any, what are some things you might want to know how to do?
2. **(Wrap-up)**
   These are the questions I wanted to ask you. I’m going to summarize what was said during this interview. Feel free to stop me at anytime and add anything that I may have missed before. [summary]

   *After each question summary ask:*
   - Did I get that right?
   - Did I miss anything?
   - Is there anything else you’d like to add?

Is there anything else you would like to add? I learned lots of things from you today! Thank you very much for your help! You have been generous with your time! We have a little bit of paper work [questionnaire and paperwork for compensation] you need to do to give you your gift card. Thank you again and have a great rest of the day!

   - (General Probe): Can you tell me more about it?
   - (General Probe): Can you give me some examples?
   - (General Probe): Is there anything else you’d like to say about that?
Appendix E. Study 1 Demographic Survey

1. When is your birthday?
   Year:                    Month:                     Day:________________________

2. Where were you born?
   City:                    State:                     Country:_____________________

3. What is your job title?
   _____________________________________________________________

4. Where do you work (location of employment)?
   City:____________________

5. How long have you been working with preschool children?
   ________________________years
   Fill in the appropriate circle

6. Are you a man or a woman?
   ○ Man
   ○ Woman

7. What is your highest level of formal education?
   ○ Have not completed high school
   ○ Received high school diploma or GED
   ○ Some college or technical school
   ○ 4-year college, university degree or advanced degree

8. Please check (✓) only one box about yourself.

   YOUR ETHNICITY
   Please check (✓) only one box.
   □ Hispanic or Latino. A person of Cuban, Mexican, Puerto Rican, South or Central American, or other Spanish culture or origin, regardless of race.
   □ Not Hispanic or Latino.

9. How would you best describe yourself with respect to race?

   YOUR RACE
   You may check (✓) more than one box.
   □ Black or African American. A person having origins in any of the Black racial groups of Africa.
   □ White. A person having origins in any of the original peoples of Europe, the Middle East, or North Africa.
   □ Alaska native or American Indian. A person having origins in any of the original peoples of North, Central and South America, and who maintains tribal affiliation or community attachment.
   □ Asian. A person having origins in any of the original peoples of the Far East, Southeast Asia, or the Indian subcontinent including for example, Cambodia, China, India, Japan, Korea, Malaysia, Pakistan, the Philippine Islands, Thailand and Vietnam.
   □ Native Hawaiian or other Pacific Islander. A person having origins in any of the original peoples of Hawaii, Guam, Samoa, or other Pacific Islands.
   □ Other. A group not mentioned above.
   If Other is checked, please describe:

   Thank you for your help!
Appendix F. Study 1 Coding Manual

How to use this coding manual?

1. Purpose:
The purpose of this coding manual is to analyze transcriptions of qualitative interviews of preschool teachers’ perceptions of motivators, barriers, and facilitators to get preschoolers to eat fruits and vegetables. The codes found in this manual are called pre-codes. This coding manual is designed to highlight areas of perceptions and beliefs expressed in qualitative interviews.

Transcripts of each individual interview are loaded into the NVivo software, and the codes listed in this manual are programmed into the NVivo program.

2. Codes:
The codes listed in the manual are organized by the categories we were interested in: Motivators, Barriers, Facilitators, Negative Facilitators, and Assessing Needs. Use the definitions to appropriately determine the subject of the quote you are analyzing.

3. Overlapping codes:
Some quotes may contain more than one code. For example:

One child said that I don’t want it. I tell the child to just try it.

This quote would be coded as “Barriers-Child’s Rejection” and “Facilitators-‘Just try it’.”

4. Off-topic:
Due to the nature of the interview, the subject may give the answer to a later question when answering the current question. For example, during they are talking about health as motivators, they may discuss that fruits and vegetables are not available at child home. This is a motivator as well as a barrier. This would be coded as “Motivator-Health Benefits” AND “Barriers-Availability at Home.”

5. Process of coding:
Code the entire statement, not just the sentence in which the code is found. If the statement does not stand alone, include the “probe question” in the coding.

6. General precautions:
Focus on what the interviewee said. Then, ask yourself: “Is this statement talking about motivators, facilitators, negative facilitators, barriers, or needs?”
Definitions

- **Motivators**: A positive motivational influence, including feelings, that leads the interviewee to take action, getting preschoolers to eat fruits and vegetables.
- **Barriers**: A fence or other obstacle that prevents movement or access. A circumstance or obstacle that prevents communication or that keeps people or things apart. Something that prevents progress or success. Remember that *negative motivators* (e.g., negative feelings, allergy) are also under barriers.
- **Facilitators**: Something that helps the interviewee to get preschoolers to eat FV.
- **Negative Facilitators**: Something that shouldn’t be done to get preschoolers to eat FV.
- **Needs**: Something tangible/intangible the interviewee needs/wants to get preschoolers to eat FV.

7. **Marking great quotations:**
   Is this a good quote? If so, you can insert a “comment” into the transcript in NVivo for use during the analysis process.

8. **Questions?** E-mail to Satoko, XXXXX@ncsu.edu.
**Topic 1: Motivators**

*This section of codes corresponds to the first topic, Motivators. Motivator is a positive motivational influence, including feelings, that leads the interviewee to take action, getting preschoolers to eat fruits and vegetables (FV). Due to the nature of the interview, the subject may give the answer to an earlier or later question when answering the current question. Remember to look at whole transcript carefully.*

**Purpose of this topic:**
To have preschool teachers describe positive motivational influence to get preschoolers to eat fruits and vegetables.

**Summary of Codes**
- Motivators_Health Benefits
- Motivators_Intrapersonal Influence
- Motivators_Interpersonal Influence
- Motivators_Education
- Motivators_Positive Feelings
- Motivators_Other

**Descriptions of Codes**

- **Motivators Health Benefits**
  *Definition:* The state of being free from illness/injury/diseases and being good mental/physical condition.
  *Examples:* Good eye sight, long hair, pretty nail, strength, fight of colds, well-being, antibodies, weight management

- **Motivators Intrapersonal Influence**
  *Definition:* Increased child’s FV consumption at school influences child’s healthy eating habits as he/she gets older. This is long-term influence to a child himself/herself.
  *Examples:* Children maintain healthy eating habits when they get older.

- **Motivators Interpersonal Influence**
  *Definition:* In a short-term period, increased child's FV consumption at school affects someone’s FV consumption positively. Someone includes child’s family members (parents, siblings, grandparents, aunts, uncles, cousins). “Someone” does not include child’s friends or child herself/himself.
  *Examples:* Children tell mom to cook FV at home, children consume enough FV as they get older. A child can share what they learn at school about FV and share with family members. Children will try to continue to eat it when they are at home.
• **Motivators_Education**
  
  **Definition:** Any information related to FV.
  
  **Examples:** Why FV are good for them, where FV come from, introduce children to different cultures and different places in the world using FV.

• **Motivators_Positive Feelings**
  
  **Definition:** Any positive feelings that move teachers to the action, getting preschoolers to eat FV.
  
  **Examples:** Honored, blessed, happy, proud, good, excited, master, grateful, honored, blessed, accomplished.

• **Motivators_Other**
  
  **Definition:** Any other motivators that do not fall under the other headings.

**Topic 2: Barriers**

*This section of codes corresponds to the second topic of this study, Barriers.*

**Purpose of this question:**
To have preschool teachers describe the challenges/difficulties they face during mealtimes in order to get preschoolers to eat fruits and vegetables.

**Summary of Codes**

- Barriers_Child’s Rejection
- Barriers_Lack of Interest
- Barriers_Lack of Availability at Home
- Barriers_Lack of Availability at School
- Barriers_Cost
- Barriers_Time
- Barriers_Accessibility
- Barriers_Parents’ Preferences
- Barriers_Lack of Parents’ Support
- Barriers_Peer Preferences
- Barriers_Negative to Body
- Barriers_Teachers Preferences and Practices
- Barriers_Teachers’ Negative Feelings
- Barriers_Other
Descriptions of Codes

• **Barriers_Child’s Rejection**
  
  *Definition:* Any actions of children that reject FV.
  *Examples:* Children don’t like FV, don’t want to try new food, don’t want FV, don’t like texture, don’t like color, picky eating, don’t like the taste

• **Barriers_Lack of Interest**
  
  *Definition:* A child is not interesting in eating, interested in doing others.
  *Example:* Playing with friends during mealtimes

• **Barriers_Lack of Availability at Home**
  
  *Definition:* FV are not available at home.

• **Barriers_Lack of Availability at School**
  
  *Definition:* A limited quantity of FV at school.
  *Example:* A child asked more FV during mealtimes, but not enough FV are available to give him/her.

• **Barriers_Cost**
  
  *Definition:* High cost of FV.
  *Example:* Parents cannot afford to purchase fresh FV at home.

• **Barriers_Time**
  
  *Definition:* No time for parents to cook.
  *Example:* Parents don’t have time to try to prepare different ways.

• **Barriers_Accessibility**
  
  *Definition:* Lack of access to grocery stores, farmer’s market, and/or other locations where fresh FV are available.
  *Example:* Parents do not have transportation to go to the location where fresh FV are available.

• **Barriers_Parents’ Preferences**
  
  *Definition:* Parents’ disliking of FV.
  *Example:* Parents did not eat FV when they were a child.

• **Barriers_Lack of Parents’ Support**
  
  *Definition:* Parents’ lack of support, motivations, and involvement to get their child to eat FV.
  *Example:* “... their mother says ‘you don’t have to’...”
• **Barriers_Peer Preferences**
  
  *Definition:* How individuals close to the child’s age affect the child’s decisions to eat FV.
  
  *Example:* In classroom, if one child says he/she does not want FV, it influences other children not to eat FV.

• **Barriers_Negative to Body**
  
  *Definition:* Negative body reactions caused by consuming FV.
  
  *Examples:* Allergic reactions to FV, frequent urination, loose stools, high sugar

• **Barriers_Teacher Preferences and Practices**
  
  *Definition:* Teachers’ FV preferences and practices during mealtimes affect their students’ FV consumption.
  
  *Examples:* Teachers don’t like FV. Teachers do not encourage children.

• **Barriers_Teachers’ Negative Feelings**
  
  *Definition:* Any teachers’ negative feelings that prevent the action, getting preschoolers to eat FV.
  
  *Examples:* Disappointed, sad, uncomfortable, concerns, failure, exhausted, alone, frustrated

• **Barriers_Other**
  
  *Definition:* Any other barriers that do not fall under the other headings.

**Topic 3: Facilitators**

*This section of codes corresponds to the third topic, Facilitators.*

**Purpose of this question:**
To have preschool teachers describe the ways they had actually got preschoolers to eat fruits and vegetables.

**Summary of Codes**

- Facilitators_“Just try it”
- Facilitators_Information
- Facilitators_Alternative Form
- Facilitators_Activity
- Facilitators_Role Modeling
- Facilitators_Referring to Others
- Facilitators_Reward
- Facilitators_Praise
- Facilitators_Pressure
- Facilitators_Excitement
Facilitators Try at Least Once
Facilitators Have To Eat
Facilitators Involvement
Facilitators Peer Influence
Facilitators Encouragement
Facilitators Other

Descriptions of Codes

Facilitators "Just try it"
Definition: Teachers use the words, “Just try it,” to get preschoolers to eat FV.
Examples: “Just try it!” “Just try it! You might like it.”

Facilitators Information
Definition: Any information about FV to provide preschoolers with.
Examples: How FV grow, stories related to FV, what are FV, where FV came from, how different types of apples have different flavors, health benefits of eating FV, sensory expressions (taste, smell, texture, sound, etc.)

Facilitators Alternative Form
Definition: Offering different ways to serve FV to preschoolers
Examples: sauté, puree, cut into small pieces, mix with others

Facilitators Activity
Definition: Any non-cooking activities related to FV for preschoolers to be involved in.
Examples: Food experience, tasting party, game, books, gardening

Facilitators Role Modeling
Definition: Serving as an example to eat FV in front of preschoolers.
Example: During mealtimes, a teacher sits with children and eats the same food that children consume.

Facilitators Referring to Others
Definition: Using characters or family members that preschoolers know as an example to eat FV.
Examples: Popeye, Dora, Veggie Tales, grandmother, mom, dad

Facilitators Reward
Definition: Any things given to preschoolers in recognition of effort/achievement to eat FV.
Examples: stickers, let preschoolers play with one special toy, “student of the week”
• **Facilitators_Praise**  
  *Definition:* Any expressions of admiration for preschoolers’ eating FV.  
  *Examples:* Lift preschoolers hands like they’re the champion

• **Facilitators_Pressure**  
  *Definition:* Teacher’s use of persuasion, influence, or intimidation to make preschoolers eat FV.  
  *Examples:* “[student’s name] is eating his vegetables”

• **Facilitators_Excitement**  
  *Definition:* Show preschoolers a feeling of great enthusiasm and eagerness for FV.  
  *Examples:* “oh my goodness, we have vegetables!”

• **Facilitators_Try at Least Once**  
  *Definition:* A child has to try FV at least once.  
  *Examples:* “You have to try it at least one time... before you say you don’t like it”  
  “…must try a serving of all the veggies to get seconds of the portions of fruits”

• **Facilitators_Have To Do**  
  *Definition:* Teachers tell children that they have to eat/try something on the plate to get seconds (their favorite food items).  
  *Examples:* “…must try a serving of all the veggies to get seconds of the portions of fruits” “most of them like the fruits…… if you try the salsa then you can get more fruit” “they have to try everything on their plate before they can have seconds and…”

• **Facilitators_Involvement**  
  *Definition:* Any cooking activities that have preschoolers involved in preparing food.  
  *Example:* Have children make fruits salad to participate and cook FV.

• **Facilitators_Peer Influence**  
  *Definition:* Eating FV by classmates leads to a child’s consumption of FV.  
  *Example:* “…if their friends eat it, they want to eat it.”

• **Facilitators_Encouragement**  
  *Definition:* Encouragement could be anything. If teacher uses “encourage” “encouragement,” then code as this.  
  *Example:* “I encourage them.”

• **Facilitators.Other**  
  *Definition:* Any other facilitators that do not fall under the other headings.
Topic 4: Negative Facilitators

Purpose of this question:
To have preschool teachers describe the ways they think teachers/parents should not to get preschoolers to eat fruits and vegetables.

Summary of Codes
• Negative Facilitators_Bribe/Reward
• Negative Facilitators_Forcing
• Negative Facilitators_Negative Parenting Styles
• Negative Facilitators_Other

Descriptions of Codes

• **Negative Facilitators_Bribe/Reward**
  
  **Definition:** Something offered or given to a child in recognition of effort/achievement to eat FV.
  
  **Examples:** Candy, sweets

• **Negative Facilitators_Forcing**
  
  **Definition:** Making preschoolers to eat FV against their will.

• **Negative Facilitators_Negative Parenting Styles**
  
  **Definition:** The authoritarian imposition of something negative or unpleasant on a child in response to not eating FV.
  
  **Examples:** Punishment, threatening, violence

• **Negative Facilitators_Other**
  
  **Definition:** Any other negative facilitators that do not fall under the other headings.

Topic 5: Needs

Purpose of this question:
To have preschool teachers describe both intangible and tangible needs to get preschoolers to eat FV.

Summary of Codes
• Needs_Information
• Needs_Resource
• Needs_Parent Support
• Needs_Preparation
• Needs_Exposure
• Needs_Human Resource
• Needs_Other

Descriptions of Codes

• Needs_Information
  
  **Definition:** Any kinds of information about FV and information about getting preschoolers to eat FV.

  **Example:** Health benefits of eating FV, other strategies that teachers can use to get preschoolers to eat FV, how FV grow, where FV came from, identifying which ones are fruits

• Needs_Resource
  
  **Definition:** Any tangible resources, including real, fresh FV, related to FV for preschoolers to be involved in.

  **Examples:** Books, food experiment at home/school, games, video, a poster of FV, real FV, a variety of real, fresh FV to use in game, taste tasting, FV in different countries, recipes

• Needs_Parent Support
  
  **Definition:** Parents’ support, motivations, and involvement to get their child to eat FV.

  **Example:** Teachers want parents to encourage their child to eat FV at home.

• Needs_Preparation
  
  **Definition:** Other ways/ideas to prepare FV.

  **Example:** What are other ways to cook broccoli to serve children?

• Needs_Exposure
  
  **Definition:** Any opportunities to expose preschoolers to the “process,” from planting to buying.

  **Examples:** How FV plant/grow/harvest, where to buy (e.g., farmer’s market, grocery store).

• Needs_Human Resource
  
  **Definition:** People who come to classroom and interact with children using FV

  **Examples:** “more visitors maybe come in and do little skits or little finger plays, or just sit and talk to them and read them books and show them stories on nutrition…”

• Needs_Other
  
  **Definition:** Any other needs that do not fall under the other headings.
Appendix G. Study 2 and 3 Participant Recruitment Protocol

1) Recruiting at a Staff Meeting
Good Morning! (or Good Afternoon!) I’m [research member’s name]. (Brief, friendly introduction). I came here today to find volunteers who could help with our research. The purpose of the study is for us to learn how preschool teachers define a positive mealtime environment. We also want to know what helps you and what gets in your way when trying to create a positive mealtime environment. I’m looking for teachers or teacher’s assistants who are over the age of 18, who work with 3-5 year-old children, and who are with children during mealtimes. The interview will be completed over the phone and will take approximately 30 to 60 minutes of your time. You will receive a $10 gift card upon completion of the interview. If you think you meet the criteria and are interested in participating in this study, please contact me. I’ll give you my contact information after this. Thank you for your time and consideration. Have a nice day!

2) Face-To-Face Recruitment
Hello, it is very nice to meet you! My name is [research member’s name]. (Brief, friendly introduction.) I’m looking for volunteers who might be interested in participating in our study. The purpose of the study is for us to learn how preschool teachers define a positive mealtime environment. We also want to know what helps you and what gets in your way when trying to create a positive mealtime environment. It’s going to be a 30 to 60 minutes phone interview. Anyone who completes the study will receive a $10 gift card. In the interview, we will ask questions about your views of a positive mealtime environment and what helps you and what gets in your way when trying to create a positive mealtime environment. Would you be interested to hear more about this study?

- (Yes) Great! (Go to *)
- (No) OK! Do you know any teachers or teacher’s assistants who might be interested in participating in the study?

* Unfortunately, not all staff will qualify for this study at this time. May I ask you a few questions to see if you qualify?

- (Yes) Great! (Go to Questions)
- (No) OK! Do you know any teachers or teacher’s assistants who might be interested in participating in the study?

Questions
1. Are you over the age of 18?
2. What is your job title?
3. What is the age of the children you currently work with?
4. Where are you usually during mealtime at your child care site?
When he/she meets the criteria: Thank you! You qualify for this study. We expect the interview to last 30 to 60 minutes. When are you available? Can I have your name, phone number, and/or e-mail address so that I can remind you about the interview beforehand?

When he/she doesn’t meet the criteria: Unfortunately, you do not meet the inclusion criteria for participation in our study. Can I contact you when we have another study in the future?

- (Yes) Thank you! Can I have your name, phone number, and/or e-mail address? Thank you so much for your time! Have a nice day!
- (No) OK. Thank you for your time. Do you know any teachers who might be interested in participating in this study?

3) Email Script

Subject: NCSU preschool mealtime study, study participants needed

Name,

Hi, I am [Researcher’s name]. I am a student at NC State University in Raleigh, NC. I am currently working on a research project to determine how preschool teachers define a positive mealtime environment.

I am looking for teachers who are willing to participate in interviews. If you agree to participate in this study, you will be interviewed and asked questions about your views of a positive mealtime environment and what helps you and what gets in your way when trying to create a positive mealtime environment. The interview will be completed over the phone and will take approximately 30 to 60 minutes of your time. For your participation in this study, you will receive a $10 gift card upon completion of the interview.

If you are interested, please respond to this email.

I look forward to hearing from you! Please email me for more information!

[Researcher’s name]
North Carolina State University
[email address]
Secondary Screening Email

Hi (name),

Glad to hear that you are interested in participating in our research project! I would really appreciate it if you would answer these few quick eligibility questions for us to determine if you are in line with what we are looking for.

Please answer the following questions:
1. Are you over the age of 18?
2. What is your job title?
3. What is the age of the children that you currently work with?
4. Where are you usually during mealtime at your child care site?

Once we determine if you are eligible, I can begin discussing times for the interview.

Thank you again for your interest and I look forward to hearing from you soon!

[Researcher’s name]
North Carolina State University
[email address]

Email Script – When a potential participant meets the criteria.

Hi (name),

Thank you so much for your responses! You qualify for this study. I expect the interview to last about 30 to 60 minutes. When are you available? Please note that during our interview, you will need to have the consent form in front of you. You will find this form attached to this email. Please review this form to learn more about our study before the interview takes place. Also, I encourage you to find a quiet, secluded place to sit during your participation in the interview.

Thank you again for your interest and I look forward to hearing from you soon!

[Researcher’s name]
North Carolina State University
[email address]
Email Script – When a potential participant does not meet the criteria.

Hi (name),

Thank you so much for your responses! Unfortunately, you do not meet the inclusion criteria for participation in our study. I would like to send information about our study to other preschool teachers you might know. Basically, you would be sending them information about participating in the interview. You could also just provide me with names, email addresses and/or phone numbers of people you think might be interested, and we can contact them directly. Either of these options will help us with our recruitment.

Thank you for your time and consideration!

[Researcher’s name]
North Carolina State University
[email address]

4) Phone Recruitment

Hello, it is very nice to meet you! My name is [research member’s name]. (Brief, friendly introduction. E.g., I am a student at NCSU). I’m looking for volunteers who might be interested in participating in our study. The purpose of the study is for us to learn how preschool teachers define a positive mealtime environment. We also want to know what helps you and what gets in your way when trying to create a positive mealtime environment. It’s going to be a 30 to 60 minutes phone interview. Anyone who completes the study will receive a $10 gift card. In the interview, we will ask questions about your views of a positive mealtime environment and what helps you and what gets in your way when trying to create a positive mealtime environment. Would you be interested to hear more about this study?

1. (YES) Great! (Go to *)
2. (NO) OK! Do you know any teachers or teacher’s assistants who might be interested in participating in the study?

*Unfortunately, not everyone will qualify for this study at this time. May I ask you a few questions to see if you qualify?

• (YES) Great! (Go to Questions)
• (NO) OK! Do you know any teachers or teacher’s assistants who might be interested in participating in the study?

Questions:

1. Are you over the age of 18?
2. What is your job title?
3. What is the age of the children that you currently work with?
4. Where are you usually during mealtime at your child care site?
When he/she meets the criteria: Thank you! You qualify for this study. We expect the interview to last about 30-60 minutes. When are you available? Can I have your name, phone number, and/or e-mail address so that I can remind you about the interview beforehand?

When he/she doesn’t meet the criteria: Unfortunately, you do not meet the inclusion criteria for participation in our study. Can I contact you when we have another study in the future?

- (YES) Thank you! Can I have your name, phone number, and/or email-address? Thank you so much for your time! Have a nice day!
- (NO) OK. Thank you for your time. Do you know any other teachers or teacher’s assistants who might be interested in participating in this study?

5) Outline of Discussion with Administrators and Site Directors

- **Purpose of the Study:** We hope to learn how preschool teachers define a positive mealtime environment. We also want to know what helps preschool teachers and what gets in their way when trying to create a positive mealtime environment.

- **Questions to be asked in the Interview:** Individuals agreeing to participate in this study will be interviewed via telephone and asked questions about their views of a positive mealtime environment and what helps teachers and what gets in their way when trying to create a positive mealtime environment.

- **About the Interview:**
  - Duration: 30 to 60 minutes
  - Compensation: $10 gift card
Appendix H. Study 2 and 3 Screening Tool

Complete all questions and record answers for each potential participant

1. Are you over the age of 18?
2. What is your job title?
3. What is the age of the children that you currently work with?
4. Where are you usually during mealtime at your child care site?
Appendix I. Study 2 and 3 Consent Form

North Carolina State University
INFORMED CONSENT FORM for RESEARCH

Title of Study: Assessing Preschool Teachers’ Perceptions of Positive Mealtime Environment
Principal Investigator: Satoko Chika
Faculty Sponsor: Suzie Goodell

(1) What are some general things you should know about research studies?
You are being asked to take part in a research study. Your participation in this study is voluntary. You have the right to be a part of this study, to choose not to participate or to stop participating at any time without penalty. Your choice to participate in this study, or not, will not affect your relationship with your work site or NCSU. The purpose of this study is to gain better understanding of how preschool teachers define a positive mealtime environment. You are not guaranteed any personal benefits from being in a study. Research studies will not pose any physical risks to those that participate. In this consent form, you will find specific details about the study in which you are being asked to participate. If you do not understand something in this form, it is your right to ask the researcher for clarification or more information. A copy of this consent form will be provided to you. If at any time you have questions about your participation, do not hesitate to contact the researcher(s) named above.

(2) What is the purpose of this study?
We hope to learn how preschool teachers define a positive mealtime environment. We also want to know what helps you and what gets in your way when trying to create a positive mealtime environment.

(3) What will happen if you take part in the study?
If you agree to participate in this study, you will be interviewed and asked questions about your views of a positive mealtime environment, what helps you, and what gets in your way when trying to create a positive mealtime environment. We anticipate the interview will last 45-60 minutes. Interviewers will audio-record the session. The interview will take place over the telephone. You are encouraged to find a quiet, secluded place to sit during your participation in the interview. You will also be asked to answer some questions about yourself, so that when we do our final report we can give a summary of the background of teachers we interviewed.

(4) Risks
We will ask you questions about your views of a positive mealtime environment and what helps you and what gets in your way when trying to create a positive mealtime environment. This process may make you uncomfortable by sharing personal experiences and feelings with an interviewer. You do not have to answer any questions that you do not wish to answer. If you want to end the interview, you can do so at anytime, without penalty. Please remember that administrators will not see your responses. Additionally, your specific responses will not be shared with your respective employers or other government agencies nor will these parties be informed of your participation or non-participation in the study.

(5) Benefits
You may not receive direct benefits from participating in this project. However, we expect that the project findings will be used to develop educational materials that will help preschool teachers make it easier to create a positive mealtime environment in the classroom.
(6) Confidentiality
The information in the study records will be kept confidential. Data will be stored electronically on the departmental server, the Principal Investigator’s research computer, and an external hard drive. All computers and servers are password protected and available only to authorized personnel. Hard copies of interview transcripts will be kept in locked file cabinets in a locked room in Schaub Food Science Building at NCSU. Within ten years after the conclusion of the study, the audio recordings of the interview will be erased, and demographic questionnaires will be destroyed. We will talk about what we learned during the interview with other researchers. This could happen in research meetings and in written reports. The demographic data will only be used to describe the characteristics of the study participants in oral or written reports. No reference will be made in oral or written reports which could link you to the study.

(7) Compensation
For participating in this study, you will receive a $10 gift card only upon completion of the interview.

(8) Questions
If you have questions at any time about the study or the procedures, you may contact the researcher, Satoko Chika at 206 Schaub Food Science Building, NC State University, or XXX-XXX-XXXX.

(9) What if you have questions about your rights as a research participant?
If you feel you have not been treated according to the descriptions in this form, or your rights as a participant in research have been violated during the course of this project, you may contact Deb Paxton, Regulatory Compliance Administrator, Box 7514, NCSU Campus (919-515-4514).

(10) Consent To Participate
“I have read and understand the above information. I have received a copy of this form. I give verbal consent to participate in this study with the understanding that I may choose not to participate or to stop participating at any time without penalty or loss of benefits to which I am otherwise entitled.”

Participant’s Name _______________________________ Date _______________

Researcher’s signature _______________________________ Date _______________
Appendix J. Study 2 and 3 Interview Guide

I

Opening

Introduction
Hello. Is this _________? Hi, I’m ______________________ at North Carolina State University. I’m calling you to interview about our study. Is this a good time to talk? [Are you ready to be interviewed?] We’ve been e-mailing/calling, but I want to take a chance to introduce myself. I am a student at North Carolina State University [briefly introduce yourself]

Now, I want to tell you a little bit about this study. Do you mind pulling up [the e-mail I sent you with a copy of the consent form]/[the document I faxed you with a copy of the consent form]? Did you have a chance to look over the consent form? [If the interviewee does not have the e-mail, e-mail/fax them the consent form again.]

Before we get started, I want to go through each section of the consent form and explain what it means. It’s long, so bear with me. At the end, I will ask you to give me verbal consent to participate in this interview. Is it alright if I begin?

What are some general things you should know about research studies?
Please look at the section (1). You are being asked to take part in a research study. Your participation in this study is voluntary. You have the right to be a part of this study, to choose not to participate or to stop participating at any time without penalty. Your choice to participate in this study, or not, will not affect your relationship with your work site or North Carolina State University. The purpose of this study is to gain better understanding of how preschool teachers define a positive mealtime environment. You are not guaranteed any personal benefits from being in a study. Research studies will not pose any physical risks to those that participate. In this consent form, you will find specific details about the study in which you are being asked to participate. If you do not understand something in this form, it is your right to ask the researcher for clarification or more information. A copy of this consent form will be provided to you. If at any time you have questions about your participation, do not hesitate to contact the researcher(s) named above.

What is the purpose of this study?
We are at the section (2). The purpose of this study is for us to learn how preschool teachers define a positive mealtime environment. We also want to know what helps you and what gets in your way when trying to create a positive mealtime environment. What questions do you have?

What will happen if you take part in the study?
Please look at the section (3). If you agree to participate in this study, you will be interviewed and asked questions about your views of a positive mealtime environment, what helps you, and what gets in your way when trying to create a positive mealtime environment. We anticipate the interview will last 30-60 minutes. Interviewers will audio-record the session. The interview will take place over the telephone. You are encouraged to find a quiet, secluded place to sit during your participation in the interview. You will also be asked to answer some questions about yourself, so that when we do our final report we can give a summary of the background of teachers we interviewed. What questions do you have?

**Use of audio recorder**

I’d like to use an audio recorder during the discussion so that I can refer back to the interview when I write my research report. Do you mind if I record this interview session?

*(NO) Thank you!  
(YES) OK. I’m afraid we have to audio record the interview. Because of that, you will not be able to participate in the interview today. Thank you for your time.*

*Press button here*

It’s on. You are now being recorded.

**Risks**

This next section discusses your risks. Please look at the section number (4). We will ask you questions about your views of a positive mealtime environment and what helps you and what gets in your way when trying to create a positive mealtime environment. This process may make you uncomfortable by sharing personal experiences and feelings with an interviewer. You do not have to answer any questions that you do not wish to answer. If you want to end the interview, you can do so at anytime, without penalty. Please remember that administrators will not see your responses. Additionally, your specific responses will not be shared with your respective employers or other government agencies nor will these parties be informed of your participation or non-participation in the study. What questions do you have?

**Benefits**

The next section is about your benefits. Please look at the section number (5). You may not receive direct benefits from participating in this project. However, we expect that the project findings will be used to develop educational materials that will help preschool teachers make it easier to create a positive mealtime environment in the classroom. What questions do you have?

**Confidential**

Okay, we are half way through! Please look at the section number (6). I want you to know about how we plan to keep information you tell us confidential. The information in the study records will be kept confidential. Data will be stored electronically on the departmental server, the Principal Investigator’s research computer, and an external hard drive. All
computers and servers are password protected and available only to authorized personnel. Hard copies of interview transcripts will be kept in locked file cabinets in a locked room in Schaub Food Science Building at NCSU. Within ten years after the conclusion of the study, the audio recordings of the interview will be erased, and demographic questionnaires will be destroyed. We will talk about what we learned during the interview with other researchers. This could happen in research meetings and in written reports. The demographic data will only be used to describe the characteristics of the study participants in oral or written reports. No reference will be made in oral or written reports which could link you to the study. What questions do you have?

Additionally, I would like to ask you to provide a pseudonym for yourself. That is, I would like you to make up a name for me to call you. What name would you like me to call you?

[Pseudonym]: ______________.

Ok, [INSERT PSEUDONYM]. We only have a few paragraphs left.

Compensation
Now, in terms of compensation. Please look at the section number (7). For participating in this study, you will receive a $10 gift card only upon completion of the interview. What questions do you have?

Questions
Okay, we are almost done! If you have questions about this project, please contact Satoko Chika. If you have questions about your rights and you would rather contact NC State, please contact Deb Paxton. Both of their contacts are on the consent form you have in front of you.

Consent to participate
Now for the last part, let’s talk about your consent to participate. If you agree to participate, would you please repeat after me while I read the statement at the bottom of the consent form, the section number (10)? This will be considered you giving your consent to participate today.

Participant reads:
“I have read and understand the above information. [pause] I have received a copy of this form. [pause] I give verbal consent to participate in this study [pause] with the understanding that I may choose not to participate [pause] or to stop participating at any time [pause] without penalty or loss of benefits [pause] to which I am otherwise entitled.”

I will now write your name and the date on my copy of the consent form, indicating that you have given your consent to participate. I am also signing my name and dating it. [Indicate on
We would like to send you a copy of the final consent form with the researcher signature and date. I’ll ask you how you would prefer us to send you the form after the interview.

Demographic Survey
Before we get started, I would like to ask you a few questions about yourself. You’ve told me a bit in the e-mail, but I’d like to have it recorded on the audio recorder. Please remember that you do NOT have to answer any questions that you do not wish to answer.
PME Demographic Survey

a) What is your job title? [If the interviewee is not a teacher or teacher’s assistant: I’m sorry. There must have been a misunderstanding. We are only interviewing teachers and teacher’s assistants.]

b) Where do you work (location of employment)? City and State:

c) How long have you been working with preschool children?

d) Can you tell me a little bit about the ethnic make up of the families you serve?

e) What is your age? [If the teacher is under 18 years of age: I’m sorry. There must have been a misunderstanding. We are only allowed to speak with people 18 years of age and older.]

f) What is your gender? Female Male

g) Have you completed high school?
   [YES] Go to question (h)
   [No] Go to question (l)

h) Did you receive high school diploma or GED?
   [YES] Go to question (i)
   [No] Go to question (l)

i) Do you have a degree from some college or technical school?
   [YES] Go to question (j)
   [No] Go to question (l)

j) Do you have a 4-year college, university degree, or advanced degree?
   [YES] Go to question (k)
   [No] Go to question (k)

k) What did you study or what was your major?

l) What is your race/ethnicity? For example, African American, Asian, White, etc.? [Read whole sentence]
Interview

(Transition): Thank you for your responses! Let’s go ahead and get started.

I am interested in hearing your thoughts about a mealtime environment in the preschool classroom, so please give me a lot of examples and tell me stories. When you tell stories, please do not refer to people in your stories by their real name. You can make up a pseudonym for that person or refer to them by their relationship to you.

Remember, this is all about what you think. It is okay if you are unsure or do not know the answer to some questions. We are just interested in what you know. At the end of our talk, I’ll recap our conversation and give you a chance to add to or correct anything that’s said during our talk today. Again, I’ll be taking notes throughout the conversation, so I may be pausing from time to time to finish writing. What questions do you have?

(Transition): Great! Now let’s get started. We have four major topics to discuss. First, I’m going to ask you a few simple questions just to get our conversation going.

1 Warm-up questions

- What kinds of fruits and veggies do your students like?
- What kinds of fruits and veggies do your students not like?
- What about them do they not like?
- (Alternative): What let’s you know they don’t like those foods?

2 Definition of Positive Mealtime Environment

(Transition): Thank you! Let’s move to the second topic! Since you have many students to look after during mealtimes, I understand there are so many things to do and that can be overwhelming at times so...

- During mealtime, what is the most important thing you do as a teacher? [*Important to take notes carefully-Answers will be used later]
- (Required Probe): Can you think of other things you do as a teacher during mealtimes? [*Important to take notes carefully- Answers will be used later]
(Transition): Thank you for that information! So, I had a chance to read the guidelines written by the American Dietetic Association on child care nutrition. It says in the guidelines that the mealtime environment in a preschool should be positive, but it does not tell us what a positive mealtime environment is. Since you are the expert in taking care of young children, I would like to ask you...

- How do YOU define a positive mealtime environment?
- (Alternative): What does a positive mealtime environment mean to you?
- (Alternative): What does a positive mealtime environment look like?
- Who is involved in creating a positive mealtime environment?
- (Required probe): Who else is involved in creating a positive mealtime environment?

(Transition): Thank you for your responses! Then...

- What is your role as a teacher in creating a positive mealtime environment?

(Transition): Thank you! A positive mealtime environment doesn’t happen magically, so...

- (Probe if not already answered) What do you do to create a positive mealtime environment?
- (Alternative): What are the steps to create a positive mealtime environment?
- (Probe if not already answered) What is your co-teacher’s role in creating a positive mealtime environment?
- What are the children’s roles in creating a positive mealtime environment?
- (Probe if not already answered): When you hear the phrase “a positive mealtime environment,” how are the children interacting with each other?
- (Probe if “other people” besides TA and children are mentioned previously): You mentioned________ are (is) involved in creating a positive mealtime environment. What are _________ roles in creating a positive mealtime environment?

3 Motivators and Barriers to a PME

- Thank you for your responses! Let’s move to our third topic! When I asked about things you do as a teacher during mealtimes, I heard you said [list what you heard in page 6]. In relationship to all these things you have to do, how important is it to you to create a positive mealtime environment in your classroom?
- Thank you! Then, what are some reasons, if any, why you or other teachers would want to create a positive mealtime environment?
- (Alternative): What are the benefits, if any, of a positive meal time environment?
[BARRIERS]

(Transition): Thank you for sharing with me! I’ve visited a preschool classroom before, and I know how chaotic the mealtime can be. For the next question, I would like to know...

- What are challenges, if any, you or other teachers face to create a positive mealtime environment?
- (Alternative): What makes it difficult for you or other teachers to create a positive mealtime environment?
  - (Probe if not already answered): When that happens, what do you do?
- When you or other teachers try to create a positive mealtime environment, what are the challenges/difficulties regarding […]
  - Children (people)
  - Meal itself
  - Time
  - Accessibility to certain materials needed in the classroom

4 Needs Assessment

(Transition): Thank you for your responses! We’re almost done. This is our final topic to discuss. Our overall goal for this project is to develop educational materials that will make it easier for preschool teachers to create a positive mealtime environment.

- What can we do to help you or other preschool teachers make it easier to create a positive mealtime environment?
- What do you want to learn about a positive mealtime environment?
- (Alternative): What are the topics you might want to learn about?
- (Alternative): What information do you need about a positive mealtime environment?

(Transition): Thank you! Let’s say that we develop these educational materials, and they are ready to be provided to you. If you were offered training about creating a positive mealtime environment in a preschool, …

- How do you want to receive this training?
- (Alternative): What ways would you like to receive the training?
- How often would you like to receive the training?
- What kinds of materials might you want to receive in training?
- (Alternative): What are the things that you want to take with you from the training?
III Summary

These are the questions I wanted to ask you. I’m going to summarize what was said during this interview. Feel free to stop me at anytime and add anything that I may have missed before. [Summarize from page 6. Use Review probes!]

IV Closing

Now the interview is over. To thank you for your time, I’d like to send you a gift card. Also, I’d like to send a copy of the final consent form with the researcher signature and date.

We have your [confirm by giving part of the information. e.g., gmail, yahoo, hotmail] e-mail address. Can I e-mail a gift card and a copy of the final consent form to this [part of the e-mail information. e.g., gmail, yahoo, hotmail]?

Next, I’d like to talk to you about sending information about our study to other preschool teachers you might know. Basically, you would be sending them information about participating in the interview you just completed yourself. Please don’t feel any pressure to do this. Are you interested in helping us recruit other preschool teachers?

(YES) Okay. I’ll send you an e-mail for you to forward to them. Again, if you have questions, you can contact me or Satoko Chika at any time.

(NO) Alright! Not a problem!

I learned lots of things from you today! However, we ask you to not share any of the information we talked about today with your co-workers or supervisors, especially someone who might be interested in this study since it might affect the study results. Thank you very much for your help! You have been generous with your time! Have a great rest of the day!
Appendix K. Study 2 and 3 Coding Manual

How to use this coding manual?

1. Purpose:
The purpose of this coding manual is to analyze transcriptions of qualitative interviews of preschool teachers’ perceptions related to a positive mealtime environment (PME). This coding manual is designed to highlight areas of perceptions and beliefs expressed in qualitative interviews.

Transcripts of each individual interview are loaded into the NVivo software, and the codes listed in this manual are programmed into the NVivo program.

2. Codes:
The codes listed in the manual are organized by the categories in which we were interested: Definition, Barriers, Facilitators, Motivators, Needs, and Training. Use the definitions to appropriately determine the subject of the quote you are analyzing.

3. Overlapping codes:
Some quotes may contain more than one code. For example:

“We ask parents to role model and have conversation with children.”

This quote would be coded as “Facilitators_Role model” and “Facilitators_Parents”

4. Off-topic:
Due to the nature of the interview, the subject may give the answer to a later question when answering the current question. For example, during teachers are talking about teacher’s role as facilitators, they may discuss that their students are not having a family mealtime at child home. This is a facilitator as well as a motivator. This would be coded as “Facilitators_Teachers” AND “Motivators_Low-income families.”

For example, during they are talking about health as motivators, they may discuss that fruits and vegetables are not available at child home. This is a motivator as well as a barrier. This would be coded as “Motivator-Health Benefits” AND “Barriers-Availability at Home”

5. Process of coding:
Code the entire statement, not just the sentence in which the code is found. If the statement does not stand alone, include the “probe question” in the coding. For
example, code the following “probe question” AND teacher’s response as “Needs_Learning.”

I: Okay, so more nutrition facts basically?

T: Yes. Absolutely.

6. **General precautions:**
   Focus on what the interviewee said. Then, ask yourself: **“Is this statement talking about definition, barriers, facilitators, motivators, needs, or training?”**

**Definitions**
- **Definition:** Definition of PME
- **Barriers:** A fence or other obstacle that prevents movement or access. A circumstance or obstacle that prevents communication or that keeps people or things apart. Something that prevents progress.
- **Facilitators:** Something/someone that helps the interviewee to create a PME.
- **Motivators:** A positive motivational influence that leads the interviewee to take action to create a PME.
- **Needs:** Something tangible/intangible the interviewee needs/wants to create a PME.
- **Training:** About the training related to create a PME.

7. **Marking great quotations:**
   Highlight a good quote! Think about this way. If we find key themes, what are quotes to illustrate the themes?

**WHY:** We need quotes as an example to illustrate key themes.

**WHEN:**
- When you are coding
- When you are using NVivo

**HOW:**
- On transcripts: Mark with a highlighter pen (any color)
- In NVivo: Insert a “comment” into the transcript in NVivo

8. **Questions?** E-mail to Satoko, XXXXX@ncsu.edu.
Topic 1: Definition (D)
This section of codes corresponds to our main topic, Definition of a Positive Mealtime Environment (PME). According to the Academy of Nutrition and Dietetics (formerly, the American Dietetic Association), “[c]hild-care providers should be knowledgeable about...creating a positive mealtime environment.” However, the Academy does not define a PME. We were interested in how preschool teachers define a PME. Due to the nature of the interview, the subject may give the answer to an earlier or later question when answering the current question. Remember to look at whole transcript carefully.

Purpose of this topic:
To have preschool teachers define a PME in preschool.

Summary of Codes
- Definition_Positive atmosphere (D_PA)
- Definition_Family style (D_FS)
- Definition_Verbal communication (D_VC)
- Definition_Non-verbal positive attitude (D_NPA)
- Definition_Learning (D_L)
- Definition_Physical environment (D_PE)
- Definition_Food (D_F)
- Definition_Eating/Nutrition (D_E/N)

Descriptions of Codes
- **Definition_Positive atmosphere (D_PA)**
  - **Definition:** A pleasant mealtime environment
  - **Examples:** Relaxed, happy, enjoyable, fun, calm, smooth, safe (choking, keeping all four legs of their chair on the floor), children can make mistakes, everyone sitting down, minimize interruption, using inside voices, not feeling threatened, not getting angry, not rushed to eat, avoiding conflicts (no arguing, screaming, yelling, or fighting),

- **Definition_Family style (D_FS)**
  - **Definition:** Family style meal service children serve themselves, allowing them to choose what and how much they want to eat. In family style meal service, food and beverages are not pre-plated/portioned. Instead, food and beverages are plated in containers/bowls/pitchers. Children serve their own plates from the containers/bowls/pitchers and pass food to their neighbors.
  - **Examples:** Child are serving themselves, child are passing food
• **Definition Verbal communication (D VC)**
  - **Definition:** Talking, having conversation with children or asking children questions
  - **Examples:** Asking questions about the day, what they are/were doing, talking freely, talking to each other, sharing about home, what they learned in the day, something about the meal

• **Definition Non-verbal positive attitude (D NPA)**
  - **Definition:** Non-verbal positive attitudes/actions
  - **Examples:** Smiling, encouraging children to try new foods, positive reinforcement, role modeling

• **Definition Learning (D L)**
  - **Definition:** Anything children can learn during mealtimes
  - **Examples:** Skills (motor skills, self-help skills), new foods, shapes, color, food groups, nutrition, independence, manners (passing food, “please,” “thank you,” “no thank you,” not talking with food in mouth)

• **Definition Physical environment (D PE)**
  - **Definition:** The mealtime environment is physically positive
  - **Examples:** Adequate space, not crowded, adequate ratio children to adults, age appropriate table size, age appropriate utensils

• **Definition Food (D F)**
  - **Definition:** Anything about food served to children
  - **Examples:** Variety in food, new food items, food looks appealing

• **Definition Eating/Nutrition (D E/N)**
  - **Definition:** Anything about a child’s eating
  - **Examples:** Focusing on eating, everybody is eating, enjoying the food, getting healthy food, getting nutrients

**Topic 2: Barriers (B)**
This section of codes corresponds to another topic, **Barriers/Challenges** to create a PME. Again, due to the nature of the interview, the subject may give the answer to an earlier or later question when answering the current question. Remember to look at whole transcript carefully.

**Purpose of this question:**
To have preschool teachers describe the barriers/challenges/difficulties they face when creating a PME in their classroom.
Summary of Codes

- Barriers_Disruption (B_D)
- Barriers_Environment (B_E)
- Barriers_Children (B_C)
- Barriers_Meal (B_M)
- Barriers_Time (B_T)
- Barriers_Accessibility to certain materials (B_A)

Descriptions of Codes

- **Barriers_Disruption (B_D)**
  - **Definition**: Any disruption by non-students (volunteers, parents, administrator, staff) or any disruption that pulls the teacher away from the table
  - **Examples**: Volunteers/parents not sure of how to model behavior or of procedures, too many adults in the room, interruptions by administrators, staff, or parents (takes time away from meal), spills

- **Barriers_Environment (B_E)**
  - **Definition**: Anything related to the physical environment, including space and safety
  - **Examples**: Lack of space, being crowded, safety, keeping things sanitary (messes, spills)

- **Barriers_Children (B_C)**
  - **Definition**: Any actions by children that preschool teachers perceive as barriers/challenges
  - **Examples**: Children don’t like food/refuse food, lack of self-help skills (trouble eating, difficulty in serving, pouring milk), eating at a different speed, behavior, mood, language barriers, sanitation, allergies, religious restriction, not following routine (arrive at different times), wasting food

- **Barriers_Meal (B_M)**
  - **Definition**: Any negative things related to the meal/food? provided at preschool.
  - **Examples**: Not age appropriate meal (size), meal preparation (menu is repetitive, unappealing, lack of fresh items, little variety, not many healthy items, poor taste), foods are not ready on time, the food temperature is not appropriate, cultural restrictions

- **Barriers_Time (B_T)**
  - **Definition**: Challenges of length of mealtime (short/long) Mealtime-related challenges that make teachers difficult to follow routine. This does not include a child’s different eating speeds.
  - **Examples**: Mealtime is short, challenges transition time
• **Barriers Accessibility to certain materials (B_A)**
  o **Definition**: Challenges related to materials and equipment needed at mealtimes, including utensils and learning materials
  o **Examples**: Lack of utensils/equipment (no kitchen in building), age appropriate utensils (e.g., size, function)/materials/chairs, lack of learning materials (nutrition), small chairs for teachers, teachers’ utensils are child-size

**Topic 3: Facilitators (F)**
*This section of codes corresponds to the topic, Facilitators to create a PME. Again, due to the nature of the interview, the subject may give the answer to an earlier or later question when answering the current question. Remember to look at whole transcript carefully.*

**Purpose of this question:**
To have preschool teachers describe what someone (e.g., teachers, parents) or something does to create a PME

**Summary of Codes**
- Facilitators_Role model (F_RM)
- Facilitators_Routine/Expectations/Rules (F_R)
- Facilitators_Create positive atmosphere (F_CPA)
- Facilitators_Having conversation (F_HC)
- Facilitators_Family Style (F_FS)
- Facilitators_Teachers (F_T)
- Facilitators_Children (F_C)
- Facilitators_Cooks/Kitchen Staff (F_C/K)
- Facilitators_Parents (F_P)
- Facilitators_Staff (F_S)
- Facilitators_Volunteers (F_V)

**Descriptions of Codes**
- **Facilitators_Role model (F_RM)**
  o **Definition**: Adults, including teachers sit and eat the same food with children.
  o **Examples**: Role model by adults (e.g., teachers, parents), eat the same food with children

- **Facilitators_Routine/Expectations/Rules (F_R)**
  o **Definition**: To create a PME, teachers follow routine and rules. Also, teachers let others (volunteers) know routine/expectations/rules.
  o **Examples**: Activities (sing a song, role play, read books), sticker system, sing songs while waiting for meal, remind kids to be polite, giving kids responsibility,
• Facilitators_Create positive atmosphere (F_CPA)
  o Definition: To create a PME, teachers create relaxed/safe/stress-free/calm atmosphere
  o Examples: Classical music, turn down the light, not forceful, remain calm (keep kids calm, trying to keep kids from throwing food or getting wild, using inside voices, ensure disruptions don’t occur during mealtime, calm tone of voice, calm down the children, spills->help children clean up), positive feelings (making sure child is comfortable, getting kids excited about the food and mealtime), socialization (gets along well with neighbors, listening to what the children have to say, building relationships), safety (nothing dangerous on the table, clean up spills, supervising/monitoring children), setting up the physical environment (no congestion, pleasing environment),

• Facilitators_Having conversation (F_HC)
  o Definition: To create a PME, teachers talk/have conversation with children, asking children questions, and facilitate conversation among children.
  o Examples: Asking questions, positive reinforcement, redirect children to focus on the mealtime, talk about food (nutrition)

• Facilitators_Family Style (F_FS)
  o Definition: Teachers report they use family style meal service to create a PME.
  o Examples: Family style, children are serving themselves and/or passing food

• Facilitators_Teachers (F_T)
  o Definition: Anything teachers do to create a PME. This category does not include teachers’ practices mentioned previously: role modeling, routine/expectations/rules, create relaxed atmosphere, talking, having conversation, and asking questions.
  o Examples: Making sure child’s eating (encouraging to try new foods, making sure children have all available food, making sure students have adequate amount of food, making sure all kids have food), teaching (set tables, healthy eating, food safety, independence, table manners), helping children (helping with independence skills, assisting children in serving food, facilitating self-help skills, transitions, helping children wash their hands), encouraging self-help skills, involving students (students help set up and clean up meal), organizing (making sure classroom don’t get crowded, making sure students have everything needed)
• **Facilitators_Children (F_C)**
  o **Definition**: Anything children do to create a PME
  o **Examples**: Eating (trying new foods, experiencing different food cultures, encouraging each other to try new foods), talking (inside voices, participate in conversation), learning (food, healthy eating, fine motor skills, math skills, self-help skills), good manners (polite, be open to suggestions, using their own utensils, not playing, sitting at the table), participating in the meal, family style (passing foods, setting the table, serving themselves, socialization, using positive language, getting along with each other, interacting with peers, helping each other, encouraging others, talking about the food, singing songs, having a routine, everyone following routine/schedule, knowing what is expected during mealtimes, children choosing where they want to sit, clean-up, wash hands, positive interactions)

• **Facilitators_Cooks/Kitchen Staff (F_C/K)**
  o **Definition**: Anything cooks/kitchen staff do to create a PME
  o **Examples**: Talking with children, encouraging children to try new foods, sitting with children, preparing foods, helping plan menu

• **Facilitators_Parents (F_P)**
  o **Definition**: Anything that parents do to create a PME at school, not at home
  o **Examples**: Sitting with children, encouraging their child to try foods, eating with their children

• **Facilitators_Staff (F_S)**
  o **Definition**: Anything the staff does to create a PME. Staff does not include teachers and cooks/kitchen staff, but include administrators (e.g., center director), health/nutrition staff, lunch monitor, bus driver, bus classroom aide, social workers, family advocate.
  o **Examples**: Guidelines for what is allowed/should be done, help plan meals, helping wash dishes, making sure food arrives fresh and timely,

• **Facilitators_Volunteers (F_V)**
  o **Definition**: Anything volunteers do to create a PME. Volunteers do not include parents, but include grandparents, high school students
  o **Examples**: Having conversation with children, encouraging self-help skills, sitting with the children, helping children in cutting their food, modeling behavior, helping facilitate the mealtime, assisting children during mealtime

**Topic 4: Motivators**

_This section of codes corresponds to the topic, Motivators. Motivator is a positive motivational influence that leads the interviewee to take action in order to create a PME. Again, due to the nature of the interview, the subject may give the answer to an earlier or_
Purpose of this topic:
To have preschool teachers describe positive motivational influence to create a PME.

Summary of Codes
• Motivators_Positive environment \((M_{PE})\)
• Motivators_Eating \((M_{E})\)
• Motivators_Learning \((M_{L})\)
• Motivators_Socializing \((M_{S})\)
• Motivators_Having conversation \((M_{HC})\)
• Motivators_Low-income families \((M_{LIF})\)

Descriptions of Codes
• **Motivators_Positive environment \((M_{PE})\)**
  o **Definition**: Teachers want to create a PME to make a safe, secure, relaxed, happy environment
  o **Examples**: Break/time to relax, to maintain good mood in the kids (increase comfort level for kids)

• **Motivators_Eating \((M_{E})\)**
  o **Definition**: Teachers describe why they want to create a PME for a child’s eating habits
  o **Examples**: Healthy eating (nourishment for kids), be open to new foods, different foods, encouraging kids to try new foods

• **Motivators_Learning \((M_{L})\)**
  o **Definition**: Teachers describe why they want to create a PME for a child’s learning.
  o **Examples**: Skills (social skills, self-help skills, cognitive skills, language skills, fine motor skills), nutrition (about food, a balanced meal, nutritional value of food), good behavior, cross-curricular activity (counting, colors, math, vocabulary), development/growth (helping build independence for children, communication, emotional development, more open to learn in a positive/happy environment, prepares students for future mealtimes)

• **Motivators_Socializing \((M_{S})\)**
  o **Definition**: Teachers describe why they want to create a PME to develop relationships among children and teachers and for students to learn how to interact with each other
Examples: develop trust between children and teachers, bonding time with the children, knowing children better, table manners (sharing food, asking someone to pass an item)

- **Motivators_Having conversation (M_HC)**
  - **Definition:** Teachers describe why they want to create a PME to have conversation.
  - **Examples:** Having conversation among children and teachers, having conversation among children.

- **Motivators_Low-income families (M_LIF)**
  - **Definition:** Teachers describe why they want to create a PME because their students are from low-income families.
  - **Examples:** A school meal may be only food that the children get, not having a family mealtime at home

**Topic 5: Needs**
This section of codes corresponds to the topic, **Needs.** Again, due to the nature of the interview, the subject may give the answer to an earlier or later question when answering the current question. Remember to look at whole transcript carefully.

**Purpose of this question:**
To have preschool teachers describe both intangible and tangible needs to create a PME.

**Summary of Codes:**
- Needs_Equipment (N_E)
- Needs_Resource (N_R)
- Needs_Learning (N_L)

**Descriptions of Codes**
- **Needs_Equipment (N_E)**
  - **Definition:** Any tangible equipment needed to create a PME.
  - **Examples:** Milk pitcher, proper food utensils that are child size, tables and chairs, bowls, round tables

- **Needs_Resource (N_R)**
  - **Definition:** Any materials and activities needed to create a PME
  - **Examples:** Education materials on nutrition, visuals, posters, books, guidelines, activities (gardening, games, getting kids involved with food prep and clean-up), songs for mealtime
• **Needs_Learning (N_L)**
  - **Definition**: Any topics that teachers want to learn about to create a PME
  - **Examples**: Nutrition (proper serving sizes, portion sizes, meal preparation, how to cook healthfully), PME (specific expectations, transitions, engaging in conversations, more about family style setting, how to make it more positive, the importance of PME, definition of PME), ideas/strategies/information (about meal, child’s behavior, child’s eating, about mealtimes, conversation topics)

**Topic 6: Training**
This section of codes corresponds to the topic, **Training**. Again, due to the nature of the interview, the subject may give the answer to an earlier or later question when answering the current question. Remember to look at whole transcript carefully.

**Purpose of this topic:**
To have preschool teachers describe training to create a PME

**Summary of Codes:**
- Training_Methods (T_M)
- Training_Frequency (T_F)
- Training_Materials (T_Ma)

**Descriptions of Codes:**
- **Training_Methods (T_M)**
  - **Definition**: Any training methods teachers describe in the interview
  - **Examples**: In-person (workshop, discussion, lecture, conference, presentation, hands-on training), online, webinar, visit classrooms, trainer to come, email

- **Training_Frequency (T_F)**
  - **Definition**: How often teachers want to receive the training
  - **Examples**: A few times a year, pre-service, when new staff comes, once every three years, once a month

- **Training_Materials (T_Ma)**
  - **Definition**: Both intangible and tangible materials that teachers want to receive in training
  - **Examples**: Advice, suggestions, materials, activities, websites, handouts
Appendix L. Study 2 and 3 Locations of Teachers Interviewed