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Head Start Teacher Nutrition Knowledge, Attitudes and Diet as Predictors of Classroom Mealtime Behaviors with Children

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HEAD START TEACHER NUTRITION KNOWLEDGE, ATTITUDES AND DIET
AS PREDICTORS OF CLASSROOM MEALTIME BEHAVIORS WITH
CHILDREN

BY

KATHERINE M. HALLORAN

A DISSERTATION SUBMITTED IN PARTIAL FULLFILLMENT OF THE
REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN
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DOCTOR OF PHILOSOPHY DISSERTATION

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ABSTRACT

Recent research has suggested that childcare settings can play an integral role in the prevention of childhood obesity. Childcare providers are in a unique position to influence the diets of children through a number of mealtime interactions including food and nutrition intake, observational learning and nutrition education (Hendy et al., 2000; Birch, Zimmerman, & Hind, 1980). However, there is little evidence on childcare provider's own behavior, in particular how their own diet, attitudes and knowledge may influence their mealtime behaviors with children. The purpose of this study was to examine the association between childcare providers' diet, nutrition knowledge, attitudes, and their classroom feeding practices.

Participants were 85 Head Start teachers (i.e., head, assistant, special education and teacher's aide) from 16 Head Start centers across Rhode Island. Teachers were predominantly female (2 participants were male), averaged 40 years of age (range: 19-63, $SD = 11.37$) and reported 14 years of experience as a childcare teacher. The study was a cross-sectional design involving a classroom mealtime observation of teachers during either a breakfast ($n=19$) or lunch ($n=66$). Teachers were rated on 48 items using the Mealtime Behavior Observation Scale, adapted from the Environmental Policy Assessment and Observation (EPAO) tool, designed to capture optimal feeding practices. Teachers also completed the EPAO Self-Report Children's Eating Scale, the Nutrition Attitudes Inventory, the NCI Fruit and Vegetable Screener, and several other measures designed for this study including a nutrition knowledge survey and a demographics, health, and center practice survey.

Principal Components Analysis of the observed and self-reported mealtime behaviors yielded six additional composite scores. Observed autonomy support and involvement composites were examined in addition to the Mealtime Behavior Observation total score. Self-reported autonomy support, self-efficacy, avoidance of reward, and structure composites were examined in addition to the EPAO Self-Report Children's Eating Scale total score.

Teachers scored relatively high on all measures. Head Start teachers reported higher than average fruit and vegetable consumption and had high levels of nutrition knowledge and positive nutrition attitudes. Both the direct observation and the self-reported mealtime behavior suggested that teachers were engaging in high levels of best practices. For example, teachers frequently engaged in talking to the children about the foods they were eating, ate fruits and vegetables at the meal with children, and encouraged pleasant conversation during mealtimes. There was no evidence of fast food, salty snacks or sugar-sweetened beverage consumption during the meal.

Among Head Start teachers in this study, older and more experienced teachers demonstrated higher scores on the observed classroom behavior and on the self-reported mealtime behavior. Teachers observed during lunch scored significantly higher on observed mealtime behaviors than those observed during breakfast. Nutrition attitudes, but not diet or knowledge, were positively associated with higher teacher self-reported behavior and the self-efficacy composite. In contrast to hypotheses, knowledge, attitudes and diet were not significantly associated with the observed mealtime behavior total score.

After controlling for age, experience, and meal type, nutrition attitudes were inversely associated with observed support for autonomy. After controlling for age and experience, nutrition knowledge was negatively associated with self-reported self-efficacy while nutrition attitudes were positively associated with self-reported self-efficacy. None of the other regression analyses were significant. In both models, controlling for the covariates resulted in significant associations between attitudes and observed autonomy support as well as knowledge and self-reported self-efficacy compared to what was observed in the bivariate analyses, though variables remained negatively associated with outcomes. Future research may need to examine how teacher experience may modify the associations between attitudes/knowledge and behavior.

In conclusion, both reported and observed mealtime behavior total scores among this Head Start population indicate high adherence to best mealtime practices. Further, there was limited support for a significant association between teacher diets, knowledge and attitudes, and their classroom behavior. Lack of variability among teachers in this sample, on both the independent and dependent measures, may have restricted our ability to establish the hypothesized associations. It appears that age and experience of the teachers, as well as strong adherence to Head Start guidelines, were the strongest predictors of mealtime behaviors.

Future research should examine similar associations among childcare provider populations with less strict regulations around meals. Multiple observations of the same mealtime might be more representative of individual teacher behavior.

Examining the association between childcare provider characteristics and child outcomes is an important next step. Given that children learn about healthy eating from their families and teachers, it is important to continue to learn all we can about the best ways to support this process.

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CHAPTER 1

Introduction

Overview

Childhood obesity is a rapidly growing issue in the United States today with currently about 14% of preschool age children considered to be obese (CDC, 2013). Obesity among children is associated with obesity in adulthood and subsequent health risks including cardiovascular issues, type II diabetes and depression (Weiss, 2008). Recent research has suggested that childcare settings can play an integral role in the prevention of childhood obesity. More than twelve million children between the ages of 3-6 are in some type of non-parental childcare where they can receive up to 75% of their daily meals (Larson, 2011). Early childhood has been identified as a sensitive time when children learn about and develop behaviors, patterns and preferences related to eating with implications for future weight and health. Epidemiological research has shown that early childcare experiences are significantly related to early childhood weight (Maher, 2008). Many food preferences have also been found to be established by the time children reach kindergarten (Sullivan & Birch, 1990).

Head Start programs have been identified as important settings for research on the prevention of childhood obesity (Hu, 2007). The Head Start Program is a federally funded early childhood program for low-income children and their families (Administration for Children and Families, 2013). One in four children under the age of six in the United States lives in poverty (defined as less than 100% of the federal poverty line) (National Center for Children in Poverty, 2014) and higher rates of obesity have been found among lower socioeconomic groups (Whitaker, 2006).

Though recent research has begun to show that those who participate in Head Start programs have a significantly healthier BMI (body mass index) by the time they reach kindergarten compared to children in a primary health care system (Lumeng, 2015), the incidence of obesity in Head Start programs has been found to be higher than national estimates.

Research in childcare environments, in general, has focused on understanding nutrition practices such as the adequacy of foods served (Williams et al., 2002), the physical environment itself (Benjamin, 2007), integrating nutrition education that is developmentally appropriate (Gorelick, 1985; Baskale, 2011; Byrne & Nitzke, 2002) and more recently, the influence of the childcare provider (Trost, Messner, Fitzgerald, & Roths, 2011; Lanigan, 2012).

Childcare providers are in a unique position to influence the diets of children through a number of mealtime interactions including food and nutrition intake, observational learning and nutrition education (Hendy et al., 2000; Birch, Zimmerman, & Hind, 1980). Some research has suggested that individual characteristics such as nutrition knowledge and attitudes as well as program policies may influence provider mealtime behaviors with children (Nahikian-Nelms, 1997; Erinosho, Hales, McWilliams, Emunah, & Ward, 2012). Research has also suggested, however, that child care providers are not consistently meeting feeding practice guidelines (Dev, 2013; Erinosho, 2012; Sigman-Grant, 2008) and may not be consistently modeling healthy behaviors (Neelon, Vaugn, Ball, McWilliams & Ward, 2012). In addition, more recent research has begun to show that Head Start Teachers may not have optimal dietary behaviors themselves, which may potentially influence

their mealtime behaviors with children, such as their feeding practices (Sharma et al., 2013; Dev, 2014).

Statement of the Problem

Childcare providers are in a unique position to influence the diets of children through a number of mealtime interactions including food and nutrition intake, observational learning and nutrition education (Hendy et al., 2000; Birch, Zimmerman, & Hind, 1980). Since young children rely on teachers for many nutritional needs, Head Start teachers' own diet, health behaviors, nutrition knowledge, attitudes, and their classroom feeding practices are an important area of inquiry in the study of childhood obesity.

Significance of the Study

There is little evidence on Head Start teacher's own behavior, in particular how their own diet, may influence their mealtime behaviors with children. While there has been some research examining the role of health characteristics of child care providers such as BMI and weight loss attitudes (Dev, 2014), there remains a gap in the literature around the role of providers own dietary behaviors and mealtime behavior, underscoring the need to further understand this relationship. In addition, existing literature suggests there may be a relationship between provider nutrition knowledge, attitudes, and mealtime behaviors. Additional knowledge about the role that individual provider dietary behaviors play, and their knowledge and attitudes about nutrition, could help inform future interventions.

Purpose of the Study

The purpose of this study was to examine the association between Head Start teachers' diet, nutrition knowledge, attitudes, and their classroom feeding practices.

Research question 1.

Are more optimal diets, higher nutrition knowledge, and more positive nutrition attitude scores associated with more optimal provider mealtime behaviors in the classroom (i.e., EPAO-SR Children's Eating Scale, Mealtime Behavior Observation Scale, and composites) among Head Start teachers?

Research question 2.

Is there a significant association between nutrition knowledge, nutrition attitudes and teacher diets?

Research question 3.

Do teacher nutrition attitudes mediate the relationship between teacher diets and knowledge and mealtime behaviors in the classroom?

CHAPTER 2

Review of Literature

Childcare Provider Mealtime Behavior

Much of the literature around mealtime interactions has been done with parents, however some research has begun to explore childcare provider behaviors that influence child eating patterns (Dev, 2014). Research has identified three key ways children's eating is impacted by child care providers: provider feeding practices, children's observation of provider behavior and nutrition education.

Provider feeding practices.

Feeding practices are defined as specific approaches adult caregivers use to control both what and how much children eat (Ventura & Birch, 2008). Examples of controlling feeding practices include pressure to eat, restricting foods and using food as a reward. Feeding experts encourage practices that allow children to control the amount of food they eat (i.e., portion size) and helping them identify cues of hunger to encourage self-regulation.

Pressure to eat has been found to increase children's dislike for that food and be associated with lower intake of fruit, juices and vegetables (Birch, 1982; Birch, 1984; Newman, 1992; Hertzler, 1983). Additionally, when caregivers restricted children's consumption of foods high in fat and sugar, children were more likely to desire these items and consume more of these "off-limits" foods even though they were satiated (Fisher & Birch, 2000). Furthermore, others have demonstrated that children who were allowed to eat whatever they wanted in whatever quantities they wanted, had lower intake of nutrient dense foods, such as fruits and vegetables

(Hennessy, Hughes, Goldberg, Hyatt, & Economos, 2012). The research regarding using rewards to get children to eat healthier foods has been inconsistent. For example, children were observed to have increased vegetable consumption when they were rewarded with stickers, pens and erasers (Lowe, 1998). In contrast, using access to an attractive play area as a reward for getting children to drink juice reduced the children's preference for that juice (Birch, 1982).

Feeding experts discourage the use of controlling feeding practices (i.e., pressuring children to eat, restricting foods, etc.) and recommend allowing children to control the amount of food they eat (i.e., portion size) by encouraging self-regulation (Satter, 2013). Research has shown that children can be taught to focus on internal signals of hunger, which can improve their ability to self-regulate energy intake. After preschoolers participated in an intervention to focus on hunger and fullness cues, children began to respond with comments such as "I'm not hungry anymore so I am going to stop eating" and "My stomach's getting full" (Johnson, 2000). Teaching children to utilize these verbal cues, as opposed to praising children for eating all the food on their plates, has been identified as a more preferable approach. In a similar study, children who were encouraged to focus on the amount of food left on their plates were less likely to regard their feelings of fullness compared to children encouraged to focus on their own hunger cues (Birch, 1987).

Family style feeding, where children serve themselves, encourages children to focus on internal cues of satiation. This practice is recommended for childcare settings by the Academy of Nutrition & Dietetics. Preschool aged children who served themselves have also been found to throw away less food and eat about 25% less than

children who were served pre-plated meals (Branen et al., 1997). Research has shown a number of added benefits of family style feeding practices in addition to paying attention to feelings of fullness. For example, eating as a family (in the home) is linked to higher intake of vegetables, fruits, protein and calcium as well as lower intake of sweets and sugar-sweetened beverages (Andaya et al., 2011). Some of the other benefits offered by family style feeding include development of social as well as gross and fine motor skills. Family style feeding allows for more conversation, connection and interaction among adults and children. More pleasure and enjoyment during the mealtime was found to be associated with higher nutritional intake among children (Skafida, 2013).

While focusing on feelings of fullness may be recommended, provider adherence to recommendations (A of N & D) has not been found across all childcare contexts (Dev, 2013). For example, one study demonstrated that the most frequent comments made by providers during mealtimes do not focus on paying attention to satiety cues but on finishing what's on the plate or eating more. Comments such as "Mm. Mm. It's good. Eat some" (93%), "Are you done?" (96%) and "You want some more?" (97%) were the most often observed (Dev, 2013). Furthermore, a study done in the Netherlands also showed that more than half of the 135 preschool children observed were encouraged to eat more (e.g., "Finish your sandwich!") (Gubbels, 2009).

Children's observation of provider behavior.

Children's observation of provider behavior has also been found to influence children's eating behaviors. For example, in a feeding intervention where childcare providers enthusiastically tasted a designated healthy food item, children were found to increase their consumption of that food (Hendy & Raudenbush, 2000). In this study, teachers placed a bowl of mangoes and cranberries on the lunch table once a week over a period of five weeks. Twice during the meal, the teacher would taste the mangoes followed by the exclamation, "Mmm, I love mangoes!" Teachers did not taste the cranberries though they were also present on the table. Children in this study were found to take more bites of mangoes as opposed to the cranberries.

An additional study showed that when teachers ate with children, higher intake of food among children was observed, regardless of whether teachers ate the same or unhealthy foods (Gubbels, 2009). The research in this area is still early and somewhat mixed, as research has not always found a direct relationship between teacher modeling and preschool children's intake. For example, when teachers silently modeled taking bites of target foods, children's food acceptance was not influenced (Hendy & Raudenbush, 2000). Despite these mixed findings, some national guidelines recommend that providers sit at the table during meals and snacks as well as consume foods and beverages that meet nutritional standards in the presence of children (American Dietetic Association, 2005; American Academy of Pediatrics, 2010).

Childcare centers vary, however, to the extent that they adopt recommendations. Though research has shown that childcare providers are capable of

influencing children's intake, they may not be consistently modeling healthy eating behaviors. In one study of ninety-six childcare centers in North Carolina, one-third of providers were found to consume unhealthy foods and beverages in front of children (Neelon et al., 2012). In another study of twenty-four childcare centers in Illinois, while 80% of providers endorsed the importance of modeling healthy foods, fewer providers (66%) reported actually sitting with children at the meals (Nahikian-Nelms, 1997). An additional study found that 38% of Head Start directors felt that staff not liking the taste of healthy foods may be a barrier to obesity prevention efforts (Hughes, 2010).

Nutrition education.

Some research has shown that actively teaching children about nutrition can influence children's nutrition knowledge and preferences (Gorelick, 1983; Baskale, 2011). For example, preschool-aged children can be taught how to identify and classify foods as well as select healthy foods. Providers can play a role in shaping children's food preferences by exposing children to new foods as well as allowing them to taste them (Birch, 1980). Research has found that offering a food ten to fifteen times is sometimes necessary in order to increase a child's preference for that food (Savage, Fisher, & Birch, 2007).

The mealtime allows the child care provider many opportunities to shape children's eating. National recommendations (American Dietetic Association, 2005; American Academy of Pediatrics, 2010) suggest that child caregivers use mealtime as an opportunity to provide nutrition education. For example, talking about healthy foods during the mealtime has been associated with higher fiber intake among

preschoolers (Gubbels, 2009). The Head Start Program has performance standards requiring that children have opportunities to learn about healthy eating through the involvement of food-related activities (1304.23 Head Start Performance standards). A curriculum referred to as “I am moving, I am learning” for the prevention of childhood obesity had been implemented in Head Start programs. In addition to improving physical activity among children, the program also focuses on teaching children to make healthy food choices (Administration for the Office of Children and Families, 2016).

Factors That Influence Childcare Provider Mealtime Behavior

Some recent research has begun to identify factors that influence provider mealtime behaviors including individual provider characteristics and childcare policies. For example, some research with parents has shown that factors such as age, race, education, nutrition attitudes and BMI predict to a number of mealtime behaviors with their children (Freedman, 2010; Bante, 2008; Brown, 2008; de Lauzon-Gaillion, 2009). Understanding these factors among childcare providers may help to inform interventions that encourage more healthy feeding practices (Dev, 2013). In addition, childcare mealtime policies have also been associated with provider mealtime behaviors.

Provider characteristics.

Providers have been found to vary individually in relation to their mealtime behavior with children. Characteristics such as teacher’s race and ethnic background, their education, training, and years of experience as well as their nutrition knowledge, attitudes and self-efficacy have all been found to be related to their behavior in the

classroom. Some limited research has found that Hispanic childcare providers use more authoritarian behaviors, such as restriction and pressure to eat, compared to African American childcare providers (Hughes, 2007). The number of years of education, years of experience, and nutrition knowledge have been associated with more optimal mealtime behaviors including sitting with children during the meal, consuming the same foods as children and allowing children to serve themselves (Nahikian-Nelms, 1997). Despite a study that found a positive correlation between nutrition knowledge and optimal mealtime behavior, however, research has found that in general, nutrition knowledge is low overall among child care providers (Nahikian-Nelms, 1997). Further, increased nutrition knowledge after a classroom intervention was not associated with improved mealtime behaviors among teachers (Freedman & Alvarez, 2010). A recent study looking at nutrition knowledge of Head Start teachers found that 97% of teachers could only answer three or fewer of five nutrition questions correctly (Sharma, 2013). These questions included identifying important food groups as well as adequate fruit and vegetable servings per day (Sharma, 2013). A qualitative study done with Head Start teachers showed that providers were aware of the importance of getting children to eat more fruits and vegetables, but expressed that they would like more nutrition knowledge such as understanding the health benefits to eating fruits and vegetables, daily recommendations for consumption, and the best ways to get children to eat more of these foods (Mita, 2013). Also, 24% of Head Start directors felt that lack of knowledge among teachers about how to encourage healthy eating was an impediment to obesity prevention efforts (Hughes, 2010). An additional qualitative study done examining communication between

teachers and parents showed that parents actually look to teachers to provide them with food and nutrition information, particularly as it relates to their child (Johnson, 2013). Previous research has suggested that when parents receive nutrition information at preschools, they utilize that knowledge to plan healthier meals further underscoring the need for provider nutrition knowledge training for early childhood teachers (Hertzler, 1983).

Provider attitudes toward nutrition, that is, believing that one's behavior influences children's eating habits, believing that nutrition is important and that a child's nutritional intake will influence the long-term health of that child, have been associated with more optimal mealtime behaviors (Nahikian-Nelms, 1997). A qualitative study done with Head Start teachers also supported these findings (Lumeng, 2008). Providers who felt empowered to shape children's food preferences were more likely to implement evidenced based strategies to influence preferences such as peer and adult modeling, provide dipping sauces with targeted vegetables, and present novel foods with positive affect at the mealtime with children (Lumeng, 2008). A recent study done with Head Start directors identifying what they thought were the most salient barriers to obesity prevention in childhood showed that staff cultural attitudes around obesity may be an impediment (Hughes, 2010). Directors communicated that some staff believe that "fat" children are "healthy" children and that weight is not an issue (Hughes, 2010). It is not clear if these attitudes were actually found to be highly prevalent among providers, however, since only directors were interviewed for this study.

Some research has supported the finding that increased levels of self-efficacy are related to nutrition education efforts among child care providers (Lanigan, 2012). Self-efficacy, defined as one's belief in his or her effectiveness to reach a particular goal (Bandura, 1997), was found to be correlated with more family communication in the childcare setting. Providers were more likely to engage families in nutrition education when they felt more efficacious (Lanigan, 2012).

Childcare program policies and teacher training.

Childcare program policies and practices have been found to both promote and limit provider behaviors. Generally, licensing agencies in most states do not mandate specific mealtime rules for child care centers and providers (Kaphingst, 2009). In addition, research on adherence to center based rules that are in place is still quite limited (Larson, Ward, Neelon and Story, 2011). Some research has found that centers with written policies about discouraging staff from eating unhealthy foods for meals and snacks and encouraging informal nutrition talks with children at meals were more likely to have staff who modeled more healthy dietary behaviors (Erinosho, Hales, McWilliams, Emunah, & Ward, 2012). Additionally reported, low levels of coercive feeding behaviors in a Head Start study was attributed to the rules and regulation in place in Head Start Programs (Hughes, 2007).

Meal implementation (whether foods are family style, pre-plated or from home), as well as which foods are allowed in the childcare center, are often outside of a provider's individual control. A study that examined the mealtime implementation at childcare centers in four western states found that 59% of centers provided the food during mealtimes, as compared to 31% where food was provided by both the center

and home. In 10% of the centers, all the food provided was brought from home (Sigman-Grant et al., 2008). In centers where children bring foods from home, rules/policies also vary regarding what foods are allowed. Regarding the meal service style, only 38% of these centers served meals family-style and 28% served meals pre-plated (food is placed on the dish for child) (Sigman-Grant et al., 2008). Despite research that suggests that pre-school aged children will typically serve themselves and eat according to their internal cues (Birch, 1999), family style feeding practices are not always available.

Even in programs where family style feeding is mandated, such as Head Start programs, some research has shown that individual providers in these centers don't always implement it. Some providers feel children cannot self-regulate, that they will select inaccurate portion sizes and that they are too young (Dev, 2014). Some also believe it clashes with center guidelines, such as the Child and Adult Care Food Program (CACFP). CACFP is part of the United States Department of Agriculture and reimburses Head Start programs with free, reduced price or paid rates for eligible meals and snacks, making them more affordable (Rhode Island Department of Education, 2014). The CACFP mandates that children follow specific meal patterns for what they eat. For example, children could hypothetically serve themselves several servings of fruit, and then not eat anything else, not meeting CACFP guidelines. More research is still required looking at this practice, however, it is hypothesized that part of the recent reduction rates in obesity in children in Head Start programs could be partly attributed to family style feeding (Frisvold & Lumeng, 2011).

Nutrition training of childcare providers has also been associated with more optimal mealtime behaviors including sitting with children during the meal, consuming the same foods as children and allowing children to serve themselves (Nahikian-Nelms, 1997). Findings regarding staff training have been mixed, however. In one study, nutrition training was associated with more optimal mealtime behaviors (Nahikian-Nelms, 1997) however in a subsequent study, training was associated with staff using more controlling feeding practices to either decrease or maintain children's weight (Dev, 2014).

Head Start programs. Research has shown that Head Start programs report practices more consistent with the Academy of Nutrition and Dietetics than all other child care contexts (Dev, 2013). The primary goal of the Head Start Program is to promote school readiness by enhancing cognitive, social, emotional and physical development and health. Regulations in Head Start programs mandate that at least one teacher sits with the children during meals and snacks and engages with children to model appropriate mealtime behavior. Children are also not forced to eat and food is not used as a reward. Head Start program performance standards additionally require that teachers educate children about nutrition, allow sufficient time for eating and serve foods family style (1304.23 Head Start Performance standards). Head Start programs also have the same meal patterns across centers (mandated by CACFP). This includes 1 fruit/1 vegetable (or 2 fruits or 2 vegetable servings), 1 bread/grain and 1 milk serving for the breakfast meal. For the lunch meal, it includes all of these, as well as a serving of protein (1304.23 Head Start Performance standards).

All Head Start programs are required by Federal Program Performance Standards to provide nutrition training for their staff (Legislation and regulation: Head Start Act, 2008). Some research has looked at how trainings are being implemented. In 2008, all 1810 Head Start programs in the United States received a survey. Of the 1583 that responded (87%), 60% of programs endorsed holding workshops to train new staff about feeding children, 84% held workshops for parents on preparing and buying healthy foods and 50% offered workshops to staff on healthy eating behaviors (Gooze, 2010). For staff training on child feeding behaviors, 92% of programs have staff members teach other staff routines pertinent to feeding children, 60% of programs have staff attend workshops about feeding children, 14% of programs provide literature on the topic, and 13% view videotapes.

All Head Start programs are also required by Federal Program Performance Standards to provide nutrition education to families (Legislation and regulation: Head Start Act, 2008). For example, in Rhode Island, some Head Start Programs have collaboration with SNAP-ED (Supplemental Nutrition Assistance Program Education), the nutrition promotion and obesity prevention component of SNAP (Supplemental Nutrition Assistance Program) (USDA, 2016). The goal of SNAP-ED is to improve the likelihood that persons eligible for SNAP will make healthy food and lifestyle choices that prevent obesity (USDA, 2016). SNAP-ED educators conduct informational sessions with parents on diet quality, food safety and food resource management.

Dietary and Health Behaviors of Childcare Providers

Recent research has begun to examine the dietary behaviors of childcare providers themselves (Sharma, 2013). In a study of one hundred and seventy three Head Start teachers in Texas, only 9% rated their own nutritional behaviors as healthy. Low fruit and vegetable consumption was reported, along with high consumption of fast foods and sugar-sweetened beverages. Nutrition knowledge in this study was also found to be low, however the relationship between nutrition knowledge and diet was not examined.

Weight status of Head Start teachers has also been examined in the literature and some research has found that almost 79% of teachers in one sample were overweight or obese (Sharma, 2013). In a separate study, 73% of Head Start teachers were overweight/obese based on BMI (Dev, 2014).

An additional study found that women working with children in Head Start programs had poorer physical (and mental) and health than do women in the United States with similar socio-demographic backgrounds (Whitaker, 2013). This research included 2,122 responders and findings in this research showed that obesity, diabetes, and high blood pressure was 19 – 35% more common in Head Start staff than in a similar socio-economic cohort of women in the United States. Nine percent of Head Start teachers in this study also reported being absent from work 10 or more days due to illness in the past year.

Again, since few studies have examined Head Start teacher diet and health behaviors, it remains unclear how widespread these findings are. These initial results,

however, are cause for concern given that providers are in a position to influence children's mealtime behaviors. The need to address childcare provider health behaviors was recently underlined as a key research issue at a meeting identifying top priorities in obesity prevention research. It was strongly encouraged that provider health issues be addressed prior to embarking on health promotion efforts with children (Ward, 2013).

The link between childcare provider dietary behavior and classroom mealtime practices, which ultimately influence child outcomes, has been less examined in the literature. In a recent study, Head Start teacher BMI was not related to their feeding practices, but their concerns about their own weight were associated with their behaviors toward children (Dev, 2014). Those who were trying to lose weight, those who were more concerned about children's weight, and those who perceived nutrition to be important in their own diet were more likely to self-report restrictive feeding practices in the childcare environment (Dev, 2014). Though this study examined BMI, data were not collected on Head Start teacher dietary behaviors. Additionally, in a qualitative study done with Head Start directors, 20% of participants believed that when teachers are uncomfortable with their body weight, they have trouble encouraging children's healthy eating (Hughes, 2010).

There is some limited research to show that more positive health characteristics and behaviors in one's own life may translate to effectiveness in influencing other's food habits, for those in a position to do so. For example, doctors with lower BMI's more frequently report discussing weight loss with patients compared to those with higher BMI's. In addition, this study found that physicians with lower BMI's also had

greater confidence in their ability to provide diet and exercise counseling to their obese patients (Bleich, Bennett, Gudzone, & Cooper, 2012). Several other studies have reported associations between physicians' healthier dietary behaviors and increased nutrition counseling of patients (Ammerman, 1993; Frank, 2002; Hyman, 1992; Levine, 1993). There are also some interesting parallels between some of these findings and those in the smoking cessation literature. Specifically, smoking as opposed to non-smoking physicians are more likely to disregard their educational role in helping patients to quit and also less likely to initiate cessation interventions with their patients (Pipe, 2009). The dietary practices of WIC staff members were also examined in relation to obesity prevention. Those staff members who received an intervention to make healthier food choices and be more physically active were also more likely to make positive changes in counseling WIC parents about their children's weight. The study also found that WIC staff who received this healthy eating intervention had increased levels of self-efficacy, feeling more comfortable engaging parents to do physical activity with their children (Crawford et al., 2004).

The idea that teacher behavior influences children's behaviors is also supported by both Bronfenbrenner's ecological model (Bronfenbrenner, 1979) as well as Bandura's Social Cognitive Theory (Bandura, 1986). Both of these theories emphasize that important adults in a child's life, such as teachers, influence behavior through several mechanisms including education, role modeling, normative practices as well as social support.

To summarize these findings, the association among Head Start teacher diet, knowledge, attitudes and mealtime behaviors are not clearly understood. For example,

it is unclear if providers with frequent intake of nutrient dense foods (i.e., fruit and vegetables) are more likely to consume the same foods as children at the mealtime, model more fruit and vegetable consumption with children or enthusiastically try healthy foods during classroom meals. It is also suggested from supporting research that teacher nutrition knowledge and attitudes may play a role in influencing their mealtime behaviors with children.

Present Research

In an effort to address gaps in the literature, the current study examined the relationship between Head Start teacher (i.e., head, assistant, special education and teacher's aides) diet and mealtime behaviors in the classroom with children using both a self-report and observational measure. The current study also examined the association between Head Start teacher nutrition knowledge and attitudes and mealtime behaviors in the classroom with children as well as teacher diets. Additional knowledge about the role that individual provider dietary behaviors play and additional information about teacher knowledge and attitudes, could help inform future interventions. Examining these factors is critical given that providers are being increasingly encouraged to promote healthy eating, teach children about nutrition and model healthy food choices. Focusing on the health behaviors of childcare providers may strengthen the efficacy of obesity prevention efforts in childcare settings.

In addition, few studies have directly assessed childcare provider dietary behaviors in Head Start program settings specifically. Head Start centers were particularly selected for this study for a couple of reasons. For one, about a third of children who enter Head Start programs are overweight or obese (Hughes, 2010).

Given the expansive reach of Head Start programs with nearly 1,000,000 children (42% of which are in poverty), these childcare settings are an important focus for obesity prevention research and interventions (Lumeng, 2015; Hughes, 2010). A second reason for selecting Head Start programs is that they all have the same specific guidelines around mealtime behavior. These standardized procedures for Head Start programs may help reduce variability attributable to program factors and help identify variation related to individual diets, knowledge, attitudes and behaviors among Head Start teachers.

Research Hypotheses.

Hypothesis 1. Healthier diets, higher nutrition knowledge and more positive nutrition attitude scores among teachers are expected to be associated with more optimal teacher mealtime behaviors in the classroom with children.

Hypothesis 2. Higher nutrition knowledge and more positive nutrition attitudes are expected to be associated with more optimal teacher diets.

Hypothesis 3. Diet and nutrition knowledge are expected to be significantly associated with nutrition attitudes, which are expected to be significantly associated with mealtime behaviors.

CHAPTER 3

Methodology

Overview

The purpose of this study was to examine the association between Head Start teachers' diet, nutrition knowledge, attitudes, and their classroom feeding practices. The study was a cross-sectional design utilizing both survey and observational methods in 16 Head Start centers across Rhode Island. Data were primarily collected by the author/researcher of the study along with the assistance of a trained research assistant in Nutrition. The study took place between September 2014 and May 2015.

Participants

Participants were a convenience sample of 85 Head Start teachers across Rhode Island (i.e., head, assistant, special education and teacher's aides). Power analysis (GPower 3.1) indicated that an n of 85 participants would be needed to have 80% power for detecting a medium effect size with an alpha of 0.05. Six out of 7 Head Start directors who agreed that their centers could participate in this study were responsible for 22 Head Start centers across the state. Though we had access to 22 centers, only 16 centers were needed to recruit 85 teachers for the study. During the recruitment process, a total of 86 teachers came into contact with the researcher, either through phone/email (19%) or in-person (81%), and a total of 85 teachers actually enrolled in the study. Only one person who was approached in-person chose to decline. At the time of the proposal for this study, there were an estimated total of 255 Head Start teachers working in classrooms throughout the state (Rhode Island

Department of Education, 2014; Rhode Island Kid's Count Factbook, 2013). A total of one third of Head Start teachers in Rhode Island were subsequently enrolled.

In 2012, there were approximately 2,432 children in Rhode Island enrolled in the Head Start program, about 10% of all children ages 3-4 (Rhode Island Kid's Count Factbook, 2013). Approximately 12% of those children were African American, 41% Latino, 47% Caucasian, 2% Asian and 18% other (percentages don't add to 100 because persons of Latino ethnicity may be of any race) (Center for Law and Social Policy, 2012). The staff to child ratio in Head Start programs is typically 1 teacher for every 9 children (National Institute for Early Education Research, 2014). In Rhode Island, there are approximately 127 pre-school classrooms in the state divided among 32 Head Start centers. The study was approved by the Institutional Review Board (IRB) at the University of Rhode Island in September of 2014 (IRB #HU1415-026).

Measures

Diet.

Diet was assessed using The National Cancer Institute (NCI) Fruit and Vegetable Screener (FVS) (By-Meal) (National Cancer Institute, 2013). The FVS is a 14-item tool that assesses daily consumption of fruit and vegetables and is measured in cups. Fruit and vegetable intake using the Fruit and Vegetable Screener has been found to have comparable (convergent) validity with fruit and vegetable intake on both the 24-hour recall ($r=0.67$) and the Food Frequency Questionnaire (FFQ) ($r=0.68$) (Thompson, 2002). (Full screener is included in Appendix A)

Nutrition knowledge.

Given the lack of nutrition knowledge measures for this population, a 12-item multiple choice nutrition knowledge questionnaire was developed for use in this study. Participants were asked to select the correct answer to questions about basic healthy eating and nutrition principles in line with current dietary guidelines suggested by the United States Department of Agriculture (USDA, 2014) (e.g., Which food is considered the healthiest snack? How many cups of vegetables should a moderately active adult eat per day? Which of the following does not make up a balanced healthy plate?). Each correct answer received one point and scores were summed, yielding a total score ranging from 0 – 12. Higher scores indicated higher levels of nutrition knowledge. Two faculty members (one each in Nutrition and Psychology) evaluated the measure for content validity. Fifteen items were originally included in the measure during development, however, after it was pretested with seven graduate students in Psychology, two items were removed due to comprehension issues. Once the measure was modified, it was further piloted with one Head Start teacher and three graduate students in Nutrition prior to use in the study. (The Nutrition Knowledge Questionnaire is included in Appendix B)

Nutrition attitudes.

Nutrition attitudes were assessed using the Nutrition Attitudes Inventory, a self-report measure of 27 items addressing attitudes about fostering healthy eating habits in early childhood (Nahikian-Nelms, 1997). Participants were asked to respond to a series of statements (e.g., I think mealtime should be used as an opportunity to educate children about nutrition, children should learn to serve themselves at meals

and snacks, children will learn to eat a variety of foods if they are offered to them, etc.) on a 3 point scale (Disagree=1; No Opinion=2; Agree =3). Scores were summed (range: 27-81) with higher scores indicating high agreement with attitudes that have been identified as important in supporting children's healthy eating. The measure has been found to have adequate reliability ($\alpha=0.69$) and content validity. (The Nutrition Attitudes Inventory is included in Appendix C)

Classroom mealtime behavioral observations.

Mealtime behaviors were assessed using a modified version (in collaboration with the author) of the Eating Occasions-Staff Behaviors Scale, one of 16 scales from The Environment and Policy Assessment and Observation (EPAO) (Ward, 2008). The EPAO is a 75-item scale designed to assess the nutrition and physical activity environment in childcare settings. For the purposes of this study, nine original items from the Eating Occasions-Staff Behaviors scale, plus an additional 39 items designed by the authors, comprised the Mealtime Behavior Observation tool. The additional 39 items were added to capture a more varied range of teacher feeding practices. The tool developed for this study captured the occurrence of 42 mealtime behaviors (e.g., whether teacher ate same foods as child, whether teacher talked with the children about the foods they were eating, whether teachers rushed children to eat, etc.) and 6 additional questions pertained to whether the meal was breakfast vs. lunch, what time meal started/ended, how long the meal lasted, what foods were served and how foods were served (children served selves/decided portions; children served selves/teacher decided portions; provider served foods/children decided portions; provider served foods/decided portions) for a total of 48 items. Fifteen responses were rated on a 2

point scale (Yes/No) and 27 items were rated on a 3 point scale (No=1; 1-2 times=2; 3 or more times=3). Total scores were summed with higher scores indicating more optimal mealtime behaviors (range: 42-111). At the start of the study, two trained observers simultaneously coded a total of nine live observations on the same participants in the Head Start setting (10% of the sample) (Neuendorf, 2002), establishing adequate inter-rater reliability (Kappa =0.83 with $p<.001$). Researchers performed an additional inter-rater reliability at a second time-point during the study. Reliability continued to be high (Kappa = 0.84 with $p<.001$). (The Mealtime Behavior Observation Scale is included in Appendix D)

Teacher self-report of mealtime behavior.

In order to assess teacher's understanding of their own behaviors, a mealtime behavior self-report assessment was utilized. The measure, the EPAO-SR Children's Eating Scale, is a scale that is part of one of three surveys from the Environment and Policy Assessment and Observation Self-Report (EPAO-SR), an 800 item self-administered version of the EPAO (for both teachers and directors) assessing classroom behaviors (Ward, 2015). Items on the EPAO-SR Children's Eating Scale asked teachers to rate 26 statements on a scale from 1- 6 to the degree to which they engaged in certain behaviors (never=1 to always=6) or agreed with certain behaviors (strongly disagree=1 to strongly agree=6). The intent of the items on the EPAO-SR Children's Eating Scale was to capture similar topics as the Mealtime Behavior Observation Scale, providing two different estimates of teacher behavior. For example, items included how often teachers reward children with food, encourage and praise children when they try a new food, and consume both healthy and unhealthy

foods in front of children. Total scores were summed with higher scores indicating more optimal mealtime behavior (range: 24-144). (The EPAO-SR Children's Eating Scale is included in Appendix E)

Demographics, health and center practices.

Teachers completed the twenty-four item Demographics, Health and Center Practice survey developed for this study. A number of demographic, health and center practice variables were selected to be examined in this study because they were found in past literature to be related to mealtime behaviors with children, and therefore identified as potential covariates (Hughes, 2007, Nahikian-Nelms, 2007). The survey was created using pre-existing items from two different measures, the Head Start on Healthy Living Health Behavior Survey (Sharma, 2013) and The Head Start Teacher Survey (Dev, 2013). Both questionnaires have been previously used in studies with Head Start teachers and have been validated for use.

Regarding the format of the survey, eleven demographic questions required teachers to select the information that best described them including gender, race/ethnicity, education (i.e., grade school, some high school, high school graduate, some college/technical school, college graduate, post-graduate work), teaching role (i.e., head, assistant, special education or teacher's aide) and work status (i.e., full-time, part-time). Several items were open ended including hours worked per day/week, teacher age, months/years as a childcare provider and teaching at current workplace and the number of children at their table for a meal. Seven health related questions asked teachers to select responses regarding physical activity (i.e., number of days per week of exercise for atleast 30 minutes), eating habits compared to other

adults my age (i.e., much healthier, somewhat healthier, about the same, somewhat less, much less healthy), computer/TV usage (i.e., number of hours a day), and dieting status (i.e., lose weight, gain weight, maintain weight, not trying to do anything, don't know). Three of the seven health related items asked about behaviors from the previous day for easier short term recall including dining out, soda consumption, and other sugar sweetened beverage consumption (i.e., none, one time, two times, three or more times). Six center-level questions asked teachers to select which eating occasions they were present for (breakfast, am snack, lunch, pm snack), the ages of children in their care (age 2, 3, 4, 5, 6), how often they took part in nutrition training and how often nutrition training was offered by their center (i.e., rarely or never, less than one time per year, 1 time per year, 2 times per year or more). Two additional questions asked how often teachers conducted nutrition education with children and how often their center offered nutrition education to parents (i.e., rarely or never, 1 time per month, 2-3 times per month, or 1 time per week or more). (The Demographics, Health and Center Practice Survey is included Appendix F).

An additional health related variable, provider body size, was also assessed by researchers using the Body Size Guide (Harris, 2007). The body size rating scale has a number assigned to ten different silhouettes (small to large), and each number is also associated with six separate categories (i.e., 1=underweight, 2-3=normal weight, 4=overweight, 5-6=class I obesity, 7-8=class II obesity and 9-10=class III obesity). Researchers selected the figure that best indicated the body size of the person being observed. Body size was assessed after the classroom mealtime observation had been completed. Criterion related validity was established for this measure using Pearson

correlations between respondent BMI from picture and current BMI (0.86 for women and 0.94 for men). Test-retest reliability was also established for this measure using a group of 84 participants who completed the BSG twice over a 6-month period (0.91) (Harris, 2007). Observers in the current study established adequate inter-rater reliability by simultaneously rating participants using the six categories for this measure (Kappa=1.0 with $p<.05$). (The Body Size Guide is included Appendix G).

Pilot Testing.

All measures were pilot tested with five Head Start teachers in the spring of 2014. Initially, six measures were identified for use, however after pilot testing, two measures were eliminated due to information being duplicated on another measure and the second measure lacked a valid coding scheme. In addition, we hoped to capture participant weight, however, teachers expressed reluctance to report this information. Items collected to calculate BMI were subsequently removed (i.e., height and weight). We were hoping to collect information on overweight/obesity rates because recent research has found high rates of obesity among Head Start teachers. The Body Size Guide was implemented in substitution.

Procedures

The initial goals and design of this study were discussed in collaboration with staff at the Rhode Island Department of Education CACFP Division during the development phase of the proposal. Upon study approval, the Division Director at the Rhode Island Department of Education Child and Adult Care Food Program (CACFP) notified all Rhode Island Head Start directors about the study and invited them to participate via an email (CACFP sponsors all the Head Start programs in the state)

(Appendix H). Rhode Island has 7 Head Start Directors who oversee a total of 32 Head Start Centers throughout the state.

Following this initial notification, the researcher then mailed the seven individual Head Start site directors a letter explaining the study and requesting their agreement to allow researchers to both recruit participants and conduct the study within their centers (Appendix I). Head Start directors were asked to sign the approval letter and send it back to the researcher in a provided self-addressed stamped envelope. Within two weeks of receiving the letter, three directors agreed to participate by signing and returning the letter to the researcher. The four directors who did not respond to the letter within two weeks were followed-up by phone-call or email (Appendix J). Three out of the four directors subsequently agreed to allow the study and recruitment to take place in their centers. One Head Start program site (Providence) declined due to an already overwhelmed agenda for that academic year. The six directors who agreed to participate were responsible for 22 Head Start centers across the state. Once they had signed the approval letter, they were asked to send an email (including researcher's contact information) to all teachers in their respective centers about the study (Appendix K). The email to teachers explained that researchers would be conducting one in-classroom mealtime observation. In addition, the email also stated that teachers would be asked to fill out several nutrition and health behavior surveys that would take approximately 20 minutes of their time. Teachers were asked to respond either by calling or emailing the researcher if they were interested. After this initial email was sent out to teachers, directors were re-contacted every several months to re-send the email reminding teachers about the study.

Initially, several teachers responded to the first recruitment email sent out by directors and once classroom observations were scheduled, researchers also talked to other teachers about participating during these center visits.

At the beginning of the study visit, the study expectations were explained, teachers were assured that their privacy would be protected (identified by subject ID number only) and all of their questions resolved. Teachers then completed the informed consent (Appendix L). Immediately following consent, either the study researcher/author or research assistant observed a meal in the classroom (breakfast or lunch). In total, 19 breakfast and 66 lunchtime meals were observed. Researchers typically sat at a removed distance from the table during observations and did not interact with the children. Mealtimes lasted approximately 23 minutes. Following the observation, the trained researchers also completed the Body Size Guide rating scale. The teachers were then given a packet of questionnaires to fill out (Appendices A, B, C, E, & F). Teachers were asked to fill out questionnaires at their convenience and return them to the researcher on her next visit or by mail. Given that the researchers were often at the same center for at least a week, teachers were told that the researchers would retrieve the completed materials at their next visit to the center, typically the following day. If teachers were unable to complete questionnaires by the time the researcher had finished all observations within a particular center, participants were instructed to mail forms back to the researcher in a provided self-addressed stamped envelope. Once participants had completed the questionnaires and the classroom observation had taken place, teachers were given a \$35 gift card for Shaw's as compensation for their time and effort.

Data Coding

All data were entered into Microsoft Excel and uploaded into SPSS 21.0. As appropriate, responses were reverse coded in SPSS. Specifically, 22 items were reverse coded on the Mealtime Behavior Observation Scale, 10 items were reverse coded on the EPAO-SR Children's Eating Scale and 13 items were reverse coded on the Nutrition Attitudes Inventory. Less than 5% of the data were missing (nutrition knowledge, attitudes and self-reported mealtime behavior (0.01% missing), observed mealtime behaviors (0.001% missing), FVS (0% missing)). A non-significant Little's MCAR test (n.s. $p > .05$) indicated that the values missing were at random. Expectation Maximization, which provides unbiased parameter estimates, was utilized to account for the data loss (Enders, 2001).

For the purposes of data analysis, thirteen categorical variables were collapsed into two categories. Variables were initially examined, collapsed based on median split and further dichotomized using the recoding option in SPSS. These variables included teaching role (head teacher/non-head teacher), dining out, soda consumption, and other sugar sweetened beverage consumption (none/one or more times yesterday), foods served family style (family style/non-family style), how often teachers took part in nutrition training (less than one time a year/one time a year or more), how often teachers conducted nutrition education with children and how often their center offered nutrition education to parents (less than once per month/once per month or more), eating habits compared to other adults (about the same or healthier than others/less healthier than others), dieting status (trying to lose weight/not trying to lose weight), computer/TV usage (one hour or less/more than one hour), body size (normal

weight vs. overweight/obese) and education (less than college graduate/college graduate or more).

Data reduction

Internal Consistency.

Data were collected on five scales: FVS, nutrition knowledge, nutrition attitudes, and mealtime behavior (observed and self-report). Internal consistency was determined for the total scores for each of the measures, with four out of five measures reaching acceptable reliability. Internal consistency for the FVS was found to be 0.74, the Nutrition Knowledge Questionnaire was 0.62, the Nutrition Attitudes Inventory was 0.62 and the Mealtime Behavior Observation Scale was 0.70. The EPAO-SR Children's Eating Scale demonstrated somewhat lower internal consistency ($\alpha=0.59$). After two items were deleted (I monitor and guide children's eating so they do not eat more than they should (and) I monitor and guide children's eating so they do not eat less than they should), the alpha increased from 0.59 to 0.65. Justification for removing these items was confirmed as they accounted for 18% of the missing data for this scale, indicating a possible comprehension or applicability issue.

Principal Components Analysis (PCA).

Because both the mealtime behavior assessments (observed and self-report) included items that represented various domains of behaviors known to be related to child outcomes (e.g., autonomy support, involvement with children during the meal, etc.), PCA was run on each measure separately to assess whether domain-specific factors would emerge.

Mealtime Behavior Observation Scale. Of the 47 items on the Mealtime Behavior Observation Scale, 23 items were entered in the PCA. Five items on the scale were descriptive and not included in the analysis, and fifteen dichotomous items could not be included (factor analysis algorithm does not compute for categorical items). Four additional items were also excluded due to lack of variability (see Table 1 for items excluded and rationale). The remaining 23 items were then examined. The Kaiser-Meyer-Olkin value was 0.58, where 0.50 is considered acceptable for factor analysis (Tabachnick, 2007). In addition, the correlation matrix could be divided into factors demonstrated by the Bartlett's Test of Sphericity. Inter-item correlations were examined to determine if any of the scale's items were highly correlated and therefore repetitive. After careful evaluation, there were no items equivalent to 0.90 or above, eliminating the need to further remove items. Varimax rotation was used to interpret items and eight factors were identified with eigenvalues greater than 1.0, explaining 64.4% of the variance. The scree plot revealed a clear cut bending point after the eighth component. All eight components were retained for further investigation based on the scree test (Catell, 1966). Stevens (1992) suggests a loading cut-off at 0.4 for factor significance. After assessing internal consistency of the factors, only two factors reached adequate reliability and were further retained to create composite scores. Six items loaded on to the first factor representing items indicating a teacher's support for autonomy and promotion of healthy eating in the classroom ($\alpha=0.81$) (See Table 2 for items loading on this factor). The second factor included four items representing teacher's positive involvement with children during the meal ($\alpha=0.70$). Composite

scores were created by calculating the mean for all items within the factor for each participant (i.e., autonomy support and involvement).

EPAO-SR Children's Eating Scale. Principal Components Analysis (PCA) identified factors underlying the EPAO-SR Children's Eating Scale. The Kaiser-Meyer-Olkin value was 0.63, where 0.5 is considered suitable for factor analysis (Tabachnick, 2007). In addition, the correlation matrix could be divided into factors demonstrated by the Bartlett's Test of Sphericity. Twenty-six EPAO-SR Children's Eating Scale items were examined. Inter-item correlations were examined to determine if any of the scale's items were highly correlated and therefore repetitive. After careful evaluation, there were no items equivalent to 0.90 or above, eliminating the need to further remove items. Varimax rotation was used to interpret items and nine factors were identified with eigenvalues greater than 1.0, explaining a 72% of the variance. The scree plot revealed a clear cut bending point after the ninth component. All nine components were retained for further investigation based on the scree test (Catell, 1966). A loading of 0.4 or above was determined significant (Stevens, 1992). After assessing internal consistency of the factors, only four factors reached adequate reliability and were further retained to create composite scores. Four items loaded on to the first factor representing items indicating provider self-efficacy ($\alpha=.86$) (See Table 3 for items loading on this factor). Four items loaded on to the second factor representing items indicating classroom structure during the meal. Following an item analysis, one item (I play videos during children's meals and snacks) was removed to increase alpha from 0.55 to 0.58. Four items loaded on to the third factor representing items indicating avoiding using food as a reward. Following the item analysis, one

item (I encourage children to eat by using food as a reward) was removed to increase alpha from 0.56 to 0.68. Seven items loaded on to the fourth factor representing items indicating a teacher's support of autonomy and promotion of healthy eating in the classroom. Following an item analysis, one item (I give a child something to eat to make them feel better when they are upset) was removed to increase alpha from 0.59 to 0.63. Composite scores were created by calculating the mean for all items within the factor for each participant (i.e., self-efficacy, structure, avoids reward, autonomy support).

Data analysis.

Descriptive measures of central tendency, variability and distributions were assessed for all variables including means, standard deviations, skewness, and kurtosis. Analyses indicated that several items were non-normal including the Nutrition Attitudes Inventory with skewness of -1.43 (SE=0.261) and kurtosis of 3.44 (SE=0.517), self-reported self-efficacy with a skewness of -2.19 (SE=0.261) and kurtosis of 8.59 (SE=0.517), self-reported structure with a skewness of -1.68 (SE=0.261) and kurtosis of 2.69 (SE=0.517), and self-reported avoids reward with a skewness of -3.17 (SE=0.261) and kurtosis of 11.1 (SE=0.517). Although both square root and Log 10 were initially conducted, transformations resulted in less interpretable scores and therefore transformations were not conducted.

Bivariate analyses were conducted between diet, knowledge, attitudes, mealtime behaviors (observed and self-reported), demographic, health-related and center-level variables using Pearson correlations, *t*-tests and ANOVA. Some bivariate analyses required multiple comparisons, therefore bonferroni correction was utilized

to control for familywise error rate. For example, for 13 analyses, we ran 11 statistical tests, therefore, the critical value for each individual test was determined to be $p < .005$. Inter-correlations were examined to identify individual covariates using these analyses. Meal-type (i.e., breakfast vs. lunch) and teacher experience (i.e., age, years at current center, years as a childcare provider) were identified as covariates for observed behaviors while teacher experience was identified as a covariate for self-reported mealtime behaviors. Collinearity diagnostics were conducted among significantly correlated variables using variance inflation factor to test for multicollinearity. Multicollinearity was not found. In addition, for the purposes of the analyses presented in this study, the two measures of teacher behavior (observation and self-report) were examined independently. The analyses of the associations between the observation and mealtime self-report have been examined elsewhere (Fallon, 2016).

Finally, regression analyses were conducted to examine individual research questions.

Research Questions

Question 1 analysis. Are more optimal diets, higher nutrition knowledge, and more positive nutrition attitude scores associated with more optimal teacher mealtime behaviors in the classroom (i.e., EPAO-SR Children's Eating and Mealtime Behavior Observation total score and composites) among Head Start teachers? Observed mealtime behavior (Mealtime Behavior Observation total score and composites) was regressed on teacher diet scores, knowledge and attitudes, after controlling for meal type (breakfast vs. lunch) and teacher experience. Self-reported mealtime behavior

(EPAO-SR Children's Eating Scale total score and composites) was then regressed on teacher diet scores, knowledge and attitudes, after controlling for teacher experience.

Question 2 analysis. Is there a significant association between nutrition knowledge, nutrition attitudes and Head Start teacher diets? Using regression analysis, teacher diet scores was regressed on knowledge and attitudes.

Question 3 analysis. Do Head Start teacher nutrition attitudes mediate the relationship between teacher diets and knowledge and mealtime behavior total scores? Because no relationship was ultimately found between teacher diets and mealtime behavior, this question was not explored. This question was originally proposed to use structural equation modeling, including an analysis of mediational, direct and full models, to determine the strength and significance of nutrition attitudes as a potential mediator. Goodness of fit was proposed to be examined utilizing chi-square (χ^2). If the mediational model was the best fit for the data compared to the other models, it would have indicated that the direct effect changed significantly as a result of including the mediational variable of attitudes, indicating a mediational effect.

CHAPTER 4

Results

Descriptive Analyses

Demographics.

Participants were 97.6% female (2 males), ranging in age from 19-63 ($M=40.31$, $SD=11.67$). The majority of participants (84.6%) were Caucasian, with 9 Hispanic/Latino participants (10.6%), and 1 each reporting as Black/African and Asian. Approximately half of the teachers in the study (50.6%) had a college education or more, 44.7% had some college or technical school and 4.7% of participants had a high school diploma or less. On average, teachers had 14 years of experience and a little more than 7 years teaching at their current center. Fifty-seven percent self-identified as head teachers, 37.6% as assistant teachers, 2.4% as special education teachers, and 2.4% as teacher's aides. Teachers reported working an average of about 7 hours a day and 32 hours a week. Complete participant characteristics are included in Tables 4 and 5.

The associations between five demographic variables (e.g., age, years as a childcare teacher, years at this center, education, and teaching role) were examined. Variables representing experience (i.e., age, years as a childcare teacher and years at this center) were significantly associated with one another (Table 6). Teaching role was significantly associated with years of education, $\chi^2(1)=20.10$, $p<.001$, with head teachers more likely to be college graduates compared to non-head teachers (Table 7). Head teachers had more years of experience working at the current center ($M=8.8$), compared to non-head teachers ($M=5.5$), $t(81)=2.06$, $p<.05$. Education was not

significantly associated with age, years as a childcare teacher, and years at this center (See tables 8 - 9). Race/ethnicity and gender were not examined in relation to other variables due to a lack of variability.

Individual health characteristics.

In general, teachers reported good health with approximately 80% of respondents rating their eating habits to be the same or healthier than others and reporting exercise (30 minutes/day) on average 3-4 days per week (Table 10). In terms of diet, 80% reported not having consumed soda during the previous day, and 47.1% reported no consumption of any other sugar-sweetened beverages the previous day (i.e., sweetened coffee beverages, kool-aid, sports drinks, etc.). Roughly 34% reported having gone to a restaurant the previous day and 63.5% reported more than one hour a day of TV or computer use. Approximately seventy-one percent, however, reported that they were trying to lose weight and 50.6% were rated as overweight or obese using the Body Size Guide.

Center-level characteristics.

Approximately 68% of respondents reported receiving nutrition training once a year or more, while 32% reported nutrition training less often. Seventy-eight percent of teachers reported conducting nutrition education with children at least once a month and 72% of teachers reported that their center offered nutrition education with parents at least once a month (Table 11).

Diet, knowledge, attitudes and self-reported mealtime behaviors.

Mean scores, standard deviations and ranges for all independent and dependent variables are presented in Table 12. Overall, teachers reported consuming, on average,

3.9 cups of fruits and vegetables per day (comprised of 31% fruits and 69% vegetables, on average), an amount exceeding the minimal Mypyramid USDA daily recommendation (3.5 cups for women) (USDA, 2014). Additionally, the teacher's demonstrated high levels of nutrition knowledge and attitudes. Teachers scored relatively high on the EPAO SR-Children's Eating Scale and the self-reported composites.

Observed mealtime behavior

Teachers also scored relatively high on the Mealtime Behavior Observation Scale and the observed composite scores. During observation of meals, 33% of teachers allowed children serve themselves and let children decide on portions (closest to family style) while 41% of teachers served foods to children and teachers decided on portions (opposite of family style). Approximately 9% of teachers let children serve themselves but teacher decided portions, and 17% of teachers served foods, but children decided portions. None of the teachers were observed to drink soda, eat fast food, or consume sweet or salty snacks during the meal. Most teachers (80%) ate fruits and vegetables at the meal with children and talked to children about the foods they were eating (91%). A little more than half (57%) praised children for trying healthy foods on their plate (see Table 13 for complete descriptive of observed behaviors).

Bivariate Analyses

Associations between demographic variables and diet, knowledge, attitudes and behavior.

The associations between five demographic variables (e.g., age, years as a childcare teacher, years at this center, education, and teaching role) and the measures of diet, knowledge, attitudes and mealtime behaviors (observed and self-reported) were examined.

Age, years as a childcare teacher, and years at this center. Age ($r(83)=0.35$, $p<.001$), years as a child care teacher ($r(83)=0.27$, $p<.05$) and years at current center ($r(83)=0.38$, $p<.001$) were significantly correlated with observed mealtime behavior, with older and more experienced teachers having higher total scores as well as higher scores on the observed autonomy support composite score. More years of teaching at the current center was associated with higher scores on the observed teacher involvement composite score ($r(83)=0.24$, $p<.05$) (Table 14).

Similar to observed mealtime behavior, age ($r(83)=0.22$, $p<.05$) and years as a child care teacher ($r(83)=0.22$, $p<.05$) were significantly correlated with the teacher self-reported mealtime behavior total score, with older more experienced teachers reporting more positive mealtime behavior. Years as a child care teacher was significantly correlated with self-reported self-efficacy composite score ($r(83)=0.25$, $p<.05$) (Table 15). None of the other self-reported composites were significantly related to the age, years at the current center and years as a childcare teacher.

Years as a child care teacher was significantly correlated with nutrition attitudes ($r(83)=0.28$, $p<.001$) (Table 16). Scores on nutrition knowledge and the FVS

were not associated with age, years at the current center and years as a childcare teacher.

Education. A one-way ANOVA examined the associations between level of education (i.e., high school graduate or less, some college or technical school, college graduate, post-graduate work) and diet, knowledge, attitudes, and mealtime behaviors (observed and self-reported) (Table 17). Nutrition knowledge ($F_{(3, 84)}=3.53, p=.02$), observed total scores ($F_{(3, 84)}=2.70, p=.05$), and observed autonomy support ($F_{(3, 84)}=2.91, p=.04$) varied significantly by education level. Post-hoc analyses showed that college graduates scored higher on nutrition knowledge ($M=10.36$) compared to those reporting to be high school graduates or less ($M=7.75$). There were no other significant differences among the groups for these variables. Analyses for education also required multiple comparisons, therefore Bonferroni correction was utilized to control for family-wise error rate, reducing the significance of correlations.

Teaching role. The results of the analyses (t -tests) examining the association between teaching role (e.g., head teachers vs. non-head teachers) and diet, knowledge, attitudes, and mealtime behaviors (observed and self-reported) are reported in Table 18. Head teachers scored higher on nutrition knowledge ($M=10.29$), compared to non-head teachers ($M=9.12$), $t(83)=2.86, p<.01$, and on nutrition attitudes ($M=73.27$), compared to non-head teachers ($M=70.4$), $t(83)=3.21, p<.01$. There was no association between teaching role and diet or mealtime behaviors.

Associations between health related variables and diet, knowledge, attitudes and behavior.

Eight individual level health-related behaviors of providers (e.g., dining out, soda consumption, other sugar sweetened beverage consumption, physical activity, body size, eating habits, computer/tv usage, dieting status) were analyzed in association with diet, knowledge, attitudes, and mealtime behaviors (observed and self-reported) (See tables 19-26) using *t*-tests and Pearson correlations (e.g., physical activity).

Teachers who reported not having ‘other sugar-sweetened beverages (not soda)’ (i.e., sweetened coffee beverages, kool-aid, sports drinks, etc.) on the previous day scored higher on nutrition knowledge ($M=10.59$) than those who reported drinking these beverages one or more times on the previous day ($M=9.09$), $t(83)= 3.82, p<.001$ (Table 21). More frequent physical activity was also positively correlated with both nutrition knowledge ($r(83)=0.27, p<.05$) and diet (i.e., fruit and vegetable consumption) ($r(83)=0.22, p<.05$) (Table 22). Scores on FVS, nutrition knowledge, attitudes and behavior (observed and self-reported) were not associated with dining out, soda consumption, body size, eating habits, computer/tv usage, or dieting status (See tables 19, 20, 23-26).

Associations between center-level variables and diet, knowledge, attitudes and behavior.

A series of independent *t*-tests were conducted between three center-level characteristics of teachers (e.g., nutrition training attended, how often nutrition education with children, how often centers offer nutrition education with parents) diet,

knowledge, attitudes, and mealtime behaviors (observed and self-reported) (See tables 27 – 29).

Teachers who said their centers offered nutrition education with parents less frequently (less than once a month) scored significantly higher on nutrition knowledge ($M=11$) than those who reported that their centers offered nutrition education with parents more frequently (once a month or more) ($M=9.5$), $t(83)= 2.88$, $p<.01$ (Table 29). Scores on FVS, nutrition knowledge, attitudes and behavior (observed and self-reported) were not associated with nutrition training attended and how often teacher's conducted nutrition education with children.

Associations between meal characteristics and observed behavior.

Independent t -tests were conducted between meal style (e.g., family style vs. non-family style) and diet, knowledge, attitudes, and mealtime behaviors (observed and self-reported). An independent t -test was conducted between meal-type (i.e., breakfast vs. lunch) and observed mealtime behaviors.

Scores on FVS, nutrition knowledge, attitudes and behavior (observed and self-reported) were not associated with use of family style feeding (Table 30). Teachers at the lunch meal, however, scored higher on observed mealtime behavior ($M=92.77$), compared to teachers at the breakfast meal ($M=89.0$), $t(83)=-3.195$, $p<.001$ (Table 31).

Associations between independent and dependent variables.

Correlation analyses were conducted to examine inter-correlations between independent variables (e.g., diet, knowledge and attitudes) and mealtime behaviors (reported and observed) (See tables 32-34).

Nutrition attitudes was significantly correlated with nutrition knowledge, $r(83)=0.40, p<.001$. Provider diet was not significantly associated with either knowledge or attitudes. Knowledge, attitudes, and diet were not significantly associated with the Mealtime Behavior Observation total score or observed composites. Nutrition attitudes, but not knowledge or diet, were associated with self-reported mealtime behavior total score ($r(83)=0.32, p<.001$) and self-reported self-efficacy composite ($r(83)=0.34, p<.001$). In both cases, more positive attitudes were associated with higher self-reported mealtime behaviors.

Research Questions

Research question 1. Are more optimal diets, higher nutrition knowledge, and more positive nutrition attitude scores associated with more optimal provider mealtime behaviors in the classroom (i.e., Mealtime Behavior Observation and EPAO SR Children's Eating Scale) among Head Start teachers?

Mealtime behavior observation scale.

Three separate hierarchical multiple regressions were conducted to assess the association between diet, knowledge and attitudes and mealtime behavior observation total score and the two composites, autonomy support (OBS) and involvement (OBS) (Table 35).

In the first hierarchical regression, the association between observed mealtime behavior and nutrition knowledge, attitudes and fruit and vegetable consumption was examined controlling for covariates. In the first step, age, years as a childcare teacher, years working at the current center as well as meal-type (breakfast vs. lunch) were entered into the model. The model ($F(4, 75)=6.15, p<.001$) indicated that the covariates

accounted for 26% of the variance. Meal-type and years at the current center entered significantly into the model. In the second step, knowledge, nutrition attitudes and fruit and vegetable consumption accounted for 3% of the variance, also yielding a significant model, $F(4, 75)=3.82$, $R^2=0.03$, $p<.01$. Only meal-type was significant in the second model. None of the other independent variables entered significantly.

In the second hierarchical regression, the association between observed autonomy support and nutrition knowledge, attitudes and fruit and vegetable consumption was examined controlling for covariates. In the first step, teacher experience and meal-type were entered into the model. The model ($F(4, 75)=7.08$, $p<.001$) indicated that the covariates accounted for 29% of the variance. Meal-type and years at the current center entered significantly into the model. In the second step, nutrition knowledge, nutrition attitudes and fruit and vegetable consumption accounted for 7% of the variance, also yielding a significant model, $F(7, 75)=5.30$, $R^2=0.07$, $p<.001$. Meal-type, years at the current center and nutrition attitudes were significantly associated with teacher's observed autonomy support during mealtime. Less positive nutrition attitudes were associated with more observed autonomy support.

In the third hierarchical regression, the association between observed teacher involvement and nutrition knowledge, attitudes and fruit and vegetable consumption was examined controlling for covariates. In the first step, teacher experience and meal-type were entered into the model. The first model was not significant. In the second step, nutrition knowledge, nutrition attitudes and fruit and vegetable consumption also did not yield a significant model, $F(7, 75)=1.21$, $R^2=0.07$, $p=.31$. None of the

independent variables were significantly related to the composite of teacher involvement.

EPAO-SR children's eating scale.

Five separate hierarchical regression analyses were conducted to assess the association between diet, knowledge and attitudes and self-reported mealtime behavior total score and four composites (i.e., self-efficacy (SR), structure (SR), avoids reward (SR), autonomy support (SR)) (Table 36).

In the first hierarchical regression, the association between self-reported mealtime behavior total score and nutrition knowledge, attitudes and fruit and vegetable consumption was examined controlling for teacher experience. In the first step, teacher experience was entered into the model ($F(3, 77)=1.72$, $R^2=0.07$, $p=.17$). The inclusion of nutrition knowledge, nutrition attitudes and fruit and vegetable consumption was not significant, $F(6, 77)=2.13$, $R^2=0.09$, $p=.06$. Nutrition attitudes were significantly associated with the mealtime behavior self-reported total score.

In the second hierarchical regression, the association between self-reported self-efficacy and nutrition knowledge, attitudes and fruit and vegetable consumption was examined controlling for teacher experience. In the first step, teacher experience was entered into the model ($F(3, 77)=1.90$, $R^2=0.07$, $p=.14$). In the second step, the inclusion of nutrition knowledge, nutrition attitudes and fruit and vegetable consumption yielded a significant model, $F(6, 77)=3.45$, $R^2=0.15$, $p<.01$. More positive nutrition attitudes significantly predicted scores on the self-reported self-efficacy composite, however, lower nutrition knowledge was associated with higher self-reported self-efficacy.

The remaining three composites (structure (SR), avoids reward (SR), autonomy support (SR)) were then regressed on nutrition knowledge, nutrition attitudes and fruit and vegetable consumption controlling for teacher experience. None of the other regression analyses resulted in significant models.

Research question 2. Is there a significant association between nutrition knowledge, nutrition attitudes and teacher diets? Teacher diet was regressed on nutrition knowledge and nutrition attitude scores. The model was not significant, $F(2, 84) = .151$, $R^2 = 0.004$, $p = .86$ (Table 37).

Research question 3. Do teacher nutrition attitudes mediate the relationship between teacher diets and knowledge and mealtime behaviors in the classroom?

Since no association was found between Head Start teacher diet, knowledge and mealtime behavior total scores, analyses examining nutrition attitudes as a mediator between diet, knowledge and mealtime behavior were not conducted.

CHAPTER 5

Discussion

Summary of Findings

The present study examined the nutrition knowledge, attitudes and diets of Head Start teachers and how they relate to mealtime behaviors in the classroom with children. Given the lack of studies examining the association between teacher knowledge, attitudes and diets as they relate to their mealtime behaviors with children, this study attempted to address this gap in the literature. Teachers appear to be reporting healthy diet and exercise behavior, high knowledge, and positive attitudes, overall. Teachers also behaved in ways that were consistent with Head Start best practices regarding mealtime behavior (1304.23 Head Start Performance standards). For example, most teachers were found to model healthy eating, use meal times as an opportunity for nutrition education, avoid using food as a reward, and avoid pressuring children to eat more than they wanted. Overall, teachers in this population appear to be well-trained and performing quite optimally, practicing healthy behaviors with children.

We found very limited support for our hypothesis that teacher diets, knowledge, and attitudes would be associated with their mealtime behaviors in the classroom with children. Teacher diet (i.e., fruit and vegetable consumption) was not found to be associated with classroom mealtime behaviors, contrary to the study's first main hypothesis. Nutrition attitudes were only positively associated with one outcome. When teachers have more positive attitudes regarding fostering healthy eating habits in early childhood, they were found to report higher levels of self-efficacy. Nutrition

attitudes were also associated with observed autonomy support, however, contrary to expectations, in a negative direction. Less positive nutrition attitudes were associated with higher observed autonomy support. Nutrition knowledge was only associated with one outcome, however, also in a negative direction. Lower nutrition knowledge was associated with a higher self-reported self-efficacy. Nutrition knowledge and attitudes were not associated with any other observed or self-reported behaviors. In both models (observed autonomy support and self-reported self-efficacy), controlling for the covariates resulted in significant associations between attitudes and observed autonomy support as well as knowledge and self-reported self-efficacy compared to what was observed in the bivariate analyses, though variables remained negatively associated with outcomes. It remains unclear why these negative associations exist. In addition, future research may need to examine how teacher experience may modify the associations between attitudes/knowledge and behavior.

The lack of association between diet, knowledge, attitudes, and behavior appears to suggest that what teachers know and believe may be independent from what they do, once they are in the classroom. This lack of association between diet, attitudes, knowledge and mealtime behavior is surprising, especially since scores were close to optimal. One potential explanation may be that the lack of variability among teachers in this sample, with regard to responses on both the independent and dependent measures, may have potentially restricted our ability to establish the hypothesized associations. In addition, the amount of training that is required by Head Start programs may also be overriding these individual differences among teachers. Past research has found that nutrition training is associated with more optimal

mealtime behaviors such as sitting with children during the meal, consuming the same foods as children and allowing children to serve themselves (Nahikian-Nelms, 1997). Furthermore, having policies in place in childcare contexts has been found to be associated with promoting healthy mealtime behaviors, as compared to programs that did not have any mealtime policies (Erinosho, 2012). The Head Start program is known for its strict adherence to regulations and guidelines. Working in Head Start programs, specifically, has been found to predict practicing more healthy feeding practices such as modeling healthy eating and teaching children about nutrition compared to other child care contexts (Hughes, 2007). The current study may lend further support to these findings.

A second goal of this study was to examine the association between teacher nutrition knowledge, nutrition attitudes, and diets (i.e., fruit and vegetable consumption). Some research, in general, has found associations between nutrition knowledge and dietary behavior. For example, participants who had more nutrition knowledge were 25% more likely to have adequate fruit and vegetable consumption (Wardle, Parmenter & Waller, 2000). Similarly, college students enrolled in nutrition programs were found to have dietary intake closer to nutritional recommendations (Litch, 1999). In the current study, neither nutrition knowledge nor nutrition attitudes were associated with teacher reported diet.

The third hypothesis of the study was that nutrition attitudes would be a mediator between diets, knowledge and mealtime behavior. No association was found between Head Start teacher diet, knowledge and mealtime behavior total scores,

therefore, analyses examining nutrition attitude as a mediator between diets, knowledge and mealtime behavior were not conducted.

Despite limited findings for associations for our hypotheses, the study revealed an overall positive picture of Head Start teacher dietary and health behaviors. Teachers appear to be reporting healthy diet and exercise behavior, as a whole. Rates of fruit and vegetable consumption among providers have been reported in the literature as relatively low (Sharma, 2013) however in this study, they appear to be on target with current recommendations. One caveat to this finding is that because we used a self-report to measure diet, it is possible that teachers may have used selective reporting. The study did find that more than half of teachers were overweight or obese. Fruit and vegetable consumption was also significantly associated with levels of physical activity indicating a consistency among teachers for health behaviors, when it comes to reporting diet and exercise. In addition, rates of overweight and obesity in this study were actually found to be lower than reported in other Head Start populations. For example, recent research has found that a large majority of Texas (79%) and midwestern (73%) Head Start teachers were found to overweight/obese based on BMI (Sharma, 2013; Dev, 2014). This could be a reflection, however, of regional trends among adults in the United States, where higher levels of obesity have been found in the south (30.6%) and midwest (30.7%) compared to the northeast (27.3%) and the west (25.7%) (CDC, 2014). High rates of overweight and obesity among Head Start teachers, in general, could also be a reflection of current national trends, where approximately 69% of adults age 20 and over are overweight or obese (Ogden, 2014).

The study also sought to examine Head Start Teacher's knowledge and attitudes, in general. Teachers appear to be reporting high nutrition knowledge and positive nutrition attitudes, overall. Though nutrition knowledge was not associated with fruit and vegetable consumption, it was associated with more weekly exercise, and less sugar-sweetened beverage consumption (excluding soda) (i.e., sweetened coffee beverages, kool-aid, sports drinks, etc.) among teachers.

Head teachers also had significantly higher nutrition knowledge and more positive nutrition attitudes compared to non-head teachers. Some research has shown that a large majority of early childcare teachers (69%) reported earlier college coursework as their main source for nutrition training and information (Nahikian-Nelms, 1997). This earlier training could potentially be influencing both nutrition knowledge and attitudes, given that they are highly correlated. In this current study, only 16% of non-head teachers were college graduates, therefore, most non-head teachers would not have had the opportunity to be exposed to nutrition curriculum in college, possibly explaining this discrepancy between groups.

Teacher experience was found to be associated with both observed and self-reported mealtime behavior. Previous studies have also found an association between experience and optimal mealtime behaviors (Nahikian-Nelms, 1997). This may be because older, more experienced teachers may have had more exposure to curriculum involving nutrition, contributing to more expertise and confidence in working with children. Though there was a wide range, teachers in this Head Start population averaged forty years of age and had fourteen years of experience as teachers. Research has shown that older early childhood teachers, as well as those who had more

experience working in the field, were more likely to stay in the job (Holochwost et al, 2011). The teachers who participated in this study averaged seven years in their current position, suggesting relatively low turnover. Research also shows that low wages are typically the reason for high turnover, and it may be possible that more experienced teachers are better compensated (Stremmel, 1991; Cassidy, Lower, Kintner-Duffy, Hedge, & Shim, 2011). The annual rate for turnover in Head Start staff is 25% and turnover rates have been found to be strongly associated with program quality (Wells, 2015; Cassidy et al, 2011; Mims, Scott-little, Lower, Cassidy, & Hestenes, 2008). For example, some research has found that high turnover among early childhood teachers negatively impacted the development of a secure attachment with teachers as well as children's social, emotional, and language development (Korjenevitch & Dunifon, 2010). Head Start teachers in this study, on average, demonstrate low turnover and are highly experienced, potentially benefitting the children in their care.

Strengths of the Present Study

Few studies have examined the association between teacher knowledge, attitudes and diets as they relate to their mealtime behaviors with children. One of the strengths of the study is that it attempted to address some of these gaps in the literature. The eating behaviors that children develop early in life influence their eating patterns throughout their development (Sullivan and Birch, 1990). Childcare providers are in a unique position to shape those eating behaviors (Hendy et al., 2000; Birch, Zimmerman, & Hind, 1980). Examining provider behavior continues to be an important area of inquiry in the study of childhood obesity.

In addition, few studies have directly assessed childcare provider dietary behaviors in Head Start program settings specifically. About a third of children who enter Head Start programs are overweight or obese and given the expansive reach of Head Start programs with nearly 1,000,000 children, these childcare settings are an important focus for learning more about obesity prevention research (Lumeng, 2015; Hughes, 2010).

An additional strength of this study is that we used both a self-report and an observation tool to gather mealtime behavior data, providing an objective picture of behaviors in real time.

Limitations of the Present Study

Several limitations of this study should be noted. One of the reasons we chose to conduct this study in Head Start settings was because of their strong focus on nutritional guidelines and behavior. Since all programs have the same specific guidelines, we had hoped that these standardized procedures would help to reduce variability attributable to program factors and help identify variation related to individual diets, knowledge, attitudes and behaviors. What we found, however, was that teachers were so consistent in following mealtime rules that outside of teaching experience, there were very limited associations among individual characteristics and mealtime behaviors.

In addition, we were somewhat limited by our measures. One of the limitations inherent in using self-report scales is social desirability bias. It is therefore unclear whether responses for behaviors are accurate reflections of how teachers are actually doing or selective reporting. In addition, we only looked at fruit and vegetable

consumption for diet, but did not look at overall fat intake or daily calorie consumption. Several available dietary measures were considered, however, required time commitments that were prohibitive for this study. We wanted to capture diet in a way that would reduce participant burden. Due to this limitation, we did not capture total dietary intake, and thus, were unable to make conclusions with regard to other aspects of their diet. We also had difficulty finding a suitable nutrition knowledge measure for this population. We had hoped to survey participants on basic concepts related to healthy eating. A number of knowledge measures were consulted, but ultimately deemed unsuitable. For example, one measure required respondents to grasp highly specific nutrition principles (e.g., differences between the role of nutrients, etc.). A second measure required respondents to rate healthy vs. unhealthy foods, however there was limited consensus on what was considered healthy/unhealthy. A third nutrition knowledge was consulted but was also deemed unsuitable due to cultural limitations regarding food references (developed in the UK). We ultimately developed our own.

There also seemed to be a limited number of mealtime observation measures developed for pre-school classrooms. We were fortunate to derive a reliable observation measure of mealtime behavior however discovered limitations with that as well. Though we had adequate internal consistency on the measure, we had a somewhat limited range for frequency of behaviors, providing limited variability when it came to coding items. For example, the coding choices for most behaviors were ‘none’, ‘1-2 times’, or ‘3 or more times.’ Therefore, if a teacher praised a behavior

three times, they were in the same category as a teacher who praised a behavior ten times.

Though a unique aspect of this study is that we used both a self-report and an observation to gather mealtime behavior data, we were only able to observe teachers at one time-point (i.e., either one breakfast or one lunch). For this reason, we may not have captured a teacher's usual mealtime behavior. Some teachers were more distracted, at times, than they might usually have been. For example, if one child was having a behavioral difficulty, this sometimes prevented the teacher from interacting with the other children in their care, sometimes for a large duration of the meal. Several observations over time may have given us a more accurate reflection of an individual's pattern of behavior. In addition, we chose to look at both breakfast and lunch meals, not expecting to find differences, however, teachers were found to score lower on observed mealtime behavior at breakfast compared to lunch. The breakfast environment itself might account for differences between breakfast and lunchtime scores. Anecdotally speaking, breakfast was observed to be slightly more disruptive as occasionally students were still arriving and teachers sometimes needed to attend to parents, as well as attend to children who were having difficulty separating from parents. Since differences between meals were observed, it may have been more preferable to only observe lunch meals, to better control for variability in teacher behavior possibly due to environmental distractions.

The study was also limited in ethnic and racial diversity among teachers. According to the Center for Law and Social Policy (2012), Rhode Island Head Start teachers were estimated to be approximately 10% African American, 17% Latino,

59% Caucasian, 2% Asian and 12% other. We did not see this level of diversity and therefore may not have had a representative sample (1% African American, 11% Latino, 85% Caucasian, 1% Asian and 1% other). This underrepresented diversity may most likely be due to accessing only half of Head Start centers in the state. We ended up recruiting all of our 85 subjects in 16 out of the 32 centers, however, there were approximately 170 subjects (from 16 centers) we did not enroll in the study, which may account for the discrepancy in diversity. Lack of variability among teachers in this sample, therefore, on both the independent and dependent measures, may have potentially restricted our ability to establish the hypothesized associations.

Implications of Study Findings

The results of this study have important implications for Head Start administrators as well as other childcare contexts. Though the study did not find an association between diets and mealtime behaviors, it confirmed that, overall, Head Start teachers seem to be adhering to best practices. We hypothesize that mealtime behavior, in this Head Start population, may be mainly driven by experience as well as having strict meal guidelines in place. In addition to influencing mealtime behaviors, teacher experience may also contribute to having attitudes identified as important in fostering healthy eating habits in early childhood. This information could be beneficial to Head Start program administrators, underscoring the importance of having and retaining experienced teachers. It is possible that experienced teachers are better trained, more familiar with the rules in place, and lower levels of turnover may be potentially benefitting the children in their care. The importance of having rules in place in regard to mealtime behaviors could also be beneficial information for other

childcare centers that are not currently mandated to follow regulations, providing more reason for adopting rules.

Study findings also contribute to a better understanding of Head Start teacher diets and health behaviors. Though 50% were rated as overweight or obese, providers reported optimal fruit and vegetable consumption and exercise. It is also possible, however, that teachers are over-reporting these behaviors. It remains unclear.

In addition, the results from this study also underline the importance of teacher nutrition knowledge and nutrition attitudes. Both nutrition knowledge and attitudes were found to be associated with several self-reported behaviors. In some programs, teachers are not only expected, but mandated to teach children about nutrition. In addition, research has shown that parents look to teachers to provide them with food and nutrition information (Johnson, 2013). Research has shown, however, that some early childhood teachers believe they don't know enough about the health benefits to eating fruits and vegetables, daily recommendations for consumption, and the best ways to get children to eat more of these foods (Mita, 2013). Having appropriate nutrition knowledge and skills prepares teachers to make informed decisions about their own behavior and the behavior of those in their care. In this study, higher nutrition knowledge was associated with some of teacher's own personal health behaviors. Though nutrition knowledge and attitudes are fairly high in this group, they continue to be important avenues for interventions to improve classroom feeding and health practices for all early childhood teachers.

Future Directions

Based on study findings and limitations, future research should seek to clarify a number of questions raised by the current study. Due to the relatively homogenous sample (Head Start programs only), future studies should aim to replicate this study in childcare provider populations with less strict regulations around meals. When providers are less driven by the rules in place, the association between their behavior and their individual characteristics may be more apparent. In addition, future studies should aim to have a more representative sample of the actual population of providers.

Future studies could also examine the relationship between teacher diet and mealtime behavior by collecting data on all aspects of diet, not just fruit and vegetable consumption. This could include the addition of food diaries as well as the utilization of a healthy eating index scale, which assesses adherence to dietary guidelines. Using these measures may help capture a fuller picture of participant diets and lead to more thorough conclusions regarding all aspects of eating behavior.

Moreover, in an effort to get a fuller understanding of the relationship between childcare provider diets, knowledge, attitudes, and mealtime behaviors, studies that are longitudinal in design are recommended. For example, one study collected mealtime observation behavior data over a period of four days to capture a more consistent picture of teacher patterns (Erinosho, 2012). Conducting several consecutive observations may reveal a more accurate reflection of individual behavior compared to a one-time observation.

In addition, significant differences were found in observed mealtime behavior scores based on meal-type (breakfast vs. lunch) where average lunch scores were

higher compared to average breakfast scores. It is possible environmental distractions during breakfast may play a role. It may be more preferable in future studies to observe one type of meal only for the sake of consistency, to better control for variability in teacher behavior due to environmental factors.

Results showed that less than a third of providers used family style feeding, though this practice is mandated in Head Start programs. Some past research has found that Head Start teachers may have their own reasons for not implementing this practice. For example, some research has shown teachers don't use family style because they personally believe it is too messy or that children can't self-regulate (Dev, 2014). Several teachers in the current study reported not using family style feeding for safety and hygienic reasons including contents of the meal being too hot for children to handle (e.g., soup) or fear of spreading germs during flu season. This explains a small number, but it is not clear why a full two-thirds of teachers in this study avoided using this practice. Future research should continue to explore ways to increase compliance on family style feeding, given that it was recently cited as one of the reasons for reduced obesity rates in Head Start settings (Lumeng, 2015).

Future directions for this study could also include examining whether any of these childcare provider variables, including mealtime behaviors, relate to child outcomes. For example, one of the questions of interest would be, is there a relationship between more optimal mealtime behaviors scores among teachers and more fruit and vegetable consumption among children? There is supporting research that feeding practices influence child outcomes, but there are still not enough studies that have been conducted in child care settings. The eating behaviors that children

develop early in life shape their food preferences and patterns throughout their development (Sullivan and Birch, 1990). In addition, these early eating patterns ultimately shape their overall health (Lumeng et al., 2004; Maher, 2008). Given that children look to their families and teachers to support them in their eating behavior, it is important that we continue to learn all we can about the best ways to support this process.

Though not the focus of the current study, some research has looked at mental health of staff and found Head Start staff to be worse off than other similar socioeconomic groups. For example, in one study looking at Head Start teachers, almost a quarter were diagnosed with significant depression symptoms, 28% rated physical and mental health as “not good”, and 15% rated their health as “poor” (Whitaker, 2013). It may be important to look at this aspect in relationship to mealtime behaviors in the classroom as well. For example, some very preliminary research has shown that symptoms of depression in early childhood staff have been associated with lessened sensitivity and more withdrawal in adult-child interactions (Hamre, 2004).

In summary, the present study findings do not support the relationship between teacher diets, knowledge, attitudes and mealtime behaviors. Both reported and observed mealtime behavior total scores among this Head Start population indicate high adherence to best mealtime practices. Teachers also demonstrate low turnover and are highly experienced, potentially benefitting the children in their care. Overall, teachers in this population appear to be well-trained and performing quite optimally, practicing healthy behaviors with children.

TABLES

Table 1

Excluded Items from PCA of The Mealtime Behavior Observation Scale

Item	Reason excluded
Type of meal	Descriptive Items
Meal begin time	Descriptive Items
Meal end time	Descriptive Items
Length of meal	Descriptive Items
Contents of meal	Descriptive Items
Provider spoon fed a child to get them to eat	Lack of Variability
Provider used food to control a child's emotions	Lack of Variability
Provider required a child to sit at the table until plate cleaned	Lack of Variability
Provider used food as a reward or withheld food as a punishment	Lack of Variability
Childsize appropriate silverware available	Dichotomous Items
Unhealthy snack foods	Dichotomous Items
A variety of healthy foods are visible	Dichotomous Items
Children were involved in meal preparation, planning or clean-up	Dichotomous Items
A moment was taken to settle before eating	Dichotomous Items
Tv was on during meal	Dichotomous Items
Provider made fruits and vegetables easier to eat	Dichotomous Items
Provider encouraged children to sit around the table during meals	Dichotomous Items
Provider talked on phone, texted or was on the computer during meals	Dichotomous Items
Provider ate fruits and vegetables in front of children	Dichotomous Items
Provider drank sugar-sweetened beverages in front of children	Dichotomous Items
Provider ate fast food in front of children	Dichotomous Items
Provider ate sweet snacks in front of children	Dichotomous Items

Table 2

Factor Loadings for Principal Components Analysis with Varimax Rotation of The Mealtime Behavior Observation Scale

Item	Support for autonomy	Involvement
Encouraged (not forced) children to try foods	0.82	-0.05
Praised child for trying new or less preferred foods	0.76	0.05
Used an authoritative feeding style	0.71	0.26
Enthusiastically role modeled eating healthy foods	0.64	-0.06
Talked with children about the foods they were eating	0.62	0.5
Negotiated with children to eat healthy foods	0.55	0.2
Sat with children during lunch	0.09	0.81
Ignores or shows indifference to a child	-0.05	-0.73
Led or encouraged pleasant conversations during meals	0.13	0.69

Note. Only loadings >.4 are in bold.

Table 3

Factor Loadings for Principal Components Analysis with Varimax Rotation of The EPAO SR-Children's Eating Scale

Item	Self-efficacy	Structure	Avoids reward	Support for autonomy
I communicate the importance of healthy eating with children	0.90	0.02	0.08	0.01
I am a role model for healthy eating for the children	0.83	-0.02	-0.04	-0.08
I communicate the importance of healthy eating to parents	0.80	0.06	0.03	0.28
I seek professional development to enhance children's eating	0.80	0.05	0.09	0.21
I leave the TV on during children's meals and snacks	0.08	-0.72	0.14	0.04
I use my behavior to encourage children to eat healthy	0.23	0.59	0.03	0.29
I show children that I enjoy fruits and vegetables	0.20	0.56	-0.08	0.44
I promise children something other than food if they eat a food	0.02	0.11	0.81	-0.09
I reward children with something to eat when they are well behaved	0.05	-0.31	0.77	0.11
I give a child something to eat to make them feel better when they are upset	0.05	-0.01	0.64	0.10
I teach children about the foods they are eating	0.18	-0.11	-0.03	0.80
I encourage children to eat a wide variety of foods	0.09	0.33	0.04	0.74
I ask children if they are full before removing an unfinished plate of food	0.34	-0.09	0.06	0.42
I encourage children to wait before getting seconds	0.01	-0.04	0.11	0.72
I ask children if they are hungry before I serve them seconds	0.12	0.06	0.16	0.70

Note. Only loadings >.4 are in bold.

Table 4

Individual Head Start Teacher Characteristics as a Percentage of the Sample

Characteristic	n	(%)
Gender		
Female	83	(97.6)
Male	2	(2.4)
Race/ethnicity		
White	72	(84.6)
Latino/Hispanic	9	(10.6)
Black/African	1	(1.2)
Asian	1	(1.2)
Other	1	(1.2)
Declined	1	(1.2)
Education level		
High school graduate or less	4	(4.7)
Some college or technical school	38	(44.7)
College graduate	36	(42.4)
Post-graduate work	7	(8.2)
Role		
Head teacher	49	(57.6)
Assistant teacher	32	(37.6)
Special education teacher	2	(2.4)
Teacher's aide	2	(2.4)
Employment status		
Full-time	71	(83.5)
Part-time	14	(16.5)
Body Size Guide		
Normal weight	42	(49.4)
Overweight	18	(21.2)
Obesity	25	(29.4)

Table 5

Summary of Means, Standard Deviations, and Ranges for Individual Head Start Teacher Characteristics

Characteristic	n	<i>M</i> (<i>SD</i>)	Range
Age	80	40.31 (11.67)	19-63
Years teaching at this center	83	7.28 (7.16)	<1 yr-35
Years as a childcare teacher	83	14.06 (8.3)	<1 yr-35
Hours worked per day	85	6.78 (1.00)	4.5-1
Hours worked per week	84	32.17 (4.44)	21-43
Number of children at your table for a meal	85	9.57 (4.81)	5-18

Table 6

Correlations among Age, Years at Current Center, and Years as a Childcare Teacher

Variable	Teacher's age	Years at current center	Years as a child care teacher
Teacher's age	—		
Years at current center	.55**	—	
Years as child care teacher	.73**	.52**	—

Note. N=83. *p<.05, **p<.01, ***p<.001.

Table 7

Crosstabulation of teaching role and education

Teaching role	Education		X^2	Φ
	Less than college	College grad or more		
Head teacher	14	35	20.10***	.000
Non-head teacher	28	8		

Note. N=85. *p<.05, **p<.01, ***p<.001.

Table 8

t-test Results Comparing Education and Experience

Measure	Less than college		College grad or more		t	p
	M	SD	M	SD		
Teacher's age	42.20	12.20	38.30	10.80	-1.51	0.38
Years at current center	8.70	7.70	5.90	6.30	-1.86	0.27
Years as a child care teacher	15.60	7.92	12.50	8.60	-1.73	0.09

Note. N=83.

Table 9

t-test Results Comparing Teaching Role and Experience

Measure	Non-head teacher		Head teacher		t	p
	M	SD	M	SD		
Teacher's age	40.76	12.72	39.98	10.95	-0.30	0.77
Years at current center	5.46	6.09	8.67	7.65	2.06	0.04
Years as a child care teacher	13.33	7.73	14.57	8.82	0.66	0.51

Note. N=83.

Table 10

Individual Head Start Teacher Health and Nutrition Behaviors

Characteristic	n	(%)
Dieting status ^a		
Trying to lose weight	60	(70.6)
Not trying to lose weight	24	(28.2)
Eating habits		
About the same or healthier than others	68	(80.0)
Less healthy than others	17	(20.0)
TV/Computer use		
One Hour or less per day	31	(36.5)
More than one hour per day	54	(63.5)
Soda		
None yesterday	68	(80.0)
One or more times yesterday	17	(20.0)
Sugar Sweetened Beverages (not soda)		
None yesterday	40	(47.1)
More than once yesterday	45	(52.9)
Dining out		
None yesterday	56	(65.9)
One or more times yesterday	29	(34.1)
	n	<i>M (SD)</i>
Days Per Week of Physical Activity	85	3.42 (2.34)

Note. ^aN=1 person missing data.

Table 11

Head Start Center Level Characteristics of Teachers

Characteristic	n	(%)
Attend nutrition training		
Less than once per year	27	(31.8)
Once a year or more	58	(68.2)
Nutrition training offered ^a		
Less than once per year	21	(24.7)
Once a year or more	62	(72.9)
Nutrition education with children ^b		
Less than once per month	14	(16.5)
Once per month or more	66	(77.6)
Nutrition education with parents offered at center ^c		
Less than once per month	17	(20.0)
Once per month or more	61	(71.8)

Note. ^aN=2 people missing data. ^bN=5 people missing data. ^cN=7 people missing data.

Table 12

Psychometric Properties of the Major Study Variables

Variable	n	<i>M</i> (<i>SD</i>)	α	Range		Skew	Kur
				Potential	Actual		
Nutrition knowledge	85	9.80 (1.96)	.62	0-12	3.0-12	-1.10	1.28
Nutrition attitudes	85	72.05 (4.30)	.62	27-81	54-79	-1.43	3.44
Fruit and vegetable consumption	85	3.88 (1.82)	.74	0-3.5	0.9-10.7	1.13	1.81
Observed mealtime behavior	85	91.93 (4.77)	.70	42-111	82-101	-.08	-.79
Autonomy Support (OBS)	85	1.90 (.482)	.81	1-3	1.0-2.83	-.06	-.81
Involvement (OBS)	85	2.54 (.436)	.70	1-3	1.0-3.0	-.89	.64
Self-reported mealtime behavior	85	121.09 (8.72)	.65	24-144	97-141	-.29	.05
Autonomy Support (SR)	85	4.38 (.824)	.63	1-6	2.5-6.0	-.16	-.46
Self-efficacy (SR)	85	5.13 (.824)	.86	1-6	1.0-6.0	-2.19	8.59
Structure (SR)	85	5.49 (.715)	.58	1-6	2.67-6.0	-1.68	2.69
Avoids reward (SR)	85	5.86 (.345)	.68	1-6	4.0-6.0	-3.17	11.10

Table 13

Frequency Data for Mealtime Behavior Observation Scale (N=85)

Item	Yes (N)	(%)
Provider used family style feeding	28	(32.9)
Provider used child size appropriate tableware	82	(96.5)
Provider made fruits and vegetables easier to eat	79	(92.9)
Unhealthy snack foods are visible to children	2	(2.4)
A variety of healthy foods are visible to children	61	(71.8)
Children were involved in meal prep, planning or clean-up	83	(97.6)
A moment was taken to settle before eating	13	(15.3)
Provider encouraged children to sit around table during meals	85	(100.0)
TV on during meal	0	(0.0)
Provider talked on phone, texted, or on computer at meal	2	(2.4)
Provider ate fast food	0	(0.0)
Provider ate salty snack	0	(0.0)
Provider ate sweet snack	0	(0.0)
Provider ate fruits and vegetables in front of children	68	(80.0)
Provider drank soda or other sugar sweetened beverage	0	(0.0)
Provider ate the same foods as the children	73	(85.9)
Item	One or more times (N)	(%)
Provider sat with children at meal	84	(98.8)
Provider talked with children about the foods they were eating	77	(90.5)
Provider enthusiastically role modeled eating healthy foods	41	(48.2)
Provider encouraged children to try foods on their plate	70	(82.3)
Provider praised children for trying new/ less preferred foods	48	(56.5)
Provider praised children for eating unhealthy foods	4	(4.7)
Provider encouraged pleasant conversation	76	(89.4)
Provider let children choose between two healthy options	14	(16.5)
Provider used an authoritative feeding style	67	(78.9)
Provider pressured a child to eat more than they seemed to want	5	(5.9)
Provider praised children for cleaning their plates	14	(16.5)
Provider spoonfed a child to get them to eat	0	(0.0)
Provider insisted that a child eat a food	48	(56.5)
Provider used food to try and control a child's emotions	2	(2.4)
Provider rushed a child or children to eat	49	(57.7)
Provider served a child seconds even if they did not ask for more	8	(9.4)
Provider served child seconds only after asking child if still hungry	4	(4.7)
If child ate less than 1/2 meal, removed plate w/o asking if full	24	(28.3)
If child ate less than 1/2 meal, asked if full before removing plate	12	(14.1)
Provider required children to sit at table until finished plate	3	(3.6)
Provider promised child something other than food for eating a food	7	(8.3)
Provider used food as a reward, or withheld it for punishment	0	(0.0)
Provider used food as a reward for eating a specific food	11	(13.0)
Provider reasoned with children to eat healthy foods	32	(37.7)
Provider negotiated with children to eat healthy foods	21	(24.7)
Provider ignores or shows indifference to a child	39	(45.9)
Children allowed to take multiple servings even if not consuming	7	(8.2)

Table 14

Correlations for Age, Years at Current Center, Years as a Childcare Teacher and Mealtime Behavior Observation Total Score and Composites

Variable	Mealtime Behavior Observation Scale Total Score	Involvement	Support for autonomy
Teacher's age	0.35**	0.18	0.34**
Years at current center	0.38**	0.24*	0.41**
Years as child care teacher	0.27*	0.14	0.24*

Note. N=83. *p<.05, **p<.01, ***p<.001.

Table 15

Correlations for Age, Years at Current Center, Years as a Childcare Teacher and EPAO-SR Children's Eating Scale Total Score and Composites

Variable	EPAO-SR Children's Eating Scale Total Score	Self-efficacy	Structure	Avoids reward	Support for autonomy
Teacher's age	0.22*	0.15	0.15	0.18	0.01
Years at current center	0.21	0.04	0.15	0.22	-0.01
Years as child care teacher	0.22*	0.25*	0.12	0.19	0.04

Note. N=83. *p<.05, **p<.01, ***p<.001.

Table 16

Correlations for Age, Years at Current Center, and Years as a Childcare Teacher and Independent Variables

Variable	Nutrition knowledge	Nutrition attitudes	Fruit and vegetable consumption
Teacher's age	0.08	0.21	0.07
Years at this center	0.02	0.13	0.15
Years as a child care teacher	0.13	0.28**	0.15

Note. N=83. *p<.05, **p<.01, ***p<.001.

Table 17

Independent and Dependent Variables by Education (ANOVA)

	High School Graduate or Less (n=4)		Some College or Tech School (n=38)		College Graduate (n=36)		Post-Graduate Degree (n=7)		F	p
	M	SE	M	SE	M	SE	M	SE		
Nutrition knowledge	7.75 ^a	0.95	9.65 ^{ab}	0.33	10.36 ^b	0.25	8.84 ^{ab}	1.06	3.53	0.02
Nutrition attitudes	70.76	1.63	71.94	0.79	72.37	0.59	71.76	2.11	0.20	0.90
Fruit and vegetable consumption	3.67	0.56	3.72	0.30	4.05	1.81	4.02	0.85	0.22	0.88
Observed mealtime behaviors	94.25 ^a	1.65	93.27 ^a	4.42	90.52 ^a	0.84	90.57 ^a	1.51	2.70	0.05
Autonomy Support (OBS)	1.96 ^a	0.23	2.05 ^a	0.08	1.78 ^a	0.08	1.62 ^a	0.16	2.91	0.04
Involvement (OBS)	2.75	0.18	2.61	0.06	2.42	0.49	2.61	0.14	1.60	0.20
Self-reported mealtime behaviors	119.12	5.35	120.89	1.47	121.85	1.35	119.20	3.83	0.27	0.85
Self-efficacy (SR)	5.06	0.21	5.04	0.16	5.24	0.11	5.14	0.22	0.36	0.87
Structure (SR)	5.51	0.39	5.40	0.13	5.61	0.11	5.38	0.25	0.57	0.64
Avoids reward (SR)	6.00	0.00	5.87	0.06	5.82	0.06	5.95	0.05	0.56	0.64
Autonomy Support (SR)	3.99	0.48	4.49	0.13	4.33	0.14	4.23	0.34	0.61	0.61

Note. Statistical significance using Bonferroni correction at $p < .005$ are indicated with an asterisk. Means with different subscripts differ significantly at $p < .05$.

Table 18

t-test Results Comparing Teaching Role and Independent and Dependent Variables

Measure	Head teacher		Non-head teacher		t	p
	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>		
Nutrition knowledge	10.29	1.44	9.12	2.35	2.85*	0.005
Nutrition attitudes	73.27	2.99	70.40	5.20	3.21*	0.002
Fruit and vegetable consumption	3.84	1.79	3.94	1.90	-0.24	0.81
Observed mealtime behaviors	92.10	5.24	91.70	4.16	0.38	0.71
Autonomy Support (OBS)	1.93	0.52	1.85	0.42	0.73	0.47
Involvement (OBS)	2.53	0.49	2.56	0.35	-0.31	0.76
Self-reported mealtime behaviors	121.06	8.33	121.11	9.34	-0.03	0.98
Self-efficacy (SR)	5.10	0.71	5.17	0.97	-0.41	0.68
Structure (SR)	5.48	0.69	5.52	0.75	-0.27	0.78
Avoids reward (SR)	5.86	0.31	5.86	0.41	-0.05	0.96
Autonomy Support (SR)	4.27	0.85	4.52	0.77	-1.38	0.17

Note. N=85. Statistical significance using Bonferroni correction at $p < .005$ are indicated with an asterisk.

Table 19

t-test Results Comparing No Restaurant Visits and One or More Visits Previous Day on Independent and Dependent Variables

Measure	None		One or more times yesterday		t	p
	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>		
Nutrition knowledge	10.01	1.85	9.38	2.11	1.41	0.16
Nutrition attitudes	71.81	4.18	72.52	4.54	-0.72	0.48
Fruit and vegetable consumption	3.73	1.94	4.17	1.56	-1.05	0.30
Observed mealtime behaviors	91.53	5.15	92.69	3.93	-1.06	0.29
Autonomy Support (OBS)	1.83	0.49	2.01	0.45	-1.60	0.11
Involvement (OBS)	2.52	0.46	2.58	0.38	-0.60	0.55
Self-reported mealtime behaviors	119.60	8.63	123.94	8.29	-2.23	0.03
Self-efficacy (SR)	5.05	0.83	5.29	0.80	-1.29	0.20
Structure (SR)	5.44	0.74	5.60	0.66	-0.96	0.34
Avoids reward (SR)	5.87	0.34	5.84	0.38	0.37	0.71
Autonomy Support (SR)	4.47	0.76	4.83	0.67	-1.93	0.06

Note. N=85. Statistical significance using Bonferroni correction at $p < .005$ are indicated with an asterisk.

Table 20

t-test Results Comparing No Soda and One or More Times Previous Day on Independent and Dependent Variables

Measure	None		One or more times yesterday		t	p
	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>		
Nutrition knowledge	10.03	1.80	8.87	2.29	2.22	0.03
Nutrition attitudes	72.49	3.49	70.29	6.46	1.91	0.06
Fruit and vegetable consumption	4.04	1.88	3.26	1.47	1.59	0.12
Observed mealtime behaviors	92.09	4.65	91.29	5.34	0.61	0.54
Autonomy Support (OBS)	1.89	0.49	1.89	0.48	0.04	0.97
Involvement (OBS)	2.60	0.42	2.44	0.49	1.03	0.31
Self-reported mealtime behaviors	121.35	8.52	119.97	9.67	0.58	0.56
Self-efficacy (SR)	5.19	0.61	4.87	1.39	1.50	0.14
Structure (SR)	5.53	0.68	5.34	0.85	1.02	0.31
Avoids reward (SR)	5.87	0.37	5.82	0.29	0.45	0.66
Autonomy Support (SR)	4.36	0.84	4.45	0.79	-0.42	0.68

Note. N=85. Statistical significance using Bonferroni correction at $p < .005$ are indicated with an asterisk.

Table 21

t-test Results Comparing No Sugar Sweetened Beverages (Not Soda) and One or More Times Previous Day on Independent and Dependent Variables

Measure	None		One or more times yesterday		t	p
	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>		
Nutrition knowledge	10.59	1.35	9.09	2.14	3.823*	0.000
Nutrition attitudes	72.64	4.89	71.53	3.67	1.19	0.24
Fruit and vegetable consumption	4.16	2.07	3.63	1.56	1.36	0.18
Observed mealtime behaviors	92.41	4.95	91.50	4.63	0.87	0.39
Autonomy Support (OBS)	1.93	0.52	1.87	0.45	0.52	0.60
Involvement (OBS)	2.58	0.46	2.51	0.42	0.73	0.47
Self-reported mealtime behaviors	121.44	9.14	120.76	8.41	0.36	0.72
Self-efficacy (SR)	5.03	0.90	5.22	0.75	-1.06	0.29
Structure (SR)	5.53	0.74	5.46	0.70	0.48	0.64
Avoids reward (SR)	5.88	0.39	5.85	0.32	0.39	0.70
Autonomy Support (SR)	4.39	0.80	4.36	0.85	0.16	0.87

Note. N=85. Statistical significance using Bonferroni correction at $p < .005$ are indicated with an asterisk.

Table 22

Correlations for Physical Activity and Independent and Dependent Variables

Measure	Days of Physical Activity Per Week
Nutrition knowledge	0.27*
Nutrition attitudes	0.16
Fruit and vegetable consumption	0.22*
Observed mealtime behaviors	0.03
Autonomy Support (OBS)	0.04
Involvement (OBS)	0.04
Self-reported mealtime behaviors	-0.006
Self-efficacy (SR)	-0.12
Structure (SR)	-0.07
Avoids reward (SR)	0.06
Autonomy Support (SR)	-0.07

Note. N=85. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 23

t-test Results Comparing Normal Weight and Overweight/Obese Participants on Independent and Dependent Variables

Measure	Normal weight		Overweight or obese		t	p
	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>		
Nutrition knowledge	9.86	1.77	9.73	2.14	0.31	0.76
Nutrition attitudes	71.63	4.56	72.47	4.03	-0.90	0.37
Fruit and vegetable consumption	3.85	1.85	3.91	1.82	-0.15	0.88
Observed mealtime behaviors	90.95	5.41	92.89	3.88	-1.91	0.06
Autonomy Support (OBS)	1.79	0.53	1.99	0.41	-2.05	0.04
Involvement (OBS)	2.50	0.48	2.58	0.39	-0.80	0.43
Self-reported mealtime behaviors	119.76	8.99	122.36	8.34	-1.38	0.17
Self-efficacy (SR)	5.10	0.92	5.17	0.73	-0.39	0.70
Structure (SR)	5.36	0.83	5.63	0.55	-1.76	0.08
Avoids reward (SR)	5.88	0.30	5.84	0.40	0.56	0.58
Autonomy Support (SR)	4.25	0.78	4.50	0.85	-1.39	0.17

Note. N=85. Statistical significance using Bonferroni correction at $p < .005$ are indicated with an asterisk.

Table 24

t-test Results Comparing Eating Habits on Independent and Dependent Variables

Measure	Less healthier than others		Same or healthier than others		t	p
	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>		
Nutrition knowledge	9.12	2.42	9.96	1.80	1.61	0.11
Nutrition attitudes	71.78	4.63	72.12	4.24	0.30	0.77
Fruit and vegetable consumption	3.54	1.16	3.97	1.95	0.86	0.39
Observed mealtime behaviors	92.27	5.06	91.84	4.73	-0.33	0.74
Autonomy Support (OBS)	1.95	0.53	1.88	0.47	-0.52	0.60
Involvement (OBS)	2.50	0.48	2.55	0.43	0.40	0.69
Self-reported mealtime behaviors	122.53	9.99	120.72	8.41	-0.76	0.45
Self-efficacy (SR)	5.12	0.58	5.14	0.88	0.09	0.83
Structure (SR)	5.49	0.64	5.50	0.74	0.02	0.98
Avoids reward (SR)	5.88	0.26	5.85	0.35	-0.30	0.76
Autonomy Support (SR)	4.56	0.96	4.33	0.79	-1.03	0.31

Note. N=85. Statistical significance using Bonferroni correction at $p < .005$ are indicated with an asterisk.

Table 25

t-test Results Comparing One Hour or Less and More than One Hour of TV on Independent and Dependent Variables

Measure	None		One or more times yesterday		t	p
	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>		
Nutrition knowledge	10.02	2.03	9.67	1.92	0.79	0.43
Nutrition attitudes	71.36	5.21	72.45	3.66	-1.13	0.26
Fruit and vegetable consumption	3.39	1.58	4.16	1.90	-1.92	0.06
Observed mealtime behaviors	91.14	5.14	92.38	4.53	-1.15	0.25
Autonomy Support (OBS)	1.86	0.53	1.92	0.46	-0.60	0.55
Involvement (OBS)	2.48	0.49	2.57	0.41	-1.00	0.32
Self-reported mealtime behaviors	120.19	9.17	121.59	8.49	-0.71	0.48
Self-efficacy (SR)	5.01	1.08	5.20	0.63	-1.06	0.22
Structure (SR)	5.55	0.61	5.46	0.71	0.53	0.60
Avoids reward (SR)	5.89	0.29	5.84	0.39	0.66	0.51
Autonomy Support (SR)	4.26	0.86	4.44	0.80	-0.95	0.35

Note. N=85. Statistical significance using Bonferroni correction at $p < .005$ are indicated with an asterisk.

Table 26

t-test Results Comparing Trying to Lose Weight and Not Trying to Lose Weight on Independent and Dependent Variables

Measure	Trying to lose weight		Not trying to lose weight		t	p
	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>		
Nutrition knowledge	9.81	1.99	9.71	1.94	0.19	0.85
Nutrition attitudes	72.44	4.34	70.96	4.13	1.44	0.16
Fruit and vegetable consumption	3.89	1.77	3.83	2.03	0.14	0.89
Observed mealtime behaviors	92.18	4.43	91.04	5.51	0.99	0.32
Autonomy Support (OBS)	1.92	0.49	1.81	0.48	0.96	0.34
Involvement (OBS)	2.54	0.44	2.51	0.45	0.30	0.77
Self-reported mealtime behaviors	121.92	8.48	118.94	9.30	1.41	0.16
Self-efficacy (SR)	5.12	0.87	5.17	0.74	-0.25	0.80
Structure (SR)	5.58	0.59	5.27	0.95	1.83	0.07
Avoids reward (SR)	5.88	0.29	5.81	0.48	0.84	0.40
Autonomy Support (SR)	4.47	0.79	4.18	0.88	1.47	0.15

Note. N=84. Statistical significance using Bonferroni correction at $p < .005$ are indicated with an asterisk.

Table 27

t-test Results Comparing Nutrition Training on Independent and Dependent Variables

Measure	Less than once per year		One time per year or more		t	p
	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>		
Nutrition knowledge	9.81	2.25	9.79	1.82	0.06	0.95
Nutrition attitudes	72.08	3.80	72.04	4.54	0.04	0.97
Fruit and vegetable consumption	3.89	1.68	3.88	1.90	0.02	0.98
Observed mealtime behaviors	90.83	3.95	92.44	5.06	-1.46	0.15
Autonomy Support (OBS)	1.73	0.37	1.97	0.51	-2.16	0.03
Involvement (OBS)	2.47	0.44	2.57	0.43	-0.95	0.34
Self-reported mealtime behaviors	120.08	9.37	121.54	8.44	-0.72	0.48
Self-efficacy (SR)	5.14	0.56	5.13	0.93	0.05	0.96
Structure (SR)	5.40	0.73	5.54	0.71	-0.86	0.39
Avoids reward (SR)	5.80	0.44	5.89	0.29	-1.00	0.32
Autonomy Support (SR)	4.31	0.95	4.41	0.74	-0.48	0.64

Note. N=85. Statistical significance using Bonferroni correction at $p < .005$ are indicated with an asterisk.

Table 28

t-test Results Comparing Nutrition Education with Children on Independent and Dependent Variables

Measure	Less than once a month		One time a month or more		t	p
	M	(SD)	M	(SD)		
Nutrition knowledge	9.86	1.51	9.72	2.08	0.23	0.82
Nutrition attitudes	73.86	3.89	71.65	4.43	1.73	0.08
Fruit and vegetable consumption	3.79	2.05	3.88	1.85	-0.16	0.88
Observed mealtime behaviors	89.93	5.06	92.24	4.75	-1.64	0.11
Autonomy Support (OBS)	1.60	0.52	1.97	0.47	-2.68	0.01
Involvement (OBS)	2.30	0.47	2.57	0.42	-2.08	0.04
Self-reported mealtime behaviors	119.44	6.74	121.45	9.13	-0.78	0.44
Self-efficacy (SR)	4.96	0.54	5.19	0.89	-0.90	0.37
Structure (SR)	5.07	0.82	5.56	0.69	-2.35	0.02
Avoids reward (SR)	5.98	0.09	5.82	0.39	1.44	0.15
Autonomy Support (SR)	4.19	0.73	4.42	0.84	-0.93	0.36

Note. N=80. Statistical significance using Bonferroni correction at $p < .005$ are indicated with an asterisk.

Table 29

t-test Results Comparing Nutrition Education with Parents Offered at Center on Independent and Dependent Variables

Measure	Less than once a month		Once a month or more		t	p
	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>		
Nutrition knowledge	11.00	1.27	9.50	2.03	2.875*	0.005
Nutrition attitudes	73.62	3.42	71.48	4.59	1.78	0.08
Fruit and vegetable consumption	4.16	2.15	3.97	1.73	0.40	0.69
Observed mealtime behaviors	91.88	3.93	92.09	5.01	-0.16	0.87
Autonomy Support (OBS)	1.94	0.44	1.92	0.49	0.20	0.85
Involvement (OBS)	2.41	0.39	2.57	0.44	-1.38	0.17
Self-reported mealtime behaviors	121.16	5.88	121.89	9.26	-0.31	0.76
Self-efficacy (SR)	4.86	0.85	5.28	0.81	-1.92	0.06
Structure (SR)	5.43	0.62	5.58	0.68	-0.84	0.40
Avoids reward (SR)	5.78	0.57	5.86	0.29	-0.79	0.43
Autonomy Support (SR)	4.50	0.71	4.43	0.82	0.30	0.77

Note. N=78. Statistical significance using Bonferroni correction at $p < .005$ are indicated with an asterisk.

Table 30

t-test Results Comparing Family Style Feeding and Independent and Dependent Variables

Measure	Used family style feeding		Did not use family style feeding		t	p
	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>		
Nutrition knowledge	9.54	2.31	9.92	1.76	0.85	0.4
Nutrition attitudes	71.16	5.38	72.49	3.62	1.35	0.18
Fruit and vegetable consumption	4.13	2.19	3.76	1.62	-0.90	0.37
Observed mealtime behaviors	93.07	4.76	91.37	4.72	-1.56	0.12
Autonomy Support (OBS)	2.04	0.44	1.83	0.49	-1.99	0.05
Involvement (OBS)	2.64	0.35	2.49	0.47	-1.56	0.12
Self-reported mealtime behaviors	121.35	9.02	120.95	8.64	-0.20	0.84
Self-efficacy (SR)	5.11	0.99	5.15	0.73	0.21	0.83
Structure (SR)	5.74	0.48	5.37	0.78	-2.26	0.03
Avoids reward (SR)	5.91	0.25	5.84	0.39	-0.84	0.40
Autonomy Support (SR)	4.41	0.77	4.36	0.86	-0.24	0.81

Note. N=85. Statistical significance using Bonferroni correction at $p < .005$ are indicated with an asterisk.

Table 31

t-test Results Comparing Meal Type and Mealtime Behavior Observation Scale

Measure	Breakfast		Lunch		t	p
	<i>M</i>	<i>(SD)</i>	<i>M</i>	<i>(SD)</i>		
Observed mealtime behaviors	89.00	3.90	92.77	4.70	-3.195**	0.002

Note. N=85. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 32

Summary of Intercorrelations among Independent Variables

Measure	Nutrition knowledge	Nutrition attitudes	Fruit and vegetable consumption
Nutrition knowledge	—		
Nutrition attitudes	0.40**	—	
Fruit and vegetable consumption	0.003	-0.05	—

Note. N=85. *p<.05, **p<.01, ***p<.001.

Table 33

Correlations for Independent Variables and Observed Mealtime Behavior Total Score and Composites

Measure	Nutrition knowledge	Nutrition attitudes	Fruit and vegetable consumption
Observed mealtime behaviors total score	0.07	-0.03	0.08
Autonomy Support (OBS)	-0.01	-0.12	0.18
Involvement (OBS)	0.09	-0.09	0.05

Note. N=85. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 34*Correlations for Independent Variables and Self-Reported Mealtime Behavior Total Score and Composites*

Measure	Nutrition knowledge	Nutrition attitudes	Fruit and vegetable consumption
Self-reported mealtime behaviors total score	0.18	0.32**	0.1
Self-efficacy (SR)	-0.06	0.34**	0.15
Structure (SR)	0.15	0.04	0.03
Avoids reward (SR)	-0.12	0.2	-0.01
Autonomy Support (SR)	0.17	0.07	0.06

Note. N=85. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 35

Hierarchical Multiple Regression Analyses Predicting Mealtime Behavior Observation Total Score and Composites

Predictor	Observed mealtime behavior total score						Autonomy support (OBS)						Involvement (OBS)					
	Model 1			Model 2			Model 1			Model 2			Model 1			Model 2		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Meal Type	-3.92	1.23	.347**	-4.01	1.26	-0.354**	-0.414	0.121	-0.364**	-0.415	0.12	-0.365**	-0.053	0.119	-0.055	-0.074	0.119	-0.077
Years as a childcare teacher	-0.115	0.096	-0.197	-0.102	0.098	-0.174	-0.015	0.009	-0.258	-0.012	0.009	-0.21	-0.003	0.009	-0.053	-0.001	0.009	-0.027
Age of Head Start teacher	0.111	0.06	0.282	0.116	0.061	0.294	0.011	0.006	0.284	0.012	0.006	0.298*	0.004	0.006	0.107	0.005	0.006	0.135
Years at current center	0.169	0.083	0.265*	0.159	0.084	0.249	0.021	0.008	0.329*	0.02	0.008	0.314*	0.008	0.008	0.145	0.006	0.008	0.107
Nutrition knowledge				0.071	0.278	0.028				0.021	0.027	0.082				-0.01	0.026	-0.046
Nutrition attitudes				-0.16	0.123	-0.145				-0.029	0.012	-0.266*				-0.018	0.012	-0.196
Fruit and vegetable consumption				0.18	0.268	0.072				0.017	0.026	0.068				0.033	0.025	0.153
R ²	0.26			0.03			0.29				0.07		0.04				0.07	
F	6.15***			3.82**			7.08***			5.30***			0.739				1.21	

Note. N=85. Meal type coded as lunch=2, breakfast=1. *p<.05, **p<.01, ***p<.001.

Table 36

Hierarchical Multiple Regression Analyses Predicting Self-Reported Mealtime Behavior Total Score and Composites

Predictor	Self-reported mealtime behavior total score						Self-efficacy (SR)						Structure (SR)						Avoids reward (SR)						Autonomy Support (SR)					
	Model 1			Model 2			Model 1			Model 2			Model 1			Model 2			Model 1			Model 2			Model 1			Model 2		
	B	SE	β	B	SE	β	B	SE	β	B	SE	β	B	SE	β	B	SE	β	B	SE	β	B	SE	β	B	SE	β	B	SE	β
Years as a childcare teacher	0.11	0.18	0.1	0	0.174	0.003	0.03	0.02	0.32	0.022	0.02	0.225	-0	0.02	0	-0	0.02	-0	0	0.01	0.08	0	0.007	0.05	0.01	0.02	0.08	0.01	0.02	0.051
Age of Head Start teacher	0.07	0.13	0.09	0.07	0.125	0.097	-0	0.01	-0	-0.001	0.01	-0.011	0.01	0.01	0.1	0.01	0.01	0.11	0	0.01	0.04	0	0.005	0.03	-0	0.01	-0	-0	0.01	-0.018
Years at current center	0.13	0.17	0.11	0.13	0.164	0.104	-0	0.02	-0.1	-0.016	0.02	-0.14	0.01	0.01	0.09	0.01	0.01	0.09	0.01	0.01	0.16	0.01	0.007	0.16	-0	0.02	-0	-0	0.02	-0.044
Nutrition knowledge				0.25	0.531	0.056				-0.103	0.05	-0.244*				0.06	0.05	0.16				-0.04	0.022	-0.23				0.07	0.05	0.166
Nutrition attitudes				0.55	0.251	0.273*				0.078	0.02	0.404*				-0	0.02	-0.1				0.02	0.01	0.248*				0	0.03	0.003
Fruit and vegetable consumption				0.45	0.532	0.095				0.075	0.05	0.165				0	0.05	0.01				-0.01	0.022	-0.03				0.03	0.05	0.058
R ²	0.07			0.09			0.07			0.15			0.03			0.02				0.06		0.07			0.004			0.03		
F	1.72			2.13			1.9			3.45**			0.74			0.63				1.42		1.67			0.09			0.42		

Note. N=85. *p<.05, **p<.01, ***p<.001.

Table 37

Multiple Regression Analyses Predicting Fruit and Vegetable Consumption (N=85)

Variable	<i>B</i>	SE B	β
Nutrition Knowledge	0.027	0.112	0.029
Nutrition Attitudes	-0.028	0.051	-0.066
R^2		0.004	
F		0.151	

Note. N=85. * $p < .05$, ** $p < .01$, *** $p < .001$.

APPENDICES

Appendix A

NCI Fruit and Vegetable Screener

NATIONAL INSTITUTES OF HEALTH
EATING AT AMERICA'S TABLE STUDY
QUICK FOOD SCAN

- The person who completed the telephone interviews for the Eating at America's Table Study should fill out this questionnaire.
- Use only a No. 2 pencil.
- Be certain to completely blacken in each of the answers, and erase completely if you make any changes.
- Do not make any stray marks on this form.
- When you complete this questionnaire, please return it in the postage-paid envelope to:

National Cancer Institute
EPN, Room 313
6130 Executive Blvd., MSC 7344
Bethesda, MD 20892-7344

BAR
CODE
LABEL
HERE

NOTIFICATION TO RESPONDENT OF ESTIMATED BURDEN

Public reporting burden for this collection of information is estimated to average 15 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. An agency may not conduct or sponsor, and a person is not required to respond to, a collection of information unless it displays a currently valid OMB control number. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to: NIH, Project Clearance Office, 6701 Rockledge Drive, MSC 7730, Bethesda, MD 20892-7730, ATTN: PRA (0925-0450). Do not return the completed form to this address.

PLEASE DO NOT WRITE IN THIS AREA

SERIAL

INSTRUCTIONS

- Think about what you usually ate last month.
- Please think about **all** the fruits and vegetables that you ate last month. Include those that were:
 - raw and cooked,
 - eaten as snacks and at meals,
 - eaten at home and away from home (restaurants, friends, take-out), and
 - eaten alone and mixed with other foods.
- Report how many times per month, week, or day you ate each food, and if you ate it, how much you usually had.
- If you mark "Never" for a question, follow the "Go to" instruction.
- Choose the best answer for each question. Mark only one response for each question.

1. Over the last month, how many times per month, week, or day did you drink **100% fruit juice** such as orange, apple, grape, or grapefruit juice? **Do not count** fruit drinks like Kool-Aid, lemonade, Hi-C, cranberry juice drink, Tang, and Twister. Include juice you drank at all mealtimes and between meals.

☐ Never
(Go to Question 2)
 ☐ 1-3 times last month
 ☐ 1-2 times per week
 ☐ 3-4 times per week
 ☐ 5-6 times per week
 ☐ 1 time per day
 ☐ 2 times per day
 ☐ 3 times per day
 ☐ 4 times per day
 ☐ 5 or more times per day

- 1a. Each time you drank **100% juice**, how much did you usually drink?

☐ Less than $\frac{1}{4}$ cup
(less than 6 ounces)
 ☐ $\frac{1}{4}$ to $1\frac{1}{4}$ cup
(6 to 10 ounces)
 ☐ $1\frac{1}{4}$ to 2 cups
(10 to 16 ounces)
 ☐ More than 2 cups
(more than 16 ounces)

2. Over the last month, how often did you eat **lettuce salad (with or without other vegetables)**?

☐ Never
(Go to Question 3)
 ☐ 1-3 times last month
 ☐ 1-2 times per week
 ☐ 3-4 times per week
 ☐ 5-6 times per week
 ☐ 1 time per day
 ☐ 2 times per day
 ☐ 3 times per day
 ☐ 4 times per day
 ☐ 5 or more times per day

- 2a. Each time you ate **lettuce salad**, how much did you usually eat?

☐ About $\frac{1}{2}$ cup
 ☐ About 1 cup
 ☐ About 2 cups
 ☐ More than 2 cups

3. Over the last month, how often did you eat **French fries** or **fried potatoes**?

- ☐ Never
(Go to Question 4)
 ☐ 1-3 times last month
 ☐ 1-2 times per week
 ☐ 3-4 times per week
 ☐ 5-6 times per week
 ☐ 1 time per day
 ☐ 2 times per day
 ☐ 3 times per day
 ☐ 4 times per day
 ☐ 5 or more times per day

3a. Each time you ate **French fries** or **fried potatoes**, how much did you usually eat?

- ☐ Small order or less
(About 1 cup or less)
 ☐ Medium order
(About 1½ cups)
 ☐ Large order
(About 2 cups)
 ☐ Super Size order or more
(About 3 cups or more)

4. Over the last month, how often did you eat **other white potatoes**? Count **baked, boiled, and mashed potatoes, potato salad, and white potatoes that were not fried**.

- ☐ Never
(Go to Question 5)
 ☐ 1-3 times last month
 ☐ 1-2 times per week
 ☐ 3-4 times per week
 ☐ 5-6 times per week
 ☐ 1 time per day
 ☐ 2 times per day
 ☐ 3 times per day
 ☐ 4 times per day
 ☐ 5 or more times per day

4a. Each time you ate **these potatoes**, how much did you usually eat?

- ☐ 1 small potato or less
(½ cup or less)
 ☐ 1 medium potato
(½ to 1 cup)
 ☐ 1 large potato
(1 to 1½ cups)
 ☐ 2 medium potatoes or more
(1½ cups or more)

5. Over the last month, how often did you eat **cooked dried beans**? Count **baked beans, bean soup, refried beans, pork and beans and other bean dishes**.

- ☐ Never
(Go to Question 6)
 ☐ 1-3 times last month
 ☐ 1-2 times per week
 ☐ 3-4 times per week
 ☐ 5-6 times per week
 ☐ 1 time per day
 ☐ 2 times per day
 ☐ 3 times per day
 ☐ 4 times per day
 ☐ 5 or more times per day

5a. Each time you ate **these beans**, how much did you usually eat?

- ☐ Less than ½ cup
 ☐ ½ to 1 cup
 ☐ 1 to 1½ cups
 ☐ More than 1½ cups

Now, divide your waking hours into three time periods:

- MORNING
- LUNCHTIME AND AFTERNOON
- SUPPERTIME AND EVENING

Please think about the foods you ate during each of those time periods over the last month.

MORNING

6. Think about all the foods you ate at your morning meal and snacks over the last month. On how many days did you eat **fruit** for your morning meal or morning snacks? Count any kind of fruit—fresh, canned, and frozen. **Do not count** juices.

☐ Never
(Go to Question 7)

☐ 1-3 days
last month

☐ 1-2 days
per week

☐ 3-4 days
per week

☐ 5-6 days
per week

☐ Every day

- 6a. When you ate **fruit** in the morning, what is the **total** amount of **fruit** that you usually ate in a morning?

☐ Less than 1 medium fruit

☐ 1 medium fruit

☐ 2 medium fruits

☐ More than 2 medium fruits

OR

☐ Less than ½ cup

☐ About ½ cup

☐ About 1 cup

☐ More than 1 cup

7. Think about all the foods you ate at your morning meal and morning snacks. On how many days did you eat **vegetables** for your morning meal or morning snacks?

DO NOT COUNT:

- Lettuce salads
- White potatoes
- Cooked dried beans
- Vegetables in mixtures, such as in sandwiches, omelets, casseroles, Mexican dishes, stews, stir-fry, soups, etc.
- Rice

COUNT:

- All other vegetables—raw, cooked, canned, and frozen

☐ Never
(Go to Question 8)

☐ 1-3 days
last month

☐ 1-2 days
per week

☐ 3-4 days
per week

☐ 5-6 days
per week

☐ Every day

- 7a. When you ate **vegetables** in the morning, what is the **total** amount of **vegetables** that you usually ate in a morning?

☐ Less than ½ cup

☐ ½ to 1 cup

☐ 1 to 2 cups

☐ More than 2 cups

LUNCHTIME AND AFTERNOON

8. Think about all the foods you ate at lunchtime and for your afternoon snacks last month. On how many days did you eat **fruit** at lunchtime or for your afternoon snacks? Count any kind of fruit—fresh, canned, and frozen. **Do not count** juices.

☐ Never
(Go to Question 9)
 ☐ 1-3 days last month
 ☐ 1-2 days per week
 ☐ 3-4 days per week
 ☐ 5-6 days per week
 ☐ Every day

- 8a. When you ate **fruit** at lunchtime or for your afternoon snacks, what is the **total** amount of **fruit** that you usually ate then?

☐ Less than 1 medium fruit
 ☐ 1 medium fruit
 ☐ 2 medium fruits
 ☐ More than 2 medium fruits
 OR
☐ Less than ½ cup
 ☐ About ½ cup
 ☐ About 1 cup
 ☐ More than 1 cup

9. Think about all the foods you ate at lunchtime and for your afternoon snacks. On how many days did you eat **vegetables** at lunchtime or for your afternoon snacks?

DO NOT COUNT:

- Lettuce salads
- White potatoes
- Cooked dried beans
- Vegetables in mixtures, such as in sandwiches, omelets, casseroles, Mexican dishes, stews, stir-fry, soups, etc.
- Rice

COUNT:

- All other vegetables—raw, cooked, canned, and frozen

☐ Never
(Go to Question 10)
 ☐ 1-3 days last month
 ☐ 1-2 days per week
 ☐ 3-4 days per week
 ☐ 5-6 days per week
 ☐ Every day

- 9a. When you ate **vegetables** at lunchtime or for your afternoon snacks, what is the **total** amount of **vegetables** that you usually ate then?

☐ Less than ½ cup
 ☐ ½ to 1 cup
 ☐ 1 to 2 cups
 ☐ More than 2 cups

SUPPERTIME AND EVENING

10. Think about all the foods you ate at supper and for your evening snacks last month. On how many days did you eat **fruit** at supper or for your evening snacks? Count any kind of fruit—fresh, canned, and frozen. **Do not count** juices.

- ☐ Never
(Go to Question 11)
 ☐ 1-3 days last month
 ☐ 1-2 days per week
 ☐ 3-4 days per week
 ☐ 5-6 days per week
 ☐ Every day

10a. When you ate **fruit** at supper or for your evening snacks, what is the **total** amount of **fruit** that you usually ate then?

- ☐ Less than 1 medium fruit
 ☐ 1 medium fruit
 ☐ 2 medium fruits
 ☐ More than 2 medium fruits
- OR
- ☐ Less than ½ cup
 ☐ About ½ cup
 ☐ About 1 cup
 ☐ More than 1 cup

11. Think about all the foods you ate at supper and for your evening snacks. On how many days did you eat **vegetables** at supper or for your evening snacks?

- DO NOT COUNT:**
- Lettuce salads
 - White potatoes
 - Cooked dried beans
 - Vegetables in mixtures, such as in sandwiches, omelets, casseroles, Mexican dishes, stews, stir-fry, soups, etc.
 - Rice

COUNT:

- All other vegetables—raw, cooked, canned, and frozen

- ☐ Never
(Go to Question 12)
 ☐ 1-3 days last month
 ☐ 1-2 days per week
 ☐ 3-4 days per week
 ☐ 5-6 days per week
 ☐ Every day

11a. When you ate **vegetables** at supper or for your evening snacks, what is the **total** amount of **vegetables** that you usually ate then?

- ☐ Less than ½ cup
 ☐ ½ to 1 cup
 ☐ 1 to 2 cups
 ☐ More than 2 cups

These last few questions ask about how often you ate particular foods at any time of the day.

12. Over the last month, how often did you eat **tomato sauce**? Include tomato sauce on pasta or macaroni, rice, pizza and other dishes.

☐ Never
(Go to Question 13)
 ☐ 1-3 times last month
 ☐ 1-2 times per week
 ☐ 3-4 times per week
 ☐ 5-6 times per week
 ☐ 1 time per day
 ☐ 2 times per day
 ☐ 3 times per day
 ☐ 4 times per day
 ☐ 5 or more times per day

- 12a. Each time you ate **tomato sauce**, how much did you usually eat?

☐ About ¼ cup
 ☐ About ½ cup
 ☐ About 1 cup
 ☐ More than 1 cup

13. Over the last month, how often did you eat **vegetable soups**? Include tomato soup, gazpacho, beef wit

☐ Never
(Go to Question 14)
 ☐ 1-3 times last month
 ☐ 1-2 times per week
 ☐ 3-4 times per week
 ☐ 5-6 times per week
 ☐ 1 time per day
 ☐ 2 times per day
 ☐ 3 times per day
 ☐ 4 times per day
 ☐ 5 or more times per day

- 13a. When you ate **vegetable soup**, how much did you usually eat?

☐ Less than 1 cup
 ☐ 1 to 2 cups
 ☐ 2 to 3 cups
 ☐ More than 3 cups

14. Over the last month, how often did you eat **mixtures that included vegetables**? Count such foods as sandwiches, casseroles, stews, stir-fry, omelets, and tacos.

☐ Never
 ☐ 1-3 times last month
 ☐ 1-2 times per week
 ☐ 3-4 times per week
 ☐ 5-6 times per week
 ☐ 1 time per day
 ☐ 2 times per day
 ☐ 3 times per day
 ☐ 4 times per day
 ☐ 5 or more times per day

Thank you very much for completing this form. Please return it in the enclosed, postage-paid envelope or to the address on the front cover.

Appendix B

Nutrition Knowledge Instrument

(Please circle the answer you think is correct)

1. Which of the following diseases are closely linked to diet?
 - a. Diabetes
 - b. Heart disease
 - c. Cancer
 - d. All of the above
 - e. None of the above
2. Using the following choices, which is considered the healthiest snack?
 - a. Chips and salsa
 - b. Cheese puffs
 - c. Veggies and hummus
 - d. Potato chips
 - e. French Fries
3. Eating too much added sugar can lead to:
 - a. Weight gain
 - b. Obesity
 - c. Tooth decay
 - d. All of the above
 - e. None of the above
4. Which of the following should you try to avoid:
 - a. Proteins
 - b. Carbohydrates
 - c. Trans-fat
 - d. Fiber
 - e. All of the above
5. The item that has the most “empty calories” is:
 - a. Whole grain toast with 100% fruit spread
 - b. 1 cup of vanilla ice cream
 - c. Baked chicken
 - d. 1 cup of broccoli
 - e. Plain yogurt
6. Which of the following is considered the healthiest way to lose weight?
 - a. Diet pills
 - b. Reducing your calorie intake through a balanced diet and increasing your physical activity
 - c. Skipping meals
 - d. Avoiding all carbohydrates
 - e. None of the above
7. Which of the following does not make up a balanced healthy plate?
 - a. Fruits
 - b. Solid fats
 - c. Dairy

- d. Protein
 - e. None of the above
8. Which behavior-specific message supports a healthy diet?
- a. Make half your plate fruits and vegetables, half your grains whole and avoid oversized portions
 - b. You can eat as much as you want of any food as long as it is low-fat
 - c. Avoid all carbohydrates
 - d. All of the above
 - e. None of the above
9. Dry beans, eggs and nuts are in which food group?
- a. Protein group
 - b. Dairy group
 - c. Grains group
 - d. Vegetable group
 - e. None of the above
10. The amount of oil you are allowed each day depends on your age, gender, and amount of physical activity you get. Which of these foods is naturally high in oil?
- a. Walnuts
 - b. Olives
 - c. Avocados
 - d. All of the above
 - e. None of the above
11. How many cups of vegetables should a moderately active adult eat per day?
- a. 1/2 cup
 - b. 1 cup
 - c. 2 or more cups
 - d. None of the above
12. Which of these represents one cup from the vegetable group?
- a. 1 cup of raw vegetables
 - b. 1 cup of cooked vegetables
 - c. 2 cups of raw leafy greens
 - d. All of the above

Appendix C

Nutrition Attitudes Inventory

	Disagree	No Opinion	Agree
1. Most of children's nutritional needs are taken care of at home	1	2	3
2. When I eat with children, I influence their eating habits	1	2	3
3. The foods that are served at snack times are not as important as the foods that are served at mealtime	1	2	3
4. Children should learn to serve themselves at meals and snacks	1	2	3
5. Mealtime can be incorporated into my teaching curriculum	1	2	3
6. I prefer to use non-food treats such as stickers or books to celebrate special occasions	1	2	3
7. I discuss children's eating habits at school with their parents	1	2	3
8. I'd rather meals and snacks be finished quickly so that I can move on to more important activities with the children	1	2	3
9. Children will learn to eat a variety of foods if they are offered to them	1	2	3
10. Caregivers should sit with children during meals in order to model good eating behaviors	1	2	3
11. Caregivers don't need to sit with children during snacks in order to model good eating behaviors	1	2	3
12. I think mealtime should be used as an opportunity to educate children about nutrition	1	2	3
13. It is important for caregivers to consume the same food as the children during meals and snacks	1	2	3
14. It is important for children to help set the table and assist in clean-up	1	2	3
15. I think what children learn to eat now will make a difference in their life as an adult	1	2	3
16. I feel our food service has accomplished its job if the children are no longer hungry	1	2	3
17. Children's mealtime is a good time to take a break and visit with the other teachers	1	2	3
18. Children should be required to taste all the foods served	1	2	3
19. Children should be required to eat all the foods on their plate before receiving second helpings	1	2	3

	Disagree	No Opinion	Agree
20. If a child refuses to try a particular food, it will help to encourage tasting the food by promising desert or another treat	1	2	3
21. When introducing children to a new food, it is best to start them out with small portions	1	2	3
22. I praise children when they eat alot	1	2	3
23. It is OK to withhold favorite foods as a part of discipline	1	2	3
24. It is best to substitute a food the child likes better if the child is refusing to eat	1	2	3
25. I give food to children if it helps to calm them when they are upset	1	2	3
26. If a child is refusing to eat, they should be excused from the table	1	2	3
27. Rather than waste food, it is better to serve food that we know children will eat	1	2	3

Appendix D

Mealtime Behavior Observation Scale

EPAO – Observation for use in Head Starts

MEAL TODAY

1. What time did meal **start**? Please select type of meal: Breakfast Lunch
 ____ : ____ AM / PM
2. What time did meal **end**? (*when the last child finished eating*)
 ____ : ____ AM / PM
3. How long did meal last?
 ____ Minutes
4. Which of the following practices most closely describes **how food was served** to children **during this meal**? (*select one*)
 - ☐ Children served themselves most/all foods and decided what size portions to take.
 - ☐ Children served themselves most foods, but the provider decided what size portions children may take.
 - ☐ The provider served most foods, but children decided what size portions they wanted.
 - ☐ The provider served most foods and decided what size portions to give to the children.
 - ☐ Food delivered to home already portioned on each child's plate.
 - ☐ Children brought food from home.
5. Specifically, what was served to the children for meal?

	Yes	No
Location/physical environment of meals/Involvement		
6. ... the provider used child size appropriate tableware (e.g., smaller plates and cups)	☐	☐
7. ... the provider made fruits and vegetables easier to eat (e.g., offered slices, peeled orange)	☐	☐
8. ... unhealthy snack foods (potato chips, Doritos, cheese puffs) are visible to children	☐	☐

9...a variety of healthy foods (fruits, vegetables) are visible to children	☐	☐
10...children were involved in meal preparation, planning or clean up (e.g., setting table, preparing foods, clearing and cleaning table)	☐	☐
11...a moment was taken to settle before eating	☐	☐
12...the provider encouraged the children to sit around the table during meals	☐	☐

13. Was the TV on during this meal today?
- Home does not have a TV that can be **seen OR heard** from eating area
 - No, TV in home, but not on during meal
 - Yes, TV on, but in another room where it can only be **heard** from eating area
 - Yes, TV on and visible from eating area

	Yes	No
14.The provider talked on the phone, texted, or was on the computer during meals	☐	☐

For each event listed, check the box or boxes that describes **what was observed** during meal.

DURING MEAL IN THIS CLASSROOM...

	Yes	No
Did the provider eat any of the following foods in front of children?		
15. ... the provider ate fast food .	☐	☐
16. ... the provider ate a salty snack (e.g., chips) .	☐	☐
17.the provider ate a sweet snack (e.g., donuts, pastries, cookies, candy) .	☐	☐
18. ... the provider ate fruits or vegetables in front of the children.	☐	☐
19. ... the provider drank a soda or other sweetened beverage .	☐	☐
20. ... the provider ate the same foods as the children.	☐	☐

	No	1-2 times	3+ times
What kind of interactions did the provider have with children during the meal?			
21... the provider sat with the children during lunch.	☐	☐	☐
22... the provider talked with the children about the foods they were eating.	☐	☐	☐
23... the provider enthusiastically role modeled eating healthy foods.	☐	☐	☐
24... the provider encouraged (not forced or coerced) children to try the foods on their plate.	☐	☐	☐
25... the provider praised a child for trying new or less preferred foods.	☐	☐	☐
26... the provider praised a child for eating unhealthy foods	☐	☐	☐
27...the provider led/encouraged pleasant conversations during meals	☐	☐	☐
28...the provider let the children choose between two healthy food options	☐	☐	☐

29...the provider used an **authoritative feeding style**

Definition: authoritative feeding styles strike a balance between encouraging children to eat healthy foods and allowing children to make their own food choices. Providers use reason and education, rather than bribes or threats.

☐ ☐ ☐

	No	1-2 times	3+ times
How did the provider support or hinder children's self-regulation?			
30... the provider pressured a child to eat more than they seemed to want (e.g., after the child said they were finished or full).	☐	☐	☐
31... the provider praised children for cleaning their plates, examples, "Very good! You have a happy (clean) plate."	☐	☐	☐
32...the provider spoon fed a child to get them to eat	☐	☐	☐
33...the provider insisted that a child eat a food	☐	☐	☐
34...the provider used food to control a child's emotions (e.g., giving a child something to eat or drink if they get fussy, upset, or bored)	☐	☐	☐
35... the provider rushed a child or children to eat	☐	☐	☐
Second helpings were...	☐	☐	☐
36... served to a child even when the child did NOT ask for more.	☐	☐	☐
37... served only after a child requested seconds and the provider asked the child if he/she was still hungry.	☐	☐	☐
When a child ate less than half of a meal or snack...	☐	☐	☐
38... the provider removed the plate without asking the child if he/she was full.	☐	☐	☐
39... the provider asked a child if he/she was full before removing the plate.	☐	☐	☐
40... the provider required a child to sit at the table until he/she cleaned their plate.	☐	☐	☐
How did the provider use rewards or bribes?			
41... the provider promised something other than food for eating a specific food (for example, "If you eat your beans, we can play ball outside.")	☐	☐	☐
42... the provider used food as a reward or withheld food as a punishment (for example, "If you clean up your blocks, you can have a bigger helping of food.")	☐	☐	☐
43... the provider used food as a reward for eating a specific food (for example, "If you eat your spinach, you can have your cake"	☐	☐	☐
44...the provider reasoned with children to eat healthy foods (e.g., "Drinking milk makes your bones strong.")	☐	☐	☐
45...the provider negotiated with children to eat healthy foods (e.g., "What about trying one bite and if you don't like it, you don't have to finish it.")	☐	☐	☐
Permissiveness/Indulgence			
46... the provider ignores or shows indifference to a child or children	☐	☐	☐
47...the provider allows child to continue to take multiple servings of various foods, even if they aren't consuming the foods	☐	☐	☐

Appendix E

EPAO-SR Children's Eating Scale

Please indicate how often you do the following with children in your care.

	Never	Rarely	Some times	Often	Very Often	Always
1. I promise children something other than food if they eat a specific food. (For example, "If you eat your beans, we can play ball outside.")	☐	☐	☐	☐	☐	☐
2. I reward children with something to eat when they are well behaved.	☐	☐	☐	☐	☐	☐
3. I teach the children about the foods they are eating.	☐	☐	☐	☐	☐	☐
4. I give a child something to eat to make them feel better when they are upset.	☐	☐	☐	☐	☐	☐
5. I leave the TV on during children's meals and snacks.	☐	☐	☐	☐	☐	☐
6. I encourage children to wait a few minutes before getting seconds so the child can decide if they are still hungry.	☐	☐	☐	☐	☐	☐
7. I let children decide how much they should eat.	☐	☐	☐	☐	☐	☐
8. I encourage children to eat fruits and vegetables by telling them that they taste good.	☐	☐	☐	☐	☐	☐
9. I ask children if they are hungry before I serve them seconds.	☐	☐	☐	☐	☐	☐
10. I encourage children to eat a wide variety of foods.	☐	☐	☐	☐	☐	☐
11. I praise children when they try a new food.	☐	☐	☐	☐	☐	☐
12. I wait to give seconds until a child has finished another food on their plate.	☐	☐	☐	☐	☐	☐
13. I show children that I enjoy fruits and vegetables, just so the children are more likely to eat them.	☐	☐	☐	☐	☐	☐
14. I use my behavior to encourage children to eat healthy.	☐	☐	☐	☐	☐	☐
15. I encourage children to eat by using food as a reward. (For example, "If you finish your vegetables, you will get some fruit.")	☐	☐	☐	☐	☐	☐
16. I eat chips, sweets, or fast food while I am caring for children.	☐	☐	☐	☐	☐	☐
17. I monitor and guide children's eating so that they do not eat more than they should.	☐	☐	☐	☐	☐	☐
18. I play videos during children's meals and snacks.	☐	☐	☐	☐	☐	☐
19. I ask children if they are full before I remove an unfinished plate of food.	☐	☐	☐	☐	☐	☐
20. I monitor and guide children's eating so that they don't eat much less than they should.	☐	☐	☐	☐	☐	☐
21. I drink soda and/or other sugary drinks while I am caring for children.	☐	☐	☐	☐	☐	☐
22. I encourage children to finish their food even if they say "I'm not hungry."	☐	☐	☐	☐	☐	☐

	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
1. I seek professional development opportunities to enhance children's healthy eating.	☐	☐	☐	☐	☐	☐
2. I communicate the importance of healthy eating to parents.	☐	☐	☐	☐	☐	☐
3. I am a role model for healthy eating for the children attending my childcare home.	☐	☐	☐	☐	☐	☐
4. I communicate the importance of healthy eating to the children.	☐	☐	☐	☐	☐	☐

Appendix F

Demographics, Health and Center Practice Survey

1. What year were you born? _____
2. What is your gender? (Please circle a response)
 - a. Female
 - b. Male
3. Are you Hispanic or Latino?
 - a. Yes
 - b. No
- 3a. What is your race?
 - a. White
 - b. Black/African
 - c. Asian
 - d. Native Hawaiian or Pacific Islander
 - e. American Indian or Alaskan Native
4. What is the highest grade or level of schooling you have completed?
 - a. Grade School (Grades 1-8)
 - b. Some High School (Grades 9-11)
 - c. High School Graduate (Grade 12 or GED)
 - d. Some College or Technical School (College 1 year to 3 years)
 - e. College Graduate (4 years or more)
 - f. Post-Graduate Work (eg. MD, MA, Ph.D., J.D)
 - g. None
5. How many months or years have you taught at this particular center?
 - a. Months _____
 - b. Years _____
6. How many total months or years of experience do you have as a child care teacher?
 - a. Months _____
 - b. Years _____
7. In what capacity do you know the children?
 - a. Regular Teacher
 - b. Assistant Teacher
 - c. Special Education Teacher
 - d. Teacher's Aide
 - e. Other
8. Do you work full-time or part-time
 - a. Full-time
 - b. Part-time
9. What are your typical work hours/day?
 - a. Start Time _____
 - b. End Time _____
10. On average, how many hours per week do you work in this program?
 - a. Number of Hour Per Week _____

11. What are the ages in years of children in your classroom? (Check all that apply)
 - a. Age 2
 - b. Age 3
 - c. Age 4
 - d. Age 5
 - e. Age 6
12. Eating occasions when you are present in the classroom
 - a. Breakfast
 - b. AM Snack
 - c. Lunch
 - d. PM Snack
13. Number of children at your table at mealtime
 - a. Number of Children _____
14. Training opportunities on nutrition (other than food safety and food program guidelines) are provided for staff
 - a. Rarely or never
 - b. Less than one time per year
 - c. 1 time per year
 - d. 2 times per year or more
15. How often have you taken part in nutrition training opportunities in the Head Start setting?
 - a. Rarely or never
 - b. Less than one time per year
 - c. 1 time per year
 - d. 2 times per year or more
16. Nutrition education is provided for children through a standardized curriculum
 - a. Rarely or never
 - b. 1 time per month
 - c. 2-3 times per month
 - d. 1 time per week or more
17. Does your Head Start offer nutrition education to parents?
 - a. Rarely or never
 - b. 1 time per month
 - c. 2-3 times per month
 - d. 1 time per week or more
18. Are you trying to lose weight, gain weight, or maintain weight?
 - a. Lose weight
 - b. Gain weight
 - c. Maintain weight
 - d. Not trying to do anything about weight
 - e. Don't know
19. Compared to other adults my age, I would say that my eating habits are:
 - a. Much healthier
 - b. Somewhat healthier
 - c. About the same

- d. Somewhat less healthy
 - e. Much less healthy
20. On how many of the past 7 days did you take part in physical activity or exercise for at least 30 minutes where your heart did not beat fast or you did not breathe hard, such as fast walking, slow bicycling, skating, pushing a lawn mower, or mopping floors?
- a. 0 days
 - b. 1 day
 - c. 2 days
 - d. 3 days
 - e. 4 days
 - f. 5 days
 - g. 6 days
 - h. 7 days
21. How many hours per day do you usually sit and watch tv or spend time on the computer away from work?
- a. I don't watch TV or use a computer
 - b. 1 hour
 - c. 2 hours
 - d. 3 hours
 - e. 4 hours
 - f. 5 hours
 - g. 6 hours or more
22. Yesterday, how many times did you drink any regular (not diet) soda or soft drinks?
- a. None
 - b. One time
 - c. Two times
 - d. Three or more times
23. Yesterday, how many times did you drink any sweetened coffee beverages, punch, kool-aid, sports drinks, or other fruit flavored drinks?
- a. None
 - b. One time
 - c. Two times
 - d. Three or more times
24. Yesterday, how many times did you eat food from any type of restaurant?
Restaurants include fast food, sit down restaurant, pizza places and cafeterias.
- a. None
 - b. One time
 - c. Two times
 - d. Three or more times

Appendix G

Body Size Guide

Please choose the letter that represents this provider's body weight/size:

Weight by Measured BMI	Under weight	Normal weight	Over weight	Class I Obesity	Class II Obesity	Class III Obesity
Perception of Weight by Respondents	Underwt.	Normal weight	Overweight	Obese		
		Healthy				

Appendix H

Initial Introduction Recruitment Letter

Dear Head Start Directors,

Kate Halloran, a doctoral student in Behavioral Science in the Psychology Department at the University of Rhode Island, is currently doing her doctoral research on the health behaviors of Head Start teachers. She would like to contact you about the potential of having your Head Start center participate in her study. I am pleased to collaborate on this project because her proposed research shows promise in improving children's diets. Participation consists of teachers filling out a nutrition and health behavior survey and one classroom visit from a researcher who will observe a mealtime session with children. The survey takes approximately 20 minutes to fill out. Providers will receive incentives for participating.

Kate will be in touch soon to contact you about your interest and plans to begin recruitment in early September. If you would like to contact her directly to participate, or with additional questions, her email is Khalloran@my.uri.edu and you can also reach her directly at 1-401-874-2304. She is also available to meet at your convenience.

Thank you,

Becky Bessette, MS, RD
RIDE CACFP Division Director

Appendix I

Email Recruitment Letter to Directors

<Name and Address of Head Start>

Dear <specific Head Start Director name here>,

Hello. My name is Kate Halloran and I am a doctoral student in Behavioral Science in the Psychology Department at the University of Rhode Island. I am following up on the email Becky Bessette recently sent out regarding my research study. I am currently conducting my dissertation with a focus on gaining a better understanding of health behaviors of Head Start teachers and how this may ultimately affect their interactions with children in the classroom. I am writing to you to invite your Head Start Center to participate in my research. If you agree, I would be asking you to allow me to contact the Head Start Teachers at your center and to visit their classrooms (if and when they agree). This research is being conducted under the supervision of Dr. Kathleen Gorman, who is also the Principal Investigator for the study. I am very excited about my project, The Head Start Teacher Health Behavior Study, and I would love for your center to participate.

In this study, we are hoping to learn more about the health and nutrition of Head Start teachers, which may help us strengthen future Head Start health programs. Specifically, your role would be to forward an email from me to Head Start teachers in your center describing the study. Participation consists of teachers filling out a nutrition and health behavior survey and one classroom visit from me (or a trained research assistant) who will observe a mealtime session with children. The survey takes approximately 20 minutes to fill out. Teachers will receive incentives for participating. If teachers are interested in the study, there will be information in the email for them to contact me directly. I plan to begin recruitment for the study in September, 2014 and will continue until the end of May, 2015. We are excited about the potential this study has to positively affect Head Start teachers and their students!

If you are interested in participating, please let me know by responding to this email at khalloran@my.uri.edu or call (401-874-2304). I look forward to hearing from you.

Thank you for your time!

Sincerely,

Kate Halloran, M.A.
Doctoral Candidate
University of Rhode Island

Appendix J

Recruitment Letter to Providers

Dear Head Start Teachers,

My name is Kate Halloran and I am a doctoral student in Behavioral Science in the Psychology Department at the University of Rhode Island currently doing my doctoral research on the health behaviors of Head Start teachers. I am contacting you to let you know about an exciting research study I am conducting that I am hoping you would be able to help me with! In this study, we are hoping to learn more about the health and nutrition of Head Start teachers, which may help us strengthen future Head Start health programs. Participation consists of teachers filling out a nutrition and health behavior survey and one classroom visit from a researcher who will observe a mealtime session with children. The survey takes approximately 20 minutes to fill out. Teachers will also receive a \$35 gift card to Shaw's for participating. We are excited about the potential this study may have to positively impact Head Start teachers and their students!

If you would like to contact me directly to participate, or with additional questions, my email is Khalloran@my.uri.edu and my phone number is [401-874-2304](tel:401-874-2304). I look forward to hearing from you!

Thank you for your time,

Kate Halloran, M.A.
Doctoral Candidate
University of Rhode Island

Appendix K

Director Approval Letter

<Name and Address of Head Start>

Dear <specific Head Start Director name here>,

Hello. My name is Kate Halloran and I am a doctoral student in Behavioral Science in the Psychology Department at the University of Rhode Island. I am following up on the email Becky Bessette recently sent out regarding my research study. I am currently conducting my dissertation with a focus on gaining a better understanding of health behaviors of Head Start teachers and how this may ultimately affect their interactions with children in the classroom. I am writing to you to invite your Head Start Center to participate in my research. If you agree, I would be asking you to allow me to contact the Head Start Teachers at your center and to visit their classrooms (if and when they agree). This research is being conducted under the supervision of Dr. Kathleen Gorman, who is also the Principal Investigator for the study. I am very excited about my project, The Head Start Teacher Health Behavior Study, and I would love for your center to participate.

In this study, we are hoping to learn more about the health and nutrition of Head Start teachers, which may help us strengthen future Head Start health programs. Specifically, your role would be to forward an email from me to Head Start teachers in your center describing the study. Participation consists of teachers filling out a nutrition and health behavior survey and one classroom visit from me (or a trained research assistant) who will observe a mealtime session with children. The survey takes approximately 20 minutes to fill out. Teachers will receive incentives for participating. If teachers are interested in the study, there will be information in the email for them to contact me directly. I plan to begin recruitment for the study in September, 2014, and will continue until the end of May, 2015. We are excited about the potential this study has to positively affect Head Start teachers and their students!

If you would like to discuss this further – I would be happy to speak with you. Please feel free to email me (khalloran@my.uri.edu) or call (401-874-2304). If you agree to participate, please fill out the information below. By signing below you are agreeing to send an email out to Head Start teachers about this study. If providers enroll, you are also agreeing to have a researcher visit your center to obtain survey data from the teacher(s) and complete a short mealtime observation of the teacher(s):

Name: _____

Date: _____

Email: _____

Thank you for your participation! After filling out the above information, please send back to me in the enclosed self-addressed stamped envelope. Once I receive this approval, I will plan to follow-up with you.

Sincerely,

Kate Halloran, M.A.
Doctoral Candidate
University of Rhode Island

Appendix L

Informed Consent

CONSENT FORM FOR RESEARCH

You have been invited to take part in a research project described below. The researcher will explain the project to you in detail. You should feel free to ask questions. If you have more questions later, Kate Halloran, the person mainly responsible for this study, 401-874-2304, will discuss them with you. You must be at least 18 years old to be in this research project.

Description of the project:

You are being asked to take part in a research study looking at the nutrition beliefs and attitudes of Head Start teachers. We are hoping to learn more about the health and nutrition of teachers, which may help us strengthen the efficacy of future Head Start health programs. Please read this form carefully and ask any questions you may have before agreeing to take part in the study.

What will be done:

If you decide to take part in this study here is what will happen:

You will be asked to fill out a survey that will take about 20 minutes of your time to complete. A researcher will also observe a mealtime session in your classroom at a mutually agreed upon time. The classroom mealtime observation will take about 25 minutes total. The survey will include questions about your health, your job, and your beliefs, attitudes and behaviors toward nutrition.

Risks or discomfort:

While some may potentially find questions to be of a sensitive nature, there are no risks to participating in this study. You may choose to ignore any questions you don't feel comfortable answering and skip over them.

Benefits of this study:

Although there will be no direct benefit to you for taking part in this study, the researcher may learn more about the health and nutrition of Head Start teachers, which may help us strengthen the efficacy of future Head Start health programs.

Confidentiality:

Your part in this study is confidential. None of the information will identify you by name. The records of this study will be kept private. In any sort of report we make public we will not include any information that will make it possible to identify you. Research records will be kept in a locked file; only the researchers will have access to the records.

Decision to quit at any time:

The decision to take part in this study is up to you. You do not have to participate. If you decide to take part in the study, you may quit at any time. Whatever you decide will in no way affect your employment. If you wish to quit, simply inform Kate Halloran, at 401-874-2304, of your decision.

Rights and Complaints:

If you are not satisfied with the way this study is performed, you may discuss your complaints with Kate Halloran or with Dr. Kathleen Gorman, 401-874-9089, anonymously, if you choose. In addition, if you have questions about your rights as a research participant, you may contact the office of the Vice President for Research and Economic Development, 70 Lower College Road, Suite 2, University of Rhode Island, Kingston, Rhode Island, telephone: (401) 874-4328.

You have read the Consent Form. Your questions have been answered. Your signature on this form means that you understand the information and you agree to participate in this study.

Signature of Participant

Signature of Researcher

Typed/printed Name

Typed/printed name

Date

Date

Please sign both consent forms, keeping one for yourself

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