

2016

## Exploring Self-Reported and Observed Feeding Practices of Rhode Island Head Start Teachers

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EXPLORING SELF-REPORTED AND OBSERVED FEEDING PRACTICES OF  
RHODE ISLAND HEAD START TEACHERS

BY

MEGAN N. FALLON

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE  
REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE

IN

NUTRITION AND FOOD SCIENCES

UNIVERSITY OF RHODE ISLAND

2016

MASTER OF SCIENCE THESIS

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2016

## ABSTRACT

**Background:** Head Start (HS) teachers care for low-income and ethnically diverse preschool-aged children who are disproportionately impacted by obesity. While it is known that parent feeding practices influence child weight status and eating behaviors, little is known about HS teacher feeding practices. The limited number of studies with HS teachers have been completed primarily with self-report measures, which have documented limitations such as response bias. Capturing HS teacher feeding practices through self-report and observations may provide valuable information needed to evaluate the inconsistencies of current findings.

**Methods:** Rhode Island HS teachers (n=85) were observed and feeding behaviors coded using the Mealtime Behavior Observation Scale, adapted from the Environmental Policy Assessment and Observation (EPAO) tool. Post-observation, teachers completed the Children's Eating Scale, adapted from the EPAO Self-Report (EPAO-SR), to capture self-reported feeding practices. Correlations (Spearman) were used to explore associations between self-reported and observed items (14) that were intended to measure the same feeding practice. Chi-square tests were also used to compare the level of consistency between measures and socio-educational factors.

**Results:** Teachers were predominantly non-Hispanic White (89%) and female (98%). Not all self-reported and observed feeding practices were related. After aligning feeding practices on the self-report and observation scales, self-reported and observed "use of food as a reward" was the only significantly related feeding practice ( $r=22$ ,  $p=.04$ ). No significant associations were found with teachers' self-reported years of experience, nutrition training, or desired weight status.

**Conclusions:** Even though items on the self-report and observation measures were designed to capture identical feeding practices, most of them were not significantly related. It is possible that because HS has such a clear policy with regards to the “use of food as a reward”, this practice was significantly related. Currently self-report measures are used to capture feeding practices, yet inconsistencies between measures of self-report and observation exist. Further understanding of these inconsistencies is needed to better capture teacher feeding practices.

## ACKNOWLEDGEMENTS

There are a number of people without whom this thesis might not have been written, and to whom I am greatly indebted. I would like to first thank my major advisor, Dr. Alison Tovar, who has supported me throughout my two years as a graduate student. Without your guidance and persistent help, this thesis would not have been possible. Thank you for inspiring me to become a better researcher, strengthening my ability to become a better writer, and instilling a passion for community nutrition in me. I am forever grateful of my graduate experience with such a knowledgeable and understanding mentor.

Thank you to my thesis committee members, Dr. Kathleen Gorman and Dr. Geoffrey Greene, and my thesis defense chair Dr. Karen McCurdy, for taking the time out of their undoubtedly busy schedules to be a part of this learning process. I greatly appreciate your thoughtful insights and contributions to improve my manuscript. I would also like to thank Katherine Halloran for her help in nearly every aspect of my research. Thank you for “taking me under your wing” as a young researcher. I consider myself fortunate to be a part of your research as much as my own.

I do not want to miss this opportunity to thank the people who particularly made my graduate experience most valuable and memorable. There are a number of influential faculty members I’ve been lucky to have in my seven years at URI, but I would especially like to thank Ingrid Lofgren and Linda Sebelia for making the biggest impact on my academic, and soon to be professional, career. Thank you to my fellow graduate students for your support (and humor) when I needed it the most. I have no doubt you all will be successful in your future endeavors, but I wish you the

best of luck, health, and happiness. To my lab mates – Nooreem, Laura, Amy, and Maggie – thank you for your positivity and motivation. In your own individual ways, you inspire me to be a better person. A special thank you to Michael MacArthur and Chelsea Paulin for providing indispensable advice, constructive feedback, and support on multiple aspects of my thesis.

Lastly, I would like to express gratitude to all the love that surrounds me each and every day for their support and encouragement throughout this process. Mom, Dad, Miranda, Luke, and Matt – It is your unconditional love that motivates me to set higher goals for myself. I love you.

## PREFACE

My thesis was written to comply with the University of Rhode Island graduate school Manuscript Thesis Format. This thesis contains one manuscript: *Exploring self-reported and observed feeding practices of Rhode Island Head Start teachers*. This manuscript has been written in a form suitable in publication in the International Journal of Behavioral Nutrition and Physical Activity (IJBNPA).



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## CHAPTER 1

Exploring self-reported and observed feeding practices of Rhode Island Head Start  
teachers

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*To be submitted to International Journal of Behavioral Nutrition and Physical Activity  
(IJBNPA)*

## **Exploring self-reported and observed feeding practices of Rhode Island Head Start teachers**

**Background:** Head Start (HS) teachers care for low-income and ethnically diverse preschool-aged children who are disproportionately impacted by obesity. While it is known that parent feeding practices influence child weight status and eating behaviors, little is known about HS teacher feeding practices. The limited number of studies with HS teachers have been completed primarily with self-report measures, which have documented limitations such as response bias. Capturing HS teacher feeding practices through self-report and observations may provide valuable information needed to evaluate the inconsistencies of current findings.

**Methods:** Rhode Island HS teachers (n=85) were observed and feeding behaviors coded using the Mealtime Behavior Observation Scale, adapted from the Environmental Policy Assessment and Observation (EPAO) tool. Post-observation, teachers completed the Children's Eating Scale, adapted from the EPAO Self-Report (EPAO-SR), to capture self-reported feeding practices. Correlations (Spearman) were used to explore associations between self-reported and observed items (14) that were intended to measure the same feeding practice. Chi-square tests were also used to compare the level of consistency between measures and socio-educational factors.

**Results:** Teachers were predominantly non-Hispanic White (89%) and female (98%). Not all self-reported and observed feeding practices were related. After aligning feeding practices on the self-report and observation scales, self-reported and observed "use of food as a reward" was the only significantly related feeding practice ( $r=22$ ,

p=.04). No significant associations were found with teachers' self-reported years of experience, nutrition training, or desired weight status.

**Conclusions:** Even though items on the self-report and observation measures were designed to capture identical feeding practices, most of them were not significantly related. It is possible that because HS has such a clear policy with regards to the “use of food as a reward”, this practice was significantly related. Currently self-report measures are used to capture feeding practices, yet inconsistencies between measures of self-report and observation exist. Further understanding of these inconsistencies is needed to better capture teacher feeding practices.

**Keywords:** Child care, Preschoolers, Nutrition, Feeding Practices, Measurement

**Background:**

Childhood obesity is a serious public health concern. Early prevention efforts targeting preschool-age children is of particular importance given that their taste preference and eating behaviors develop [1-4], and often persist into adulthood [5]. Mothers have been considered the primary caregivers during this critical period [6], and their feeding practices during meals have been shown to influence a child's dietary intake [7-11] and weight status [10, 12, 13]. However, annual enrollment in child care continues to increase [14] and feeding practices of child care teachers remains largely unexplored [15, 16]. Of the few studies that have been completed, it appears that teachers can have an influence on children's dietary intake [17-20], however findings are mixed. Child care teachers often share the feeding responsibility with parents because early childhood experiences are so critical for establishing healthy habits [21-23].

In order to evaluate the impact of child care provider feeding practices on child diet and weight status, it is important to accurately capture their feeding interactions with children. Since self-report measures are easy to use and have less participant burden, they have been the primary tool used to capture feeding practices to date. One major limitation of using these qualitative, self-report measures (i.e. surveys, focus groups, interviews) to capture teacher feeding practices is possible response bias [16, 24-28]. Results may also be inaccurate due to the difficulty teachers may experience when self-reporting their behavior due to lower levels of education, cultural norms, or language barriers [29]. Rather than capturing true feeding practices, self-report measures may instead be tapping into the teacher's perception of their feeding practices [16, 24, 29].

To overcome limitations of self-report measures, researchers recommend the use of methods that do not rely primarily on self-report, such as observation [29]. Observational methods provide a valuable method for collecting detailed information about the caregiver-child relationship and behaviors of interest during feeding, especially when conducted in naturalistic environments [29-32]. Furthermore, observations provide important perspectives about feeding practices not captured through self-report measures (i.e. capturing practices teachers may not be aware of or choose not to report) [29]. Few studies to date have collected observed feeding practices of child care teachers most likely due to their cost and resource-intensive nature [29, 33].

Rather than dismissing the use of self-report measures, it is possible that collecting both types of data may provide interesting information on the difference between a teachers' perception of how they feed children compared to practices directly observed [29]. Several studies found little to no congruency between self-reported and observed feeding practices of parents [30, 31, 34, 35]. Hughes et al. found moderate congruence between self-reported and observed feeding behaviors when evaluating the impact of Head Start teachers' feeding styles on child intake [36]. Unlike parents who have lower congruence, moderate congruency between measures of feeding practices with child care teachers indicate unique external factors that may influence their feeding behaviors with children. For instance, Head Start participates in programs (i.e. Child Adult Care Food Program (CACFP)) [37] and employs a diverse set of mealtime policies that contribute to the development and socialization of children during meals [38]. Another study evaluating the feeding practices of Head



Start teachers found that self-reported feeding practices were influenced by individual level (i.e. race, education, feeding attitudes and style) and child care-level (i.e. policy contexts and training) factors [24]. Dev et al. specifically reported that non-white race, less than college education, and authoritarian feeding style were predictive of controlling feeding practices [24]. Thus, while looking at the congruency of self-report and observed feeding practices, it is important to also take into consideration demographic and educational factors that may impact any associations.

Given the mixed findings, it is important to further evaluate the congruency of self-reported and observed measures with child care teachers. Thus, the purpose of this study was to compare self-reported and observed feeding practices of Rhode Island (RI) Head Start teachers. It is hypothesized that self-reported and observed feeding practices of child care teachers will be highly correlated. By understanding any underlying associations between the measures, future studies can better assess feeding practices and their association with dietary and weight outcomes. How consistently teachers report feeding practices in comparison to observations will also be explored with regards to socio-educational factors (i.e. years of experience, staff nutrition training, desired weight loss).

**Methodology:**

This study is a secondary analysis of data collected for a previous study that examined the relationship between teacher diet and mealtime behaviors in Head Start classrooms [39].

*Recruitment and Procedures*

Recruitment took place through the 2014-2015 academic year. The RI Department of Education CACFP Division Director worked with the primary investigator to notify all RI Head Start directors about the study. Directors indicated their interest by signing an approval letter and inviting the Head Start teachers at their center to participate in the study. Eighty-five Head Start teachers were observed from 16 centers during meal times to code feeding behaviors using a Mealtime Behavior Observation Scale, adapted from the Environmental Policy Assessment and Observation (EPAO) tool. Following the observation, Head Start teachers completed a Children's Eating Scale, adapted from the adapted version the EPAO-Self Report (EPAO-SR) and a self-administered demographics questionnaire to assess socio-demographics, nutrition education, training, and other health-related behaviors (i.e. physical activity and eating behaviors). Those who participated in a classroom observation and completed both questionnaires were given a \$35 Shaw's gift card as a compensation for their time and effort. The study was approved by the University of Rhode Island Institutional Review Board for research involving human subjects.

#### *Mealtime Behavior Observation Scale*

For the purpose of this study, teacher feeding practices and behaviors were coded using the Mealtime Behavior Observation Scale from the EPAO. Primarily developed as an evaluation tool for the self-assessment component of the Nutrition and Physical Activity Self-Assessment for Child Care (NAP SACC) program, the EPAO tool was among the first instruments developed to objectively measure and assess the nutrition and physical activity environment and practices of child care centers [40, 41]. Reliability of the EPAO has been previously assessed, and

agreement among observer pairs was strong for nearly 80% (76/99) of items [40]. However, the majority of studies utilize the EPAO to examine the associations between the child care environment and physical activity behavior of preschool children [42]. Only one study explored the relationship between characteristics of the child care environment and dietary intake of children ages 2 to 3 utilizing the EPAO [18].

The EPAO tool includes 16 scales that capture nutrition and physical activity behaviors in child care settings [43]. However, this measure was modified to examine one of those 16 domains: “staff mealtime behaviors.” The Mealtime Behavior Observation Scale is an observational checklist that captures the frequency of 27 mealtime behaviors (i.e. how many times teacher sits with child, etc.) and 15 questions capture the occurrence of a behavior (i.e. whether teacher ate same foods as child, etc.). An additional 5 questions pertaining to the environment are also included (i.e. how food was served, etc.) for a total of 47 items. Fifteen responses are rated on a 2-point scale (Yes/No) and 27 frequency items are converted to a 3 point scale (No/1-2 times/3+ times). Scores range from 42 – 111, and 22 items are reverse scored. Higher scores indicate more optimal mealtime behaviors. Internal consistency, or the homogeneity, of items included in the Mealtime Behavior Observation Scale was determined using Cronbach alpha, and was found to have adequate reliability ( $\alpha = .70$ ) [39]. Inter-rater reliability was also established at two time points between two observers (KH and MF) using a Kappa statistic [39]. After 9 observations, inter-rater reliability for the observers was found to be  $\text{Kappa} = .83$  with  $p < .001$  at time point one [39]. Continued adequate inter-rater reliability at time point two was found to be

Kappa = .84 with  $p < .001$  after an observation of one meal [39]. This measure is included in Appendix B.

### *Children's Eating Scale*

The Children's Eating Scale, adapted from the EPAO-SR, was administered to teachers after mealtime observations to assess self-reported feeding practices. Similar to the EPAO, the EPAO-SR is a multicomponent measure that assesses the nutrition and physical activity environments in child care settings [44]. The EPAO can be costly to implement and requires considerable effort to train and certify data collectors [40]. Thus, Ward *et al.* modified the EPAO tool to be completed by center staff using a self-report format (EPAO-SR) [44]. A range of reliability and validity evidence for the EPAO-SR measure are reported elsewhere [44]. However, for the purpose of this study, the 43-item Children's Eating Scale was reduced to include only 24 items related to mealtime feeding practices (Appendix C). Response choices varied between one of two 6 point Likert scales (Never - Always or Strongly Disagree - Strongly Agree). Scores range from 24 – 144, and 10 items are reverse scored. Higher scores indicate healthier mealtime behaviors among teachers. Internal consistency of items included in the Children's Eating Scale was determined using Cronbach alpha, and was found to have adequate reliability ( $\alpha = .65$ ) [39].

### *Teacher Demographics Questionnaire*

Head Start teachers were asked to provide demographic information including their age, race, ethnicity, education and training. Additional questions regarding from the School Physical Activity and Nutrition (SPAN) Project Questionnaire were added to this questionnaire to capture health behaviors. Items from this questionnaire were

selected because it had previously been modified for use with Head Start teachers [27]. This measure is included in Appendix D.

### *Principle Component Analysis*

Prior to this project, a Principal Component Analysis (PCA) was used to identify factors underlying the EPAO observation and self-report scales [39]. Item loadings revealed two factors, Autonomy Support ( $\alpha=0.81$ ) and Involvement ( $\alpha=0.70$ ), on the Mealtime Behavior Observation Scale [39]. Item loadings also revealed four factors, Autonomy Support ( $\alpha=0.63$ ), Teacher Self-efficacy Eating ( $\alpha=0.86$ ), Structure ( $\alpha=0.58$ ), and Avoidance of Food as a Reward ( $\alpha=0.68$ ), on the Children's Eating Scale [39].

### *Statistical Analysis*

A full exploratory data analysis (summary statistics and distribution assessment) was completed prior to the main analysis. Given that each of the factors were scored on a scale and are ordinal, Spearman correlations were used to assess associations between self-reported and observed factors. Spearman correlations were also used to assess associations between self-reported and observed items (items within factors). Items that were intended to capture the same feeding practice between self-report and observation EPAO scales were then aligned, reviewed, and discussed by MF and AT (14 paired items in total). Once aligned, the 6-point Likert scales on the EPAO-SR items were collapsed (i.e. 1=Always/Very Often, 2=Often/Sometimes, and 3=Rarely/Never) to align with the 3-point scales EPAO observation items.

Associations of the same feeding practice with different measures was analyzed using

Spearman correlations. Percent agreement was used to assess the agreement between nominal categorical variables (results not shown).

Aligned feeding practice items were also used to assess the degree of congruence between self-reported and observed feeding practices. A continuous variable/score was made by totaling the response differences of 14 observed and self-reported feeding practice items for each teacher. For example, the Mealtime Behavior Observation Scale item “use of food as a reward” was assessed for 85 teachers on a 3-point response scale (1=No, 2=1-2 times, 3=3+ times). To align with the observation scale, the Children’s Eating Scale item “use [of] food as a reward”, which was also assessed for 85 teachers but on a 6-point response scale, was collapsed to a 3-point scale (1=Always/Very Often, 2=Often/Sometimes, and 3=Rarely/Never). The difference (i.e. 1-1=0, 2-1=1, 3-1=2...) between teachers’ self-reported “use [of] food as a reward” response and the researcher observed “use of food as a reward” was then calculated. Thus, each teacher was given a score for their response difference in self-reported and observed “use of food as a reward”. The 14 paired self-reported and observed items that were intended to capture the same feeding practice were scored and totaled into one continuous variable, giving each teacher a total consistency score of their self-reported feeding practices in comparison to their observed feeding practices. Scores were then categorized by tertiles to indicate high (values  $\geq 13$ ), medium (values between 9 and 12), and low (values  $\leq 8$ ) levels of response consistency across teachers. Given that the paired item consistency variable and all socio-education factors of interest were categorical, Chi-square statistic was used to explore if the level of consistency was associated with staff nutrition training, self-

reported desire to lose weight, and years of experience as a child care teacher. However, given the distribution of the socio-educational variables, some item scales were collapsed. The 4-point scale to assess attendance at staff nutrition training was collapsed to indicate no nutrition training (rarely/never or less than one time per year) and some nutrition training (1 time per year or 2+ times per year). Similarly, the 4-point scale to capture desired weight status of the child care teacher was collapsed to indicate a desire to lose weight or other (gain, maintain, or not trying to do anything about weight). Teachers' years of experience was also coded as a categorical variable by tertiles to indicate low (less than 10 years), moderate (11-17 years), and high (18+ years) experience as a child care teacher.

For all analyses, IBM SPSS grad pack version 22.0 was used and a *p* value <0.05 was considered significant.

## **Results**

The following results reflect data from 85 observations and their corresponding self-report questionnaires.

### **Teacher demographics and characteristics**

Teacher demographics and characteristics are described in Table 1. Of the 85 teachers who participated in this study, most were female (n=83; 97.6%) and identified as non-Hispanic, White (n=75; 88.2%) with a mean age of 40.3±11.7 years. Nearly half of the teachers attended some college (n=38; 44.7%) or received a college degree (n=36; 42.4%). Teachers reported on average 14.1±8.4 years of experience and were employed for 7.3±11.7 years at the center in which they were observed. The majority reported either trying to lose (n=60; 70.6%) or maintain their weight (n=17;

20.0%). Teachers reported that staff nutrition training opportunities were rarely or never available (n=11; 12.9%), less than one time per year (n=10; 11.8%), one time per year (n=44; 51.8%), or two times per year or more (n=18; 21.2%). Although 73% of teachers reported staff nutrition training opportunities were available one or more times per year, 24.7% (n=21) reported rarely or never attending these staff nutrition trainings. A larger percentage of teachers reported attending staff nutrition trainings only once per year (n=40; 47.1%).

### **Observed characteristics of Head Start meals**

Observed characteristics of Head Start child care meals are described in Table 2. Lunch (77.7%) was more frequently observed than breakfast (22.4%). On average, meals at the Head Start centers were  $23 \pm 5.49$  minutes in length. Teachers were observed serving most foods and deciding the portion size (41.2%), while 32.9% of the time teachers were observed allowing children to serve themselves most or all foods and deciding what portions to take. During most mealtimes, children were observed participating in meal preparation, planning, or cleanup (97.6%) and child size appropriate silverware was usually available (96.5%). Television was never on during the meal (100%). While unhealthy snack foods (i.e. potato chips, cheese puffs) were rarely observed being visible to children (2.4%), a variety of nutritious foods (i.e. fruits and vegetables) were observed to be visible and readily available to children (71.8%).

### **Observed feeding practices during Head Start meals**

Observed feeding practices employed by Head Start Child care teachers during meals are described in Table 3. A majority of the time (77.6%), Head Start teachers



sat with children during the entire meal. Teachers were always observed encouraging children to sit around the table during meals (100%), and nearly all teachers (92.9%) made fruits and vegetables easier to eat (i.e. offering slices; peeling an orange). However, teachers only talked with the children about the foods that they were eating or encouraged pleasant conversation during approximately half of the meals observed (52.9% and 55.3%, respectively). Even fewer Head Start teachers were observed enthusiastically role-modeling (8.2%) healthy eating even though 85.9% of teachers were observed eating the same foods as children during meals. More teachers were observed encouraging children to try the foods on their plate (48.2%). To encourage a child to try the healthy foods on their plate, teachers were observed reasoning (i.e. “Drinking milk makes your bones strong!”) (63.5%) and negotiating (i.e. “You can have more soup if you eat your pear”) (75.3%) with children. Praise by teachers when a child tried a new food item on his or her plate was rarely observed (15.3%). Teachers were seldom observed pressuring a child to eat more than they seemed to want (5.9%), praising a child for cleaning his/her plate (1.2%), using food to control a child’s emotions (2.4%), allowing a child to take multiple servings (8.2%), or rushing a child to eat (5.9%). Teachers were never observed spoon-feeding a child, but were observed insisting that a child eat a food in nearly half of the observations (47.1%). Seconds were rarely served by the teacher unless the child was observed asking for more (9.4%). However, when a child asked for seconds, teachers were rarely observed asking a child if he/she was still hungry before serving seconds (95.3%). Teachers rarely used food (87.1%) or promised something other than food (i.e. toy) (91.8%) as a reward for eating a specific food.

## **Self-reported feeding practices of Head Start teachers**

Self-reported feeding practices of Rhode Island Head Start teachers are described in Table 4. In accordance with Head Start policies of being a good role model and not having a TV present in the room, teachers rarely ate chips, sweets, or fast food (7.1%) or drank soda and/or other sugar drinks (3.5%) when caring for children. Teachers also reported rarely leaving the TV on (2.4%) or playing videos (1.2%) during children's meals and snacks. In general, teachers agreed or reported similarly with regards to rarely using negative feeding practices. For instance, teachers seldom reported promising something other than food for eating a specific food (5.9%), rarely rewarding children with something to eat when they are well behaved (5.9%), and rarely giving a child something to eat to make them feel better when they are upset (5.9%). In contrast, the range of response options (6-point Likert scale) led to varying results for self-reported positive feeding practices. For example, the majority of teachers reported teaching children about the foods they are eating often (17.6%), very often (45.9%), or always (28.2%). Similarly, teachers reported showing children they enjoy fruits and vegetables so the children are more likely to eat them often (10.6%), very often (21.2%), and always (61.2%), or encouraging the children to eat fruits and vegetables by telling them they taste good often (20.0%), very often (27.1%), and always (41.2%). Overall, more than half of the teachers reported always encouraging children to eat a wide variety of foods (62.4%). In contrast to what was observed, more than half of the teachers reported always praising children when they try a new food (67.1%). Feeding practices related to children's autonomy and/or satiety cues had a wide variability in the self-reported teacher

responses. For example, teachers self-reported allowing children to decide how much they should eat never (10.6%), rarely (14.1%), sometimes (35.3%), often (17.6%), very often (12.9%), or always (9.4%). Teachers also self-reported encouraging children to wait a few minutes before getting seconds so the child can decide if he/she is still hungry never (12.9%), rarely (12.9%), sometimes (37.6%), often (11.8%), very often (11.8%), or always (12.9%).

### **Associations between self-reported and observed factors and paired items**

Spearman's correlation coefficients between self-reported and observed factor scores are reported in Table 5. Only the Involvement factor from the Mealtime Behavior Observation Scale was significantly related to factors that emerged from the Children's Eating Scale ( $p < 0.05$ ). Involvement was positively correlated to the Avoidance of Food as a Reward factor ( $r = .24, p = 0.24$ ), but inversely correlated to the Autonomy Support factor ( $r = -.22, p = .047$ ). Correlation analysis of items within these factors are reported in Table 6. Observed "led/encouraged pleasant conversations" during meals was significantly and inversely correlated with self-reported "promising children something other than food if they eat a specific food" ( $r = -.38, p = .000$ ) and "encouraging children to eat by using food as a reward" ( $r = -.22, p = .042$ ). Observed "talking with children about the foods they were eating" was significantly and positively correlated to self-reported "teaching the children about the foods they were eating" ( $r = .25, p = 0.023$ ) and "encouraging children to eat a wide variety of foods" ( $r = .26, p = .018$ ). Observed "ignoring or showing indifference to a child" was significantly and positively related to self-reported "asking children if they are hungry before I serve them seconds" ( $r = .26, p = .07$ ).

Individual items between self-report and observation EPAO measures were aligned for additional correlation analysis. Spearman correlations of aligned EPAO and EPAO-SR items are reported in Table 7. Correlation analysis indicated a significant positive relationship between self-reported “I encourage children to eat by using food as a reward” and observed “use of food as a reward for eating a specific food” ( $r = .22, p=.044$ ).

### **Levels of congruence between self-reported and observed paired items**

The distribution and range of how consistently teachers’ self-reported their feeding practices (subjective) in comparison to observed and coded feeding practices (objective) are reported in Figure 1. Total consistency scores across our sample of teachers ranged from a score of 1 (difference of 1 response scale; high consistency) to a score of 17 (difference of 17 response scales; low consistency). The greatest number of teachers differed by 7 response scales (12 teachers) or 8 response scales (11 teachers) across paired items. On average, teachers and observers differed in their self-report and observations of feeding practices by  $9.8 \pm 3.4$  response scales (results not shown).

Descriptive statistics were utilized to describe the frequency of perfect agreement between self-reported and observed feeding practice items (Figure 2). A score of “0” between a self-reported and observed feeding practice item corresponds to perfect agreement. Feeding practices with the highest frequency of consistency (scores of “0”) were rewarding children with food (97.6%), use of food to control emotion (96.5%), promising child something other than food for eating a specific food (85.9%), and use of food as a reward for eating a specific food (78.8%). In contrast,

feeding practices with the lowest frequency of consistency (few scores of “0”) = included practices such as praising a child for trying new foods (20.0%), enthusiastically role modelling/using behavior to get children to eat (17.6%), allowing children to take multiple servings (17.6%), and enthusiastically role modelling to get children to try foods (11.8%).

The direction of feeding practices with the highest and lowest frequencies of perfect agreement are reported in Figures 3 and 4, respectively. Feeding practices with the highest consistency also had the highest frequency of agreement in one direction (Never/Rarely). Within the consistent self-reported and observed “rewarding children with food” and “use of food to control emotion” feeding practices, 100% of teachers and observers agreed upon the response choice “Rarely/Never”. Within the other consistent self-reported and observed “promising a child something other than food for eating a specific food” and “use of food as a reward for eating a specific food”, teachers and observers agreed upon the response choice “Rarely/Never” by 98.6% and 97.0%, respectively. In contrast, feeding practices with the lowest frequencies of perfect agreement had the lowest frequency of agreement in one direction. For instance, 86.6% of teachers and observers agreed upon the response choice “Very Often/Always” when self-reporting and coding “allow child to take multiple servings”. Roughly two-thirds of teachers and observers agreed upon the response choice “Very Often/Always” when self-reporting and coding “praising a child for trying new foods” (70.5%) and “enthusiastically role modeling” (60.0%). Another item capturing self-reported and observed “enthusiastic role modeling” by teachers had a range of response agreement between teachers and observers. Within

this items' low frequency of agreement, teachers and observers agreed on the response choices of "Very Often/Always" (46.6%), "Sometimes/Often" (26.7%), and "Rarely/Never" (26.7%).

### **Influence of socio-educational factors**

A chi-square test for association was conducted between levels of consistency between self-reported and observed items (low, high) and years of teacher experience ( $\chi^2 (4) = 3.508, p = .477$ ), staff nutrition training ( $\chi^2 (2) = 4.108, p = .128$ ), or weight status ( $\chi^2 (2) = 1.571, p = .456$ ). No significant associations were found (Table 8).

### **Discussion**

The purpose of this study was to compare self-reported and observed feeding practices of RI Head Start teachers. Although we hypothesized that self-reported and observed feeding practices would be highly correlated, we found that only three feeding practices were modestly correlated. However, we found negative feeding practices to have higher levels of agreement between self-report and observation compared to more positive feeding practices. We also hypothesized that teachers with more experience and attendance at staff nutrition trainings would report feeding practices that are highly consistent with their observation, while teachers who reported a desire to lose weight would report feeding practices that were inconsistent with their observation. However, no significant associations were found.

Findings of the current study add to the existing research documenting feeding practices in child care settings using the EPAO. We observed a range of positive feeding practices that are consistent with Head Start policies [38], such as "talking with children about the foods they were eating", "leading or encouraging pleasant conversation", and "encouraging children to try new foods" during meals.

Enthusiastic role-modeling of healthy eating however, was not as frequently observed and could be a target for future teacher training. Although teachers were almost always observed to be eating fruits and vegetables or the same foods as children, teachers may not be trained on how to effectively role-model healthy eating during meals to increase a child's consumption of nutritious foods [45, 46]. Given that observers were instructed to only code verbal interactions of role modelling (i.e. "Mmm", "Yum!"), the practice of "enthusiastic role modelling of healthy eating" may have been misrepresented. Teachers were frequently observed to role model healthy eating by eating fruits, vegetables, and the same foods as children yet these behaviors may not have been captured as "enthusiastic role modelling". It was also surprising that although Head Start encourages family style meal service [38], teachers were most often serving the foods and deciding the portion sizes for children. Although the food was initially placed on the table, it was not truly "family style meal service" where children are allowed to serve themselves and select their own portions from communal dishes and pitchers placed on the table [47]. Benefits to serving foods family-style such as allowing a child to better self-regulate their food intake and learning social and self-help skills have been documented [48]. Further, teachers' have been found to value family-style meal service because it resulted in pleasant mealtimes and offered greater opportunities to model healthy eating within their child care context [48]. Teachers in this study were observed serving seconds only when a child asked for more, but rarely asking if he/she was hungry before serving seconds. Teachers may benefit from further training and education on how to use family-style

meal service together with verbal cueing to promote the development of self-regulation of energy intake [49-51].

In contrast to the parenting literature where self-reported and observed feeding practices have shown little to no association [31], teacher feeding practices have shown moderate congruency between assessments of feeding practices [17]. We explored associations between self-report and observation factor scores and items within the significant factors scores and found little to no associations. Given these findings, it is hard to know which of the measures, subjective self-reports or objective observations, is superior and should be interpreted with caution. Thus, items capturing the same feeding practices across the Mealtime Behavior Observation and Children's Eating Scales were aligned to compare subjective reports to objective coding of feeding practices. Of the items that were meant to capture the same feeding practice, only observed and self-reported "use of food as a reward" was significantly related while feeding practices such as "encouraging children to eat a wide variety" and "talking/teaching children about foods" trended towards significance. These findings are consistent with a previous study that found moderate congruency between self-reported and observed behaviors of Head Start teachers [36], but our finding differ when comparing which feeding practices we found to be significant. For instance, Hughes et al. reported that only self-reported permissive and observed indulgent feeding practices were significantly correlated ( $r = .27, p < .05$ ), while authoritative feeding behaviors were modestly correlated and trending toward significance ( $r = .24, p = 0.07$ ) [36]. The strength and direction of the associations between our significantly related items endorses recommended use of the EPAO, but modest



correlations with only positive feeding practices suggests the possibility of response bias. It is not uncommon for individuals to over report a more favorable picture of their behavior. Hughes et al. attributed the limited findings of their correlation analysis to their small sample size of fifty Head Start teachers [36]. While it is possible our findings may result in significantly more and/or stronger correlations with a larger sample of teachers, differences in reporting are most likely attributable to the wording and subjective nature of the self-report questions.

Comparing response differences between self-reported and observed feeding practices also highlights the inconsistent wording and subjective nature of certain items. After totaling response differences of the 14 aligned feeding practice items for each teacher, a range of consistency scores across self-reported and observed feeding practices emerged. However, analyzing the frequencies of perfect agreement (score of “0”) across the 14 totaled response differences indicated which feeding practices were most consistent and which were least consistent. The most consistent feeding practices across self-report and observation are those embedded within the Head Start mealtime policies (i.e. use of food as a reward, avoidance of food to control emotion), and teachers and observers often showed perfect agreement on the occurrence/direction of these feeding practices during meals (Never/Rarely). However, teachers and observers were less consistent with other feeding practices highly encouraged by the literature (i.e. praising a child to try new foods, allowing children to take multiple portions, and enthusiastically role modelling). The direction of these feeding practices also ranged within a variety of response options, indicating clear disparities when interpreting some of these “less known” feeding practices.

Teachers have been trained to avoid using “food as a reward” or to “control a child’s emotion”, but their self-reported use of “role modelling” and “praising children to try new foods” may tap into their perceptions and opinions rather than actual behaviors. Comparing their self-reported perceptions of these feeding practices to their actual behaviors during observation may explain the inconsistencies found across these items.

Overall, the lack of congruency between self-report and observation may have resulted from the formatting of the tool/scale. For example, the nature of the Mealtime Behavior Observation Scale response options (0 times, 1-2 times, or 3+ times) captures behaviors as if they already or are known to happen. Although comprehensively reviewed by the literature, some feeding practices may not apply to the setting observed. When using self-report measures, although it may be impossible to eliminate biased reporting, designing questions that also provide an option for participants not to answer or report feeding practices that are “not applicable” may improve accuracy. Further, the wording used to capture feeding practices on the Children’s Eating Scale (i.e. “I reward children something to eat when they are well behaved” and “I teach the children about the foods they are eating”) is subjective and may have been interpreted by the teachers as a behavior that occurs “on average”. In contrast, feeding behaviors captured through the observation scale were coded and assessed at one time point. Multiple observations of the same child care teacher to average feeding practices may minimize differences in self-reported and observed feeding practices, and may even strengthen correlations between assessments of feeding practices. Inconsistent findings between self-reported and observed measures

has implications for future research in this area and development of tools to capture feeding practices. For instance, quantifying feeding practices that occur during mealtimes has obvious importance but future measures may want to consider the benefit of adding qualitative assessments of the interactions that occur during meals. We may be able to further explore the inconsistencies between measures used in this study to understand why hypothesized associations across teacher training, education and desired weight loss were not found. Furthermore, an in depth look at the feeding practices that were more inconsistent than others may have implications for future training and education of child care teachers.

Given that certain socio-educational factors (i.e., attendance at staff nutrition training, desired weight loss, and years of experience) may influence feeding practices [24], it was hypothesized that they may also influence the congruency between observed behaviors and self-reported practices. Unlike Dev et al., we did not find these factors to be associated with how consistently teachers self-reported their feeding practices in comparison to their observed feeding practices. Contrary to our hypothesis, we did not find teacher's self-reported desire to lose weight to be related to how consistently teachers self-reported their feeding practices when compared to their observed feeding practices. Our findings are consistent with another cross-sectional study that found teachers' previous nutrition training and level of education were not significantly related to caregiver behavior [52].

This study is not without limitations. Future research should utilize both observation and self-report measures to capture feeding practices of child care teachers, but feeding practices should be coded across multiple mealtime observations.

Multiple feeding practices and behaviors can then be averaged to capture what teachers usually do and to align with self-report measures that capture what teachers think they do “on average”. Response bias and social desirability are a well-documented limitation of self-report measures. Even though our study also utilized the “gold standard” of observations to explore/code feeding practices, experimenter bias and social desirability are also potential limitations. Although the 85 Head Start child care teachers observed is considered a large sample size, the lack of variability across teachers may be considered a limitation of this study as a more diverse sample of teacher may yield different results in self-reported feeding practices. However, we believe that the observation coding scheme utilized (to be observed 0 times, 1-2 times, 3 or more times) and the response options assessing self-reported feeding practices (Never, Rarely, Sometimes, Often, Very Often, Always) explains the lack of variability across teachers. Lastly, the modified scales used to capture self-reported and observed feeding practices lack validity testing but were found to have adequate reliability. Future research utilizing tools that are tailored and validated for the nutrition environments of child are needed.

## **Conclusions**

We encourage use of this instrument by others in the field, either in its entirety or subsections, as our findings align with previous research that found modest correlations between observed and self-reported feeding practices of child care teachers. However, future studies should explore different ways of coding feeding behaviors to capture a wider range of frequencies of these observed feeding practices which may result in more variability. Future research is needed with large, diverse

samples of participants over multiple days of observation. The use of consistent, valid, and reliable measures across different studies will strengthen our knowledge of child care teacher feeding practices, as comparisons between studies is easier when similar measures are used. Although observation can be costly and time consuming, collecting both types of may provide interesting information on the difference between a teachers' perception of how they feed children compared to actual feeding behaviors observed [29].

### **Competing Interests**

The authors declare that they have no competing interests.

### **Authors' Contributions**

MF participated in data collection, and was primarily responsible for reviewing the literature and all written drafts of the manuscript. AT and KG oversaw all study components (i.e. study design, IRB approval, collection of reliability data). MF conducted analyses. MF, AT, KG, and GG participated in data review and interpretation of analyses. MF and AT led manuscript development, with contributions, edits and review by KG and GG. All authors read and approved the final manuscript.

### **Acknowledgements**

The authors would like to thank the directors and teachers who participated in this study.

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**Table 1.** Potential predictors (demographics, individual, and center-level characteristics) of Rhode Island Head Start teachers' feeding practices (N=85)

<b>Demographic factors</b>	<b>n (%)</b>
<b>Gender</b>	
Female	83 (97.6%)
<b>Ethnicity</b>	
Non-Hispanic, White	75 (88.2%)
Latino	9 (10.6%)
Declined	1 (1.2%)
<b>Race</b>	
White	76 (89.4%)
Black/African	1 (1.2%)
Asian	1 (1.2%)
Other	1 (1.2%)
Decline	6 (7.1%)
<b>Education</b>	
Some High School	1 (1.2%)
High School Graduate	3 (3.5%)
Some college or technical school	38 (44.7%)
College Graduate	36 (42.4%)
Post graduate work	7 (8.2%)
<b>Age (mean ± SD)</b>	40.3 ± 11.7
<b>Individual-level characteristics of teachers</b>	
<b>Desired weight goals</b>	
Lose weight	60 (70.6%)
Gain weight	1 (1.2%)
Maintain weight	17 (20.0%)
Not trying to do anything about weight	6 (7.1%)
Declined	1 (1.2%)
<b>Years of experience (mean ± SD)</b>	14.1 ± 8.4
<b>Years at center (mean ± SD)</b>	7.3 ± 7.2
<b>Role of the teacher</b>	
Regular Teacher	49 (57.6%)
Assistant Teacher	32 (37.6%)
Special Education Teacher	2 (2.4%)
Assistant Aid	2 (2.4%)

<b>Full-time or Part-time</b>	
Full-time	71 (83.5%)
Part-time	14 (16.5%)
<b>Eating occasions in the classroom</b>	
Present lunch only	1 (1.2%)
Present at more than one eating occasion	84 (98.8%)
<b>Child care-level characteristics of teachers</b>	
<hr/>	
<b>Staff nutrition training opportunities</b>	
Rarely or never	11 (12.9%)
Less than 1 time per year	10 (11.8%)
1 time per year	44 (51.8%)
2 times per year or more	18 (21.2%)
Declined	2 (2.4%)
<b>Attendance at staff nutrition trainings</b>	
Rarely or never	21 (24.7%)
Less than 1 time per year	6 (7.1%)
1 time per year	40 (47.1%)
2 times per year or more	18 (21.2%)
<b>Nutrition education provided for the children</b>	
Rarely or never	14 (16.5%)
1 time per month	21 (24.7%)
2-3 times per month	13 (15.3%)
1 time per week or more	32 (37.6%)
Declined	5 (5.9%)
<b>Nutrition education provided for parents</b>	
Rarely or never	17 (20.0%)
1 time per month	50 (58.8%)
2-3 times per month	6 (7.1%)
1 time per week or more	5 (5.9%)
Declined	7 (8.2%)

**Table 2.** Observed characteristics of Head Start child care meals

<b>EPAO Item</b>	<b>n (%)</b>
<b>Type of meal</b>	
Breakfast	19 (22.4%)
Lunch	66 (77.6%)
<b>Length of meal (mean ± SD in minutes)</b>	23:32 ± 5:49
<b>How was food served to children?</b>	
Provider served most foods and decided what size portions	35 (41.2%)
Children served themselves most foods, but provider decided the portion size	8 (9.4%)
Provider served most foods, but children decided the portion size	14 (16.5%)
Children served themselves most/all foods and decided what portions to take	28 (32.9%)
<b>Child size appropriate silverware available</b>	
Yes	82 (96.5%)
No	3 (3.5%)
<b>Unhealthy snack foods (i.e. potato chips, cheese puffs) were visible to children</b>	
Yes	2 (2.4%)
No	83 (97.6%)
<b>A variety of healthy foods (i.e. fruits, vegetables) are visible to children</b>	
Yes	61 (71.8%)
No	24 (28.2%)
<b>Children were involved in meal preparation, planning or clean up</b>	
Yes	83 (97.6%)
No	2 (2.4%)
<b>A moment was taken to settle before eating</b>	
Yes	13 (15.3%)
No	72 (84.7%)
<b>TV was on during meal</b>	
No	85 (100%)



**Table 3.** Frequencies of observed feeding practices

<b>EPAO Item</b>	<b>n (%)</b>
<i>Location/physical environment of meals/Involvement</i>	
<b>Teacher made fruits and vegetables easier to eat (i.e. offered slices, peeled orange)</b>	
Yes	79 (92.9%)
No	6 (7.1%)
<b>Teacher encourage children the children to sit around the table during meals</b>	
Yes	85 (100%)
<b>Teacher talked on phone, texted or was on the computer during meals</b>	
Yes	2 (2.4%)
No	83 (97.6%)
<i>Did the teacher eat any of the following foods in front of children?</i>	
<b>Fast food</b>	
No	85 (100%)
<b>Sweet snacks (i.e. donuts, pastries, cookies, candy)</b>	
No	85 (100%)
<b>Fruits and vegetables</b>	
Yes	68 (80.0%)
No	17 (20.0%)
<b>Sugar-sweetened beverages (i.e. soda, juice)</b>	
No	85 (100%)
<b>The same foods as children</b>	
Yes	73 (85.9%)
No	12 (14.1%)
<i>Interactions (The teacher...)</i>	
<b>Sat with children during the meal</b>	
No	1(1.2%)
1-2 times	18 (21.2%)
3+ times	66 (77.6%)
<b>Talked with children about the foods they were eating</b>	
No	8 (9.4%)
1-2 times	32 (37.6%)
3+ times	45 (52.9%)
<b>Enthusiastically role-modeled eating healthy foods</b>	
No	44 (51.8%)
1-2 times	34 (40.0%)
3+ times	7 (8.2%)
<b>Encouraged children to try the foods on their plate</b>	

No	15 (17.6%)
1-2 times	29 (34.1%)
3+ times	41 (48.2%)
<b>Praised a child for trying new or less preferred foods</b>	
No	37 (43.5%)
1-2 times	35 (41.2%)
3+ times	13 (15.3%)
<b>Praised a child for eating unhealthy foods</b>	
No	81 (95.3%)
1-2 times	4 (4.7%)
<b>Led/encouraged pleasant conversation during meals</b>	
No	9 (10.6%)
1-2 times	29 (34.1%)
3+ times	47 (55.3%)
<b>Let the children choose between two healthy food options</b>	
No	72 (84.7%)
1-2 times	13 (15.3%)
<b>Used an authoritative feeding style</b>	
No	18 (21.2%)
1-2 times	44 (51.8%)
3+ times	23 (27.1%)
<i>Support or hinder self-regulation (The teacher...)</i>	
<b>Pressured a child to eat more than they seemed to want (i.e. child said they were finished or full)</b>	
No	80 (94.1%)
1-2 times	5 (5.9%)
<b>Praised children for cleaning their plates</b>	
No	71 (83.5%)
1-2 times	13 (15.3%)
3+ times	1 (1.2%)
<b>Spoon fed a child to get them to eat</b>	
No	85 (100%)
<b>Insisted that a child eat a food</b>	
No	37 (43.5%)
1-2 times	40 (47.1%)
3+ times	8 (9.4%)
<b>Used food to control a child's emotions (i.e. fussy or bored)</b>	
No	83 (97.6%)
1-2 times	2 (2.4%)
<b>Rushed a child or children to eat</b>	
No	36 (42.4%)
1-2 times	44 (52.8%)
3+ times	5 (5.9%)

<b>Served seconds even when child did not ask for more</b>	
No	77 (90.6%)
1-2 times	8 (9.4%)
<b>Served seconds after a child requested seconds and asked if he/she was still hungry</b>	
No	81 (95.3%)
1-2 times	4 (4.7%)
<b>Removed plate without asking if he/she was full</b>	
No	61 (71.8%)
1-2 times	19 (22.4%)
3+ times	5 (5.9%)
<b>Asked child if he/she was full before removing the plate</b>	
No	73 (85.9%)
1-2 times	11 (12.9%)
3+ times	1 (1.2%)
<b>Required a child to sit at the table until he/she cleaned their plate</b>	
No	83 (97.7%)
1-2 times	2 (2.4%)
 <i>Use of rewards or bribes (The teacher...)</i>	
<b>Promised something than food (i.e. toy) for eating a specific food</b>	
No	78 (91.8%)
1-2 times	6 (7.1%)
3+ times	1 (1.2%)
<b>Used food as a reward or withheld food as a punishment</b>	
No	85 (100%)
<b>Used food as a reward for eating a specific food</b>	
No	74 (87.1%)
1-2 times	9 (10.6%)
3+ times	2 (2.4%)
<b>Reasoned with children to eat healthy foods (i.e. “Drinking milk makes your bones strong!”)</b>	
No	54 (63.5%)
1-2 times	19 (22.4%)
3+ times	12 (14.1%)
<b>Negotiated with children to eat healthy foods (i.e. “You can have more soup if you eat your pear.”)</b>	
No	64 (75.3%)
1-2 times	17 (20.0%)
3+ times	4 (4.7%)
 <i>Permissive/Indulgence (The teacher...)</i>	
<b>Ignores or shows indifference to child or children</b>	
No	46 (54.1%)

1-2 times	36 (42.4%)
3+ times	3 (3.5%)
<b>Allows child to continue to take multiple servings of various foods</b>	
No	78 (91.8%)
1-2 times	7 (8.2%)

Table 4. Frequencies of self-reported feeding practices

EPAO Item	<i>I (the provider)....</i>	n (%)
<b>... promise the children something other than food if they eat a specific food</b>		
	Never	73 (85.9%)
	Rarely	5 (5.9%)
	Sometimes	6 (7.1%)
	Often	1 (1.2%)
<b>... reward children with something to eat when they are well behaved</b>		
	Never	79 (91.8%)
	Rarely	5 (5.9%)
	Sometimes	2 (2.4%)
<b>... teach the children about the foods they are eating</b>		
	Never	1 (1.2%)
	Sometimes	6 (7.1%)
	Often	15 (17.6%)
	Very often	39 (45.9%)
	Always	24 (28.2%)
<b>...give a child something to eat to make them feel better when they are upset</b>		
	Never	79 (93.0%)
	Rarely	5 (5.9%)
	Sometimes	1 (1.2%)
<b>...leave the TV on during children's meals and snacks</b>		
	Never	81 (95.3%)
	Rarely	2 (2.4%)
	Sometimes	2 (2.4%)
<b>... encourage children to wait a few minutes before getting seconds so the child can decide if they are still hungry</b>		
	Never	11 (12.9%)
	Rarely	11 (12.9%)
	Sometimes	32 (37.6%)
	Often	10 (11.8%)
	Very often	10 (11.8%)
	Always	11 (12.9%)
<b>... let children decide how much they should eat</b>		
	Never	9 (10.6%)
	Rarely	12 (14.1%)
	Sometimes	30 (35.3%)
	Often	15 (17.6%)
	Very often	11 (12.9%)
	Always	8 (9.4%)

<b>...encourage the children to eat fruits and vegetables by telling them they taste good</b>	
Never	1 (1.2%)
Rarely	2 (2.4%)
Sometimes	7 (8.2%)
Often	17 (20.0%)
Very often	23 (27.1%)
Always	35 (41.2%)
<b>....ask children if they are hungry before I serve them seconds</b>	
Never	20 (23.6%)
Rarely	6 (7.1%)
Sometimes	18 (21.2%)
Often	14 (16.5%)
Very often	11 (12.9%)
Always	16 (18.8%)
<b>...encourage children to eat a wide variety of foods</b>	
Sometimes	1 (1.2%)
Often	12 (14.1%)
Very often	19 (22.4%)
Always	53 (62.4%)
<b>...praise children when they try a new food</b>	
Never	2 (2.4%)
Sometimes	2 (2.4%)
Often	8 (9.4%)
Very often	16 (18.8%)
Always	57 (67.1%)
<b>...wait to give seconds until a child has finished another food on their plate</b>	
Never	11 (12.9%)
Rarely	13 (15.3%)
Sometimes	29 (34.2%)
Often	10 (11.8%)
Very often	14 (16.5%)
Always	8 (9.4%)
<b>...show children they I enjoy fruits and vegetables, just so the children are more likely to eat them</b>	
Never	1 (1.2%)
Rarely	3 (3.5%)
Sometimes	2 (2.4%)
Often	9 (10.6%)
Very often	18 (21.2%)
Always	52 (61.2%)
<b>....use my behavior to encourage children to eat healthy</b>	
Never	3 (3.5%)
Rarely	2 (2.4%)

Sometimes	1 (1.2%)
Often	9 (10.6%)
Very often	20 (23.5%)
Always	50 (58.8%)
<b>...encourage children to eat by using food as a reward</b>	
Never	58 (68.2%)
Rarely	14 (16.5%)
Sometimes	8 (9.4%)
Very often	2 (2.4%)
Always	3 (3.5%)
<b>...eat chips, sweets, or fast food while I am caring for children</b>	
Never	76 (89.4%)
Rarely	6 (7.1%)
Sometimes	1 (1.2%)
Always	2 (2.4%)
<b>...monitor and guide children's eating so that they do not eat more than they should</b>	
Never	6 (7.1%)
Rarely	7 (8.3%)
Sometimes	18 (21.2%)
Often	12 (14.1%)
Very often	27 (31.8%)
Always	15 (17.6%)
<b>...play videos during children's meals and snacks</b>	
Never	84 (98.8%)
Rarely	1 (1.2%)
<b>...ask children if they are full before I remove an unfinished plate of food</b>	
Never	16 (18.8%)
Rarely	7 (8.3%)
Sometimes	12 (14.1%)
Often	16 (18.8%)
Very often	14 (16.5%)
Always	20 (23.5%)
<b>...monitor and guide children' eating so that they don't eat much less than they should</b>	
Never	9 (10.6%)
Rarely	6 (7.1%)
Sometimes	16 (18.8%)
Often	15 (17.6%)
Very often	25 (29.0%)
Always	14 (16.5%)
<b>...drink soda and/or other sugary drinks while I am caring for children</b>	
Never	82 (96.5%)
Rarely	3 (3.5%)

**...encourage children to finish their food even if they say “I’m not hungry**

Never	46 (54.1%)
Rarely	14 (16.5%)
Sometimes	16 (18.8%)
Often	3 (3.5%)
Very often	3 (3.5%)
Always	3 (3.5%)



**Table 5.** Spearman's correlation coefficients between self-reported (left) and observed (right) factor scores

	Autonomy Support ( $\alpha = 0.81$ )	Involvement ( $\alpha = 0.70$ )
Autonomy Support ( $\alpha = 0.63$ )	.08 (p = .44)	-.22* (p = .05)
Teacher Self-Efficacy Eating ( $\alpha = 0.86$ )	-.03 (p = .77)	-.06 (p = .59)
Structure ( $\alpha = 0.58$ )	.11 (p = .31)	.09 (p = .41)
Avoidance of Food as a Reward ( $\alpha = 0.68$ )	.15 (p = .19)	.24* (p = .02)

Factor scores (names and alphas) emerged from item loadings after a previously conducted *Principle Component Analysis* by Halloran et al. [39].

\*Significant at the 0.05 level

**Table 6.** Item correlation analysis (Spearman’s *r*) between self-reported “Avoidance of Food as a Reward” (top-left), “Autonomy Support” (bottom-left) and observed “Involvement” (right) factor scores

		Involvement Factor Score			
		The provider sat with children during lunch	The provider ignores or shows indifference to a child or children	The provider led/encouraged pleasant conversations during meals	The provider talked with the children about the foods they were eating.
Avoidance of Food as a Reward Factor Score	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.")	-.12 (p = .26)	.09 (p = .44)	-.38** (p = .00)	-.18 (p = .09)
	I reward children with something to eat when they are well behaved	-.15 (p = .19)	.18 (p = .10)	-.15 (p = .17)	-.10 (p = .36)
	I give a child something to eat to make them feel better when they are upset.	-.09 (p = .41)	.05 (p = .64)	-.18 (p = .09)	-.03 (p = .78)
	I encourage children to eat by using food as a reward. (For example, "If you finish your vegetables, you will get some fruit.")	.05 (p = .62)	.05 (p = .67)	-.22* (p = .04)	-.06 (p = .56)

Autonomy Support Factor Score	I teach the children about the foods they are eating.	-.00 (p = .97)	.01 (p = .91)	.15 (p = .18)	.25* (p = .02)
	I encourage children to eat a wide variety of foods.	-.04 (p = .71)	.01 (p = .95)	.01 (p = .93)	.26* (p = .02)
	I encourage children to eat fruits and vegetables by telling them that they taste good.	-.09 (p = .42)	.13 (p = .25)	-.16 (p = .15)	.19 (p = .09)
	I praise children when they try a new food.	-.09 (p = .41)	.03 (p = .82)	.07 (p = .54)	.07 (p = .54)
	I encourage children to wait a few minutes before getting seconds so the child can decide if they are still hungry.	-.20 (p = .06)	.02 (p = .85)	-.06 (p = .56)	.01 (p = .96)
	I ask children if they are hungry before I serve them seconds.	-.16 (p = .14)	.26* (p = .02)	-.19 (p = .08)	-.03 (p = .81)

\*Significant at the 0.05 level

\*\*Significant at the 0.01 level

**Table 7.** Correlations between self-reported (EPAO-SR) and observed (EPAO) items

EPAO Item	EPAO-SR Item	<i>r</i> value (p value)
41... the teacher promised something <b>other than food</b> for eating a specific food (for example, “If you eat your beans, we can play ball outside.”)	(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.")	.07 (.56)
42... the teacher used <b>food</b> 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.”)	(2) I reward children with something to eat when they are well behaved.	--
22... the teacher <b>talked</b> with the children about the foods they were eating.	(3) I <b>teach</b> the children about the foods they are eating.	.21 (.05)
34...the teacher 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)	(4) I give a child something to eat to make them feel better when they are upset.	-.02 (.89)
24... the teacher <b>encouraged</b> (not forced or coerced) children to try the foods on their plate.	(8) I encourage children to eat fruits and vegetables by telling them that they taste good.	.12 (.28)
37... served only after a child requested seconds and the teacher asked the child if he/she was still hungry.	(9) I ask children if they are hungry before I serve them seconds.	.07 (.54)
24... the teacher encouraged (not forced or coerced) children to try the foods on their plate.	(10) I encourage children to eat a wide variety of foods.	.20 (.06)
25... the teacher <b>praised</b> a child for trying new or less preferred foods.	(11) I praise children when they try a new food.	.00 (.98)
23... the teacher <b>enthusiastically role modeled</b> eating healthy foods.	(13) I show children that I enjoy fruits and vegetables, just so the children are more likely to eat them.	.06 (.60)

23... the teacher <b>enthusiastically role modeled</b> eating healthy foods.	(14) I use my behavior to encourage children to eat healthy.	.16 (.13)
43... the teacher used <b>food</b> as a reward for eating a specific food (for example, "If you eat your spinach, you can have your cake")	(15) I encourage children to eat by using food as a reward. (For example, "If you finish your vegetables, you will get some fruit.")	.22 (.04)*
39... the teacher <b>asked a child if he/she was full before removing the plate</b>	(19) I ask children if they are full before I remove an unfinished plate of food.	.03 (.82)
47...the teacher allows child to continue to take multiple servings of various foods, even if they aren't consuming the foods	(20) I monitor and guide children's eating so that they don't eat <b>much less</b> than they should.	.06 (.59)
30... the teacher <b>pressured</b> a child to <b>eat more</b> than they seemed to want (e.g., after the child said they were finished or full).	(22) I encourage children to finish their food even if they say "I'm not hungry."	.06 (.59)

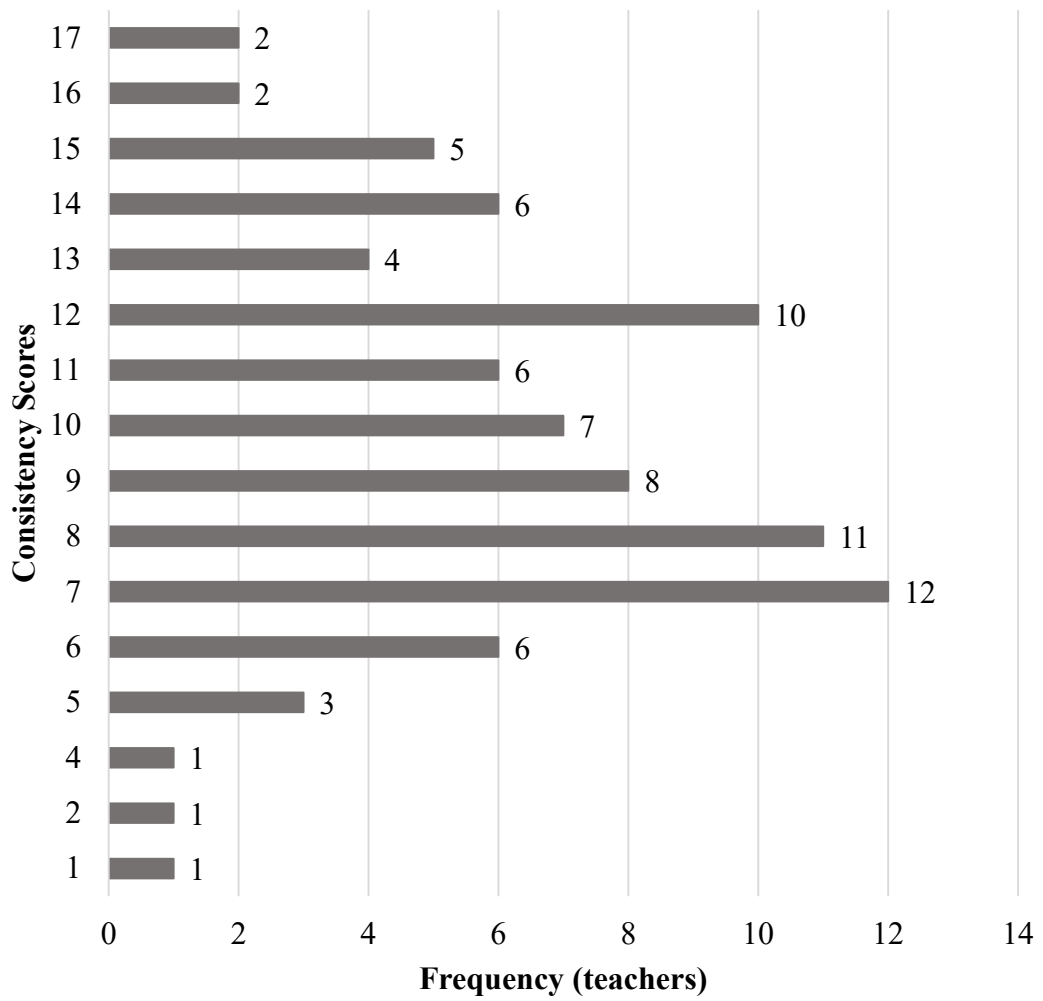
\*Significant at the 0.05 level

\*\*Significant at the 0.01 level

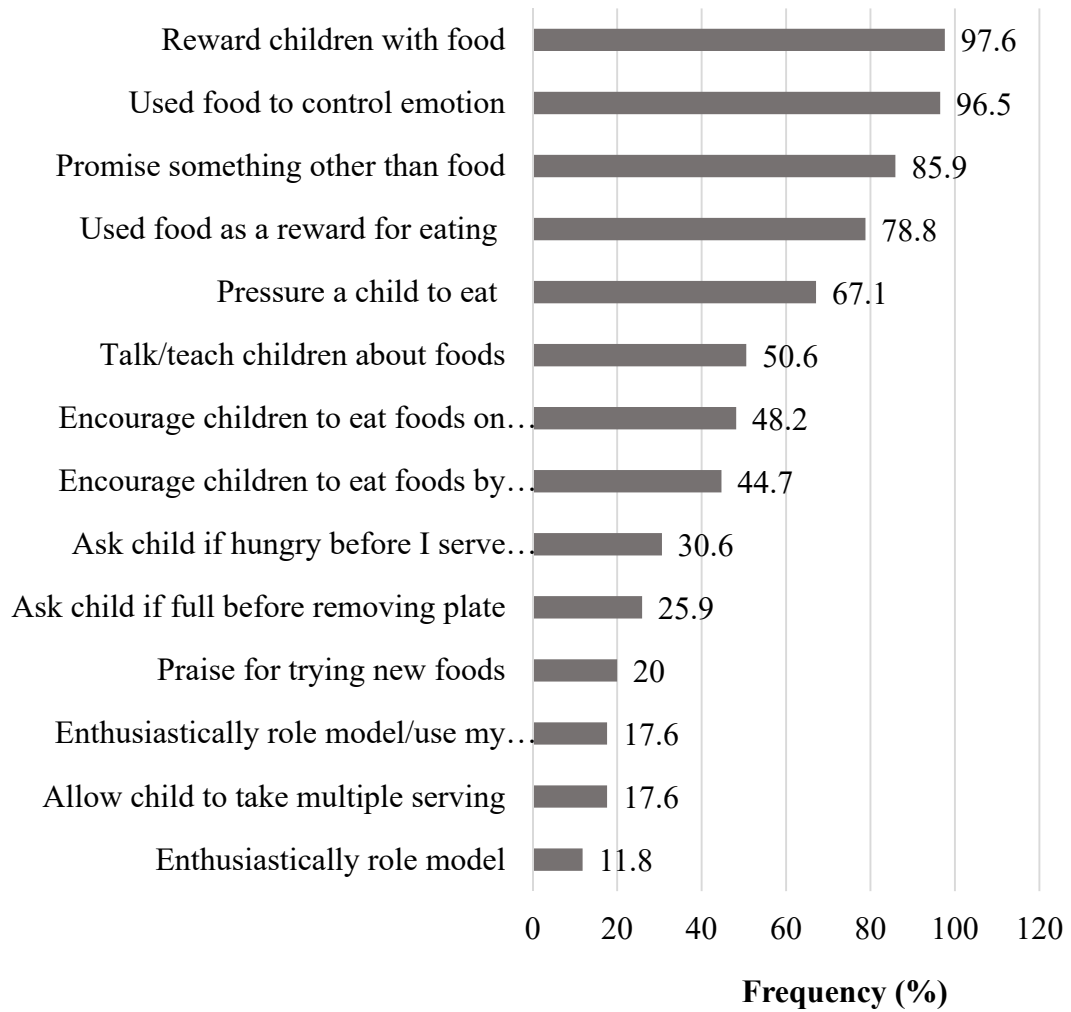
**Table 8.** Chi-square test for independence between item consistency and socio-educational factors

	Pearson Chi-Square ( $\chi^2$ )	Degrees of Freedom	p-value
Years of experience as a child care teacher	3.508	4	.45
Attendance at staff nutrition trainings	4.108	2	.13
Weight status	1.571	2	.46

**Figure 1.** Distribution of consistency scores between teachers' self-reported and observed feeding practices

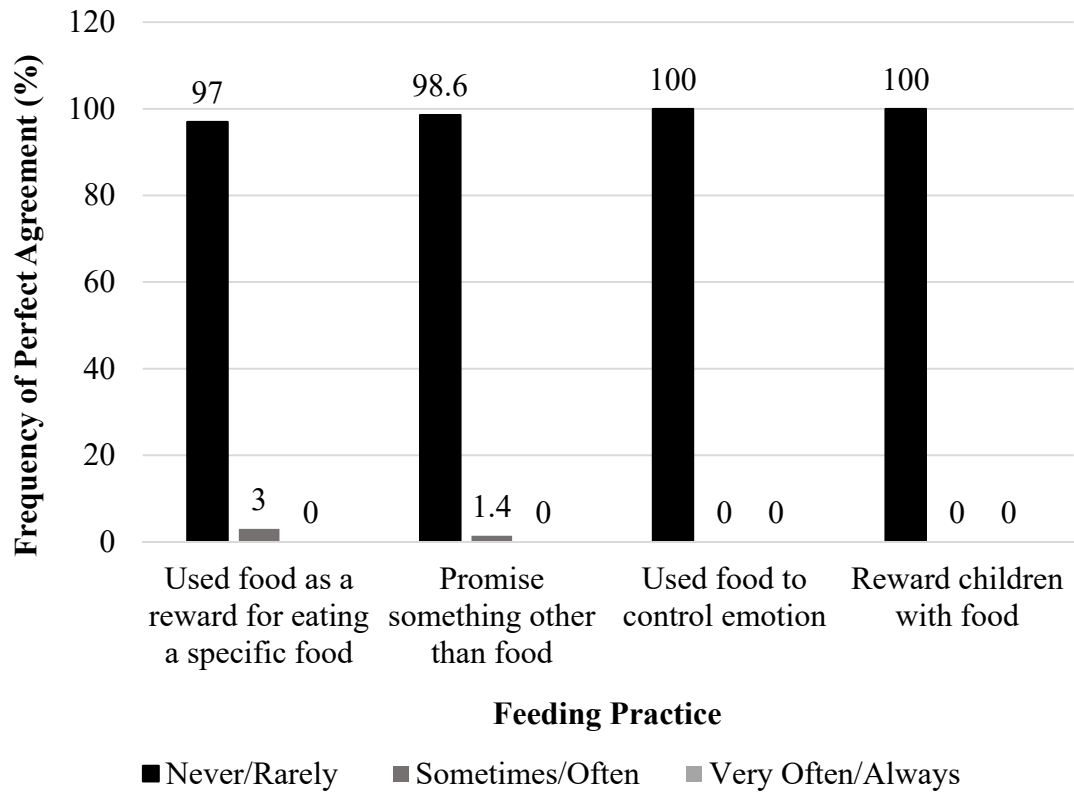


**Figure 2.** Distribution of consistent feeding practices

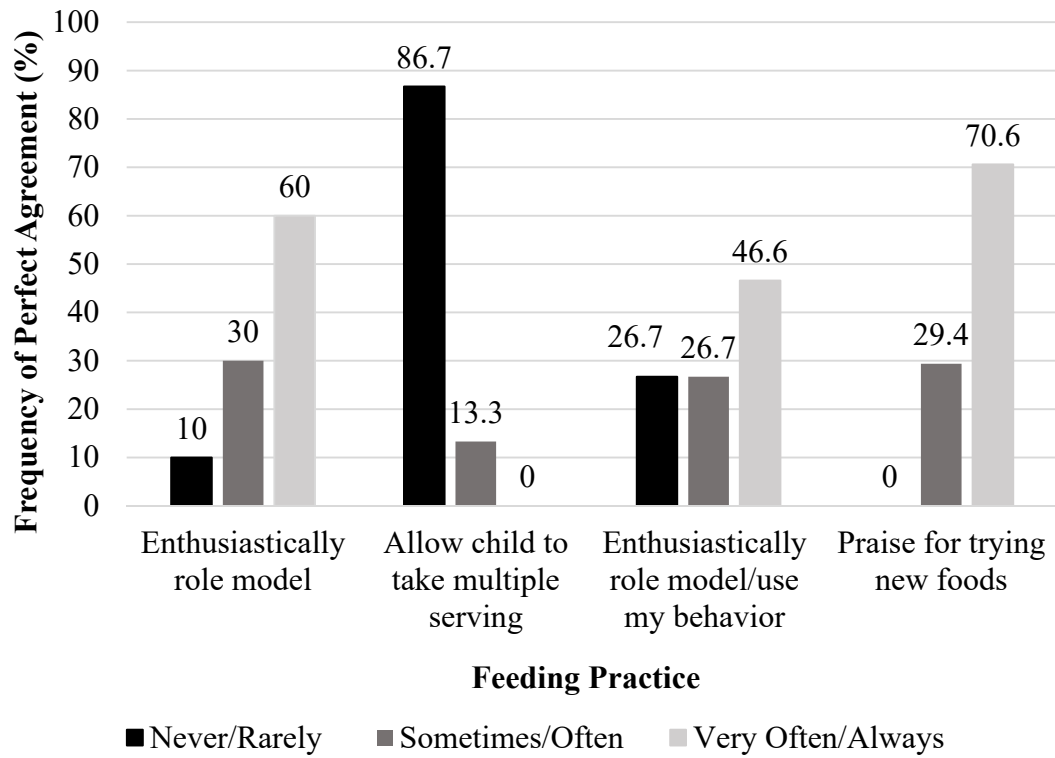




**Figure 3.** Response direction of feeding practices with highest consistency



**Figure 4.** Response direction of feeding practices with lowest consistency



## APPENDIX A

### LITERATURE REVIEW

#### I. Introduction

Obesity among children and adolescents in the United States (US) has nearly tripled over the last 30 years [1]. National data from 2011-2014 show that 8.9% of children between the ages of 2-5 years of age are overweight, but the prevalence of obesity is higher among non-Hispanic black (19.5%) and Hispanic youth (21.9%) compared to non-Hispanic white youth (14.7%) [2]. Childhood obesity is of significant concern due to the numerous adverse short- and long-term health effects associated with excess weight. In the short term, overweight children are more likely to experience psychological or psychiatric problems, cardiovascular risk factors, and other clinical consequences such as asthma, inflammation, and risk of developing type II diabetes mellitus [3, 4]. In the longer term, research shows that children who are overweight at a young age are more likely to be overweight and obese later in adulthood [5]. Obesity in adulthood is associated with an increased incidence of cardiovascular disease, type 2 diabetes mellitus, hypertension, stroke, dyslipidemia, osteoarthritis, and some cancers [6]. Other research has found that adult obesity is associated large decreases in life expectancy and increases in early mortality [7], making childhood obesity a growing burden and an important issue to address early on.

Combating childhood obesity is complex as its development is caused by a multitude of factors and environments [8, 9]. In addition to genetics [10-14], obesity in children is linked to a number of social changes, including a rise in the use of fast foods [15], as well as sugar-sweetened beverages [16, 17], the decline in everyday

physical activity [18, 19], and the general availability of computers, videogames, and television [20, 21]. It has also been known that family demographic factors such as ethnicity and income are related to overweight in both children and adults [22, 23], and that children who receive less positive parenting are more likely to become overweight [24, 25]. The interactive behavioral process occurring between parents and children surrounding eating have become a recognized influence on children's intake [26-30] and weight status [31, 32, 29]. Thus, an extensive amount of obesity prevention research has been dedicated to feeding practices within the home environment as children's dietary behaviors are largely influenced by parents [33-35]. Provider feeding practices with young children will be described in greater detail later in this paper.

Although the home environment has been extensively researched, no one specific environment has said to cause obesity and defining a child's food environment poses an additional challenge as the food environment can be interpreted in many ways with multiple levels of influence [9, 36]. With extensive research pertaining to the home [37, 38] and school [39, 40] food environment, research within the child care food environment is lacking [41-43]. Every week in the US, nearly 11 million children younger than age 5 whose parents are working spend 36 hours a week in child care on average [44]. In Rhode Island there are 46,828 children under the age of 6 potentially needing child care [45]. As research continuously illustrates the importance of quality early experiences for achieving good health [46-48], parents and child care providers share the responsibility for the safety and wellbeing of children.

Child care settings have been identified nationally as an ideal setting for childhood obesity prevention as children develop healthy eating habits between the ages of 2-5 years old [9, 49-51] that often persist into adulthood [52]. Furthermore, previous research has found child care providers within the child care environment influence a child's diet and weight status [53-55], but research examining their specific feeding practices has been limited. While a multitude of parental feeding practices have been shown to influence the eating behaviors and weight status of young children [56, 57], little is known about the feeding practices child care providers use when feeding children in their care [41, 43]. Growing evidence suggests providers can have an influence on children's dietary intake [55, 58] and eating behaviors [59], however findings are mixed and given the increase of use in child care, there is a need to "better" capture feeding practices.

During the last decade, there has been a rapid increase in the development of instruments to measure feeding practices [60, 61], but measures primarily assess parental feeding practices. Regardless, objective, valid and reliable tools are needed to capture the feeding practices of parents and child care providers [36]. Although there are several validated instruments used to capture parent feeding practices [61], the Environment and Policy Assessment and Observation (EPAO) tool is among the first instruments developed to measure and assess components of a healthy weight environment in child care centers [62]. This observational checklist is a structured instrument that assesses both physical and social characteristics of the child care environment [62]. More specifically, the EPAO is an expansion of the self-assessment component to the Nutrition and Physical Activity Self-Assessment for Child Care

(NAP SACC) program, an environmental nutrition and physical activity intervention in child care [62, 63]. When completed by trained field observers through direct observation during one full-day visit, Ward et al. found the EPAO to provide reliable, objective data about the healthy weight child care [64]. Strengths and limitations of existing measures and methodology used to capture parent and child care provider feeding practices will also be described in greater detail later in this paper.

Findings from this study will be used to further validate the EPAO and inform future investigators of its use in a child care setting. Accurately capturing feeding practices with reliable and validated tools can provide researchers with insight to the mechanisms that drive feeding practices related to obesity [60]. Furthermore, findings from this study will reinforce the use of gold standard methodology (observation) to capture feeding practices and provide insight to how observation relates to the more commonly used self-report.

## **II. Childhood Obesity**

The prevalence of childhood obesity has been increasing among pre-school aged children in the last thirty years [1], but more recent data suggest a leveling off of childhood obesity [2]. National data showed that obesity prevalence among 2-5 year olds in the US drastically decreased from 13.9% in 2003-2004 to 8.4% in 2011-2012 [65]. However, obesity prevalence within this age group slightly increased to 8.9% more recently in 2014 [2]. While this data optimistically may prove obesity prevention efforts are being effective, stagnant data in childhood obesity prevalence from 2012-2014 clearly indicates that all efforts to combat this epidemic are not

exhausted. In order to understand the scope of childhood obesity and the research avenues needed for future prevention and treatment, this literature review will describe the following areas: 1) childhood obesity rates and disparities among low-income preschool children, 2) social influences within the food environment that often impact obesity, 3) child care as an untapped setting for childhood obesity prevention, 4) the significant role of child care providers and the feeding practices they employ when feeding children in their care, and 5) the need for valid and reliable instruments to measure child care provider feeding practices.

### **What is Obesity?**

According to the Centers for Disease Control and Prevention (CDC), weight that is higher than what is considered to be a healthy weight for a given height is described as overweight or obese [66]. Body Mass Index (BMI), a common screening tool for overweight and obesity, is an attempt to quantify the amount of tissue mass (muscle fat and bone) in an individual by dividing a person's weight in kilograms (kg) by a their height in meters squared ( $m^2$ ) [66]. Calculated BMI values are then categorized as underweight, normal weight, overweight, or obese [66]. Thus, a high BMI can be an indicator of high body fatness, which usually has negative effects on a person's health [66]. Several studies have shown that even when a sustained energy imbalance of an excess of as little as 30-50 calories per day can promote obesity [67, 68]. As Faith et al. stated, extra sips of soda or bites of cookies can achieve this energy imbalance [10].

### **Defining Childhood Obesity**

To account for the growth and development during childhood, childhood obesity is often measured by age and sex-specific BMI percentiles rather than BMI categories used for adults. The CDC defines childhood overweight at or above the 85<sup>th</sup> and below the 95<sup>th</sup> percentile, and obesity greater than or equal to the 95<sup>th</sup> percentile [69]. Although BMI is the most common and cost-effective tool to measure obesity, there are limitations to using BMI. For instance, BMI uses height and weight to measure obesity, but does not measure adipose tissue directly [66]. Body mass index does not differentiate between adipose tissue and fat free mass, which can also influence the accuracy when used to measure obesity in children [69].

### **Risks associated with childhood obesity**

Childhood obesity is not only strongly associated with risk of being obese as an adult [5], but it burdens one's health and quality of life [7]. Obese children are at greater risk of developing obesity-related co-morbidities such as hypertension [70, 71], hyperlipidemia [71], type 2 diabetes [72, 73], and even some cancers [74]. This is significant because high blood pressure, high cholesterol, and type 2 diabetes are risk factors for cardiovascular diseases (CVD) [75] and may even lead to premature death [76, 77]. Annual data documents CVD as the leading cause of adult death globally for more than a decade [78], but more recent data documents heart disease as the second leading cause of death in young adults, ages 18 to 29 [79]. Other problems related to childhood obesity include: sleep apnea [80, 81], orthopedic problems [82], and psychological effects like low self-esteem, depression, discrimination, negative body image, and teasing or bullying [82-84]. Obese children who become obese adults are at greater risk for developing these obesity-related comorbidities when compared to



obese adults who were not obese as children [85]. Thus, prevention of childhood obesity is essential to prevent not only comorbidities early in life, but later in the life cycle as well.

### **Disparities in Obesity**

Childhood obesity disproportionately affects minority and low-income families.

Greater prevalence of obesity has been observed in population groups of low-socioeconomic status (SES) as low-SES has been associated with the consumption of lower quality diets [86, 87]. However, despite SES, obesity prevalence remains higher among Hispanic and non-Hispanic black children and adolescents when compared to non-Hispanic white youth [88]. National data from 2011-2012 show clear disparities, where 17% of Hispanic children ages 2-5 were obese compared to 3.5% of non-Hispanic white, a prevalence nearly five times greater than white non-Hispanic children and double the national average (8.4%) [65]. Along with the burden of low-SES and environmental factors in the US, Hispanic children experience other risk factors for childhood obesity such as: acculturation to the obesogenic US environment [89], suboptimal health insurance coverage, and access to medical care [90-92]. Tracking obesity by race, ethnicity, and SES is important to identify health disparities and prioritize obesity prevention interventions.

### **Obesity among low-income preschool-aged children**

Between 2009-2010, 12.1% of US children between ages 2-5 were obese, however obesity prevalence among US Hispanic children within the same age group at this time was 16.2% [88]. According to the Pediatric Nutrition Surveillance System, 1.2 million of the low-income preschool aged children surveyed were overweight or obese

with 15% of those children being obese [93]. A preschool-aged child is defined as a child between the ages of 2 and 5 [94, 95]. However, in contrary to past trends in obesity prevalence, the first national study of 2013 revealed that obesity and extreme obesity among low-income children has decreased in the US [96]. Recent data also reveals that the obesity rate among low-income preschool-aged children have remained stagnant in RI [97]. However, despite that obesity rates are stagnant, childhood obesity continues to be an important public health issue.

### **III. The Socioecological Model**

As previously mentioned, the complexity of childhood obesity has increased interest in the food environment given its impact on behavior related to diet, weight and health outcomes [98-100]. However, no one specific environment has said to cause obesity, and defining a child's food environment poses an additional challenge as the food environment can be interpreted in many ways with multiple levels of influence [9]. Researchers have begun to question how the food environment can be assessed in the broader context of an ecological model [101-104]. For instance, what interactions can occur between the physical and social environments that impact individual food choice [101]? In health behavior and public health research, the socio-ecological model (SEM) is a visual depiction of dynamic relationships among individuals, groups, and their environment [105]. The framework is derived from a systems orientation to human development, in which individuals are understood to influence, and be influenced by, people and organizations with which they interact, available resources and institutions, and societal norms and rules [105]. Conceptually, this means the

individuals with different characteristics or different characteristics may react differently to similar influences (13). In particular, Gubbels et al. suggests validation of the ecological perspective using young children as a sample population since their behavior is largely unreasoned, unplanned, and environment-driven [101]. Further, young children encounter only a handful of environments at most, primarily the home and child care [101]. Thus, from a child's ecological perspective, the child's interpersonal sphere or home environment is nested within a community sphere consisting of organizations such as child care [106].

### **Interpersonal Sphere: The home environment with parents**

The home food environment is a complex domain, and is thought to include parental factors such as nutrition knowledge, their parenting styles and feeding practices, role modelling, food availability and accessibility, as well as children's own individual characteristics and behaviors [9]. In terms of a broader family environment, food availability has been identified as an important influence of child consumption and weight status [38, 107]. Taking a closer look at the environment, Ventura and Birch have proposed a mediation model to explain the influence of parenting practices, children's eating behaviors and child weight status [108]. Their model theorizes that whereas parental transmission of genetic potential for obesity is a direct parental influence on child weight status, it is eating-related parenting style and practices that mediate that risk [108].

There is an increasing body of literature on the role of parenting styles and risk of obesity in young children. Parenting style is defined by a set of attributes, attitudes and ways of interacting with children that can influence child outcomes [109]. Four

general types of parenting have been identified. Authoritative parenting is characterized by caring parents who convey concrete, behavioral expectations and consistently enforce rules through the withdrawal of privileges (high demand; high responsiveness) [33]. Authoritarian parents show less affection toward their children and exhibit controlling behaviors often including physical or verbal reprimands, and are highly critical (high demand; low responsiveness) [33]. Permissive parents are very affectionate toward their children, sometimes the point of overindulgence, do not convey clear behavioral expectations, and admonish children infrequently (low demand; high responsiveness) [33]. Neglectful or uninvolved parenting is characterized by the absence of caring behaviors, few behavioral expectations, and little or no discipline (low demand; low responsiveness) [33]. Authoritative parenting has generally been associated with a lower risk for child and adolescent obesity, as well as an improved consumption of healthful foods [110, 111]. A child-centered feeding style resembles an authoritative parenting style in which parents set concrete, age-appropriate expectations for children at meal times, but remain responsive to the child's needs and behaviors [33]. For example, with authoritative feeding, adults may determine which foods are offered, and children may determine which foods are eaten [112]. In contrast, authoritarian parenting style has been linked to an almost fivefold increase in risk for obesity among young children compared with the authoritative parenting style, whereas children exposed to neglectful or permissive parenting had a twofold increase in risk for obesity [113, 114].

Parent feeding practices are different from parenting style in that they may vary from child to child within a family and are based on the context of the situation

[115]. In other words, parent feeding practices are types of behavioral strategies that aim to moderate children's eating behavior [116]. In particular, maternal controlling feeding practices (i.e. pressuring a child to eat, coercing, restricting the consumption of a particular food) are linked to childhood overweight/obesity because of their potential to hinder children's ability to develop adequate self-regulatory eating practices that would ordinarily be driven by natural hunger/satiety cues [117]. Using baseline data of a randomized-controlled intervention study, Hubbs-Tait et al. found that parental perceptions of responsibility and parental monitoring, modeling and restriction (negative) significantly predicted authoritative parenting style [118]. Similarly, encouraging of healthy eating was positively correlated with authoritative parenting [118].

### **Community Sphere: The child care environment with child care providers**

Although the home food environment with parents is said to have a considerable amount of influence on child eating behaviors and weight status, it is imperative to note that nearly one-third of all eating occasions have been found to occur outside of the home [119]. For preschool-aged children, the child care environment can be expected to be one of the most common environments in which children spend a substantial amount of time. Among the 60% of children 5 years and younger who were in at least one weekly non-parental care arrangement in 2012, 56% of were attending a day care center, preschool, or pre-kindergarten (i.e. center-based care) [120]. Research shows that children attending child care are at increased risk of overweight [54, 121].

As the number of children cared for outside of the home increases, child care is becoming an increasingly important social environment to study the development of food-related behaviors [41]. A review conducted by Larson et al. concluded that child care settings are an opportunity to promote healthful eating behaviors, however, improving the nutritional quality of the foods provided, nutrition education, and mealtime practices among caregivers is needed [41]. Small, significant changes have been made in the last 30 years in diet quality among preschoolers in the US [122], but intake of added sugars and fruit juices is excessive, while intakes of fruits, vegetables, and whole grains are inadequate [123, 124]. However, more recent research has found programs and policies often impact the foods served. For instance, a study by Ritchie et al. found that participation in the Child and Adult Care Food Program (CACFP) to be associated with more nutritious foods and beverages in child care [125]. The CACFP provides the nation's most vulnerable populations (over 3 million infants and children and over 100,000 disabled or older adults, primarily from low-income households) with high-quality nutritious foods [126]. In a study conducted among 303 child care sites in California, Ritchie et al. found that those enrolled in the CACFP reported serving more milk than non-CACFP sites [125]. Non-CACFP sites served more sugar-sweetened beverages than CACFP sites (14% vs. 3%,  $p < 0.001$ ), and over half of the sites surveyed served 100% fruit juice, especially at snack time but CACFP sites served significantly less juice when compared to non-CACFP sites [125]. Although not all food comparisons proved to be a healthier option in CACFP sites, it was evident that CACFP sites, particularly in Head Start centers, served more nutritious food items when compared to non-CACFP sites [125].

Eligible Head Start centers may receive reimbursement with free, reduced price or paid rates on meals from the Child and Adult Care Food Program (CACFP) [126]. Head Start, the largest federally funded comprehensive early childhood program for preschool-age children from low-income families [127], presents an ideal setting for obesity prevention efforts. Head Start centers serve a diverse group of low-income children [128] who are disproportionately impacted by obesity [65, 129, 130]. In addition to CACFP [126], Head Start centers employ policies centered around feeding [131]. Children enrolled in Head Starts that receive CACFP reimbursements can consume up to two meals and a snack that meets USDA nutritional standards [126]. Separate from CACFP, Head Starts employ a diverse set of mealtime practices that contribute to the development and socialization of children. Head Starts assign classroom staff to eat each meal served in family style [131]. To broaden a child's food experiences, each child is encouraged to try a variety of food served, avoiding food used as a punishment or reward [131].

Head Start is an important child care environment to evaluate given that roughly one-third of the total energy intake of Head Start children comes from the meals served at Head Start, and these meals provide as much as 70% of the child's daily energy requirement [132, 133]. Furthermore, characteristics of Head Start have been shown to exert beneficial health effects. For instance, recent research shows Head Start participation is associated with healthier changes in BMI by kindergarten entry age [134]. In a total sample of 43,748 children, children who entered Head Start as obese exhibited a greater decline in BMI  $z$ -score during their first academic year versus the comparison groups ( $\beta = -0.70$  [SE: 0.05] vs.  $-0.07$  [0.08] in the Medicaid

group [ $p < .001$ ] and  $-0.15$  [SE: 0.05] in the Not Medicaid group [ $P < 0.001$ ]). These patterns were similar for overweight children. Overall, when compared to children insured and uninsured by Medicaid, children enrolled in Head Start were less obese, less overweight, and less underweight at follow-up (2<sup>nd</sup> academic year) [134].

Characteristics of the child care food environment along with the social influences of the child care food environment are important to consider. The role that childcare providers play in child development is likely critical [53, 55], but as summarized by Patrick et al., we have yet to fully understand child care provider feeding styles and practices and their influence on children's dietary intake and eating behaviors [35]. Of the few studies done with providers, it appears that enthusiastically role-modeling [55, 135] and talking with children about healthy foods [135] promotes healthier eating in children. Child care providers have assumed much of the feeding responsibility, but research exploring child care providers' feeding practices with objective measures has been limited [43].

#### **IV. Measuring Feeding Practices**

In order to capture feeding practices of providers, valid and reliable measurement tools are needed [36]. In a recent review of existing measures and instruments, Vaughn et al. identified 71 unique instruments that measure and assess the quality of parental feeding practices [60]. The large majority of instruments assessing parental feeding practices capture self-reported data from surveys or questionnaires [60].

Unfortunately, self-reported measures have several limitations including response bias [43]. Moreover, some providers may experience difficulty self-reporting their



behavior due to lower levels of education, cultural norms or language barriers [136]. The use of observational measures however may overcome some of these limitations and are recommended for a number of reasons. Observation provides a valuable method for collecting detailed information about the provider-child relationship and behaviors of interest during feeding, especially when conducted in naturalistic environments [137, 136]. Furthermore, observational methods capture feeding practices not captured through self-report measures (i.e. capturing practices providers may not be aware of or choose not to report) [136]. Such fine details would be very hard for researchers to access through self-report data [138], but self-report remains exclusively utilized in the majority of studies examining child care providers' feeding styles and practices [43]. While studies have explored parental feeding styles and practices through observation [137, 139, 140, 116], exploring child care providers' feeding styles and practices with objective measures have been limited [43]. In addition, few studies have assessed the level of agreement between self-reported and observed feeding practices. Collecting both these types of data may provide insight on the difference between a providers' self-reported feeding practices versus those actually being observed [136]. Despite the benefits of observational research, tools to capture observed feeding practices in child care settings are limited [141].

### **Self-Report Measures**

Regardless of their documented limitations, self-report measures are critical to our understanding of feeding practices. The two most widely used scales in the child feeding literature include the Child Feeding Questionnaire (CFQ) [142] and the Comprehensive Feeding Practices Questionnaire (CFPQ) [143]. The CFQ is a self-

administered paper survey for parents of 2-11 year old children [60]. Scales on the CFQ pertain to perceived responsibility (3,  $\alpha = 0.88$ ), restriction (8,  $\alpha = 0.73$ ), pressure to eat (4,  $\alpha = 0.70$ ), and monitoring (3,  $\alpha = 0.92$ ) [60]. In contrast, the CFPQ is a computer-assisted self-administered survey for parents of 1.5-8 year old children [60]. Scales on the CFPQ pertain to monitoring (4,  $\alpha = 0.78-0.87$ ), emotion regulation (3,  $\alpha = 0.74-0.78$ ), food as a reward (3,  $\alpha = 0.66-0.69$ ), child control (5,  $\alpha = 0.49-0.70$ ), monitoring (4,  $\alpha = 0.77-0.84$ ), restriction for weight control (8,  $\alpha = 0.70-0.82$ ), restriction for health (4,  $\alpha = 0.69-0.81$ ), teaching about nutrition (3,  $\alpha = 0.60-0.68$ ), encouraging balance and variety (4,  $\alpha = 0.58-0.73$ ), pressure to eat (4,  $\alpha = 0.79$ ), healthy environment (4,  $\alpha = 0.75$ ), and involvement (3,  $\alpha = 0.77$ ) [60]. In addition to adequate internal consistency to prove the reliability of scales, the CFQ and CFPQ have also proven to be valid measures of parent feeding practices [60]. However, a review by Vaughn et al. notes that self-report measures of parent food practices would benefit greatly from a common conceptual model [60]. Consensus is required in order to develop a clear conceptual model including an indication of what constructs should be included and how these constructs should be defined [60]. The lack of consensus has resulted in scales from different instruments that may share the same names, but include items measuring very different behaviors [60]. Further, other instruments may include similar items, but employ different names for their scales [60].

### **Observational Measures**

Objective observational measures to evaluate provider-child interactions are recommended for a number of reasons. As previously stated, observational measures provide a valuable method for collecting detailed information about the provider-child

relationship and behaviors of interest, especially when conducted in naturalistic environments[138]. Researchers are allowed to view and summarize the overt process within a social interaction as they occur, testing hypotheses about how behavior unfolds over time and is influenced by social conditions [138]. Such subtle nuances would be very hard for researchers to access through self-report data [138], however self-report measures remain exclusively utilized in the majority of studies examining child care providers' feeding styles and practices [43]. In the parent-child feeding literature, one limitation of being observed in the home is that observation may impact parents' usual meal time practices [144]. However, this problem of participant reactivity has been addressed in a review article by Garner [138]. The author suggests that the presence of an observer does not markedly distort participant behaviors [138]. Gardner also found no differences in the frequency and nature of behaviors between the first and later observations, and little evidence of systematic changes in the frequency of negative and positive behaviors [138]. Although there is merit in observing behaviors during mealtimes, some researchers conversely note observational methods provide little information about the feeding practices that parents engage in while not at the dinner table [143]. For instance, it is likely that many parent child feeding interactions, especially restriction of some foods or the use of food as a reward, do not often occurring during planned mealtimes [143]. Instead, these feeding practices are more commonly employed when less nutritious food is more readily available [143]. In such scenarios, self-report measures may capture feeding practices outside the realm of lab-based or home-based mealtime observations.

### **Comparing Self-Report to Observation**

Combined, mixed-method approaches provide the opportunity to draw on the strengths of each of each of these methodologies enabling a more rigorous study to draw stronger inferences than either method alone [140]. For example, mixed-method approaches have been utilized to evaluate mother-child mealtime behaviors through observation, however, a systematic review by Bergmeier et al. found no significant relationships between self-reported and observed maternal feeding practices were reported [140]. Even more alarming, this review found the most widely used measure of self-reported parent feeding practices, the CFQ, was not significantly associated with observational measures of parent feeding practices [140]. Although one would not expect the two measures to be identical, demonstrating an association between the two measures would suggest that the observational coding system is measuring similar constructs as the traditional and validated self-report instrument [53].

From the wealth of research examining parental feeding practices, some attention has been given to whether parent reports of their feeding practices are congruent with observations of their child-feeding behaviors. Overall, the few studies that have explored this have little to no congruency between self-reported and observed feeding practices [137, 145, 139, 140]. In trying to understand this lack of congruence, some studies have explored the influence of certain socio-demographic and health characteristics. In 2005, Sacco et al. examined and compared self-reported semi-structured interviews to video-recorded observations of parental feeding approaches among 20 low-income, African-American mothers with infants aged 3-20 months [137]. They found limited correspondence between reported (interview) and observed (video-taped) feeding which puts the accuracy of self-report measures into

question [137]. Sacco et al. speculated that lower maternal education was associated with better agreement between measures, although sample size was small, limiting interpretations [137]. In support of the findings by Sacco et al., three additional studies found no significant association between self-reported maternal feeding practices and those independently coded during observations [140]. In particular, Lewis and Worobey explored in a cross-sectional study (n=20 mothers) how a mother's weight status might help determine the discrepancy between reported and observed feeding style specifically within the feeding practice construct of control [145]. Although it was hypothesized based on the prior literature that overweight mothers would report less control (i.e. pressure and restriction) during meals, overweight mothers showed no difference in their feeding practices compared to normal weight mothers during a buffet-style meal in a laboratory setting [145]. Such findings suggest that overweight mothers may have the amount of food they served to themselves and their children [145], perhaps due to observation in an artificial or structured setting not necessarily representative of their home environment [138]. Though hardly significant, overweight mothers did however display lower scores of restriction [145]. Given the large number of variables for a relatively small sample size, the results of this study also caution the interpretation of associations made and are only suggestive [145]. It is important to note that the majority of studies to date examining the accuracy of self-reported maternal feeding practices through comparison of observed feeding practices only address the construct of maternal control as it relates to childhood obesity [145, 139, 116], rather than broad and newly developed constructs of parental feeding practices [146]. Furthermore, the bulk of the

literature has not included other influential caregivers (i.e. fathers, grandparents, siblings, child care providers) although other caregivers are involved in feeding children [136].

## **V. Measurement of Child Care Provider Feeding Practices**

It is estimated that approximately 60% of all children between the ages of 2 and 5 years are in some form of nonparental child care, and more than 50% are enrolled in a center based program [120]. Even more limited than interventions in child care settings are appropriate measures to assess the healthy weight environments of child care. Given the broad spectrum of unique environmental factors in this setting (i.e. the amount and type of food and beverages served, staff interactions with children during meals, the number and length of physical activity opportunities, staff support for physical activity, the amount of time spent in sedentary activities, and the actual physical elements of the child care environment), Ward et al. developed an instrument to evaluate the nutrition and physical activity environments, policies, and practices at child care [62]. Because direct observation is considered the gold standard when attempting to measure complex environments, the Environment and Policy Assessment and Observation (EPAO) instrument was developed using observation and review of documents that describe nutrition and physical activity practices and policies at any given child care center [62].

### **EPAO**

The environment and policy assessment and observation (EPAO) tool was among the first instruments developed to measure and assess components of a healthy weight

environment in child care centers [62]. This observational checklist is a structured instrument that assesses both physical and social characteristics of the child care environment [62]. More specifically, the EPAO is an expansion of the self-assessment component to the Nutrition and Physical Activity Self-Assessment for Child Care (NAP SACC) program, an environmental nutrition and physical activity intervention in child care [62, 63]. When executed by objective, trained field observers through direct observation during one full-day visit, Ward et al. found the EPAO to provide reliable observation data about the healthy weight child care center environment (87.26% mean inter-observer agreement) [62]. Low-performing observation items may be attributed to counting or judging the behavior of multiple staff members in one setting or over an entire day [62].

The majority of studies utilize the EPAO to examine the relationships between child care environment and the physical activity behavior of preschool children [141, 147]. Although more studies to date have utilize the EPAO, one of the first studies utilizing the EPAO within the nutrition environment of child care explored the relationship between characteristics of the child care environment and dietary intake of children ages 2 to 3 utilizing the EPAO [55]. To assess the dietary intakes (i.e. saturated fat, dietary fiber, and energy intake) of 135 children and the presence of various environmental factors (i.e. physical environment, food serving style, supervision practices, and staff behavior), the EPAO was selected, translated, and adjusted to fit the Dutch child care system [55]. Children were randomly selected and observed during the three meals that children in the Netherlands usually receive when in child care: morning snack, lunch, and an afternoon snack [55]. Observations of

each meal were conducted on two separate days (i.e. breakfast snack and lunch on day 1, and afternoon snack on day 2) [55]. Findings support previous research by Hughes et al. who found specific feeding behaviors of child care providers (i.e. role modelling or encouragement to eat) to be positively associated with child intake [135]. Although these findings are some of the first to assess feeding practices of providers, only certain feeding practices were observed and coded [55]. Furthermore, Gubbels et al. primarily assessed the behaviors and dietary intake of children rather than providers [55]. Researchers also did not report diversity among the large sample of child and provider participants recruited for this study [55]. Future research examining child care provider feeding practices with the EPAO across a large, diverse sample of providers is needed to expand our understanding of the feeding practices child care provider employ.

### **Comparing self-report and observational measures of child care providers**

To date, only one study has evaluated the influence of child care providers' feeding practices on children's dietary intake through observation. Hughes et al. randomly selected fifty child care providers (25 African American; 25 Hispanic) from 13 Head Start centers in the Houston metropolitan area to be observed on three separate meal occasions [53]. Results indicate that provider's use of indulgent feeding behaviors were positively related to children's consumption of vegetables, dairy, entrée and starch [53]. These findings are in contrast to the parental feeding literature in that, an indulgent styles has been negatively associated with the consumption of nutrient-dense foods and healthy weight status.[30, 32]. Also in contrast to parental literature, Hughes et al. found moderate congruence between self-reported and



observed feeding behaviors [53]. The moderate congruency between measures of feeding behaviors may be explained by the rules and policies enforced by Head Start [53]. In other words, moderate congruency would occur because what child care providers may have been afraid or unable to indicate on a self-reported measure due to rules and regulations enforced by Head Start became evident in observations, showing further support for the importance of observational research [53]. It is also possible that higher significant correlations between self-reported and observed authoritative and authoritarian feeding may have resulted with a larger sample of child care providers [53]. By understanding the congruence between self-reported and observed feeding practices, future studies can better assess associations between certain practices and dietary weight outcomes in addition to developing tailored interventions for obesity prevention.

## **VI. Conclusion**

On October 6, 2015, the Roundtable on Obesity Solutions of the National Academies of Sciences, Engineering and Medicine held a workshop titled “Obesity in the Early Childhood Years: State of the Science and Implementation of Promising Solutions” [148]. The workshop examined what is currently known about the prevalence of obesity in young children, its trends over time, and its persistence into later childhood, adolescence, and adulthood; epigenetic factors related to risk of early childhood obesity; and the development of taste and flavor preferences in the first few years of life [148]. Building upon modifiable and protective risk factors, the workshop highlighted programs that take place in early child care and education settings as

interventions that have demonstrated promise in prevention and treatment of early childhood obesity [148]. The experiences children have in these settings can affect diet, physical activity, and general health outcomes [148].

As previously stated, child care centers can be opportunities to promote healthful eating behaviors [41]; however, little is known about the feeding practices child care providers employ when feeding young children in their care. The literature reveals that self-report measures are primarily administered to capture parent and child care provider feeding practices, but response bias is a well-documented limitation of self-report that is nearly impossible to prevent. Objective observational measures to evaluate provider-child interactions are recommended for a number of reasons, but the cost and resource-intensive nature of the methodology often deters its implementation in research. Combined, mixed-method approaches provide the opportunity to draw on the strengths of each of each of these methodologies enabling a more rigorous study to draw stronger inferences than either method alone.

Mixed-method approaches have been utilized to evaluate mother-child mealtime behaviors through observation, however no significant relationships between self-reported and observed maternal feeding practices have been reported [140]. In contrast to the parent literature, only one study has evaluated the influence of child care providers' feeding practices on children's dietary intake through observation and found moderate congruency between their self-reported and observed feeding practices [53]. Moderate congruency between self-reported and observed feeding practices of child care providers suggests that other factors (i.e. nutrition training, years of experience) that do not pertain to mothers within the home environment may

be influencing this association, however more research is needed. Understanding these associations can help create more effective interventions, nutrition trainings, and mealtime environments for child teachers. In a broader context, these strategies can empower child care providers to be more effective agents of change for the preschool children they care for each day.

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## APPENDIX B

### 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
<b>Location/physical environment of meals/Involvement</b>		
6. ... the provider used child size appropriate tableware (e.g., smaller plates and cups)	<input type="checkbox"/>	<input type="checkbox"/>
7. ... the provider made fruits and vegetables easier to eat (e.g., offered slices, peeled orange)	<input type="checkbox"/>	<input type="checkbox"/>
8. ... unhealthy snack foods (potato chips, Doritos, cheese puffs) are visible to children	<input type="checkbox"/>	<input type="checkbox"/>
9. ...a variety of healthy foods (fruits, vegetables) are visible to children	<input type="checkbox"/>	<input type="checkbox"/>

10. ....children were involved in meal preparation, planning or clean up (e.g., setting table, preparing foods, clearing and cleaning table)	<input type="checkbox"/>	<input type="checkbox"/>
11. ...a moment was taken to settle before eating	<input type="checkbox"/>	<input type="checkbox"/>
12. ...the provider encouraged the children to sit around the table during meals	<input type="checkbox"/>	<input type="checkbox"/>

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

	<b>Yes</b>	<b>No</b>
14. ....The provider talked on the phone, texted, or was on the computer during meals	<input type="checkbox"/>	<input type="checkbox"/>

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

**DURING MEAL IN THIS CLASSROOM...**

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

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

29...the provider used an <b>authoritative feeding style</b> 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.	<b>No</b> <input type="checkbox"/>	<b>1-2 times</b> <input type="checkbox"/>	<b>3+ times</b> <input type="checkbox"/>
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	<b>No</b>	<b>1-2 times</b>	<b>3+ times</b>
<b>How did the provider support or hinder children's self-regulation?</b>			
30... the provider <b>pressured</b> a child to <b>eat more</b> than they seemed to want (e.g., after the child said they were finished or full).	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31... the provider praised children for cleaning their plates, examples, "Very good! You have a happy (clean) plate."	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32...the provider spoon fed a child to get them to eat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33...the provider insisted that a child eat a food	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35... the provider rushed a child or children to eat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Second helpings were...</b>			
36... served to a child even when the child did NOT ask for more.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37... served only after a child requested seconds and the provider asked the child if he/she was still hungry.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
When a child ate less than half of a meal or snack...			
38... the provider removed the plate <b>without asking</b> the child if he/she was full.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39... the provider <b>asked a child if he/she was full before removing the plate.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40... the provider required a child to sit at the table until he/she cleaned their plate.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>How did the provider use rewards or bribes?</b>			
41... the provider promised something <b>other than food</b> for eating a specific food (for example, "If you eat your beans, we can play ball outside.")	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42... the provider used <b>food</b> 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.")	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
43... the provider used <b>food</b> as a reward for eating a specific food (for example, "If you eat your spinach, you can have your cake"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44...the provider reasoned with children to eat healthy foods (e.g., "Drinking milk makes your bones strong.")	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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.”)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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## APPENDIX C

### CHILDREN’S EATING BEHAVIOR SCALE

#### EPAO – Self-Report Measure My Nutrition and Physical Activity Practices

**A. Children’s Eating**

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

	Never	Rarely	Sometimes	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.	○	○	○	○	○	○

	Never	Rarely	Sometimes	Often	Very Often	Always
14. I use my behavior to encourage children to eat healthy.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
15. I encourage children to eat by using food as a reward. (For example, "If you finish your vegetables, you will get some fruit.")	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
16. I eat chips, sweets, or fast food while I am caring for children.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
17. I monitor and guide children's eating so that they do not eat <b>more</b> than they should.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
18. I play videos during children's meals and snacks.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
19. I ask children if they are full before I remove an unfinished plate of food.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
20. I monitor and guide children's eating so that they don't eat <b>much less</b> than they should.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
21. I drink soda and/or other sugary drinks while I am caring for children.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
22. I encourage children to finish their food even if they say "I'm not hungry."	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Please indicate how strongly you agree or disagree with the following statements.

	Strongly Disagree	Disagree	Slightly Disagree	Slightly Agree	Agree	Strongly Agree
23. I seek professional development opportunities to enhance children's healthy eating.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
24. I communicate the importance of healthy eating to parents.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
25. I am a role model for healthy eating for the children attending my childcare home.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
26. I communicate the importance of healthy eating to the children.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## APPENDIX D

### DEMOGRAPHICS QUESTIONNAIRE

#### Provider Demographics Questionnaire

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
4. What is your race?
  - a. White
  - b. Black/African
  - c. Asian
  - d. Native Hawaiian or Pacific Islander
  - e. American Indian or Alaskan Native
5. 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
6. How many months or years have you taught at this particular center?
  - a. Months \_\_\_\_\_
  - b. Years \_\_\_\_\_
7. How many total months or years of experience do you have a child care teacher?
  - a. Months \_\_\_\_\_
  - b. Years \_\_\_\_\_
8. In what capacity do you know the children?
  - a. Regular Teacher
  - b. Assistant Teacher
  - c. Special Education Teacher
  - d. Teacher's Aide
  - e. Other
9. Do you work full-time or part-time
  - a. Full-time
  - b. Part-time
10. What are your typical work hours/day?
  - a. Start Time \_\_\_\_\_
  - b. End Time \_\_\_\_\_

11. On average, how many hours per week do you work in this program?
  - a. Number of Hour Per Week \_\_\_\_\_
  
12. 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
  
13. Eating occasions when you are present in the classroom
  - a. Breakfast
  - b. AM Snack
  - c. Lunch
  - d. PM Snack
  
14. Number of children at your table at mealtime
  - a. Number of Children \_\_\_\_\_
  
15. 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
  
16. 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
  
17. 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
  
18. 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
  
19. 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

20. Compared to other adults my age, I would say that my eating habits are:
- Much healthier
  - Somewhat healthier
  - About the same
  - Somewhat less healthy
  - Much less healthy
21. 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?
- 0 days
  - 1 day
  - 2 days
  - 3 days
  - 4 days
  - 5 days
  - 6 days
  - 7 days
22. How many hours per day do you usually sit and watch tv or spend time on the computer away from work?
- I don't watch TV or use a computer
  - 1 hour
  - 2 hours
  - 3 hours
  - 4 hours
  - 5 hours
  - 6 hours or more
23. Yesterday, how many times did you drink any regular (not diet) soda or soft drinks?
- None
  - One time
  - Two times
  - Three or more times
24. Yesterday, how many times did you drink any sweetened coffee beverages, punch, kool-aid, sports drinks, or other fruit flavored drinks?
- None
  - One time
  - Two times
  - Three or more times
25. Yesterday, how many times did you eat food from any type of restaurant?  
Restaurants include fast food, sit down restaurant, pizza places and cafeterias.
- None
  - One time
  - Two times
  - Three or more times