HAMM, EMILY, M.S. Does Parental Feeding Style Moderate the Relationship between Children's Taste Preferences for Fruit and Vegetables and Consumption in Preschoolers? (2017)
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Introduction: Fruit and vegetable (FV) consumption is linked to a number of positive health outcomes, with taste preferences representing one of the key predictors of FV intake across age groups. Thus, it is important to establish diets rich in FV early in life when children's eating habits begin to form. The authoritative feeding style has been proposed as most favorable to nutrition-related outcomes in current nutrition research.

Objective: The purpose of this study was to determine whether the authoritative feeding style moderates the relationship between children's FV taste preferences and consumption of FV among low-income preschool-aged children.

Methods: Parental feeding style was measured by the Caregiver's Feeding Style Questionnaire. FV intakes and likings were measured by a validated food frequency questionnaire/taste preference measure. Associations between FV taste preferences, FV intake (frequency in past 7 days), the authoritative feeding style, and potential covariates were examined using bivariate correlations. Hierarchical multiple regression models for F and V were used to test the interactions between the authoritative feeding style and taste preferences on children's FV frequency intakes, controlling for race/ethnicity, education, marital status, parental FV taste preferences, and FV household availability.

Results: A total of 281 eligible parent-child dyads completed the study (38% African American, 35% Hispanic White, and 27% Non-Hispanic White). Approximately 16% of parents were categorized as authoritative, 35% as indulgent, 26% authoritarian,

and 20% uninvolved. Both regression models were significant, explaining 29% of the variance in child F frequency intake ($F(8,256) = 12.5$; $p < .001$) and 28% in child V frequency intake ($F(8,246) = 11.5$; $p < .001$). No significant interaction effects were observed between the authoritative feeding style and child taste preferences when explaining their F or V frequency intakes. After the covariates were entered into the model, child taste preferences for F had a significant main effect on F intake ($B = 3.83$; $p < 0.01$), explaining additional 2% of the total variance (R^2 change = .024; $p <.01$). Household availability of F also had a main effect on F intake ($B = 1.43$; $p < 0.001$). In the vegetable model, child taste preferences had the largest significant main effect on V intake ($\beta = 4.67$; $p < 0.001$), adding 7% of unique variance (R^2 change = .07; $p < 0.001$). Household availability of V also had a significant effect on child V frequency intake ($B = 0.97$; $p < 0.001$).

Conclusion: The authoritative parental feeding style did not moderate the relationship between child taste preferences and child intake of either F or V. However, our findings highlight the role of FV taste preferences and household availability on FV intakes among low-income preschool-aged children. Although efforts have focused on increasing availability of FV in low-income populations, further research is warranted to better understand development and predictors of FV taste preferences in early childhood.

DOES PARENTAL FEEDING STYLE MODERATE THE RELATIONSHIP BETWEEN CHILDREN'S TASTE PREFERENCES FOR FRUIT AND VEGETABLES AND CONSUMPTION IN PRESCHOOLERS?

by

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LIST OF ABBREVIATIONS

ANOVA	Analysis of Variance
BMI	Body Mass Index
CFSQ	Child Feeding Style Questionnaire
FFQ	Food Frequency Questionnaire
FV	Fruits and Vegetables
F	Fruit(s)
NHANES	National Health and Nutrition Examination Survey
SPSS	Statistical Package for Social Sciences
V	Vegetable(s)

CHAPTER I

INTRODUCTION

Diets rich in fruit and vegetables (FV) have been associated with increased protection against chronic diseases, such as obesity and type II diabetes in adults (Boeing et al., 2012; Liu, 2013). However, current intakes of FV in the U.S. remain low (Boeing et al., 2012; Liu, 2013; Lorson, Melgar-Quinonez, & Taylor, 2009; Rolls, Ello-Martin, & Tohill, 2004). In the most recent Dietary Guidelines for Americans, a strong emphasis has been placed on increasing FV intakes across all age and gender groups (USDA & USDHH, 2015).

Early childhood is a critical time for growth and development and adequate nutrition is crucial to ensure optimal development (Cooke, 2007; Lorson et al., 2009). Adequate FV consumption early in life has been linked to reduced obesity risk later in life, which represents a significant public health problem among both children and adults in the U.S. (Epstein et al., 2001; Fletcher, Wright, Jones, Parkinson, & Adamson, 2016; Ledoux, Hingle, & Baranowski, 2011; Ogden, Carroll, Kit, & Flegal, 2014). Establishing healthy eating habits and consuming diets rich in FV is critical during early childhood because such healthy habits are likely to track into later years (Cooke, 2007; Hansen, Alfonso, Hackney, & Luque, 2015; Lorson et al., 2009).

Regardless of the public awareness of the FV importance for human health, children struggle to consume the minimum recommended amounts (Kim et al., 2014).

The current guidelines recommend that children ages 1 to 8 years of age should consume between 1 to 2.5 cups of vegetables (V) per day and 1.5 to 2 cups of fruit (F) per day. However, current intakes are 1.2 to 1.5 cups of F and only 0.7 to 0.8 cups of V per day (Drewnowski & Rehm, 2015; Kim et al., 2014). Furthermore, disparities in FV intakes have been identified in different studies across the nation (Dubowitz et al., 2008; Guerrero & Chung, 2016). Children and adults from low-income families and those from minority populations tend to have even lower consumption of FV compared to other children (Di Noia & Byrd-Bredbenner, 2014; Dubowitz et al., 2008; Guerrero & Chung, 2016; Kamphuis et al. 2006; Kong et al., 2013; Rasmussen et al., 2006; Story, Neumark-Sztainer, & French, 2002).

Several factors have been identified as correlates of children's FV intakes in previous studies, including taste preferences for FV, household availability of FV, parental and peer modeling of FV, and other individual, family, and community-level influences (Benton, 2004; Birch, 1999; Di Noia & Byrd-Bredbenner, 2014; Rasmussen et al., 2006). Taste preferences, one of the greatest predictors of food intake in general, begin to develop at an early age, with dispositions for sweet and salty tastes over bitter or sour tastes (Birch, 1999). However, these aversions to bitter and sour tastes diminish over time and individuals develop a broader palate as they get older (Benton, 2004; Birch, 1999; Cooke, 2007; Desor, Greene, & Maller, 1975). Thus, it is crucial to ensure a variety of FV are introduced at a young age to help children develop taste preferences and familiarity for a wide variety of healthy foods (Cooke, 2007; Maratos & Staples, 2015; Perry et al., 2015). Household availability of FV has also been identified as an

indicator of FV intake, with children being more likely to consume FV if FV are readily available in the home (Amuta, Jacobs, Idoko, Barry, & McKyer, 2015; Bryant et al., 2011; Noia & Byrd-Bredbenner, 2013; Rasmussen et al., 2006). In fact, several studies have identified availability as the greatest prediction of children's FV consumption, regardless of children's taste preferences for FV (Amuta et al., 2015; Bryant et al., 2011; Gross, Pollock, & Braun, 2010).

Previous research also shows that parents' behavior significantly influence children's dietary intake, diet quality, and general eating habits (Bante, Elliott, Harrod, & Haire-Joshu, 2008; Benton, 2004; Blissett & Fogel, 2013; Cooke et al., 2004). Factors such as parental taste preferences for certain foods, parental encouragement during meal/snack times, and FV modeling have been linked to FV intake among children and adolescents (Bante et al., 2008; Blissett & Fogel, 2013; Hoerr et al., 2009; Papaioannou et al., 2013; Vereecken, Legiest, De Bourdeaudhuij, & Maes, 2009). To better understand the influence of parenting in the feeding context, Hughes, Power, Orlet Fisher, Mueller, and Nicklas (2005) developed a measure of parental feeding styles from the general parenting styles. Feeding styles are categorized using two dimensions of parenting—demandingness and responsiveness—following a similar scheme as the general parenting styles: authoritative (high demandingness, high responsiveness), authoritarian (high demandingness, low responsiveness), indulgent (low demandingness, high responsiveness), and uninvolved (low demandingness, low responsiveness; Baumrind, 1971; Hughes et al., 2005; Maccoby & Martin, 1983). Previous studies found that parents of indulgent feeding style and authoritarian feeding style were more likely to have

children at a greater risk of obesity (Frankel et al., 2014; Hughes et al., 2005; Hughes, Shewchuk, Baskin, Nicklas, & Qu, 2008; Tovar et al., 2012; Vollmer & Mobley, 2013).

Some studies have examined associations between parental feeding style and children's dietary intakes (Blissett, 2011; Hennessy, Hughes, Goldberg, Hyatt, & Economos, 2012; Kremers, Brug, de Vries, & Engels, 2003; Lora et al., 2016; Patrick, Nicklas, Hughes, & Morales, 2005). Children whose parents were categorized as permissive were more likely to consume higher amounts of energy-dense foods and sugar-sweetened beverages compared to parents who use other feeding styles (Hennessy et al., 2012; Lora et al., 2016). The authoritative feeding style has been identified as having the most favorable dietary outcomes (Hoerr et al., 2009; Patrick et al., 2005; Vollmer & Mobley, 2013). Hoerr et al. (2009) found that parents whose parenting styles were more demanding during the meal time had children with higher intakes of FV. In addition, higher FV intakes were found in families where parents had more controlled and structured meals (Vollmer & Mobley, 2013). Patrick et al. (2005) found that parents who had an authoritative feeding style were associated with higher attempts of children consuming FV. However, more research is needed to observe the authoritative feeding style and its direct association to child FV consumption because general parenting styles are too broad (Patrick et al., 2005).

It is well established that children's taste preferences influence their dietary intake, and that is the case with FV as well (Birch, 1999; Cooke, 2007; Cooke et al., 2004). An extensive body of research also demonstrates the importance of parental influences on child nutrition outcomes, especially the positive role of parental

responsiveness coupled with clear and consistent demandingness during meal/snack times, known as the authoritative feeding style (Hughes et al., 2005; R. Johnson, Welk, Saint-Maurice, & Ihmels, 2012; Shloim, Edelson, Martin, & Hetherington, 2015; Vollmer & Mobley, 2013). To date, however, little is known about the relationship among the authoritative feeding style, child taste preferences for FV, and children's FV intake. The purpose of this study was to test the moderating effect of the authoritative feeding style on the link between children's FV taste preferences and FV intake among low-income young children and their parents.

Study Objectives

The purpose of this study was to:

1. Examine the nature of the relationships among the parental authoritative feeding style, children's taste preferences, and intake of FV among low-income preschool-aged children.
2. Test whether the authoritative feeding style moderates the association between children's taste preferences and intake of F and/or V.

Definition of Terms

Body Mass Index-for-Age—The measure used to classify child weight status. BMI is defined by dividing the weight in kilograms by the height in centimeters squared. This measurement is plotted on growth charts created by the Centers for Disease Control to track childhood growth.

Childhood Obesity—Defined as the child being classified as having a BMI-for-age percentile greater than the 95th percentile.

Feeding Practices—Refers to the parent's actions in relation to the child during a meal and/or snack (i.e., restriction to eat).

Food Insecurity—Refers to the state of being without or unable to access or afford quality, nutritious food.

Food Neophobia—Refers to the avoidance or refusal to eat new foods.

Healthy Eating Index—Is a measure created to assess diet quality in relation to the Dietary Guidelines for Americans. Mainly used among low-income populations.

Household Availability of Fruit and Vegetables—Refers to specific F and/or V that are present in the home over a specified time period (i.e., past week, month). The term typically refers to any fresh, frozen, or canned FV items.

National Health and Nutrition Examination Survey (NHANES)—**A** research program that is conducted by the National Center for Health Statistics which surveys health and nutritional status of adults and children in the U.S. over time.

Parental Feeding Styles—A feeding style refers to the overall climate of interactions between the parent and child in the feeding context. Parents are categorized based on levels of demandingness (control) and responsiveness (warmth, acceptance) and placed in one of four categories: authoritative (high demanding; high responsive), authoritarian (high demanding; low responsive), indulgent (low demanding; high responsive), and uninvolved (low demanding; low responsive).

Taste Preferences—Refers to individuals' inclination or predisposition to like certain flavors or specific foods, typically assessed using a Likert-type scale.

U.S. Dietary Guidelines for Americans—The recommendations created by the U.S. Departments of Agriculture and Health and Human Services to reduce incidences of chronic disease related to nutrition and food intake.

CHAPTER II

LITERATURE REVIEW

Benefits of Fruits and Vegetables in the General Population

Previous research has provided substantial evidence that consumption of fruits and vegetables (FV) throughout life is beneficial for prevention of chronic diseases (Boeing et al., 2012). Mainly composed of water and dietary fiber, FV also provide a variety of micronutrients and bioactive compounds that attribute to various aspects of health (Liu, 2013). Thus, humans should consume a wide range of FV to take advantage of the health benefits throughout their lifetime (Liu, 2013). Among adults, adequate FV consumption has been positively associated with lower risk of several chronic diseases, such as type 2 diabetes mellitus, hypertension, coronary heart disease, cancer, stroke, and obesity (Boeing et al., 2012; Rolls et al., 2004). Based on growing evidence about the role of various FV in chronic disease prevention, the most recent Dietary Guidelines for Americans call for greater attention on specific subgroups of fruit and vegetables (USDA & USDHH, 2015). Among the most nutrient-dense FV are dark leafy greens, citrus fruits, and cruciferous vegetables such as broccoli and cauliflower (Lorson et al., 2009). These deep-colored FV provide not only ample amounts of vitamins, minerals, and dietary fibers, but also various bioactive compounds such as phytochemicals that have been linked to antioxidant activity by reducing oxidative stress (Lorson et al., 2009).

Despite the known health benefits, FV consumption remains inadequate across most age groups in the United States (Drewnowski & Rehm, 2015; Lorson et al., 2009). Furthermore, previous studies indicate that FV consumption declines between middle childhood and adolescence, with teens having the lowest intakes of FV compared to any other age group (Lorson et al., 2009; Ramsay, Shriver, & Taylor, 2017). Because taste preferences influence what children eat and both dietary habits and taste preferences tend to track into later years (Fletcher et al., 2016), greater focus on establishing adequate FV consumption is needed prior to middle childhood and adolescence, starting in early childhood or even earlier (Hansen et al., 2015; Shriver & Buehler, 2016).

Fruit and Vegetable Consumption and Children's Health Outcomes

Although adequate FV consumption is warranted throughout the lifespan (Boeing et al., 2012; Liu, 2013; Lorson et al., 2009), nutrients provided through FV contribute to a healthier overall diet quality and are essential for proper growth and development of children (Butte et al., 2010; Kranz, Mitchell, Siega-Riz, & Smiciklas-Wright, 2005; Ramsay et al., 2017). For instance, a study by Ramsay et al. (2017) examined dietary intakes of children aged 2-5 years old from the 2005-2010 National Health and Nutrition Examination Survey (NHANES) to find associations between FV intake and overall diet quality. The study found that children who readily consumed FV were more likely to have a higher diet quality, as measured by the Healthy Eating Index-2010 scores. The findings also indicated that consumption of F/100% F juices was linked to overall better diet quality among children (Ramsay et al., 2017). Another study conducted by Butte et al. (2010) examined the usual nutrient intakes in infants and toddlers using the data from

the Feeding Infants and Toddlers Study (FITS) 2008 and concluded that even though nutrient intakes exceed or met recommendations for this group of children, diet quality still needs to be improved. More specifically, the researchers emphasized the importance of incorporating healthy fats and dietary fiber during the transition from infancy to toddlerhood (Butte et al., 2010) due to the high intakes of saturated fats and lack of fiber in children's diets. Kranz et al. (2005) found that a majority of preschoolers in the study consumed less than 14 grams of fiber per 1,000 calories and that most of their dietary fiber came from food sources such as low-fiber F and legumes. It is important for children to meet the recommendations for fiber due to its many protective benefits from cardiovascular disease, constipation, and obesity risk (Boeing et al., 2012; Kranz et al., 2005).

The prevalence of childhood obesity has remained stable in recent years; however, the most recent estimates from the NHANES indicate that nearly 17% of children and adolescents aged 2-19 years old are obese, with another 15% being overweight in the US (Ogden et al., 2014). Although the link between FV and weight and/or obesity outcomes is much stronger among adults than it is among children (Epstein et al., 2001; Ledoux et al., 2011), some studies suggest that diets rich in FV can potentially lower children's risk for obesity and help them maintain a healthy weight (Newby, 2009). For example, in a longitudinal study conducted by Fletcher et al. (2016), the researchers found that children who ate more FV by the age of 7 years had a lower body mass index (BMI) and skinfolds compared to children who did not have a high intake of FV. In a study conducted by Epstein et al. (2001), researchers examined the

effects of a diet rich in FV on obese parents and their non-obese, preschool children. The study found that diets rich in FV had a great impact on reducing obesity among the parents and also suggested that preschool children who had a higher intake of FV and lower intake of energy-dense foods had a lower risk of developing obesity (Epstein et al., 2001). Emmett and Jones (2015) found that children who consume higher amounts of energy-dense foods and lower amounts of FV or nutrient-dense foods were at higher risk for the development of obesity and accumulating fat mass (Emmett & Jones, 2015).

Fruit and Vegetable Guidelines and Children's Intakes in the U.S.

The 2015 Dietary Guidelines for Americans recommends that children aged 1 to 8 years consume between 1 and 2.5 cups of V per day and 1.5-2 cups of F per day (USDA & USDHH, 2015), with the actual amount determined by children's age, gender, and daily energy needs that take physical activity level into account. The FV guidelines also stress that consuming a variety of FV is important and children should consume leafy green V and red and orange V such as carrots, peppers, and squash. These recommendations reflect the need to emphasize more nutrient-dense FV, with less focus on V in the starchy category that represent the most frequently consumed V (i.e., white potatoes, corn; USDA & USDHH, 2015).

The national estimates of FV consumption show that children and adolescents do not consume adequate amounts (Kim et al., 2014). In fact, adolescents had the lowest intakes of FV compared to other age groups (Lorson et al., 2009; Ramsay et al., 2017), with only 8.5% of high school students meeting the recommendations for F and 2.1% meeting the V recommendations in 2010 (Moore, Thompson, & Demissie, 2016). Among

younger children 1 to 8 years old, the consumption of F is higher in relation to the current recommendations compared to the consumption of V (Kim et al., 2014). On average, children consume 1.2 to 1.5 cups of F but only 0.7 to 0.8 cups of V per week. Potatoes and tomatoes represent the most commonly consumed V, contributing 21% and 18% of total V consumption, with potatoes including fried options. On the other hand, consumption of more nutrient-dense V, such as leafy greens and deep orange V, are below the minimum recommended amounts. It is also important to note that although this age group (1-8 year olds) represent the only age group that meets the current recommendations for F intake (Kim et al., 2014), one-third of the children's reported F intake comes from F juices (Drewnowski & Rehm, 2015; Kim et al., 2014). Several studies have linked F juice consumption to increased risks of childhood obesity and type 2 diabetes, suggesting that excessive intakes of a concentrated form of F in the form of juice, although counting as F, may contribute to potential health risks (Imamura et al. 2015; Kim et al., 2014; Wang, Bleich, & Gortmaker, 2008). These concerns are reflected in the 2015 Dietary Guidelines that put special emphasis on encouraging children to consume whole F rather than juice to meet the recommended F intake levels (USDA & USDHH, 2015).

Previous research shows that children's FV intakes follow different patterns across racial and/or ethnic segments of the population in the U.S. (Di Noia & Byrd-Bredbenner, 2014; Dubowitz et al., 2008; Guerrero & Chung, 2016; Kong et al., 2013). In a study by Dubowitz et al. (2008), White adults consumed significantly more FV compared to African Americans and Mexican Hispanics (Dubowitz et al., 2008). In a

recent systematic review, it was concluded that Hispanic children consume greater amount of FV compared to African American children (Di Noia & Byrd-Bredbenner, 2014; Kong et al., 2013). In a recent study utilizing 2009-2010 NHANES data, African American children aged 2-19 were more likely to consume starchy V and F juice compared to Hispanic children (Nielsen, Rossen, Harris, & Odgen, 2014). Similarly, minority children were found to be at greater risk for inadequate FV intake compared to White children in a recent study in California (Guerrero & Chung, 2016). These findings suggest that minority groups may be facing unique challenges that influence FV intakes, such as having poor availability of FV and/or low access to FV (Di Noia & Byrd-Bredbenner, 2014; Guerrero & Chung, 2016).

Strong associations between income status and FV intake have been suggested in previous research (Di Noia & Byrd-Bredbenner, 2014; Dubowitz et al., 2008; Kamphuis et al., 2006). In a recent systematic review, low-income status has been identified as an important correlate of lower FV consumption among children, in addition to having a minority status (Di Noia & Byrd-Bredbenner, 2014). Several studies suggest that low-income children are more likely to consume less FV compared to children whose parents have a higher income (Rasmussen et al., 2006; Story et al., 2002). Furthermore, Dubowitz et al. (2008) found positive associations between socioeconomic status and FV intake across different racial groups, suggesting that income status influences FV consumption beyond the effects of race/ethnicity. The proposed mechanisms of the income status effect on FV consumption include, but are not limited to, lower FV availability in low-income neighborhoods, transportation barriers to gain access to FV,

and food insecurity (Asfour et al., 2015; Di Noia & Byrd-Bredbenner, 2014; Dubowitz et al., 2008; Scammell et al., 2015). Such barriers might make it difficult for low-income families to purchase and consume adequate FV on a regular basis. Children from low-income families not only report lower intakes of FV, but they are also at the greatest risk of consuming inadequate amounts of FV into their adolescent and adult years, which affects their long-term health outcomes (Lorson et al., 2009; Moore et al., 2016).

Development and Role of Taste Preferences in Fruit and Vegetable Intake

Research demonstrates that natural predispositions for sweet and salty tastes over bitter and sour tastes are present at birth and individualistic taste preferences begin to develop early during infancy and childhood (Beauchamp, Cowart, & Moran, 1986; Benton, 2004; Birch, 1999). Infants readily give facial expressions in response to tastes of foods—pleasant facial expressions for sweet and salty foods and adverse responses to bitter or sour foods. Typically, infants will respond to unpleasant tastes by spitting out food (Birch, 1999). An inherited trait to taste, phenylthiocarbamide or 6-n-propylthiouracil (PROP), has been identified as a compound in bitter foods. Tasters of PROP are more likely to reject V such as broccoli, brussels sprouts, cabbage, and spinach, as well as other leafy greens due to their bitter tastes (Birch, 1999). Research has suggested that predispositions for sweet tastes diminish with age and a broader palate develops over time (Benton, 2004; Birch, 1980, 1999; Desor et al., 1975). Infants as well as young children are thus likely to prefer sweet and salty foods over other foods when given a choice (Birch, 1999). Because regular exposure and availability of foods influences what children like, early childhood represents a critical time period for

exposing children to new foods, tastes, and textures, thus establishing their taste preferences for nutrient-dense foods and long-term healthy eating habits (Hansen et al., 2015; Shriver & Buehler, 2016).

Previous research studies have examined the specific associations between taste preferences and FV consumption among children (Birch, 1999; Cooke, 2007; Cooke et al., 2004; Noia & Byrd-Bredbenner, 2013). Food neophobia (fear of new foods) is a common problem among young children, especially when trying FV (Howard, Mallan, Byrne, Magarey, & Daniels, 2012; S. L. Johnson, Davies, Boles, Gavin, & Bellows, 2015; Maratos & Staples, 2015; Perry et al., 2015). In a study conducted by S. L. Johnson et al. (2015), children who were neophobic consumed fewer V and had a lower variety of foods in their diet. Researchers suggest that finding strategies to cope with food neophobia and introduction to FV at a young age can reduce the potential of food neophobia (Perry et al., 2015; Maratos & Staples, 2015). Furthermore, Cooke (2007) and Kong, Gillman, Rifas-Shiman, and Wen (2016) discussed the importance of food introductions to young children; the more the child is introduced to FV the more likely they are to eat them and try new FV. Also, parental influences such as breastfeeding and early introduction to FV can positively influence the taste preferences for FV of young children (Blissett, Bennett, Donohoe, Rogers, & Higgs, 2012; Cooke, 2007; Kong et al., 2016; Möller, Hoog, Eijsden, Gemke, & Vrijkotte, 2013). While other factors such as texture, visual, and olfactory senses influence children's acceptability of FV (Benton, 2004; Blissett & Fogel, 2013), FV taste preferences has been identified as one of the

main predictor of children's FV intake, especially in preschool-aged and older children (Birch, 1999; Cooke, 2007; Cooke et al., 2004).

Parental and Household Influences on Children's Fruit and Vegetable Intake

While child taste preferences are considered to be a key predictor of children's FV intakes, parents have been shown to have significant direct and indirect influences on children's FV intakes as well (Bante et al., 2008; Benton, 2004; Birch, 1980; Blissett & Fogel, 2013; Hughes & Shewchuk, 2012). FV household availability has been identified as a correlate of FV intake among preschool children (Amuta et al., 2015; Bryant et al., 2011; Gross et al., 2010; Noia & Byrd-Bredbenner, 2013; Rasmussen et al., 2006). In a sample of low-income, multi-ethnic/racial children, Amuta et al. (2015) found that greater availability of FV in the household was associated with higher consumption of FV. Another study indicated that FV availability moderated the link between African American adolescents' taste preferences and their Afrocentric values on their reported FV intakes (Noia & Byrd-Bredbenner, 2013). In another study with African American infants, FV availability led to greater intake of FV (Bryant et al., 2011). Gross et al. (2010) found that elementary-aged children in low income neighborhoods consumed more FV if they were included in grocery shopping and if the foods were present in their homes (Gross et al., 2010).

In addition to making FV available to children in the household, parents also directly influence children's FV consumption via their own consumption of FV, taste preferences for specific FV, and the way they encourage and/or discourage their child to eat specific foods (Bante et al., 2008; Blissett & Fogel, 2013; Hoerr et al., 2009;

Papaioannou et al., 2013; Vereecken et al., 2009). Parents who model consumption of FV to their children tend to have children who consume greater amounts of FV compared to children whose parents consume fewer FV (Blissett & Fogel, 2013). Furthermore, positive feeding practices, including verbal and behavioral strategies, such as parents who are visibly enthusiastic about eating FV, are more likely to elicit children's interest in FV and thus increase children's overall consumption of FV (Hughes & Shewchuk, 2012). Some studies found that negative and positive associations to foods as directed by the parent directly affected not only children's taste preferences for FV, but also their consumption of FV (Cooke et al., 2004; Hughes & Shewchuk, 2012). Other studies found that parents who are likely to use negative practices, such as judging the child for not eating their V, tend to have children with lower V intakes compared to parents who use positive strategies to promote FV intake, such as having structured meal times or making vegetables accessible to the child (Baranowski et al., 2013). Thus, research shows that parents may influence their children's FV intakes not only through their own FV taste preferences, consumption/modeling of FV intake, and FV household availability, but also through their daily interactions with the child, the use of feeding practices and strategies, and verbal and nonverbal communications that may encourage children's consumption of FV and thus develop long-term healthy eating habits and diets rich in FV (Birch, 1980).

Parental Feeding Styles and Children's Nutrition Outcomes

General parenting styles have been studied extensively in relation to children's diet quality and/or obesity risk (Hughes et al., 2008; Shloim et al., 2015; Tovar et al., 2012; Vollmer & Mobley, 2013). General parenting styles were developed by Baumrind

(1971) and later refined and categorized into four specific parenting styles by Maccoby and Martin (1983). The parenting styles are defined by two dimensions—demandingness, which refers to parental control, demands, and supervision, and responsiveness, which refers to parental approval, connection, and warmth. The four categories of general parenting styles are derived from the combination of the two dimensions: authoritarian parenting style (high demandingness, low responsiveness), authoritative parenting style (high demandingness, high responsiveness), indulgent parenting style (low demandingness, high responsiveness), and uninvolved parenting style (low demandingness, low responsiveness) (Baumrind, 1971; Maccoby & Martin, 1983). Nutrition researchers have acknowledged, however, that parenting style in feeding situations may differ from the general parenting style of the parent (Hughes et al., 2005). Thus, Hughes et al. (2005) examined dimensions of general parenting style in a feeding context and coined the term "feeding styles" because general parenting styles may not reflect parenting behaviors that are specifically related to food. Based on this theoretical model, Hughes et al. (2012, 2005) developed and validated a new measure of parental feeding style called the Caregiver's Feeding Style Questionnaire (CFSQ). This assessment tool utilizes various questions to rate the demandingness and responsiveness of the parent in relation to food-related situations during a meal or snack with the child.

The CSFQ has been used extensively in nutrition literature and utilized largely to examine associations between parental influences and children's weight status and/or obesity risk (Frankel et al., 2014; Hughes et al., 2011; Hughes et al., 2005; Hughes et al., 2008; Tovar et al., 2012; Vollmer & Mobley, 2013). Furthermore, a systematic review

concluded that parents have a strong influence on child weight status through their practices and behaviors and that child weight status may also be, in turn, influencing parenting behaviors (Ventura & Birch, 2008). Parents who use permissive feeding styles such as indulgent or uninvolved have been associated with having children who are overweight or obese (Ventura & Birch, 2008). Moreover, a study by Frankel et al. (2014) found that obesity risk in 2- to 5-year-old children was higher among children whose parents reported using a permissive feeding style, more specifically, the indulgent feeding style. Hughes et al. (2008, 2005) also found an increased obesity risk among children aged 3 to 5 years whose parents utilized the indulgent feeding style. The indulgent feeding style is characterized by warmth but low parental demandingness; children are more likely to have higher weights due to their impaired ability to adhere to hunger and satiety cues (Hughes et al., 2005). Furthermore, a study by Tovar et al. (2012) discovered that the indulgent feeding style was associated with negative health outcomes among children, including obesity, in their investigations; a review by Vollmer and Mobley (2013) concurred. The authoritarian feeding style is characterized by restrictive and power-asserting behaviors towards children (Hughes et al., 2012; Hughes et al., 2005). Authoritarian parents have been proposed to utilize the "clean your plate" practice more than others, which is a practice that has been linked to higher weight status due to parents overriding children's sense of hunger and satiety cues (Hughes et al., 2005). The uninvolved feeding style is characterized by parents displaying little to no control or interest in the feeding context (Hughes et al., 2005). The uninvolved feeding style

moderated the relationship between preschoolers' emotional eating and their BMI z-scores (Hankey, Williams, & Dev, 2016).

In contrast to the three feeding styles discussed above, the authoritative feeding style and more generally, the authoritative parenting style has been associated with the most positive children's weight- and/or obesity-related outcomes across studies (Frankel et al., 2014; Hughes et al., 2005; R. Johnson et al., 2012; Shloim et al., 2015; Vollmer & Mobley, 2013). In a study examining general parenting styles, researchers found that the authoritative feeding style was associated with lower weights among children 8-12 years of age and their parents were more easily able to control food intake in the home (Rodenburg, Kremers, Oenema, & van de Mheen, 2012). Frankel et al. (2014) found that children whose parents used an authoritative feeding style had significantly lower BMI z-scores compared to children of indulgent parents. Tovar et al. (2012) had consistent findings among low-income, Hispanic mothers who categorized themselves as high demanding/high responsive in the feeding context.

Additional research has examined the associations between parental feeding styles and children's diet quality and/or dietary intakes, with studies largely focusing on consumption of energy-dense foods and beverages (Hennessy et al., 2012; Lora et al., 2016). In a study conducted by Lora et al. (2016), mothers who scored higher for responsiveness or who used a permissive feeding style were more likely to allow their children to buy sugar-sweetened beverages or F juice during grocery shopping (Lora et al., 2016). In another study by Hennesey et al. (2012), permissive feeding style was related to lower overall diet quality, suggesting that children of permissive parents were

more likely to consume energy dense foods compared to children whose parents were not permissive (Hennessy et al., 2012).

A few previous studies have examined feeding style specifically in relation to children's FV intake (Blissett, 2011; Kremers et al., 2003; Patrick et al., 2005). In a study by Patrick et al. (2005), it was noted that children whose parents used the authoritarian feeding style consumed less V, whereas children of parents who used the authoritative feeding consumed more than V than children whose parents used other feeding styles. However, it is important to note that the directionality of this relationship has not yet been determined; it could be that lower V consumption leads to parental coercion and demandingness for the child to eat the target/undesired foods (Rigal, Chabanet, Issanchou, & Monnery-Patris, 2012). In another study, researchers found that parents who have a permissive feeding style had children with lower intakes of FV between 3 pm and the child's bedtime (Hoerr et al., 2009). However, the researchers concluded that parents who reported being more demanding during mealtimes had children who consumed greater amounts of FV, suggesting that demandingness in the feeding context may contribute to higher FV intakes among children (Hoerr et al., 2009). Kremers et al. (2003) examined parenting styles in relation to F consumption in adolescents. Adolescents who consumed significantly higher amounts of F had parents who used an authoritative style compared to adolescents whose parents used the other parenting styles (Kremers et al., 2003). Papaioannou et al. (2013) studied moderating effects of feeding styles in relation to parenting practices and overall FV consumption in low-income families with preschool children. The findings showed that parents who used the

indulgent feeding style were more likely to have children with lower FV consumption compared to parents who used other feeding styles (Papaioannou et al., 2013).

Previous studies on feeding styles and children's dietary and obesity/weight outcomes have utilized different methodologies, sample sizes, and unique populations, which make summarizing the findings difficult. However, studies have suggested that parents with an authoritative feeding style tend to have more control over feeding situations, have structured meals, and tend to provide higher nutrient-dense food to their children compared to parents utilizing one of the other feeding styles (Vollmer & Mobley, 2013). In conclusion, previous research has largely focused on parental feeding styles in relation to child weight status/obesity risk or consumption of high energy foods (Frankel et al., 2014; Hughes et al., 2011; Hughes et al., 2005; Hughes et al., 2008; Tovar et al., 2012; Vollmer & Mobley, 2013). The authoritative feeding style has been suggested to represent the most positive feeding style for children's weight outcomes; however, much less is known about the influence of the authoritative feeding styles on consumption of healthy foods among children, such as FV (Hoerr et al., 2009; Hughes et al., 2005; Kremers et al., 2003; Patrick et al., 2005). Furthermore, the associations between the feeding styles, children's consumption of FV, and known predictors of FV intakes have not been extensively studied among low-income diverse families that face a number of socioeconomic and other unique challenges and barriers that may influence not only their home environment, but also their availability and access to FV (Di Noia & Byrd-Bredbenner, 2014; Rasmussen et al., 2006).

Purpose of the Current Study

A strong association between children's taste preferences for specific foods and children's consumption of such foods, including FV, has been established in previous studies (Birch, 1999; Cooke, 2007; Cooke et al., 2004). A number of studies have also shown that how parents feed children plays an important role in children's nutrition-related outcomes (Hughes et al., 2005; R. Johnson et al., 2012; Shloim et al., 2015; Vollmer & Mobley, 2013), with the authoritative feeding style being linked to favorable dietary outcomes, including higher FV intake in some populations (R. Johnson et al., 2012; Kremers et al., 2003; Patrick et al., 2005; Shloim et al., 2015; Vollmer & Mobley, 2013). Yet, the relationship between the authoritative feeding style, children's FV taste preferences, and their FV intake has not been examined in previous studies. The purpose of this study was to test the moderating effect of the authoritative feeding style on the relation between children's FV taste preferences and FV frequency intake in a sample of low-income, diverse parents and their preschool-aged children. It was hypothesized that the authoritative feeding style, marked by high demandingness and high responsiveness, strengthens the relationship between children's FV taste preferences and FV consumption.

Study Hypotheses

H_1: There is a significant positive association among children's taste preferences for F and their F frequency consumption.

H_2: The positive association among children's F taste preferences and children's F consumption is stronger among children whose parents use an

authoritative feeding style compared to parents who use other feeding styles. The link between F taste preferences and consumption is strengthened by authoritative feeding style.

H_3: There is a significant positive association among children's taste preferences for V and their V frequency consumption.

H_4: The positive association among children's V taste preferences and children's V consumption is stronger among children whose parents use an authoritative feeding style compared to parents who use other feeding styles. The link between V taste preferences and consumption is strengthened by authoritative feeding style.

CHAPTER III

METHODOLOGY

Study Design

Data for this correlational study were collected as part of a large, observational study of parents/legal guardians of 3- to 5-year-old children enrolled in Head Start programs in North Carolina. Recruitment of participants took place between March 2015 and May 2016 from a total of 42 Head Start centers across seven counties in NC. The primary goal of the larger study was to identify parenting practices that parents use to encourage FV consumption among 3- to 5-year-old children and develop a new measure of parenting practices specifically targeting FV parenting strategies. Participants were recruited during drop-off and pick-up times at participating Head Start programs and individual sites, at parent meetings, and/or via flyers that were sent home with children or posted in the hallways. After potential participants provided their contact information to participate in the larger study, they were contacted, screened for study eligibility, and one-on-one visits were scheduled. Prior to data collection, potential participants reviewed and signed written informed consent forms, and provided written permission for researchers to obtain their child's birthdate, height, weight, and date of measurement from official Head Start records. The study protocol and procedures were reviewed and approved by the University Institutional Review Board at the University of North Carolina Greensboro prior to any data collection.

Participants and Study Procedures

Interested participants (hereafter the term "parents" is used to refer to all eligible parents/legal guardians) were screened using the following inclusion criteria: (a) being a parent/legal guardian of a 3 to 5 year-old child enrolled in the Head Start program in one of the participating counties; (b) being 18 years of age or older; (c) being primarily responsible for feeding the child at home; (d) identifying as a non-Hispanic White, Hispanic White, or African American individual; and (e) their child did not have any medical conditions that required a special diet or influence FV intake (e.g., diabetes). The one-on-one visits were scheduled using parents' availability, mostly around pick up and drop off times in Head Start centers during the weekdays. Once parents arrived for the scheduled visit, they were presented with the details of the study and a written informed consent form and permission form for obtaining information from the Head Start records.

After consent and permission forms were signed, parents were asked to complete the Parent Survey. The survey for the larger study included six sections, but only data from the following sections were utilized in the current study: Section 1 (socio-demographic, individual/family information), Section 2 (parent-reported child FV food frequency questionnaires [FFQ]), and Section 6 (FV household availability, parent-reported child taste preferences for FV, and parent taste preferences for FV). Data from Section 2 were collected in an interview format, with a research assistant recording the parents' responses. Parents completed the survey sections 1 and 6 on their own in a pencil and paper format, with the help of trained research assistants who were present to assist each parent. After completion of the visit, each parent received a $25 gift card for her/his

participation. The individual measures and variables collected and analyzed for the purposes of the current study are presented below.

Child Variables and Measures

Anthropometrics

Children's demographic and anthropometric characteristics (i.e., age, gender) were collected via the Parent Survey and/or from the Head Start official records (i.e., height, weight, birthdate). Body Mass Index-for-age (BMI-for-age) z-score and percentile were calculated for each child using the Epi Info software (Epi Info, CDC, version 2007). Before utilizing the Epi Info, children's most recent height, weight, birthdate, and date of measurement were obtained from the official Head Start records at each participating site. Using the following criteria, children were categorized into four weight status categories: 1 = underweight (BMI-for-age < 5th percentile); 2 = healthy weight (BMI-for-age 5th to < 85th percentile); 3 = overweight (BMI-for-age 85th to < 95th percentile); and 4 = obese (BMI-for-age > 95th percentile; Kuczmarski et al., 2002).

Child Fruit and Vegetable Taste Preferences

Children's taste preferences for FV were assessed using a modified version of a previously validated measure developed by Haire-Joshu et al. (2004). Several FV items were added to the measure based on focus group findings from our preliminary research with the target population of the current study (e.g., cacti, squeezable FV pouches). The final measure utilized in the larger study included 21 F and 29 V that were consumed by young children; these were the same FV included in the FFQ. Parents were asked to report their child's FV taste preferences for each item using the following answer

options: 0 = never had; 1 = hates it; 2 = dislikes it; 3 = likes it; 4 = loves it/favorite (Bante et al., 2008).

First, frequencies of F and V that were "ever consumed" by children in the sample were examined. For the purposes of the current study, the top 10 F and 10 V that were consumed by the greatest proportion of our sample were included in all final analyses. The 10 F included bananas, grapes, apples, strawberries, oranges, peaches, watermelon, pineapple, cuties/mandarins, and pears. The 10 V included the following items: white potatoes (not fried), corn, carrots, broccoli, lettuce, green beans, tomatoes, cucumbers, green peas, and cabbage. The same 10 F and 10 V were included in the measures of FV child taste preference, child frequency intake, and household FV availability. Frequencies of child taste preferences for FV reported by parents were carefully examined. The possible responses included a 0 = my child never had; if the child has ever had the item, a Likert-type scale was used to report the child's preference for the item (1 = my child hates it to 4 = my child loves it). The parental responses to each fruit and vegetable item were examined to determine which 10 F and 10 V items were reported by most parents with responses 1 through 4. Thus, the items that a significant number of children in the sample "has never had" were omitted from the analysis.

Children's Fruit and Vegetable Intake

During the one-on-one visits with trained research assistants, parents responded to the FFQ items (section 2 of the survey) based on their child's FV consumption in their presence during the past 7 days. The food frequency questionnaire, called the Slu4Kids FFQ, was originally developed in a study of parents of preschool-aged children in

Missouri (Haire-Joshu et al., 2008; Haire-Joshu et al., 2004; Linneman et al., 2004). Based on the results of preliminary focus groups with the target population of the current study (*n*=62), the Slu4Kids FFQ was modified to better fit our sample and purposes of the larger study. The modified version containing 21 F items and 29 V items was utilized during data collection. Parents were asked if their child's intake was "typical" in the past week and they were asked to provide frequency and approximate portion size of the items that were reported (Bante et al., 2008). First, parents were asked whether the child ate the specific FV in the past week; then the parent was asked how many times in the past week the child consumed it.

For the purposes of the current study, only frequency intake of the 10 F and 10 V listed above were included in the final analyses. Child FV intake was operationalized as frequency of 10 F and 10 V consumption over the past week (i.e., number of times when the 10 F and 10 V were consumed over the past seven days). The frequency of child F and V intake was computed as continuous variables, ranging from 0 to 5 for both, F and V (0 = never had; 1 = 1 time in the past week; 2 = 2 times; 3 = 3-4 times; 4 = 5-6 times; 5 = >7 times), with 5 being the highest possible value per item. Given that frequency intake was estimated for 10 F and 10 V, each child had a frequency intake score with a possible range of 0 to 50 for each, the F frequency intake and the V frequency intake.

Parental Variables and Measures

Parental Feeding Style

Parental feeding styles were assessed using the Caregiver's Feeding Style Questionnaire (CFSQ) (Hughes et al., 2005). Parents answered 31 questions based on

their usual interactions with their child during a meal or snack using the following answer choices on a Likert scale: 1 = never; 2 = rarely; 3= sometimes; 4= most of the time; 5= always, to describe the frequency of the situation presented in the questions. For the purposes of the current study, 19 specific items from the CFSQ were utilized to classify parents into four feeding styles, following procedures developed by Hughes et al. (2005). The 19 questions were used to calculate parents' scores for two dimensions, demandingness and responsiveness, during the meal or snack. The two dimension scores were created using seven child-centered directives that focused on child autonomy (e.g., complimenting the child on eating, allowing the child to choose from prepared foods) and 12 parent-centered directives that focused on control using external pressures (e.g., demanding the child to eat, withholding dessert until plate cleaned). To calculate the scores of demandingness and responsiveness, first the mean of all 19 items was calculated to determine the demandingness score. Next, the mean of the seven child-centered directives was calculated to yield the responsiveness score (Hughes et al., 2012). The calculations that were completed to generate the feeding style categories are presented below:

$$\text{Demandingness score} = \text{The mean of all 19 questions}$$

$$\text{Responsiveness score} = \frac{\text{The mean of the seven child-centered questions}}{\text{Demandingness score}}$$

The median splits for demandingness and responsiveness scores of 2.80 for demandingness and 1.16 for responsiveness from Hughes et al. (2012) were used as cutoff points for categorizing parents into one of the four parental feeding styles

(authoritative, authoritarian, indulgent, and uninvolved). The cutoff points were calculated by taking the mean score for both demandingness and responsiveness from each study sample after examining several studies with different sample sizes and populations (Hughes et al., 2012). The median splits were also calculated specifically for our sample and were similar to those found by Hughes et al. (2012) (2.74 for demandingness and 1.18 for responsiveness). Because the characteristics of our sample were similar, the cutoff median values from the study by Hughes et al. (2012) were utilized for the purposes of the current study. Furthermore, sensitivity analyses were run using both sets of median cutoff values for feeding typology. Parents who scored above 2.80 on demandingness and below 1.16 on responsiveness were categorized as authoritarian; parents above 2.80 and above 1.16 as authoritative; parents below 2.80 and above 1.16 as indulgent; and parents below 2.80 and below 1.16 as uninvolved (Hughes et al., 2012; Hughes et al., 2005; Maccoby & Martin, 1983). For the purposes of the current study, parents were classified into one of two categories of feeding style for final analyses (0 = authoritative feeding; 1 = all other feeding styles).

Study Measures and Variables

Race/Ethnicity, Education, Household Income

Parental race/ethnicity was determined by two questions. First, parents were asked to self-report their ethnicity, with the following answer options: 1) No, not Hispanic, Latino, or Spanish origin; 2) Yes, Hispanic, Latino, or Spanish origin. If the parent answered yes, a follow up question was asked to gather more details about their origin (Mexican, Mexican American, Chicano/Puerto Rican/Cuban/Another Hispanic/Latino, or

Spanish origin). Second, parents were asked to self-identify using the following answer options: 1) African American (or Black; Hispanic or Non-Hispanic); 2) Caucasian (or White; Hispanic or Non-Hispanic); 3) Two or more races (i.e., African American and White); and 4) Other. The final race/ethnicity variable for the regression models was dummy coded as follows: 0) African American & Hispanic; 1) White.

Parents were asked about their highest level of education completed (i.e., What is your highest level of general education?). Response options were as follows: 1) Grade school (grades 1-8); 2) Some high school, no degree; 3) High school graduate (or equivalent/GED); 4) Some college (1-4 years, no degree); 5) Associate degree (occupational or academic degree); 6) Bachelor's degree (4-year degree; BS, BA, AB); 7) Master's degree (MS, MA, MSW); 8) Professional degree (MD, JD, DDC); 9) Doctorate degree (e.g., PhD); and 10) Other. For the final regression analyses in the current study, the education categories were combined to create 2 categories and dummy coded as follows: 0) High school degree or less; 1) Some college, associate degree, baccalaureate degree and/or graduate studies.

The target population of the current study was low-income families whose 3- to 5-year-old children were enrolled in Head Start programs. To participate in the Head Start program, families must have a low-income status and meet specific eligibility criteria (i.e., a parent of a family of four has to make an annual income below $24,600, according to the US Federal Poverty Guidelines, to have a child enrolled in Head Start; Poverty Guidelines, 2015). In addition to meeting these criteria, parents were asked about their total household income in the past year using the following response options: 1) Less

than $10,000; 2) $10,000-$24,999; 3) $25,000-$34,999; 4) $35,000-$49,999; 5) $50,000-$74,999; and 6) >$75,000. For the final analyses in the current study, the income categories were dummy coded as: 0) Under $10,000; 1) ≥ $10,000.

Parental Fruit and Vegetable Taste Preferences

Parental taste preferences for FV were measured using the modified tool developed and validated by Haire-Joshu et al. (2004). Some FV items were added to the measure based on focus group findings from our preliminary research with the target population of the current study (e.g., cacti, squeezable FV pouches). The final measure utilized in the larger study included 21 F and 29 V that were consumed by the parents; these were the same FV included in the FFQ. Parents were asked to report their own FV taste preferences for each item using the following answer options: 0 = never had; 1 = hates it; 2 = dislikes it; 3 = likes it; 4 = loves it/favorite (Bante et al., 2008). Because parental taste preferences for FV were used as a control variable, the same 10 F and 10 V were examined for child and parental taste preferences. Each item ranged from 1 (hates it) to 4 (loves it/favorite); the final parental taste preference score ranged from 10-40 for the 10 F and 10 V. Similarly, to child taste preferences, the parental responses to each fruit and vegetable item were examined to determine which 10 fruit and 10 vegetable items were reported by parents with responses 1 through 4. Thus, the items in the sample listed as “have never had” were omitted from the analysis.

Household Availability of Fruit and Vegetables

FV availability was assessed using a modified version of a previously validated household FV availability measure (Marsh, Cullen, & Baranowski, 2003). Parents were

asked whether or not they had specific FV in their home in the past 7 days, using a "yes" and "no" format (0 = no; 1 = yes). The availability survey asked parents to report any of the listed FV whether they were fresh, frozen, or canned. The measure included a total of 21 F and 28 V items, with several items added to the list based on previously completed focus groups with the target population of the current study. The items matched the FVs included in the FFQ that was used to estimate children's frequency intake of FV consumption in the past 7 days (section 2).

For the purposes of this study, all measures related to FV (i.e., availability, child and parent taste preferences, frequency intake over the past 7 days) were based on top 10 F and 10 V that were "ever consumed" by the greatest proportion of children in the sample to avoid including FV in the analyses that a large number of children in our sample never tasted/consumed. The 10 F included bananas, grapes, apples, strawberries, oranges, peaches, watermelon, pineapple, cuties/mandarins, and pears. The 10 V included the following items: white potatoes (not fried), corn, carrots, broccoli, lettuce, green beans, tomatoes, cucumbers, green peas, and cabbage. Given that the top 10 F and 10 V were included in the availability variables, the possible score ranged from 0-10 for each.

Statistical Analyses

Data were analyzed using the Statistical Package for Social Sciences for Windows (21.0 SPSS Inc., Chicago, IL, 2012). All data were checked for accuracy by a minimum of two trained and research assistants independently. All key continuous variables were carefully checked for normal distribution and outliers, using visual inspection and q-q plots (Thode, 2002; Wilk & Gnanadesikan, 1968). Descriptive statistics were computed

for all socio-demographic, family, child, and parent study variables, including means, standard deviations, and frequencies.

Pearson's bivariate correlations were used to test hypothesis 1 and 3 which examine associations among the key continuous study variables such as child FV taste preferences, child FV intake frequency (times/week), FV household availability, child BMI z-scores, parent FV taste preferences, and parental feeding style (dummy coded; 1 = authoritative; 0 = all other feeding). Variables that were significantly correlated with child frequency intake of 10 F or 10 V (dependent variables) were included in subsequent multiple regression models as control variables. Potential differences in child FV frequency intake or taste preferences by race/ethnicity, income, and education were examined using Analysis of Variance (ANOVA). If significant differences in DVs were detected by race/ethnicity, income, and/or education, the variables were included as covariates in the moderated regression models for F and V. The levels of significance for the preliminary analyses were set at $p < 0.05$.

To test Hypothesis 2 and 4, the interaction effects of child taste preferences and authoritative feeding style on child frequency intake of FV were examined using two separate step-wise multiple regression models, one for F intake and one for V intake. The preliminary analyses showed that parental race/ethnicity, income, education, and marital status were significantly associated with either the dependent (child frequency intake of FV) or the main independent variable (child taste preferences for FV) and thus, these variables were included as control variables in the regression analyses. Prior to running the regression models, continuous variables of child FV taste preferences, parental taste

preferences, and FV availability were centered to avoid varying results, which are common in regression with interactions (Aiken & West, 1991).

Control variables, including race/ethnicity, education, marital status, parental taste preference for F or V, and household availability of F or V were entered in the first block of each omnibus regression model, followed by child taste preferences in block 2, and the moderating variable of the authoritative feeding style (dummy coded) in block 3. To test the interactions between child taste preferences and authoritative feeding style on child F and V frequency intake, the interaction term was entered in the last block of each of the two regression models (block 4). Tests of simple slopes were conducted if a significant interaction was not detected. A significance level for the interaction effect was set at $p < 0.10$ based on a previous study that found 91% of stimulated correlations studies make Type II errors in identifying moderation effects (McClelland & Judd, 1993). Significance levels for all other tests were set at $p < 0.05$.

CHAPTER IV

RESULTS

Parent and Child Demographics

A total of 431 parents of 3- to 5-year-old children expressed interest in finding out more about the study and provided their contact information to the researchers during the recruitment phase of the current study. Of the 431, a total of 281 (65%) completed the study. The characteristics of the sample are presented in Tables 1 and 2. The average age of parents was 32 years, with most being female (*n*=265, 94%). Of all the female participants, 90% were mothers and the remaining 10% reported being the child's grandmother/other family member. More than 70% of the parents were overweight or obese, with BMI above 25 (Table 1). The proportion of the sample by race/ethnicity was as follows: 37% were Non-Hispanic African American, 35% Hispanic White, and 26% Non-Hispanic White. Frequency analyses revealed that 31% of parents did not complete a high school education, 25% graduated from high school, 37% had some college or associates degree, and only 6% were college graduates or completed post-graduate studies. A total of 58% of parents were not employed during the time of data collection and about half (*n*=126, 45%) made between $10,000 and $24,999 annually in the past year. Using the feeding style typology by Hughes at al. (2005), the greatest proportion of the sample was classified as parents who used indulgent feeding style (35%), followed by

authoritarian (26%), uninvolved (20%), and authoritative (16%). The detailed descriptive characteristics of the sample are presented in Table 1.

Children's demographic and anthropometric characteristics are presented in Table 2. The sample was evenly split between females and males, with an average age of 4 years (4.35 ± 0.7). The majority of the children in the sample were classified as overweight or obese, with only 40% being within the healthy weight status category (see Table 2).

Bivariate Correlations Related to Fruit Intake

Table 3 displays bivariate correlations between the independent variables, potential control variables, and the moderating variable in relation to children's F intake. Several significant correlations were identified between the variables of interest. First, a positive correlation between child F intake and F availability was detected ($r = 0.491$; $p < 0.01$). Parents with higher education had children with lower intakes of F. However, F availability was negatively correlated with parent education ($r = -0.195$; $p < 0.01$); parents with higher education reported lower availability of F in the home. However, higher education was positively correlated with children's F taste preferences ($r = 0.196$; $p < 0.01$). Parental taste preferences for F were positively correlated with children's taste preferences for F ($r = 0.626$; $p < 0.01$). No significant correlations were found between any of the variables and the authoritative feeding style. There was a strong trend towards a significant positive correlation between child F taste preferences and F frequency intake ($r = 0.118$; $p = 0.051$), with the level of significance just outside the significance cutoff value, thus rejecting Hypothesis 1 of the current study (Table 3).

Moderated Regression Analysis for Fruit Intake

The results of the moderated regression analysis, with child F frequency intake as the dependent variable, are depicted in Table 5. The analysis revealed no significant interaction between child taste preferences for F and the authoritative feeding style on the child F frequency intake ($B = 0.47$; $p = 0.875$). Thus, Hypothesis 2 that the authoritative feeding style positively moderates the relationship between child F taste preferences and F intake was rejected. However, there was a main effect of household availability of F and a main effect of child taste preferences for F on the child F frequency intake. Parents who reported greater availability of F in the home had children who consumed F more frequently than others ($B = 1.43$; $p < 0.001$). Finally, children with greater mean taste preferences for F had greater frequency of F intake in the past 7 days ($B = 3.83$; $p < 0.01$). The overall model predicting F frequency intake among children was significant ($F(8,256) = 12.5$; $p < 0.001$) and explained 28.7% of the variance in children's F frequency intake over the past 7 days. After controlling for race, education, marital status, parental F taste preferences, and household availability of F, child taste preferences for F contributed a small but significant amount of unique variance to the overall model (R^2 change = 0.024; $p < 0.001$; see Table 5).

Bivariate Correlations Related to Vegetable Intake

Bivariate correlations in relation to V intake are presented in Table 4. Positive associations were detected between marital status and child V frequency intake ($r = 0.152$; $p < 0.05$), intake and household availability of V ($r = 0.405$; $p < 0.01$), and intake compared to child V taste preferences ($r = 0.261$; $p < 0.01$), accepting Hypothesis 3 of the

current study. Household availability of V was also correlated with child taste preferences for V ($r = 0.228$; $p < 0.01$). Negative correlations were identified between education and child V intake ($r = -0.174$; $p < 0.01$). Child V taste preferences were also positively correlated with parent income ($r = 0.150$; $p < 0.05$). Furthermore, no significant correlations were detected between the authoritative feeding style and other variables in relation to V (see Table 4).

Moderated Regression Analysis for Vegetable Intake

The moderated regression analysis for child V intake as the dependent variable revealed significance in the overall model ($F(8,246) = 11.46$; $p < 0.001$). The regression model explained 27.8% of the variance in children's V frequency intake over the past 7 days. However, no significant interaction effect between the child taste preferences for V and the authoritative feeding style on children's V frequency intake was detected ($B = -2.75$; $p = 0.259$). Thus, the hypothesis 4 stating that the authoritative feeding style positively moderates the relationship between child V taste preferences and V intake was rejected. Household availability of V had a significant main effect on the child frequency intake of V ($B = 0.97$; $p < 0.001$). A significant amount of variance in the child V intake was contributed to the child taste preferences for V ($B = 4.67$; $p < 0.001$) after covariates, including household availability of V, were entered into the model (R^2 change = 0.072; $p < 0.001$; see Table 6).

CHAPTER V

DISCUSSION

The purpose of this study was to test the moderating effect of the authoritative feeding style on the association between child taste preferences and consumption of FV in a sample of low-income parents and their preschooler-aged children in North Carolina. While no interactions between the authoritative feeding style and taste preferences on children's F or V intake were found, important main effects were identified in both models. These findings expand the current literature on parental feeding style and child dietary outcomes by demonstrating that, among low-income families with 3- to 5-year-old children, child taste preferences for and household availability of FV have an influence on children's intake of both F and V and have more of an influence on FV intake than the type of feeding style parents utilize in the FV feeding context.

Previous research has linked the authoritative feeding style to more favorable nutrition-related outcomes among children compared to other feeding styles (Frankel et al., 2014; R. Johnson et al., 2012; Shloim et al., 2015; Tovar et al., 2012; Vollmer & Mobley, 2013). Such evidence was found even among parents of young children enrolled in Head Start, which was the target population of the current study. For instance, Tovar et al. (2012) examined mother-child dyads among immigrant Hispanics and found that the authoritative feeding style was associated with healthier weight status compared to other feeding styles. In a study that examined parental feeding styles in relation to preschool-

aged children's ability to self-regulate, researchers found that children of authoritative parents had children that were more easily able to self-regulate food intake and had lower BMI z-scores compared to children of indulgent parents (Frankel et al., 2014). Consistent with these findings, R. Johnson et al. (2012) suggested that authoritative parents are able to create a less obesogenic environment at home for their elementary-aged children compared to parents who use other feeding styles. While this research provides some evidence that the authoritative feeding style may provide overall protection against childhood obesity risk, the specific mechanisms of such protective effect are not lacking in current literature.

Previous studies that examined the associations between parental feeding styles and children's dietary intakes have mixed findings and are less consistent than previous studies on the feeding style in relation to children's obesity/weight outcomes (Blissett, 2011; Frankel et al., 2014; Hughes et al., 2011; Hughes et al., 2005; Hughes et al., 2008; Kremers et al., 2003; Patrick et al., 2005; Tovar et al., 2012; Vollmer & Mobley, 2013). In a recent review, parents with the authoritative feeding style were shown to have greater control over meals and provide higher nutrient-dense foods to their children compared to parents with the permissive feeding style (Vollmer & Mobley, 2013). In our sample of 3- to 5-year-old children, the authoritative feeding style did not moderate the relationship between children's taste preferences and their F or V intake. This could be due to the fact that the authoritative feeding style is a broader construct that reflects overall climate but not specific strategies used during feeding. Thus, parents may be categorized as generally having the "authoritative feeding style," while using coercive

feeding tactics when offering the child certain foods. Thus, it is likely that specific feeding practices are more influential than overall feeding climate when encouraging children to consume the target food (Shriver & Buehler, 2016). This may be even important when the child is particularly resistant to eating or even trying foods that are typically less palatable to children, such as V. Thus, our findings may be explained, at least in part, by the fact that parental feeding styles, similarly to general parenting styles, do not represent specific parenting practices important to children's FV intakes. The differences between feeding styles and feeding practices in relation to FV consumption have been well summarized in a review paper by Blissett (2011). The authors also highlighted potential impacts of parental feeding on children's FV intakes and emphasized the current need to conduct further studies on the parental influences of children's consumption of nutrient-dense foods such as FV (Blissett, 2011).

The main effects of child taste preferences for F and V and household availability identified in our study are consistent with previous literature on children's FV consumption (Amuta et al., 2015; Benton, 2004; Blissett & Fogel, 2013; Cooke, 2007; Cooke et al., 2004; Di Noia & Byrd-Bredbenner, 2014; Rasmussen et al., 2006). Studies have found associations between taste preferences for both F and V and reported intakes, making taste preferences a correlate of children's FV consumption (Birch, 1999; Cooke, 2007; Cooke et al., 2004; Di Noia & Byrd-Bredbenner, 2014). In addition to taste, many other factors, including texture, visual, and olfactory senses can influence children's acceptability of foods, especially V that are bitterer or tarter than F (Benton, 2004; Blissett & Fogel, 2013). While texture, color, and visual characteristics of FV that

contribute to children's taste preferences were not examined in the current study, it was apparent that children in our sample had much greater taste preferences for F over V. This finding is consistent with previous research conducted with young children and is largely contributed to the sweeter taste of F compared to V and the natural predispositions of human to like sweet and salty tastes over bitter and sour taste (Birch, 1999; Blissett & Fogel, 2013; Desor et al., 1975).

Although the importance of positively impacting children's taste preferences for healthy foods early in life is well acknowledged in previous research, recent studies suggest that parental influences on children's preferences might begin even before birth via taste exposures during pregnancy and via breastfeeding in early infancy (Blissett et al., 2012; Kong et al., 2016; Möller et al., 2013). In the sample, child taste preferences for F were correlated with F frequency intake, approaching significance (Table 3). A greater correlation was found in child V taste preferences on V frequency intake, supporting our third hypothesis (Table 4). This was an interesting finding due to the fact that F is sweeter and children typically like sweet tastes over the bitter and tart taste of V (Birch, 1999). However, the current study only examined FV intake over a seven-day period and other factors besides taste preferences (i.e., household availability) influenced their FV intake. Based on literature that supports findings of taste preferences (Birch, 1999; Cooke, 2007; Cooke et al., 2004; Di Noia & Byrd-Bredbenner, 2014), not only household availability but also parental taste preferences have been related to children's taste preferences. This suggests that a variety of inter-related factors may be driving taste preferences of children for FV (Di Noia & Byrd-Bredbenner, 2014; Rasmussen et al., 2006). In the current study,

parental taste preferences for both F and V became non-significant once the control variables were added to the model. Thus, child taste preferences remained the key significant factor influencing children's frequency intake of both F and V. Further research on predictors of taste preferences among low-income preschool children is warranted. Because it is critical to expose children at a young age to a variety of FV to ensure taste preferences develop and track into later years, identification of specific target foci for influencing taste preferences is critical for future effective intervention programs for parents of infants and young children (Cooke, 2007).

Household availability of FV has been linked to greater intakes of FV among both adults and children (Amuta et al., 2015; Bryant et al., 2011; Gross et al., 2010; Noia & Byrd-Bredbenner, 2013; Rasmussen et al., 2006). Because FV must be available to children in order to develop taste preferences for them, it is logical that availability indirectly promotes development of taste preferences for FV among children (Noia & Byrd-Bredbenner, 2013). While household availability of F was not related with child taste preferences for F in this sample, it was positively correlated with child fruit frequency intake. Household availability of V was significantly positively correlated with both child taste preferences for V and V frequency intake. Possible explanation for why household availability of F did not correlate with child's F taste preferences could be that children already have a strong preference for F due to their sweet taste. However, it is typically more difficult to create taste preferences for V among children (Birch, 1999; Blissett & Fogel, 2013). Thus, having them readily available in the home may make it easier for children to develop taste preferences for them. The findings demonstrate the

role household availability has on FV intake in the target population of the current study, a trend that has been supported across multiple previous investigations (Amuta et al., 2015; Bryant et al., 2011; Gross et al., 2010; Noia & Byrd-Bredbenner, 2013). For instance, Bryant et al. (2011) assessed the association between intake of FV in low-income and showed that FV consumption of African American mothers and their infants was significantly associated with greater home availability of FV. Similarly, Amuta et al. (2015) found that low-income children living in rural communities were more likely to consume FV if they were present in the home (Amuta et al., 2015).

Previous research has linked parental education to be positively associated with higher diet quality in children (Horodynski, Stommel, Brophy-Herb, Xie, & Weatherspoon, 2010; Rauber, da Costa Louzada, Feldens, & Vitolo, 2013). However, in this sample higher parental education was inversely associated to overall FV consumption in children. A study by Vereecken, Maes, and De Bacquer (2004) found that maternal education may be linked to various feeding practices. Furthermore, cultural factors and family traditions may have a strong impact on how children are fed within the family (Shloim et al., 2015). Thus, regardless of the mother's educational level, the type of feeding practices the mother uses may be more indicative of children's diet quality (Vereecken et al., 2004).

The participants for the current study were recruited from low-income, diverse families with children enrolled in the Head Start program in NC. Previous research has shown that this population is at high risk of malnutrition, poor diet quality, as well as obesity risk, with limited resources and poor access to healthy nutritious foods (Di Noia

& Byrd-Bredbenner, 2014; Dubowitz et al., 2008; Guerrero et al., 2016; Kong et al., 2013). A very high prevalence of obesity was observed among both parents and children in our sample, with 38% of children being obese and 9% being overweight. These estimates are significantly higher compared to the national obesity rate of 8% that was most recently reported for preschool-aged children (Ogden et al., 2014). Additionally, a total of 43% of parents in the sample were obese and 29% were overweight, with only 24% being classified as having a healthy weight. Given the very high prevalence of overweight and obesity in this sample, it is especially important to continue further efforts in the area of parental and family influences on young children's dietary intake in order to design more effective programs for this high-risk population.

The findings of the current study contribute significantly to the existing literature on predictors of FV intakes among low-income, racially diverse families with young children. The sample of child-parent dyads was relatively large and unique because participants were recruited from various areas of NC, from both rural and urban areas, and parents of different racial/ethnic backgrounds were recruited for the study, including African Americans, Hispanic Whites, and Non-Hispanic Whites. Also, in regards to feeding style, the sample had very similar characteristics to studies examined by Hughes et al. (2012), allowing for the use of the standardized cutoff points that were developed. However, the study had also several limitations that must be noted. First, children's FV intake in this study was based on a parent-completed food frequency questionnaire rather than a 3-day 24-hour dietary recall that is considered to be the gold standard of dietary assessment techniques (24-Hour Dietary Recall (24HR) At a Glance | Dietary Assessment

Primer, n.d.; Walker, Duggan, & Watkins, 2003). The FFQ used for estimating child frequency intake of FV was based on parental recall of child intake over the past 7 days, and not directly observed by the researchers. Direct observations were, however, not feasible in this study. Thus, parents could have over- or under-reported the frequency of FV intake for their child which may have influenced the findings of the study. Second, parents recalled one week's worth of FV intake during the scheduled one-on-one visit. Because the study took place between Spring 2014 and Fall 2016, parents were interviewed at different times of the year and therefore findings may have been influenced by the seasonality of FV. For instance, parents interviewed during the winter months may not have had financial means or access to fresh FV as those parents who were interviewed in the summer months. Third, household availability of FV could have been affected by geographical location of the participant's homes (i.e., food deserts, living in areas with little to no access to fresh FV). Low-income families may have no or only one car, or have limited access to public transportation, which may affect availability of FV in their homes. Finally, child FV intake was only estimated for when the child was with the parent, so the estimated of FV frequency intake do not reflect children's overall frequency of FV intake over the past 7 days. When recalling foods "ever consumed" by their child for the measurement of taste preferences, parents might have reported baby foods; the measure used was unclear with the definition of "ever consumed" and did not take into account baby foods as a first time for trying FV. Lastly, our participants were not a nationally representative sample of low-income families with

young children enrolled in the Head Start program. Thus, our findings cannot be generalized to other low-income families enrolled in Head Start across the nation.

Implications for Practice and Research

In the current study, the authoritative feeding style did not moderate the link between child FV taste preferences and child FV intake. However, our findings can be used for future efforts in educating and encouraging parents to have FV readily available in their homes. Because children's taste preferences cannot be developed without repeated exposure to the target foods, the availability and access to FV are critical in low-income families with young children. Furthermore, parents can be educated on introducing FV as first foods to their infants as well as eating a healthful diet while breastfeeding (Blissett et al., 2012; Kong et al., 2016; Möller et al., 2013). It is also important to note that due to seasonally high prices, and the fact that this population may not be able to always afford fresh FV, canned and frozen FV should be promoted as healthy and acceptable nutrient-dense options. Also, it is important to note that focus is also needed on nutrition policies at the broader level that would increase access to and affordability of FV among low-income families with young children.

Future studies are warranted to examine predictors of children's taste preferences for FV in low-income and racially/ethnically diverse preschool children. Larger studies are needed to assess FV intake among this population; NHANES data only reveal estimates for the nation at large and doesn't accurately depict unique barriers to FV consumption in specific geographical areas and across diverse populations. It is important to significantly expand research in this area because low-income and racially diverse

families with young children currently face significant health disparities that not only put them at a high risk for future obesity, but also chronic diseases such as diabetes and cancer (Boeing et al., 2012). Furthermore, longitudinal studies examining the influence of parental feeding behaviors in relation to children's FV consumption starting from the time of solid food introduction into early childhood are warranted to move the current knowledge on the development of children's FV taste preferences forward.

Table 1

Characteristics of the Parents/Legal Guardians of Children in the Sample (*n*=281)

	Descriptive Statistics	
Variable	***M*±*SD***	**N (%)**
Age (in years)	32 ± 10	
Parent Weight Status[a]		
Underweight		4 (1)
Normal Weight		67 (24)
Overweight		80 (29)
Obese		120 (43)
Sex		
Female		265 (94)
Male		16 (6)
Race/Ethnicity[b]		106 (38)
African-American		75 (27)
Non-Hispanic White		100 (35)
Hispanic White		

Table 1

Cont.

Variable	Descriptive Statistics	
	Mean ± SD	***n* (%)**
Highest Education Obtained[c]		
Less than high school		86 (31)
High school graduate		69 (25)
Some college/technical school/associate degree		105 (37)
College graduate and post-graduate study		18 (6)
Marital status[d]		83 (30)
Never married/single		170 (60)
Married/living with a partner		27 (10)
Divorced/separated/widowed		
Household Income[e]		93 (33)
Less than $10,000		163 (58)
$10,000-$34,999		21 (8)
More than $35,000		
Federal Food Assistance		
SNAP Benefits *(Receiving in the last month)*		204 (73)
Yes		77 (27)
No		
WIC Benefits *(Receiving in the last month)*		149 (53)
Yes		132 (47)
No		

Note. BMI[a] was calculated by the following formula and the cut offs developed by Center for Disease were used to categorize participants into the weight status categories: underweight=BMI <18.5; health weight=BMI of 18.5-24.9; overweight=BMI of 25-29.9; overweight=BMI >30. 4% of the sample had missing information for height and weight therefore BMI categories could not be determined. Parent race/ethnicity[b] (1= African American; 2= Hispanic White; 3= Non-Hispanic White). Education[c] (1= < high school; 2= high school graduate; 3= some college/technical school/associates degree; 4= college graduate/post-graduate study). 1% of the sample had missing information for highest education obtained. Marital status[d] (1= never married/single; 2= married/living with partner; 3= divorced/separated; 4= other). Income[e] (1= < $10,000; 2= $10,000-$34,999; 3= >$35,000). 1% of the sample did not provide information on household income for the past year.

Table 2

Characteristics of the Children in the Sample (*n*=281)

Variable	Descriptive Statistics	
	Mean ± SD	***n* (%)**
Age (in years)	4.35 ± 0.7	
Body Mass Index-for-age Percentile[a]	75.8 ± 29.5	
Sex[b]		
Female		131 (47)
Male		146 (52)
Weight Status[c]		
Underweight		11 (4)
Normal weight		112 (40)
Overweight		26 (9)
Obese		107 (38)

Note. BMI[a] was calculated by the following formula and the cut offs developed by Center for Disease were used to categorize participants into the weight status categories: underweight=BMI <18.5; health weight=BMI of 18.5-24.9; overweight=BMI of 25-29.9; overweight=BMI >30. Sex[b] was dummy coded (1= male; 2= female). 1 % of the sample had missing information on child sex, thus sex categories could not be determined. [c]9% of the sample has missing information on height, weight, birthdate or date of measurement, thus weight categories could not be determined.

Table 3

Bivariate Correlations Between Sociodemographic Characteristics, Child Fruit Taste Preferences, Fruit Frequency Intake, and Authoritative Feeding Style

Variable	Parent Race/Ethnicity	Education	Income	Marital Status	Fruit Availability	Child Fruit Taste Preferences	Child Fruit Frequency Intake	Parent fruit Taste Preferences	Authoritative Feeding Style
Parent Race/Ethnicity[a]	--								
Education[b]	-.285**	--							
Income[c]	.154*	.070	--						
Marital Status[d]	.262**	-.150*	.255**	--					
Fruit Availability[e]	.094	-.195**	.085	.107	--				
Child Fruit Taste Preferences	-.221**	.196**	-.014	-.059	-.002	--			
Child Fruit Frequency Intake	.098	-.188**	-.005	.102	.491**	.118	--		
Parent Fruit Taste Preference	-.172**	.196**	-.010	.013	.115	.626**	.117	--	
Authoritative Feeding Style[f]	-.071	.079	-.076	-.020	.081	.090	.053	.043	--

Note. Parent race/ethnicity[a] (0= African American & Hispanic; 1= White), education[b] (0= ≤ high school; 1= > high school), income[c] (0= ≤ $10,000; 1= > $10,000), marital status[d] (0= never married/single/divorced; 1= married/living with partner), fruit availability[e] (0= no; 1= yes), Authoritative feeding style[f] (Coded 1= yes and 0= no).
* $p < .05$; ** $p < .01$

Table 4

Bivariate Correlations Between Sociodemographic Characteristics, Child Vegetable Taste Preferences, Vegetable Frequency Intake and Authoritative Feeding Style

Variable	Parent Race/Ethnicity	Education	Income	Marital Status	Vegetable Availability	Child Vegetable Taste Preferences	Child Vegetable Frequency Intake	Parent Vegetable Taste Preferences	Authoritative Feeding Style
Parent Race/Ethnicity[a]	--								
Education[b]	-.285**	--							
Income[c]	.154*	.070	--						
Marital Status[d]	.262**	-.150*	.255**	--					
Vegetable Availability[e]	.070	-.051	.050	.122*	--				
Child Vegetable Taste Preferences	-.042	.016	.150*	.092	.228**	--			
Child Vegetable Frequency Intake	.190**	-.174**	.072	.152*	.405**	.261**	--		
Parent Vegetable Taste Preference	-.222**	.167**	.000	.009	.324**	.548**	.112	--	
Authoritative Feeding Style[f]	-.071	.079	-.076	-.020	-.018	-.064	-.036	.071	--

Note. Parent race/ethnicity[a] (0= African American & Hispanic; 1= White), education[b] (0= ≤ high school; 1= > high school), income[c] (0= ≤ $10,000; 1= > $10,000), marital status[d] (0= never married/single/divorced; 1= married/living with partner), vegetable availability[e] (0= no; 1= yes), Authoritative feeding style[f] (Coded 1= yes and 0= no).

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

Table 5

Results of Multiple Regression Analyses Predicting Child Fruit Frequency Intake from Child Fruit Taste Preferences and Authoritative Feeding Style

Variables	*B*	SE	Beta	*t* Test	Significance
Block 1: Control Variables					
Race/ethnicity[a]	1.157	.796	.084	1.454	.147
Education[b]	-1.170	.779	-.087	-1.502	.134
Marital Status[c]	.888	.767	.065	1.157	.248
Fruit Availability[d]	1.427	.175	.457	8.152	.000***
Parent Fruit Taste Preferences[e]	-.101	1.028	-.007	-.089	.922
Block 2: Predictor					
Child Fruit Taste Preferences[f]	3.829	1.308	.198	2.926	.004**
Block 3: Moderator					
(Authoritative Feeding Style)[g]	-.571	.988	-.032	-.578	.564
Block 4: Interaction Term					
(Authoritative Feeding Style x Children's Fruit Taste Preferences)	.465	2.956	.010	.157	.875

Note. Parent race/ethnicity[a] (0= African American & Hispanic; 1= White), education[b] (1= ≤ high school graduate; 2= > high school graduate), marital status[c] (0= never married/single/divorced; 1= married/living with partner), fruit availability[d] (0= no; 1= yes) final scores ranged from 10-40 on a continuous scale, parent fruit taste preferences[e] missing data (2), child fruit taste preferences[e] missing data (5), Authoritative feeding style[g] (Coded 1= yes and 0= no).

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Table 6

Results of Multiple Regression Analyses Predicting Child Vegetable Frequency Intake from Child Vegetable Taste Preferences and Authoritative Feeding Style

Variables	*B*	SE	Beta	*t* Test	Significance
Block 1: Control Variables	1.132	.743	.094	1.524	.129
Race/ethnicity[a]	-1.200	.696	-.102	-1.726	.086
Education[b]	.863	.698	.072	1.237	.217
Marital Status[c]	.971	.188	.306	5.155	.000***
Vegetable Availability[d]					
Parent Vegetable Taste Preferences[e]	-1.101	.956	-.080	-1.152	.251
Block 2: Predictor					
Child Vegetable Taste Preferences[f]	4.673	.986	.311	4.741	.000***
Block 3: Moderator					
(Authoritative Feeding Style)[g]	-1.011	.915	-.062	-1.104	.271
Block 4: Interaction Term					
(Authoritative Feeding Style x Children's Vegetable Taste Preferences)	-2.753	2.434	-.068	-1.131	.259

Note. Parent race/ethnicity[a] (0= African American & Hispanic; 1= White), education[b] (1= ≤ high school graduate; 2= > high school graduate), marital status[c] (0= never married/single/divorced; 1= married/living with partner), fruit availability[d] (0= no; 1= yes) final scores ranged from 10-40 on a continuous scale, parent vegetable taste preferences[e] missing data (2), child vegetable taste preferences[e] missing data (14), Authoritative feeding style[g] (Coded 1= yes and 0= no).
*p < 0.05; **p < 0.01; ***p < 0.001

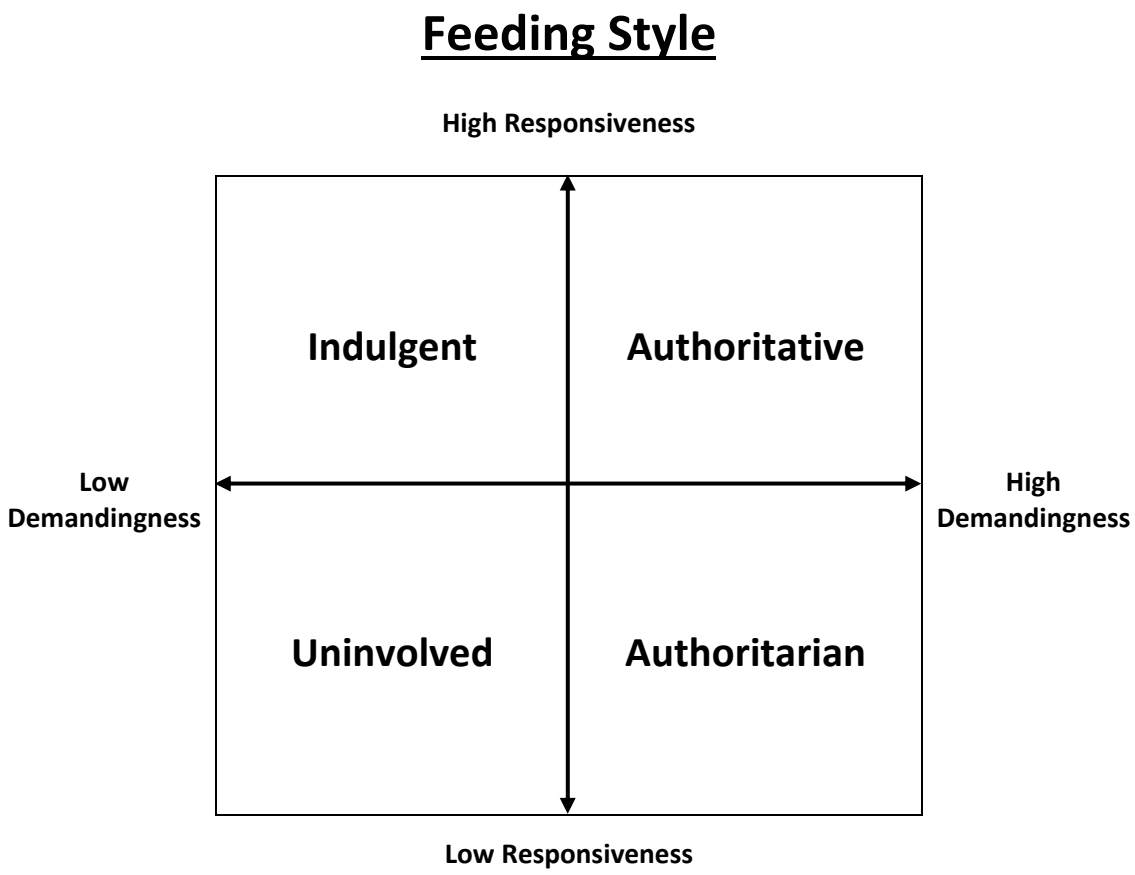

Figure 1. Feeding Style Typological Approach (Hughes et al., 2005).

CHAPTER VI

EPILOGUE

Throughout my undergraduate career at Appalachian State University (ASU), I knew that I wanted to pursue a career in dietetics and eventually become a registered dietitian. However, I also knew that I wanted to obtain a Master's of Science in Nutrition and was intrigued by the program at The University of North Carolina at Greensboro (UNCG). Prior to accepting a position to study at UNCG, I began looking for a mentor and discovered Dr. Lenka Shriver. Our interests aligned and I really enjoyed reading her various publications on child nutrition. Once I started working on her larger project which examined feeding practices related to FV consumption in preschool children enrolled in Head Start, I became interested in using some of her variables and data to answer a question of my own. I was very interested in investigating parental feeding style on child FV intake. Once I started reviewing literature, it became apparent that there was a gap in the current literature examining the differences with parental feeding style and variables such as child taste preferences and child intake of FV. There were many studies that found positive associations between the authoritative feeding style and various outcomes such as obesity and intake of certain foods. Also, previous studies had made associations between child taste preferences and FV intake. However, there was limited research showing the relationship that parental feeding style had on taste preferences and intake for FV. There was also a lack of research examining these differences in low-

income, diverse populations. Therefore, by allowing further investigation into Dr. Shriver's larger study, I was able to examine this effect.

Overall, the current study did not find any significance that the authoritative parental feeding style moderated the relationship between child FV taste preferences and intake of FV in our sample of low-income, diverse preschool children. As examined in previous literature, the authoritative feeding style was found to positively influence healthful eating habits and reduce obesity risk among various ages of children (Hughes et al., 2005; Hughes et al., 2008; Kremers et al., 2003; Papaioannou et al., 2013; Vollmer & Mobley, 2013). However, in this study parental feeding style did not influence child taste preferences on intake. There were main predictors found in each regression model for both fruits and vegetables with availability being an indicator for both FV intake and child taste preference being another indicator for vegetable intake. Previous studies have identified correlations between both household availability and taste preferences on FV intake in children and adolescents (Amuta et al., 2015; Cooke, 2007; Di Noia & Byrd-Bredbenner, 2014; Rasmussen et al., 2006). Some suggestions for why our sample was influenced by the parental feeding style may be because child taste preferences and availability are more directly associated with the intake of FV in low-income populations. Parents may not have access to fresh FV all the time, so the FV that were in their home at the time of the interviews may have been the only FV that the children could have eaten; there may not have been a choice for children to make. Also, parents may only purchase FV that they know their children will like because they do not want to waste food.

Furthermore, future studies are warranted to gain further understanding of the direct influences on child taste preferences and availability of FV.

The ability to be involved in a community level nutrition research study has allowed me to experience unique and complex methods to address a problem. I learned many valuable skills and made many connections within the communities with which we worked. With community level research, I have learned that flexibility and accommodation is necessary to work with different populations of people. My hopes are that after I finish the dietetic internship and become a registered dietitian I would be allowed another opportunity and numerous opportunities to work with these types of populations to give them nutrition education and help them live better, healthier lives.

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APPENDIX A

INSTITUTIONAL REVIEW BOARD APPROVAL

THE UNIVERSITY of NORTH CAROLINA
GREENSBORO

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To: Lenka Shriver
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Nutrition, 318 Stone Building, Campus, Greensboro, NC 27402-6170

From: UNCG IRB

Authorized signature on behalf of IRB

Approval Date: 2/18/2015
Expiration Date of Approval: 2/17/2016

RE: Notice of IRB Approval by Expedited Review (under 45 CFR 46.110)
Submission Type: Initial
Expedited Category: 7.Surveys/interviews/focus groups,5.Existing or non-research data
Study #: 15-0072
Study Title: Parental Strategies to Encourage Fruit and Vegetable Consumption in Preschool-aged Children: Development and Testing of a New Research Measure

This submission has been approved by the IRB for the period indicated. It has been determined that the risk involved in this research is no more than minimal.

Study Description:
This project represent a continuation of the previously approved study, or phase I, titled "Parental Strategies to Encourage Fruit and Vegetable Consumption in Preschool-age Children" (IRB #: 102583). Phase II of the study, the current IRB application, is titled "Parental Strategies to Encourage Fruit and Vegetable Consumption in Preschool-aged Children: Development and Testing of a New Research Measure." Based on the information collected during phase I, we aim to test our new research measure of parenting practices related to fruit and vegetable consumption in low-income parents/legal guardians of preschool-aged children (phase II). Phase II requires recruitment and participation of the same population as in phase I, which is a diverse sample of parents/legal guardians whose children are enrolled in Head Start program. The diverse sample will be recruited so that it will be possible to learn which specific parenting practices are unique to non-Hispanic and Hispanic Black and White individuals in terms of encouraging fruit and vegetable consumption in their young children. This study addresses a critical gap in the field of parenting and young children's consumption of healthy foods.

Regulatory and other findings:

- If your study is contingent upon approval from another site (additional recruitment sites), you will need to submit a modification at the time you receive that approval.

Investigator's Responsibilities

Federal regulations require that all research be reviewed at least annually. It is the Principal Investigator's responsibility to submit for renewal and obtain approval before the expiration date. You may not continue any research activity beyond the expiration date without IRB approval. Failure to receive approval for continuation before the expiration date will result in automatic termination of the approval for this study on the expiration date.

Signed letters, along with stamped copies of consent forms and other recruitment materials will be scanned to you in a separate email. **Stamped consent forms must be used unless the IRB has given you approval to waive this requirement.** Please notify the ORI office immediately if you have an issue with the stamped consents forms.

You are required to obtain IRB approval for any changes to any aspect of this study before they can be implemented (use the modification application available at http://integrity.uncg.edu/institutional-review-board/). Should any adverse event or unanticipated problem involving risks to subjects or others occur it must be reported immediately to the IRB using the "Unanticipated Problem-Adverse Event Form" at the same website. Please be aware that valid human subjects training and

signed statements of confidentiality for all members of research team need to be kept on file with the lead investigator. Please note that you will also need to remain in compliance with the university "Access To and Retention of Research Data" Policy which can be found http://policy.uncg.edu/research_data/.

APPENDIX B

PARENTAL CONSENT FORM

UNIVERSITY OF NORTH CAROLINA AT GREENSBORO

CONSENT TO ACT AS A HUMAN PARTICIPANT

Project Title: Parental Strategies to Encourage Fruit and Vegetable Consumption in Preschool-aged Children: Development and Testing of a New Research Measure (Phase II)

Principal Investigator and Faculty Advisor (if applicable): Lenka H. Shriver (PhD) from the Department of Nutrition and Cheryl Buehler (PhD) from the Department of Human Development and Family Studies

Participant's Name: _____

What are some general things you should know about research studies?
You are being asked to take part in a research study. Your participation is voluntary. You may choose not to join, or you may withdraw your consent to be in the study, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. There may not be any direct benefit to you for being in the research study. There also may be risks to being in research studies. If you choose not to be in the study or leave the study before it is done, it will not affect your relationship with the Head Start program, the researchers, or the University of North Carolina at Greensboro. Details about this study are discussed in this consent form. It is important that you understand this information so that you can make an informed choice about being in this study.

You will be given a copy of this consent form. If you have any questions about this study at any time, you should ask the researchers named in this consent form. Their contact information is below.

What is the study about?
Your participation is voluntary. We would like to invite you to be part of a research project that will tell us more about what strategies parents/legal guardians use when serving fruit and vegetables to their young children and how frequently young children consume different fruit and vegetables.

Why are you asking me?
You are being asked to participate because you have a child that is between the ages of 3 to 5 years and she/her is enrolled in the Head Start program. You are eligible to participate in this study if you meet the following criteria for the study: 1) you are the parent/legal guardian of the 3-5 year old child enrolled in Head Start; 2) you are the primary person responsible for feeding the child; 3) you are 18 or older; 4) you identify yourself as a Hispanic White individual; 5) your child does not have a health/medical condition that requires a special diet.

What will you ask me to do if I agree to be in the study?
You will be asked to participate in a 1 to 11/2-hour interview during which you will be asked questions and complete a survey with questions related to your parenting practices, basic information about your employment, education and your household, your child's fruit and vegetable intake and other topics. We will also ask for your permission to obtain the latest height and weight measurements of your child from the Head Start site where your child is enrolled. Your responses are important because they will help nutrition educators know more about what parents do to help children consume fruit and vegetables, which fruit and vegetables young children prefer and consume. The information will be used to learn more about families with young children and plan future nutrition education programs. We will ensure

that the interview is scheduled at the time that is convenient for you and your family (e.g., your child's Head Start center; right after drop off). Childcare services for your child may be provided while you are taking part in the meeting, if needed.

Is there any audio/video recording?
No

What are the risks to me?
The Institutional Review Board at the University of North Carolina at Greensboro has determined that participation in this study poses minimal risk to participants. This study has minimal risk. You do not have to answer any questions that you do not feel comfortable answering (some questions ask about your mood and feelings). If you would like to visit with someone about your feelings and concerns, please contact your Head Start family advocate/family worker and she/he will coordinate a visit with a mental health professional for you. The researchers will ensure confidentiality of any data collected from you throughout and after the study. Your particular information will not be shared with anyone outside the research team. The signed informed consent forms and the completed surveys will be locked in a locked file cabinet in Dr. Shriver's office at UNCG (311 Stone Bld. Or 307 Stone Bld.). After information is collected from you, data will be entered into an electronic file and stored in password-protected UNCG computers. Any information from this project will only be shared without any identifying information and in a group format, so no one will be able to link any information to your identity.

If you have questions, want more information or have suggestions, please contact Dr. Lenka H. Shriver who may be reached at (405) 762-9746 or lenka.shriver@uncg.edu.

If you have any concerns about your rights, how you are being treated, concerns or complaints about this project or benefits or risks associated with being in this study please contact the Office of Research Integrity at UNCG toll-free at (855)-251-2351.

Are there any benefits to society as a result of me taking part in this research?
There are no direct benefits to you. However, findings of this study may help nutrition researchers better understand what parental practices tend to encourage fruit and vegetable intakes among young children. It may also advance current knowledge of common barriers parents face, such as child's characteristics, related to fruit and vegetable intake in their family.

Are there any benefits to *me* for taking part in this research study?
The participation in the interview may help you become aware of how often and what types of fruit and vegetables your child eats on a regular basis.

Will I get paid for being in the study? Will it cost me anything?
If you decide to participate in this research project, you will be given a $25 Walmart gift card. This incentive will be offered to you after you reviewed this document and after you participated in the interview. The incentive will be given to you by one of the research investigators.

How will you keep my information confidential?
Your name will be included on this consent form to document that you have volunteered to participate in the study. If you would like to participate, you will be asked to provide your preferred contact information so one of our research assistants can contact you and schedule the interview based on your availability. Both, the consent form and contact information will be kept confidential and will be stored safely in a locked file cabinet in Dr. Shriver's office at UNCG. Nobody but the research personnel will

have access to the cabinet. Initially, your name will also be included on the materials used by the research assistants to collect information from you (e.g., survey) during the interview. However, your name will be removed from the materials after the interview and replaced with a unique ID number. The collected information will then be entered into electronic files under your unique ID and saved on UNCG password-protected computers. A list of unique IDs linked to individuals will be kept in a locked file cabinet in the PI's office (Shriver) at UNCG. The interview materials with unique IDs only will be kept in a separate locked drawer, away from the consent forms and the ID list. Nobody outside the study personnel will have access to the locked file cabinets or the electronic files with de-identified data. All information obtained in this study is strictly confidential unless disclosure is required by law.

What if I want to leave the study?
You have the right to refuse to participate or to withdraw at any time, without penalty. If you do not participate or withdraw, it will not affect your relationship with the Head Start program or UNCG. If you choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state. As long as you complete the interview, whether you allow us to use your data or not, you will receive the incentive for your participation. The investigators also have the right to stop your participation at any time. This could be because you have had an unexpected reaction, or have failed to follow instructions, or because the entire study has been stopped.

What about new information/changes in the study?
If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.

Voluntary Consent by Participant:
By signing this consent form, you are agreeing that you read, or it has been read to you, and you fully understand the contents of this document and are openly willing consent to take part in this study. All of your questions concerning this study have been answered. By signing this form, you are agreeing that you are 18 years of age or older and are agreeing to participate, or have the individual specified above as a participant participate, in this study described to you by _____.

Signature: _____ Date: _____

APPENDIX C

PERMISSION TO OBTAIN HEIGHT AND WEIGHT

Parent/Legal Guardian Permission to Obtain Child's Anthropometric Measurements from Head Start

I (print parent name) _____give permission to the research staff of this study to obtain my child's latest height and weight measurements from the Head Start records. Head Start nurse, family advocate or anyone else responsible for my child's information in Head Start records may provide this information to the researchers.

I understand that the researches need this information for the purposes of the study. I understand that my child's information will be kept confidential and will be stored in a locked file cabinet in Dr. Shriver's departmental office (311 Stone Bld.) at UNCG. Nobody but the research personnel will have access to this information. After the information is entered into an electronic file and saved on a password protected UNCG computer, my child's name will be removed and replaced with unique ID that is assigned to me and my child during the study.

(Spanish)

Permiso del padre/Tutor legal para obtener las medidas antropométricas de los Archivos de Head Start

Yo (nombre del padre en letra de molde) _____doy permiso a que el personal de investigación obtenga las medidas más recientes de estatura y peso de los archivos del Head Start. Cualquier persona responsable de esta información como el enfermero/a de Head Start, trabajadores familiares puede proveerles esta información a los investigadores.

Entiendo que los investigadores necesitan esta información para los objetivos del estudio. Entiendo que la información de mi niño/a permanecerá confidencial y será almacenada en un gabinete bajo llave en la oficina en el departamento de la Dra. Shriver en UNCG (Edificio Stone 311). Nadie que no sea parte del personal de investigación tendrá acceso a la información. Después de que se entre la información en un archivo electrónico y se guarde en las computadoras de UNCG protegida por contraseña, el nombre de mi niño/a será removido y reemplazado con un ID único que será asignado a mí y a mi niño/a durante el estudio.

_____
Name of your child/(please print)
Nombre de su niño/a (por favor en letra de molde)

_____ _____
Signature /Firma Date/Fecha

_____
Head Start Center in which child is Enrolled/
Centro de Head Start en el que el niño/a está inscrito

Approved IRB
4/2/15

APPENDIX D

RECRUITMENT FLYER

Join us and participate in a research study about children's fruit and vegetable consumption and parenting!

You can participate if you are the parent/legal guardian and the primary person responsible for feeding your child, you are 18 or older, your child is 3-5 years old, and you identify yourself as a non-Hispanic or Hispanic Black or White individual. You can participate as long as your child does not have a health condition that requires a special diet.

Approved IRB
2/18/15

You will receive a $25.00 gift card for participation in a 1-1.5 hour interview.

Please call Lauren Porter at (919) 345-3176
to find out more about the project! Or if available, talk to your family advocate/worker in your Head Start Center to find out more about this opportunity!

Thank you for your consideration!

Lenka Shriver, PhD & Cheryl Buehler, PhD
Department of Nutrition & Department of Human Development and Family Studies
Phone: (405) 762-9746
Email: lenka.shriver@uncg.edu

APPENDIX E

FOOD FREQUENCY QUESTIONNARE FOR THE CHILD

CHILD FOOD FREQUENCY QUESTIONNAIRE (FFQ)

The first set of questions is about foods and drinks that (*child's name*) has had outside of school/daycare while he/she was with you during the **LAST 7 DAYS**. Please keep in mind that there are no right or wrong answers. Every child eats differently and their habits vary, so please answer as honestly as you can. This information is confidential and nobody from the Head Start program will see this information. It is only for our project's purposes. Do you have any questions before we begin? Ok, the first question is:

1. In the last week, were (*child's name*)'s eating habits typical of the way he/she usually eats? (Circle the parent response)

0	No
1	Yes
8	Parent Doesn't know or not sure
9	Refused to answer

Great, thank you! And now, I am going to ask you if (child's name) ate or drank specific foods or drinks in the **LAST 7 DAYS when you were with him/her**. And that means when you were at home or even outside of home together; for example when you were at your friend's house or grandmother's house, or when you ate out. When I ask how many times (*child's name*) has had something in the last 7 days, you can answer anywhere from 1 to 7 times or more. Then I will ask you to estimate how much of each food/drink he/she has typically had. I have different cups, spoons and pictures to help you estimate the amount. Ok, let's go ahead and start!

First, I will ask you about fruit that (*child's name*) has or has not eaten when you were around him/her in the past seven days. Remember to include not only fresh, but also any frozen or canned fruit.

	"In the last seven days, did (*child's name*) have…"			***[IF YES]* "How many times?"**						**Portion Size**
2. Bananas? (note: ask if the whole banana or cut up?	Don't know/ Not Sure 8↓	NO 0↓	YES 1↑→	1 1↓	2 2↓	3-4 3↓	5-6 4↓	7+ 5↓	Don't know/ Not Sure 8↓	
3. Grapes?	Don't know/ Not Sure 8↓	NO 0↓	YES 1↑→	1 1↓	2 2↓	3-4 3↓	5-6 4↓	7+ 5↓	Don't know/ Not Sure 8↓	
4. Pears?	Don't know/ Not Sure 8↓	NO 0↓	YES 1↑→	1 1↓	2 2↓	3-4 3↓	5-6 4↓	7+ 5↓	Don't know/ Not Sure 8↓	
5. Cantaloupe?	Don't know/ Not Sure 8↓	NO 0↓	YES 1↑→	1 1↓	2 2↓	3-4 3↓	5-6 4↓	7+ 5↓	Don't know/ Not Sure 8↓	
6. Peaches?	Don't know/ Not Sure 8↓	NO 0↓	YES 1↑→	1 1↓	2 2↓	3-4 3↓	5-6 4↓	7+ 5↓	Don't know/ Not Sure 8↓	
7. Strawberries?	Don't know/ Not Sure 8↓	NO 0↓	YES 1↑→	1 1↓	2 2↓	3-4 3↓	5-6 4↓	7+ 5↓	Don't know/ Not Sure 8↓	

	"In the last seven days, did (*child's name*) have…"			**[*IF YES*] "How many times?"**						**Portion Size**
8. Apples?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 1→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
9. Pineapple?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 1→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
10. Plums?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 1→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
11. Cuties/ Mandarins?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 1→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
12. Blueberries?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 1→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
13. Raspberries or other berries (like blackberries)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 1→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
14. Kiwi?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 1→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
15. Applesauce (note here if sweetened or unsweetened)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 1→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	

	"In the last seven days, did (*child's name*) have…"			***[IF YES]*** "How many times?"						**Portion Size**
16. Mango?	Don't know/ Not Sure8	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
17. Oranges?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
18. Watermelon?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
19. Fresh fruit salad?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
20. Fruit cocktail cups? (ask if light, heavy syrup or 100% own juices)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
21. Fruit smoothies? (Purchased or homemade)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
22. Dried fruit (raisins, prunes)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
23. Other fruit not already mentioned? (squeezable pouches?)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	

Now, I will ask whether (child's name) ate specific vegetables in the past seven days when you were around him/her. Remember think of fresh, but also frozen or canned vegetables that (child's name) ate when you were around him/her either at home or away from home in past seven days.

	"In the last seven days, did (*child's name*) have…"			**[*IF YES*] "How many times?"**						**Portion Size**
24. White Potatoes (baked, mashed or boiled? Not fried.	Don't know/ Not Sure 8↓	NO 0↓	YES 1↓→	1 1↓	2 2↓	3-4 3↓	5-6 4↓	7+ 5↓	Don't know/ Not Sure 8↓	
25. French Fries or other fried potatoes like hash brown?	Don't know/ Not Sure 8↓	NO 0↓	YES 1↓→	1 1↓	2 2↓	3-4 3↓	5-6 4↓	7+ 5↓	Don't know/ Not Sure 8↓	
26. Lettuce? Include on sandwiches or salads.	Don't know/ Not Sure 8↓	NO 0↓	YES 1↓→	1 1↓	2 2↓	3-4 3↓	5-6 4↓	7+ 5↓	Don't know/ Not Sure 8↓	
27. Broccoli	Don't know/ Not Sure 8↓	NO 0↓	YES 1↓→	1 1↓	2 2↓	3-4 3↓	5-6 4↓	7+ 5↓	Don't know/ Not Sure 8↓	

	"In the last seven days, did (*child's name*) have…"			[*IF YES*] "How many times?"						Portion Size
28. Cauliflower	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
29. Carrots	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
30. Celery	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
31. Peppers (green, red, yellow)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
32. Spinach	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
33. Avocado	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	

CONTINUE……

	"In the last seven days, did (*child's name*) have…"			**[*IF YES*] "How many times?"**						**Portion Size**
34. Green peas?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
35. Corn?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
36. Green Beans?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
37. Tomatoes (including in soups, sandwiches)?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
38. Asparagus	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
39. Plantain	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	

CONTINUE……

	"In the last seven days, did (*child's name*) have…"			***[IF YES]*** "How many times?"						**Portion Size**
40. Cacti (nopales)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
41. Dried Beans? (like baked, bean soup, pork and beans, refried beans or bean dishes).	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
42. Kale?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
43. Turnip greens?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
44. Collard Greens	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
45. Mushrooms	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
46. Cucumbers	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
47. Zucchini/squash	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	

	"In the last seven days, did (*child's name*) have…"			**[*IF YES*] "How many times?"**						**Portion Size**
48. Cabbage (cooked or raw)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
49. Salsa or other sauces made with tomatoes?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
50. Cole slaw?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
51. Mixtures that included vegetables (tacos, omelets, casseroles, stews, sandwiches)?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
52. Sweet potatoes	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
53. Other vegetables not already mentioned?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	

Now, I will ask you whether (child's name) ate a few other foods and beverages in the past seven days and if so, how often. Remember this includes the times when (child's name) was around you (when not at preschool) and this could be at home or away from home in past seven days.

	"In the last seven days, did (*child's name*) have…"			**[*IF YES*] "How many times?"**						**Portion size**
1. Potato chips, Tortilla chips, Cheetos, popcorn or other salty snack foods? (ask what kind-low-fat, baked chips, microwave, butter?)	Don't know/ Not Sure 8↑	NO 0↑	YES 1↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know / Not Sure 8↑	Get portion size in cups
2. Sweets (cookies, pies, cakes, brownies, sweet muffins)?	Don't know/ Not Sure 8↑	NO 0↑	YES 1↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know / Not Sure 8↑	If possible, get portion size if possible but not needed
3. Hard candies, lollipops, gummy bears, fruit snacks, popsicles, chocolate?	Don't know/ Not Sure 8↑	NO 0↑	YES 1↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know / Not Sure 8↑	If possible, get portion size if possible but not needed
4. Ice cream (or other frozen treats except popsicles)	Don't know/ Not Sure 8↑	NO 0↑	YES 1↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know / Not Sure 8↑	Get portion size in cups
5. Sweetened drinks (regular soda, Juicy Juice, Kool-aid, lemonade, sweet tea, non-100% juices)?	Don't know/ Not Sure 8↑	NO 0↑	YES 1↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know / Not Sure 8↑	Get portion in cups
6. Diet Drinks (Diet Coke, Diet Crystal Light, diet lemonade)	Don't know/ Not Sure 8↑	NO 0↑	YES 1↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know / Not Sure 8↑	Get portion in cups

	"In the last seven days, did (*child's name*) have…"				[*IF YES*] "How many times?"					Typical Portion Size
7. 100% Orange juice	Don't know/ Not Sure 8↓	NO 0↓	YES 1 ↓→	1 1↓	2 2↓	3-4 3↓	5-6 4↓	7+ 5↓	Don't know / Not Sure 8↓	Get portion in cups
8. 100% Apple Juice	Don't know/ Not Sure 8↓	NO 0↓	YES 1 ↓→	1 1↓	2 2↓	3-4 3↓	5-6 4↓	7+ 5↓	Don't know / Not Sure 8↓	Get portion in cups
9. Other 100% Juices (grape, mix)	Don't know/ Not Sure 8↓	NO 0↓	YES 1 ↓→	1 1↓	2 2↓	3-4 3↓	5-6 4↓	7+ 5↓	Don't know / Not Sure 8↓	Get portion in cups

Supplemental Questions:

1S. **Now think about the *past week*. In the past 7 days, how many times did {child's name} eat fast food? Include fast food meals eaten at school or at home, or at fast food restaurants, carryout, or drive thru (places like McDonalds, Chick-Fil-A, Wendy's, Taco Bell)**

_____Times in the past 7 days

2S. **Does (*child's name)* usually take a multivitamin or mineral supplement? (Circle the response).**

0 No
1 Yes
8 Don't know/not sure

APPENDIX F

FOOD FREQUENCY QUESTIONNAIRE FOR THE PARENT

PARENT FOOD FREQUENCY QUESTIONNAIRE (FFQ)

The first set of questions is about foods and drinks that YOU have had during the **LAST 7 DAYS**. Please keep in mind that there are no right or wrong answers. All of us eat differently and our eating habits vary, so please answer as honestly as you can. This information is confidential and nobody from the Head Start program will see this information, it is only for our project's purposes. Do you have any questions before we begin? Ok, the first question is:

1. In the last 7 days, were your eating habits typical of the way you usually eat? (Circle the parent response)

0	No
1	Yes
8	Doesn't know or not sure
9	Refused to answer

Great, thank you! And now, I am going to ask you if you ate or drank specific foods or drinks in the **LAST 7 DAYS.** It does not matter where you were, either at home or outside of home, for example when you were in your friend's house or grandmother's house, or when you ate out. When I ask how many times you had it in the past 7 days, you can answer anywhere from 1 to 7 or more times. Then I will ask you to estimate how much of each food/drink you typically had. I have different cups, spoons and pictures to help you estimate the amount. Ok, let's go ahead and start!

First, I will ask you about fruit that you ate or did not eat **IN THE PAST 7 DAYS** days. Remember to think of not only fr
also any frozen or canned fruit.

	"In the last seven days, did you have…"			**[*IF YES*] "How many times?"**						**Portion Size**
2. Bananas? (note: ask if the whole banana or cut up?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
3. Grapes?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
4. Pears?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
5. Cantaloupe?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
6. Peaches?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
7. Strawberries?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	

	"In the last seven days, did you have…"			[*IF YES*] "How many times?"						Portion Size
8. Apples	Don't know/ Not Sure 8↑	NO 0↑	YES 1 1→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
9. Pineapple?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 1→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
10. Plums?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 1→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
11. Cuties/ Mandarins?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 1→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
12. Blueberries?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 1→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
13. Raspberries or other berries (like blackberries)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 1→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
14. Kiwi	Don't know/ Not Sure 8↑	NO 0↑	YES 1 1→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
15. Applesauce (note here if sweetened or unsweetened)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 1→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	

	"In the last seven days, did you have…"			[*IF YES*] "How many times?"						Portion Size
16. Mango?	Don't know/ Not Sure8	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
17. Oranges	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
18. Watermelon	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
19. Fresh fruit salad?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
20. Fruit cocktail cups? (ask if light, heavy syrup or 100% own juices)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
21. Fruit smoothies? (Purchased or homemade)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
22. Dried fruit (raisons, prunes)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
23. Other fruit not already mentioned? (squeezable pouches?)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	

Now, I will ask whether you ate specific vegetables in the past seven days. Remember think of fresh, but also frozen or canned vegetables that you ate when you were either at home or away from home in past seven days.

	"In the last seven days, did you have…"			***[IF YES]* "How many times?"**						**Portion Size**
24. White Potatoes (baked, mashed or boiled? Not fried.	Don't know/ Not Sure 8↑	NO 0↑	YES 1↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
25. French Fries or other fried potatoes like hash brown?	Don't know/ Not Sure 8↑	NO 0↑	YES 1↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
26. Lettuce? Include on sandwiches or salads.	Don't know/ Not Sure 8↑	NO 0↑	YES 1↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
27. Broccoli	Don't know/ Not Sure 8↑	NO 0↑	YES 1↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	

	"In the last seven days, did you have…"			[*IF YES*] "How many times?"						Portion Size
28. Cauliflower	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
29. Carrots	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
30. Celery	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
31. Peppers (green, red, yellow)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
32. Spinach	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
33. Avocado	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	

CONTINUE……

	"In the last seven days, did you have…"			[*IF YES*] "How many times?"						Portion Size
34. Green peas?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
35. Corn?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
36. Green Beans?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
37. Tomatoes (including in soups, sandwiches)?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
38. Asparagus	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
39. Plantain	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	

CONTINUE……

	"In the last seven days, did you have…"			[*IF YES*] "How many times?"						Portion Size
40. Cacti (nopales)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
41. Beans? (like baked, bean soup, pork and beans, refried beans or bean dishes.	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
42. Kale	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
43. Turnip greens?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
44. Collard Greens	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
45. Mushrooms	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
46. Cucumbers	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
47. Zucchini/squash	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	

	"In the last seven days, did you have…"			[*IF YES*] "How many times?"						Portion Size
48. Cabbage (cooked or raw)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
49. Salsa or other sauces made with tomatoes?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
50. Cole slaw?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
51. Mixtures that included vegetables (tacos, omelets, casseroles, stews, sandwiches)?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
52. Sweet potatoes	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	
53. Other vegetables not already mentioned?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know/ Not Sure 8↑	

Now, I will ask you whether you ate a few other foods and beverages in the past seven days and if so, how often. Remember this includes the times when you were at home or away from home **in the PAST 7 DAYS.**

	"In the last seven days, did you have…"			***[IF YES]* "How many times?"**						**Typical Portion Size**
1. Potato chips, Tortilla chips, Cheetos, popcorn or other salty snack foods? (ask what kind-low-fat, baked chips, microwave, butter?)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know / Not Sure 8↑	Get portion size in cups
2. Sweets (cookies, pies, cakes, brownies, sweet muffins)?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know / Not Sure 8↑	If possible, get portion size if possible but not needed
3. Hard candies, lollipops, gummy bears, fruit snacks, popsicles, chocolate?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know / Not Sure 8↑	If possible, get portion size if possible but not needed
4. Ice cream (or other frozen treats except popsicles)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know / Not Sure 8↑	Get portion size in cups
5. Sweetened drinks (regular soda, Juicy Juice, Kool-aid, lemonade, sweet tea, non-100% juices)?	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know / Not Sure 8↑	Get portion in cups
6. Diet Drinks (Diet Coke, Diet Crystal Light, diet lemonade)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know / Not Sure 8↑	Get portion in cups
										Typical Portion Size

	"In the last seven days, did you have…"				[*IF YES*] "How many times?"					Typical Portion Size
7. 100% Orange juice	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know / Not Sure 8↑	Get portion in cups
8. 100% Apple Juice	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know / Not Sure 8↑	Get portion in cups
9. 100 % Other 100% Juices (grape, mix)	Don't know/ Not Sure 8↑	NO 0↑	YES 1 ↑→	1 1↑	2 2↑	3-4 3↑	5-6 4↑	7+ 5↑	Don't know / Not Sure 8↑	Get portion size in cups

Supplemental Questions:

1S. Now think about the *past week*. In the past 7 days, how many times did you eat fast food? Include fast food meals eaten at school or at home, or at fast food restaurants, carryout, or drive thru (places like McDonalds, Chick-Fil-A, Wendy's, Taco Bell)

_____Times in the past 7 days

2S. Do you usually take a multivitamin or mineral supplement? (Circle the response).

0 No
1 Yes
8 Don't know/not sure

APPENDIX G

TASTE PREFERENCE SURVEY FOR THE CHILD

Modified Child Taste Preferences Questionnaire

Child Likes and Dislikes

We want to know how much ***YOUR CHILD*** *likes or does not like* specific foods or drinks. Please ***CIRCLE*** your response below and choose one of the answer options:

1. Does your child have any food allergies? YES _____ NO _____ Which food?: _____

	Never Had	Hates It	Does Not Like It	Likes It	Loves It/Favorite
2. Bananas	0	1	2	3	4
3. Grapes	0	1	2	3	4
4. Pears	0	1	2	3	4
5. Cantaloupe	0	1	2	3	4
6. Peaches	0	1	2	3	4
7. Strawberries	0	1	2	3	4
8. Apples	0	1	2	3	4
9. Pineapples	0	1	2	3	4
10. Plums	0	1	2	3	4
11. Cuties/Mandarins	0	1	2	3	4
12. Blueberries	0	1	2	3	4
13. Raspberries (or other berries)	0	1	2	3	4
14. Kiwi	0	1	2	3	4
15. Applesauce	0	1	2	3	4
16. Mango	0	1	2	3	4
17. Oranges	0	1	2	3	4
18. Watermelon	0	1	2	3	4
19. Fresh fruit salad	0	1	2	3	4
20. Fruit cocktail cups	0	1	2	3	4
21. Fruit smoothies	0	1	2	3	4
22. Dried fruit	0	1	2	3	4
23. Squeezable fruit pouches	0	1	2	3	4
24. White potatoes	0	1	2	3	4
25. French fries	0	1	2	3	4
26. Lettuce	0	1	2	3	4
27. Broccoli	0	1	2	3	4
28. Cauliflower	0	1	2	3	4
29. Carrots	0	1	2	3	4
30. Celery	0	1	2	3	4
31. Peppers	0	1	2	3	4
32. Spinach	0	1	2	3	4
33. Avocado	0	1	2	3	4
34. Green peas	0	1	2	3	4
35. Corn	0	1	2	3	4

Modified Child Taste Preferences Questionnaire

	Never Had	Hates It	Does Not Like It	Likes It	Loves It/Favorite
36. Green beans	0	1	2	3	4
37. Tomatoes	0	1	2	3	4
38. Asparagus	0	1	2	3	4
39. Plantains	0	1	2	3	4
40. Cacti (nopales)	0	1	2	3	4
41. Dried Beans (black, kidney)	0	1	2	3	4
42. Kale	0	1	2	3	4
43. Turnip Greens	0	1	2	3	4
44. Collard Greens	0	1	2	3	4
45. Mushrooms	0	1	2	3	4
46. Cucumber	0	1	2	3	4
47. Zucchini/squash	0	1	2	3	4
48. Cabbage	0	1	2	3	4
49. Salsa (or other tomato sauces)	0	1	2	3	4
50. Cole slaw	0	1	2	3	4
51. Mixed frozen veggies	0	1	2	3	4
52. Sweet Potatoes	0	1	2	3	4
53. Chips or Salty Snacks	0	1	2	3	4
54. Sweets (candy, cookies)	0	1	2	3	4
55. Ice Cream	0	1	2	3	4
56. Diet Drinks	0	1	2	3	4
57. Sweetened Drinks	0	1	2	3	4
58. 100% Orange Juice	0	1	2	3	4
59. 100% Apple Juice	0	1	2	3	4
60. 100% Other Juice	0	1	2	3	4

APPENDIX H

TASTE PREFERENCE SURVEY FOR THE PARENT

Modified Parental Taste Preferences Questionnaire

Your Likes and Dislikes

We want to know how much ***YOU*** *like or do not like* specific foods or drinks. Please ***CIRCLE*** your response below and choose one of the answer options:

1. Do you have any food allergies? YES _____ NO _____ Which food?: _____

	Never Had	Hate It	Do Not Like It	Like It	Love It/Favorite
2. Bananas	0	1	2	3	4
3. Grapes	0	1	2	3	4
4. Pears	0	1	2	3	4
5. Cantaloupe	0	1	2	3	4
6. Peaches	0	1	2	3	4
7. Strawberries	0	1	2	3	4
8. Apples	0	1	2	3	4
9. Pineapples	0	1	2	3	4
10. Plums	0	1	2	3	4
11. Cuties/Mandarins	0	1	2	3	4
12. Blueberries	0	1	2	3	4
13. Raspberries (or other berries)	0	1	2	3	4
14. Kiwi	0	1	2	3	4
15. Applesauce	0	1	2	3	4
16. Mango	0	1	2	3	4
17. Oranges	0	1	2	3	4
18. Watermelon	0	1	2	3	4
19. Fresh fruit salad	0	1	2	3	4
20. Fruit cocktail cups	0	1	2	3	4
21. Fruit smoothies	0	1	2	3	4
22. Dried fruit	0	1	2	3	4
23. Squeezable fruit pouches	0	1	2	3	4
24. White potatoes	0	1	2	3	4
25. French fries	0	1	2	3	4
26. Lettuce	0	1	2	3	4
27. Broccoli	0	1	2	3	4
28. Cauliflower	0	1	2	3	4
29. Carrots	0	1	2	3	4
30. Celery	0	1	2	3	4
31. Peppers	0	1	2	3	4
32. Spinach	0	1	2	3	4
33. Avocado	0	1	2	3	4
34. Green peas	0	1	2	3	4
35. Corn	0	1	2	3	4

Modified Parental Taste Preferences Questionnaire

	Never Had	Hate It	Do Not Like It	Like It	Love It/Favorite
36. Green beans	0	1	2	3	4
37. Tomatoes	0	1	2	3	4
38. Asparagus	0	1	2	3	4
39. Plantains	0	1	2	3	4
40. Cacti (nopales)	0	1	2	3	4
41. Dried Beans (black, kidney)	0	1	2	3	4
42. Kale	0	1	2	3	4
43. Turnip Greens	0	1	2	3	4
44. Collard Greens	0	1	2	3	4
45. Mushrooms	0	1	2	3	4
46. Cucumber	0	1	2	3	4
47. Zucchini/squash	0	1	2	3	4
48. Cabbage	0	1	2	3	4
49. Salsa (or other tomato sauces)	0	1	2	3	4
50. Cole slaw	0	1	2	3	4
51. Mixed frozen veggies	0	1	2	3	4
52. Sweet Potatoes	0	1	2	3	4
53. Chips or Salty Snacks	0	1	2	3	4
54. Sweets (candy, cookies)	0	1	2	3	4
55. Ice Cream	0	1	2	3	4
56. Diet Drinks	0	1	2	3	4
57. Sweetened Drinks	0	1	2	3	4
58. 100% Orange Juice	0	1	2	3	4
59. 100% Apple Juice	0	1	2	3	4
60. 100% Other Juice	0	1	2	3	4

APPENDIX I

CAREGIVER'S FEEDING STYLE QUESTIONNARE

Modified Version of Caregiver's Feeding Style Questionnaire

Questions about Feeding Your Child

These questions deal with YOUR interactions with your preschool child during the dinner meal. Circle the best answer that describes how often these things happen. If you are not certain, make your best guess.

Please circle how often during the dinner meal do YOU....

1. Physically struggle with the child to get him or her to eat (for example, physically putting the child in the chair so he or she will eat).

   Never rarely sometimes most of the time always

2. Allow the child to eat as much as he or she wants. (Q2)

   Never rarely sometimes most of the time always

3. Promise the child something other than food if he or she eats (for example, "If you eat your beans, we can play ball after dinner").

   Never rarely sometimes most of the time always

4. Permit the child to decide whether he or she gets a second or third helping.

   Never rarely sometimes most of the time always

5. Encourage the child to eat by arranging the food to make it more interesting (for example, making smiley faces on the pancakes).

   Never rarely sometimes most of the time always

6. Wait to give the child more food until he or she has finished another food on the plate.

   Never rarely sometimes most of the time always

7. Ask the child questions about the food during dinner.

   Never rarely sometimes most of the time always

8. Let the child decide when he or she is done eating.

   Never rarely sometimes most of the time always

9. Tell the child to eat at least a little bit of food on his or her plate.

   Never rarely sometimes most of the time always

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10. Reason with the child to get him or her to eat (for example, "Milk is good for your health because it will make you strong").

Never rarely sometimes most of the time always

11. Say something to show your disapproval of the child for not eating dinner.

Never rarely sometimes most of the time always

12. Allow the child to choose the foods he or she wants to eat for dinner from foods already prepared.

Never rarely sometimes most of the time always

13. Give the child multiple servings of a certain food regardless of what has been eaten.

Never rarely sometimes most of the time always

14. Compliment the child for eating food (for example, "What a good boy! You're eating your beans").

Never rarely sometimes most of the time always

15. Let the child decide how much he or she should eat off of the plate.

Never rarely sometimes most of the time always

16. Suggest to the child that he or she eats dinner, for example by saying, "Your dinner is getting cold".

Never rarely sometimes most of the time always

17. Allow the child to eat what he or she wants to eat.

Never rarely sometimes most of the time always

18. Offer the child a second helping during the dinner meal.

Never rarely sometimes most of the time always

19. Say to the child "Hurry up and eat your food."

Never rarely sometimes most of the time always

20. Warn the child that you will take away something **other than food** if he or she doesn't eat (for example, "If you don't finish your meat, there will be no play time after dinner").

Never rarely sometimes most of the time always

21. Take a second helping yourself in front of the child during dinner.

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Never rarely sometimes most of the time always

22. Encourage the child to eat something by using food as a reward (for example, "If you finish your vegetables, you will get some fruit").

Never rarely sometimes most of the time always

23. Let the child eat when he or she wants to eat.

Never rarely sometimes most of the time always

24. Warn the child that you will take a food away if the child doesn't eat (for example, "If you don't finish your vegetables, you won't get fruit").

Never rarely sometimes most of the time always

25. Feel like not responding when your child asks about the food.

Never rarely sometimes most of the time always

26. Say something positive about the food the child is eating during dinner.

Never rarely sometimes most of the time always

27. Spoon-feed the child to get him or her to eat dinner.

Never rarely sometimes most of the time always

28. Help the child to eat dinner (for example, cutting the food into smaller pieces).

Never rarely sometimes most of the time always

29. Tell the child to eat something on the plate (for example, "Eat your beans").

Never rarely sometimes most of the time always

30. Beg the child to eat dinner.

Never rarely sometimes most of the time always

31. Get too busy to notice when the child talks about the food.

Never rarely sometimes most of the time always