



12-2013

# Playing with food: Maternal feeding style and perceptions of how preschoolers interact with toy foods in the home environment

Kori Michelle Higgins

*University of Tennessee - Knoxville*, [khiggin6@utk.edu](mailto:khiggin6@utk.edu)

---

## Recommended Citation

Higgins, Kori Michelle, "Playing with food: Maternal feeding style and perceptions of how preschoolers interact with toy foods in the home environment." Master's Thesis, University of Tennessee, 2013.  
[http://trace.tennessee.edu/utk\\_gradthes/2609](http://trace.tennessee.edu/utk_gradthes/2609)

This Thesis is brought to you for free and open access by the Graduate School at Trace: Tennessee Research and Creative Exchange. It has been accepted for inclusion in Masters Theses by an authorized administrator of Trace: Tennessee Research and Creative Exchange. For more information, please contact [trace@utk.edu](mailto:trace@utk.edu).

To the Graduate Council:

I am submitting herewith a thesis written by Kori Michelle Higgins entitled "Playing with food: Maternal feeding style and perceptions of how preschoolers interact with toy foods in the home environment." I have examined the final electronic copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Nutrition.

Melissa B. Hansen-Petrik, Major Professor

We have read this thesis and recommend its acceptance:

Katie Kavanagh, Marsha L. Spence

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

---

**Playing with food:  
Maternal feeding style and perceptions of how preschoolers interact with toy  
foods in the home environment**

A Thesis Presented for the  
Master of Science  
Degree  
The University of Tennessee, Knoxville

Kori Michelle Higgins  
December 2013

## **ACKNOWLEDGEMENTS**

I would like to thank my major professor, Dr. Melissa Hansen-Petrik, PhD, RD, LDN for her guidance, patience, advice, and help throughout my work with her on this thesis. She fostered independent thinking while still providing assistance and support. I am very appreciative of the work that I was able to complete with her and for the experiences that I encountered along the way. In addition, I would like to thank my committee members, Dr. Marsha Spence, PhD, MPH, RD, LDN and Dr. Katie Kavanagh, PhD, RD, LDN for their time and dedication to this research. Lastly, I would like to recognize my undergraduate assistant, Shawn Hooper for her help in co-coding my qualitative data.

My twin sister Kaci truly made this possible for me. She was there with me every step of the way, giving me a nudge when I needed it and always being the best listener. She was one of my biggest supporters, and I am forever grateful for all that she did for me. Also, I would like to thank my family and close friends for their support, especially my father for all of his wonderful words of wisdom.

## ABSTRACT

Maternal feeding styles have been linked to dietary intake patterns in young children. Additionally, pretend play with toy foods provides a promising means of promoting development of healthy eating patterns in this age group and the potential of it to play a positive role in the home environment may, in part, be related to maternal interactions with the child during pretend play. The purpose of the present study was to explore maternal perceptions of pretend play with toy foods in the home environment relative to maternal feeding style. Specifically, our objectives were to employ a mixed-methods approach to 1) describe maternal observations of their preschool-aged children while engaged in pretend play with toy foods and related materials, 2) describe maternal perceptions as to how pretend play with toy foods relates to real life experiences of preschool-aged children, and 3) describe mothers' observations and perceptions regarding pretend play with toy foods and relate these to maternal feeding style. Mothers of two to five-year-old children (n=25) were recruited via Facebook posts, online mother's groups, recruitment flyers to childcare centers, and emails sent to a local database of mothers. Eligible mothers were invited to complete an online survey to collect sociodemographic data, classify the mothers as one of the four feeding styles, and gather their observations and perceptions regarding pretend play activities with toy food and related materials in the home via a series of open-ended questions. Patterns emerging from qualitative analysis of the mothers' responses in combination with information on feeding style from the Caregiver's Feeding Styles Questionnaire (CFSQ) suggest that mother's interactions with their children and perceptions of the role of pretend play contrast by the dimensions of demandingness and responsiveness. Further exploration of the interplay between mothers and children in the pretend play environment will help to clarify how

the role of pretend play with toy foods in promoting healthy eating may vary with maternal feeding styles.

## TABLE OF CONTENTS

<b>INTRODUCTION</b> .....	<b>1</b>
<b>SECTION I LITERATURE REVIEW</b> .....	<b>2</b>
<b>ABSTRACT</b> .....	<b>3</b>
<b>REVIEW OF LITERATURE</b> .....	<b>4</b>
<i>Introduction</i> .....	4
<i>Current Food Intake Patterns in U.S. Children</i> .....	5
<i>Factors Contributing to Food Preference Development</i> .....	7
<b>RESEARCH QUESTIONS</b> .....	<b>32</b>
<b>REFERENCES</b> .....	<b>33</b>
<b>SECTION II MANUSCRIPT</b> .....	<b>38</b>
<b>ABSTRACT</b> .....	<b>40</b>
<b>INTRODUCTION</b> .....	<b>42</b>
<b>STUDY DESIGN AND METHODOLOGY</b> .....	<b>45</b>
<i>Subjects</i> .....	45
<i>Data Collection</i> .....	46
<i>Instrumentation and Measures</i> .....	47
<i>Data Analysis</i> .....	49
<b>RESULTS</b> .....	<b>51</b>
<b>DISCUSSION</b> .....	<b>59</b>
<b>LIMITATIONS TO THE STUDY</b> .....	<b>62</b>
<b>IMPLICATIONS FOR RESEARCH AND PRACTICE</b> .....	<b>63</b>
<b>CONCLUSION</b> .....	<b>64</b>
<b>REFERENCES</b> .....	<b>65</b>
<b>APPENDIX EXPANDED METHODOLOGY</b> .....	<b>67</b>
<b>STUDY DESIGN AND REVIEW</b> .....	<b>68</b>
<b>APPENDICES</b> .....	<b>72</b>
<b>APPENDIX A TABLES AND FIGURES</b> .....	<b>73</b>
<b>APPENDIX B RECRUITMENT, FORMS, AND QUESTIONNAIRES</b> .....	<b>83</b>
Facebook Post.....	84
Flyer.....	86
Pretend Play and Child Development Electronic Screening Survey.....	86
Email Text with Survey Code.....	89
Reminder Email for Eligible Participants.....	90
Informed Consent.....	91

Pretend Play and Child Development Survey ..... 93

**VITA.....102**



## LIST OF TABLES

<b>Table 1.</b> Open-ended Questions Asked in Online Survey.....	60
<b>Table 2.</b> Sociodemographic Characteristics of the Participants.....	63
<b>Table 3.</b> Type of Toy Food Reported in the Home Environment.....	64
<b>Table 4.</b> Codes Organized by Code Families with Corresponding Quotes.....	67
<b>Table 5.</b> Code Frequency Within Code Families by the Dimensions of Demandingness and Responsiveness.....	68
<b>Table 6.</b> Pretend Play Activities with Toy Foods in the Home Environment.....	82
<b>Table 7.</b> Codebook of Inductive Codes with Corresponding Definitions.....	83-85
<b>Table 8.</b> Meta Matrix of Code Families, Corresponding codes, and Scoring of Demandingness and Responsiveness.....	86-90

## LIST OF FIGURES

<b>Figure 1.</b> Maternal Rating of “Importance of Toy Foods in the Home Environment” by Dimensions of Demandingness and Responsiveness.....	64
<b>Figure 2.</b> Maternal Rating of “Importance of Healthful Eating” by Dimensions of Demandingness and Responsiveness.....	65

## **INTRODUCTION**

Because childhood obesity is prevalent throughout the United States, research in the field of nutrition has focused on potential interventions that could aid in targeting children's dietary intake. Many factors, such as genetics, maternal feeding styles, repeated food exposure, and food neophobia can influence a child's dietary habits and the development of food preferences.

Repeatedly exposed to food by way of taste and sight has been positively related to trying new foods, yet exposure to toy foods while engaging in pretend play has not been examined in depth.

Therefore, this research aimed to explore how toy foods may impact a child's development of food preferences.

# **SECTION I**

## **LITERATURE REVIEW**

## ABSTRACT

Childhood overweight and obesity persists as one of the nation's most pressing health concerns, with greater than 12% of preschool-aged children classified as obese<sup>1</sup>. Developing healthy dietary habits early in life is important to reduce the risk of obesity and comorbidities, and research has shown that a child's food intake is largely impacted by food preferences<sup>2</sup>. Additionally, food preferences have been linked with familiarity of foods<sup>3,4</sup>, and repeatedly exposing a child to a food has been shown to decrease food neophobia<sup>5,6</sup> and increase familiarity<sup>7</sup>. Repeated food exposure is one factor that can increase food acceptance<sup>8</sup>, and the effects of feeding styles on child food intake<sup>9</sup> and dietary habits<sup>10</sup> have been studied as well. However, pretend play with toy foods has not been explored as another means of exposure to new foods; thus, impacting food preference and intake. Specifically, no research to date has examined how maternal perceptions and toy foods may relate to food preferences. Therefore, the purpose of this research is to explore maternal perceptions of how preschool-aged children engage in pretend play with toy foods in the home environment and how the perceptions differ across the feeding styles.

## REVIEW OF LITERATURE

### *Introduction*

According to the Centers for Disease Control and Prevention, the obesity epidemic in the United States remains a major concern with 17% of all children and adolescents aged 2 to 19 years old classified as obese<sup>11,12</sup>. Obesity is defined as a Body Mass Index (BMI), represented as kg/m<sup>2</sup>, at or above the 95<sup>th</sup> percentile for children of the same age and sex. Based on the 1999-2010 National Health and Nutrition Examination Survey, more than 12% of two to five-year-old children were either at or above the 95<sup>th</sup> percentile of BMI for age<sup>1</sup>. Obesity in children is associated with increased risk of developing hypertension, dyslipidemia, type 2 diabetes, sleep apnea, asthma, joint stress, hepatic steatosis, cholelithiasis, and gastric reflux<sup>11</sup>. These diseases are typically seen in adults, but the age of diagnosis is lowering<sup>13</sup>. Additionally, childhood obesity is a risk factor for remaining obese as an adult, and several independent predictors of adult obesity, such as childhood BMI, maternal BMI, and family income, have been identified<sup>14</sup>.

Weight gain occurs when there is an imbalance in the number of calories consumed via dietary intake as compared to the number of calories burned via physical activity. Several lifestyle characteristics have been identified as contributing factors to excessive weight gain<sup>15</sup>. This energy imbalance has been observed in children as young as two to five years of age<sup>16</sup>. To address the dietary intake side of the balance, it is important to understand how children develop food habits and preferences, and thus, their choices in food, which may influence later weight status.

Childhood is an important developmental period for food preferences<sup>17-21</sup>. From a very young age, children begin developing food preferences<sup>18</sup> and the acceptance of certain foods and refusal of others ultimately impacts their food intake. Factors contributing to food preference development include genetics<sup>22-30</sup>, food neophobia<sup>31-35</sup>, repeated food exposure<sup>5,6,8,35-42</sup>, media<sup>43-</sup>

<sup>49</sup>, parental and peer modeling and influence<sup>3,9,19,50-58</sup>, and maternal feeding styles<sup>9,10,53,59-76</sup>.

Development of food preferences in children may be influenced and/or reinforced through more subtle means such as exposure to specific foods in picture books<sup>36,37</sup> and through pretend play with toy foods<sup>77-83</sup>. Little research, however, has been directed in the area of pretend play with toy foods as a way of acquainting children with healthy foods. Additionally, little research has been conducted to understand how this mode of interaction may interplay with parenting and repeated exposure to specific foods in the development of food habits in early life. The aims of this literature review are to describe the key factors that contribute to food preference development, begin to explore what is known about the potential contribution of the interplay between pretend play with toy foods and parental feeding style, and to identify the gaps in knowledge that currently exist with regard to this relationship.

### ***Current Food Intake Patterns in U.S. Children***

Throughout the course of the last several decades, children's food intake has shifted more to energy-dense nutrient-poor foods instead of nutrient-dense foods<sup>84</sup>. Data obtained from the 1977 Nationwide Food Consumption Survey was compared to the 2001-2002 What We Eat in America, National Health and Nutrition Examination Survey to determine differences in mean total beverage intake over time for both children six to eleven years old and adolescents twelve to nineteen years old. Results showed that children in 2001-2002 were consuming half as much milk as in the past, a decrease from 61% to 33% of total beverage intake, and intake of soda rose from 15% to 33% over that same 25-year time period. Additionally, teens reported soda as their preferred beverage over milk, and 95% of the soda in both age groups was regular rather than diet. Fruit drinks, ades, and 100% fruit juices were consumed at higher proportions in the most recent data as well. There were significantly higher intakes of tacos, pizza, and snack foods and

vegetable intake declined over the course of the 25 years<sup>84</sup>. More recent results from the National Health and Nutrition Examination Survey, 2005-2008, showed that the percent of daily calories from added sugars dropped between the years 1999 and 2008, though the American diet still contributes a high amount of added sugars<sup>85</sup>. Findings also showed that preschool-aged children consume 13.1% (girls) and 13.5% (boys) of energy from added sugars<sup>85</sup>. Additionally, when comparing non-Hispanic white children and adolescents to Mexican-American children and adolescents, non-Hispanic white children and adolescents obtained a greater percent of their calories from added sugars<sup>86</sup>. Income was not related to added sugar consumption in children and adolescents. Added sugars from food contributed more calories than added sugars from beverages. It was determined that excess added sugars were ingested at home and not at locations outside of the home<sup>86</sup>.

While the consumption data reported above is derived primarily from older children and adolescents, recent data suggest similar issues among younger children. The Feeding Infants and Toddlers Study (FITS) 2008 is a descriptive survey using cross-sectional data from a random sample of United States children from birth to three years of age<sup>87</sup>. Fox and colleagues analyzed the descriptive data from the Feeding Infants and Toddlers Study to determine food consumption patterns in this age group. Results revealed that an estimated 25% of three-year-olds were still consuming whole milk at least once per day, although the recommendations are for all children to consume lower fat milk after age two. In regards to the Dietary Guidelines for Americans, food consumption patterns in preschool-aged children met some but not all of the recommendations. French fries and other fried potato foods were the most commonly consumed vegetable while intake from the vegetable food group as a whole was low. This is of concern as potatoes are more energy dense than non-starchy vegetables, such as dark leafy greens, and



frying them further contributes to energy density. In the fruits category, fresh fruit was noted as the most commonly consumed form of fruit, but fruit juice was consumed as well in this population. Energy-dense and nutrient-poor foods, such as desserts and salty snacks, were eaten by 82% to 89% of toddlers on a daily basis<sup>87</sup>. As food preference and intake patterns develop early in life and tend to persist, unhealthful intake patterns in toddlerhood may potentially contribute in the long-term to heightened risk of obesity, type 2 diabetes, hypertension, and cardiovascular disease. Therefore, it is necessary to understand what contributes to food preference development and how these factors affect both short-term and long-term food intake patterns.

### ***Factors Contributing to Food Preference Development***

#### *Genetics*

A person's genetics can help shape appetite characteristics, which draws a link between obesity and behavior and genetics. Research has shown appetite traits to be heritable in both children<sup>22,23</sup> and adults<sup>24,25</sup>. Heritable appetite traits refer to appetite characteristics, such as external food cues and internal satiety cues that have been passed down via one's genetic make-up. However, prior to the study by Llewellyn and colleagues, no research had been conducted to test the presence of heritable appetite traits in infancy<sup>26</sup>. The eating behavior of infant twins (n= 2402 pairs) was determined based on parents' completion of four subscales of the Baby Eating Behavior Questionnaire. The data revealed that heritability for both satiety responsiveness and slowness in eating was high, while moderate heritability was found for enjoyment of food and food responsiveness. This indicates that the variation in one's response to internal satiety cues and the speed of eating as compared to another individual's was greatly impacted by genetics. Additionally, the variation in enjoyment of food and food responsiveness was moderately linked

to heritability. These results indicate that regulation of food intake may very well occur as early as the first three months of life<sup>26</sup>.

The concept that taste preferences can be inherited continues to gain the attention of researchers in the field. Studies focusing on the role of genetics in taste preference development have been conducted from both the behavior-to-biology and from the biology-to-behavior approaches<sup>27</sup>. This means that research has examined behavior and then referred back to biology for an explanation as well as studied biology to then explain or predict behavior. For example, Breen and colleagues was to assess the genetic influence on food preferences by studying twins. Mothers of same-sex four to-five-year-old twins (n= 214 pairs) completed a food preference questionnaire, and the foods were combined empirically into four groups for factor analysis. Liking for protein foods had the highest heritability followed by moderate heritability for vegetables, fruits, and dessert foods. These results reveal compelling evidence for the modest heritability of food preferences<sup>27</sup>. Although food preferences can be shaped and changed by other means, these results highlight the role of genetics in influencing food preference development.

One way in which genetics may contribute to development of food preferences is via inherited variations in individual taste perception. Certain chemical compounds found in foods, especially in vegetables, can be perceived as highly bitter for some individuals, who are referred to as ‘supertasters’<sup>28</sup>. Presently, there is not enough evidence to fully support that differing taste sensitivities are to blame for certain food dislikes<sup>29</sup>. Even so, Dinehart and colleagues tested vegetable intake as it is related to genetic variation in taste, measured by bitter and sweet taste markers<sup>30</sup>. Vegetable sweetness and bitterness served as independent predictors of greater or lower desirability for the vegetables sampled within the laboratory setting and vegetable intake, respectively. For the participants who were highly perceptive to the taste of PROP, the bitter

taste marker 6-n-propylthiouracil, vegetables were identified as having the greatest level of bitterness. This in turn resulted in variability of preference and intake for the sampled vegetables potentially due to increased bitterness. Quinine, another bitter taste marker, was associated with variability of vegetable preference and intake due to both vegetable bitterness and sweet sensation. The study's results indicate that vegetable preferences and intake for the sampled vegetables within the laboratory differed based on the taste genetic and taste function markers. Taste genetic markers refer to the variability in bitter and sweet sensation while taste function markers refer to the specific chemical compounds responsible for bitter and sweet tastes in vegetables. The varying sensations of bitterness and sweetness were shown to have an impact on vegetable preference and intake<sup>30</sup>. Together, the evidence suggests that genetic variation contributes, at least in part, to factors that can influence food intake in children including appetite, food preference, and taste characteristics.

### *Food Neophobia*

Food neophobia, defined as apprehensiveness about a novel food, is theoretically an evolutionary characteristic related to the protection of one's gastrointestinal system by avoiding the ingestion of potential toxins<sup>31</sup>. If a child is unaware of what a particular food is, how it tastes, or how it will react in the body, then he or she is prone to rejecting it for fear of it being harmful and/or displeasing. Research has shown that infants have an innate affinity for sweet and salty foods but not for sour and bitter foods<sup>32,33</sup>. This "learned safety" has been observed in other species, such as rats, as well<sup>34</sup>. Ultimately, if a child is unwilling to try new foods, then their development of food preferences may be limited, which could impact their long-term dietary intake and health status. If they avoid certain foods and/or certain food groups, then they may develop an inadequate intake of the necessary nutrients to maintain health and, conversely,

depending on the nature of foods consumed within the context of a limited diet, may have excess intake of nutrients present in the consumed foods.

The causes of food neophobia development in children are still not fully known, but the interplay of genetics and the environment with food neophobia has been examined<sup>35</sup>. The eating habits and a measure of food neophobia for 8 to 11-year-old twins (n = 5390 pairs) were collected via questionnaires completed by the children's parents. Food neophobia was concluded to be highly heritable, with only 22% of the variance being explained by non-shared environmental influences<sup>35</sup>. While genetics can contribute to a child's development of food neophobia, non-shared environmental factors can impact a child as well. Interestingly, children two to five years of age were more apt to approve of trying a new food when in the company of an adult model eating a food of the same color rather than just while in the presence of an adult model who is not eating or one who is eating a food of a different color<sup>32</sup>. Thus, it is expected that over time, the degree of food neophobia can be tempered through enhanced familiarity with target foods via repeat exposure and through modeling of food intake by adult caregivers and peers.

### *Repeated Food Exposure*

Repeated food exposure is one strategy that can be used to familiarize a child with a novel food<sup>7</sup>. Both animal<sup>38</sup> and human<sup>5,6,8,36,37,39-42,50,88</sup> studies have provided evidence to demonstrate that repeat exposure can increase food acceptance, and, as such, is key to development of food preferences. Capretta and colleagues discovered that rats were more accepting of novel flavors once they had been exposed to other novel flavors as compared to the controls, who were less accepting<sup>38</sup>. Under laboratory-based conditions, experiments further support that increased exposure to specific foods increases food preferences for those foods in both children<sup>8,89</sup> and adults<sup>5,88</sup>.

Research indicates that the number of exposures to the same food prior to acceptance varies by type of food and by age group<sup>8,39</sup>. One study concluded that to increase the acceptance of novel fruits and cheeses in two-year-olds, 5 to 10 exposures were necessary<sup>39</sup>, and 8 to 15 exposures were needed in three to four-year-olds to increase their preference for salted, sweetened, or plain tofu<sup>8</sup>. Repeat exposure primarily occurs via the actions of parents and other caregivers<sup>40</sup>, and children can be exposed to new foods through different sensory experiences, such as by touch<sup>41</sup>, smell<sup>41</sup>, taste<sup>41</sup>, and visual<sup>6</sup> exposure. These varying modes of exposure may also have varying degrees of effectiveness. While recurring exposures to novel foods have been studied as an intervention tool<sup>5</sup>, it has yet to be clearly determined what type of exposure yields the greatest success. In one study, taste was concluded to be a better determinant of food acceptance than touch in a sample of children ages two to five years old<sup>6</sup>. In an adult sample, providing information about a novel food (smell, taste, and visual exposure) and comparing the novel food with an already familiar food resulted in a decrease in negative reactions at the time of the food's introduction<sup>42</sup>. Houston-Price and colleagues solely examined visual exposure in two separate studies regarding children's looking and tasting behavior<sup>36,37</sup>. In the first study, three experiments were designed, each with a varying number and nature of exposure, to determine visual exposure impact on children's visual preferences<sup>36</sup>. Parents were asked to read a picture book about fruits and vegetables to their 17 to 20-month-old child daily for one, two, or three weeks. The books revealed how a food looks on the inside and outside as well as how it is grown, prepared, and cooked. The children's visual preference was measured by having them look at exposed versus non-exposed foods displayed on a projection screen. Results showed that children had a positive visual preference, demonstrated by significantly greater looking time, for foods that they had been repeatedly exposed to via the picture books<sup>36</sup>. In the second study,

parents of 20 to 24-month old children were read similar books, each containing two familiar and two unfamiliar foods, daily for two weeks to test the impact of visual exposure on a child's likelihood to taste fruits and vegetables<sup>37</sup>. After undergoing a taste test in which the children were presented with both exposed and non-exposed foods, the results indicated that children were more inclined to try an unfamiliar food that they had been visually exposed to versus an unfamiliar food without exposure<sup>37</sup>. Although the study had a small sample size, the results demonstrate that visual exposure may be another useful strategy to aid children in consuming more fruits and vegetables.

While toy food does not provide taste exposure, it does allow a child to role-play with certain foods through both visual and tactile exposure, similar to the two articles previously discussed. Children's interaction with toy foods could provide another means of exposure to different foods through play, which could potentially impact their food preference development and food intake in a positive manner. Thus far, efficacy of this means of exposure in enhancing food acceptance has not yet been extensively studied.

### *Media*

Research has shown media to be influential on children's food preferences and weight status by means of advertising through popular children's television programs, television commercials, and by the use of a well-known celebrity. Using a within-subjects, counterbalanced design, 9 to 11-year-old UK children were tested under two conditions to assess the effect of television food advertisements on their food intake and whether the effect differed based on weight status<sup>44</sup>. The first condition involved the children viewing food advertisements followed by a cartoon whereas the second condition involved the children viewing nonfood advertisements followed by the same cartoon. Findings showed that children had significantly

greater food intake, specifically of high fat and/or sweet energy-dense foods, across all weight statuses after completion of the first condition ( $p < 0.001$ ). Additionally, the greatest significant increase was noted in obese children ( $p < 0.04$ ). Therefore, the results indicate that children who are overweight or obese respond more so to food advertisements, which could increase their intake of nutritionally poor foods<sup>44</sup>. To understand what commercials children were exposed to when watching popular children programs, six public Swiss television channels and two private German and Italian television channels were recorded and analyzed<sup>49</sup>. Of the total commercials recorded, 26% were for food with the majority for fast food, candy, cereals, and sweet beverages in descending order by frequency. This representation of an inverted food pyramid was being marketed to children during the time slots when their television use was the highest. This is of concern given the messages that children are receiving based on these food advertisements<sup>49</sup>. Batada and colleagues used a cross-sectional design to examine the nutritional quality of food advertisements by Nickelodeon, one of the major companies that markets to children worldwide<sup>43</sup>. Results showed that 88%, 76%, 60%, and 94% of television advertisements, magazine food advertisements, products with Nickelodeon characters, and children's restaurant meals affiliated with Nickelodeon, respectively were of poor nutritional quality. Thus, it was found that 80% of foods and beverages marketed by Nickelodeon were not of sound nutritional quality<sup>43</sup>. Boyland and colleagues found that in a sample of 8 to 11-year-old UK children ( $n=181$ ), the use of a sports celebrity endorser in television food advertisements and in a nonfood context resulted in overconsumption and significantly greater consumption of the brand name potato chip that was endorsed<sup>45</sup>. These results demonstrate the power of endorsement on influencing food preferences<sup>45</sup>.

### *Parental and Peer Modeling*

Psychologist Albert Bandura developed the Social Cognitive Theory, stating that human behavior is guided by modeling others through observing their actions<sup>50</sup>. The theory is shaped around several key factors, including how they operate, and the means in which they can be incorporated into successful health practices<sup>51</sup>. They are knowledge, self-efficacy, outcome expectations, goals, perceived facilitators, and impediments, all relating to one's health<sup>51</sup>. Evidence has demonstrated that a parent can have a large impact on their child's food intake by acting as a role model<sup>52</sup>. For example, Fisher and colleagues found a negative association between parental pressure to eat fruits and vegetables and intake of these foods in 5-year-old girls<sup>19</sup>. However, the parents' own intake of fruits and vegetables was positively associated with their daughter's intake of these foods. The results reveal the role of healthy eating behaviors as modeled by parents<sup>19</sup> and is consistent with the findings of Murashima, who likewise observed that low-income mothers' nondirective control of feeding behavior, i.e. modeling, was associated with healthier diets in preschool-aged children<sup>53</sup>. Further support for modeling is given by data showing that healthy eating behavior modeled by the mother when her child was one year of age forecasted greater frequency of vegetable intake at age two<sup>9</sup>. Again, a separate study established a significant positive relationship between children's fruit and vegetable intake and both parental fruit and vegetable intake and the frequency of parental daily role modeling of fruit and vegetable intake<sup>54</sup>. Moreover, children were shown to be more accepting of a novel food when in the presence of an adult consuming the same food than when the novel food was only offered to the child<sup>32,55</sup>. While this research has shown that an adult can impact a child's dietary intake, research has shown that a child's presence can impact his/her parents' eating behaviors as well. Tibbs and colleagues recognized that parents chose to engage in healthier eating behaviors while



in the presence of their children to encourage their children to consume certain foods<sup>90</sup>. These pieces of evidence further identify the importance that modeling can have on children and their food choices. In all, the weight of evidence suggests that parental modeling of healthy food intake and other non-directive, such as modeling, feeding behaviors relate to intake of healthy foods in young children.

The power of peer influence on children's food preferences has been noted in the research literature as well, though to a lesser extent<sup>3,56,57</sup>. O'Connell and colleagues conducted a randomized controlled trial within the environment of two preschools, including a total of 96 three to six-year-old children<sup>56</sup>. After controlling for parent feeding practices, a significant positive association was found between exposing children to three new vegetables and greater intake of those vegetables while in the presence of their peers<sup>56</sup>. Additionally, peer influence to try a novel vegetable has been shown to be a successful tool in overcoming food neophobia as well<sup>3,56</sup>. After observing peers choose a different preferred vegetable over the course of four days, preschool-aged children showed a significant shift in their choice of preferred vegetable, demonstrating the impact of peer modeling<sup>3</sup>. Similar influences have been observed in other children as well. For example, fourth and fifth grade students had higher fruit and vegetable intake when they perceived that their parents and their peers consumed fruit<sup>57</sup>. In addition, they reported higher fruit and vegetable intake when home engagement, i.e. selecting fruits and vegetables at the store and asking that their favorite fruits and vegetables be in reach in the home, was used<sup>57</sup>. Overall, evidence suggests that parents are the most influential models in young children<sup>58</sup>, and as such, could impact a child's willingness to try new foods.

### *Maternal Feeding Styles*

Diana Baumrind, a clinical and developmental psychologist, has conducted several studies focusing specifically on parenting styles. She created a framework based on two dimensions known as ‘control/demandingness’ and warmth/responsiveness<sup>59</sup>.

‘Control/demandingness’ refers to the level of control a parent places on the child while ‘warmth/responsiveness’ refers to the nurturing aspect of parenting and the level of responsiveness a parent gives to the child’s needs. When combined, these two dimensions yield four parenting styles. The ideal parenting style, ‘authoritative’ is marked by high control and high warmth, so a parent with this style is firm and sets boundaries while also being perceptive and aware of their child’s needs. ‘Authoritarian’ is defined as having high control but low warmth; so unlike the authoritative parent, an authoritarian will impose order and rules but will not readily acknowledge the child’s needs. A parent exhibiting the ‘indulgent’, also referred to as ‘permissive’, style of parenting conveys high warmth but low control, so the child is less disciplined and experiences greater freedom. To maintain consistency throughout the paper, the term ‘indulgent’ will be only be used to denote this feeding style. Lastly, the ‘uninvolved’, otherwise known as ‘neglectful’, parent is low on both control and warmth, therefore lacking any restraint over the child’s actions and also failing to react to their needs<sup>59</sup>.

These four parenting styles have been linked with four feeding styles, which can have an impact on a child’s overall food intake<sup>10</sup>. A parent with the ‘authoritative’ feeding style is more child-centered and recognizes the child’s hunger signals. This parent will provide support to eat by using reassurance but not force, and the child is ultimately left to determine what and how much of the food he or she cares to eat. A parent with an ‘authoritarian’ feeding style commonly resorts to the reward system in which coercion, i.e. promise of a “treat” or “reward”, is used to

encourage a child to eat a certain food. This parent relies on controlling their child's behavior through methods such as pressuring, monitoring, and restricting. Parents with the 'indulgent' feeding style lack limitation of the child's intake, and instead, primarily emphasize support. An indulgent parent is much more apt to say 'yes' to the child regardless of the food being requested. Control and support for eating are both absent in the 'uninvolved' feeding style, so children are left to make their own choices without guidance<sup>10</sup>. In utilizing a certain feeding style, a parent is therefore apt to shape a child's eating behaviors and food preferences.

The research literature primarily focuses on parental (paternal and maternal combined) and maternal feeding styles, with the latter predominating, but makes little mention of paternal feeding styles. Thus, the literature reviewed henceforth will focus on parental and maternal feeding styles. Researchers have identified a considerable amount of data supporting the hypothesis that parenting style does impact a child's food intake<sup>60</sup>. Conversely, observational data suggest that a child's food intake and their weight status may influence the style of parenting. At this time it is clear that there is a relationship between food intake and weight status in children and parenting style. However, it is not completely clear which is the cause and which is the effect or if the relationship is bidirectional. Consequently, these relationships need to be examined in greater depth<sup>60</sup>.

Several studies have examined the association between maternal feeding styles and a child's food intake. Nondirective (covert) feeding practices, i.e. authoritative feeding style, involve setting meal times, eating with children, allowing the children to choose among nutrient-dense foods, making nutrient-dense foods available, and carefully promoting healthy eating without being forceful<sup>53</sup>. In contrast, directive (overt) feeding practices, i.e. authoritarian feeding style, encompass pressuring and controlling a child to eat certain foods and to consume a healthy

diet. Children of mothers using nondirective control of feeding behavior have been shown to consume a greater amount of nutrient-dense foods than children of mothers using directive control of feeding behavior. Paradoxically, in this study an inverse relationship was also noted between weight status of preschoolers and maternal pressure to eat, which has been cited in prior research regarding middle-income samples. The rationale to pressure a child to consume certain food in the context of middle- and low-income groups may differ, but these possible differences are not entirely known or understood<sup>53</sup>. In a United Kingdom study, researchers investigated the environmental and individual determinants of ‘core’ food intake, referring to fruits and vegetables, and ‘non-core’ food intake, referring to snacks and sweetened beverages, in a sample of preschool-aged children<sup>61</sup>. Maternal fruit intake, i.e. modeling, children’s liking for fruit, and a monitoring style of parental feeding, consistent with the authoritative feeding style, were all positively associated with children’s fruit intake. Children’s vegetable intake likewise was related to maternal vegetable intake, i.e. modeling, encouragement and monitoring, i.e. the authoritative feeding style, and children’s liking for vegetables. Maternal intake of non-core snacks and sweetened beverages and television screen time were associated with children’s intake of snack foods and sweetened beverages, respectively. Maternal food intake of core and non-core foods and beverages was the only predictor for all types regarding children’s intake of such foods and beverages<sup>61</sup>. This again demonstrates the impact that numerous maternal factors can have on a child’s food intake, thus, supporting the importance of achieving a greater understanding as to how these factors work together and how they may effectively be targeted in interventions to optimize intake of healthful food in children.

Hoerr and colleagues found that in a low-income multiethnic family study sample, children of indulgent or uninvolved parents consumed less fruit, vegetables, juices, and dairy

foods than children of authoritarian parents<sup>62</sup>. Consistent with this finding, a multiethnic low-income sample from five rural regions across the U.S. showed that the indulgent feeding style was also associated with low diet quality among children with intakes characterized by high consumption of nutrient-poor foods<sup>63</sup>. In contrast, other studies have linked authoritarian feedings to lower fruit and vegetable intake in young children<sup>9,64</sup>. One cross-sectional German study focused on low socioeconomic status children between three and six years old who were at risk of becoming overweight<sup>64</sup>. The researchers found three maternal feeding strategies, those being child's control, rewarding, and pressure, to be significant predictors of a child's food intake. The food intake measured was defined as fruits and vegetables and 'problematic foods', such as soft drinks, sweets, fast food, and additional unhealthy snacks. Pressuring a child to eat was shown to result in a greater intake of problematic foods, while a child's control was shown to be associated with fruit and vegetable intake, and rewarding was associated with lower intake of these foods<sup>64</sup>. Taking a different approach, a 12-month prospective longitudinal study, including a sample of mothers in which 75% had post-secondary education, discovered that lower fruit intake at two years of age was predicted by maternal pressure to consume the fruit at one year of age<sup>9</sup>. The same trend was observed with regard to vegetables, although this did not reach statistical significance. The results imply that maternal feeding styles may be related to food intake among children even at a young age, with a negative association between pressure and fruit intake and a positive association between maternal modeling and vegetable intake<sup>9</sup>. These results provide further support for the aforementioned study in which pressuring was linked to higher consumption of problematic foods. As the relationship between maternal feeding practices and child food intake may differ by mother's educational level, Vereecken and colleagues took a closer look at that variable<sup>65</sup>. Results revealed that maternal intake was an

independent predictor for consumption of fruits, vegetables, sweets, and soft drinks. Regarding fruits and vegetables, the variation in children's food intake by maternal education level was entirely explained by maternal intake, i.e. modeling, and food parenting practices<sup>65</sup>.

Inconsistencies in results suggest that other factors, such as ethnicity and socioeconomic status, may modulate the relationship between parental feeding style and food intake in children.

Results from similar studies in older children showed that in a sample of Dutch adolescents, authoritative parenting was related to the highest amount of fruit intake followed by indulgent parenting and ending with the lowest fruit intake among adolescents reporting uninvolved and authoritarian parents<sup>66</sup>. Similar findings were observed in a sample of British adolescents with a high socioeconomic status. Data from their food frequency questionnaires indicated that those with authoritative parents had greater fruit and breakfast intake and less unhealthy snack intake as compared to those with uninvolved parents<sup>67</sup>. Currently, research has shown both positive and negative associations between maternal feeding styles and a child's food intake. Given that food intake differs by feeding style, a child's weight status could, therefore, be related to maternal feeding style as well.

Feeding styles have been linked to children's weight status as well. Two studies using a sample of preschoolers, predominantly African American and Hispanic, attending Head Start facilities, looked at weight status relative to feeding style<sup>68,69</sup>. Head Start is an all-encompassing childcare program designed to meet the needs of low-income children<sup>69</sup>. In this sample, indulgent parenting was related to higher BMI among the preschoolers when compared to authoritarian parenting<sup>68</sup>, and Hispanic boys of indulgent parents had significantly higher BMI z-scores than did Hispanic boys of one of the three other feeding styles<sup>69</sup>. In contrast, data from the National Institute of Child Health and Human Development (NICHD) Study of Early Child

Care and Youth Development discerned the percent of overweight children among the four maternal feeding styles and suggest a different relationship between feeding style and child weight status<sup>70</sup>. The results showed 3.9% of children of authoritative mothers, 17.1% of children of authoritarian mothers, 9.8% of children of indulgent mothers, and 9.9% of children of uninvolved mothers were overweight out of a sample of 872 first graders. The majority of this sample (82.8%) was White with high maternal education (mean  $14.6 \pm 2.4$  years) and 87.9% living with spouse or partner. It is important to note that these demographic characteristics are much different than the samples included in the aforementioned studies by Hughes and colleagues, which likely explains the contrasting findings. The four parenting styles and their relationship to feeding behaviors have been shown to vary among different ethnicities. These findings suggest that the relationship with weight may also be dissimilar among cultural groups<sup>70</sup>. Research completed by Cachelin and colleagues further supports the inconsistencies in feeding styles among different ethnicities<sup>71</sup>. To examine this notion, they looked closely at three factors: maternal weight status, maternal concern with regard to eating, and maternal concern for child weight status in an ethnically diverse sample of 563 mothers with children 2 to 11 years old. Results showed that White mothers concerned with eating-related factors was predictive for maternal control over the child's intake. However, mothers who were Hispanic did not experience this same correlation, further reinforcing the findings that ethnicity does impact feeding behaviors<sup>71</sup>. Although undetermined, it appears as though the degree of responsiveness may play a role. A balance of responsiveness and demandingness is associated with positive outcomes whereas exhibiting almost solely responsive or solely demanding parental feeding styles are associated with negative outcomes. However, it is uncertain if parental support drives

development of healthy eating behaviors and/or if demandingness fosters resistance to those behaviors being demanded.

Additional data analysis from the longitudinal NICHD Study of Early Child Care and Youth Development examined the direction of the relationship between controlling maternal feeding practices (CMFPs) and the increase in a child's BMI<sup>72</sup>. CMFPs refer to restrictive and controlling feeding practices, and they are akin to the authoritarian feeding style. The investigators were unsure if CMFPs preceded or stemmed from a child's increase in BMI. An increase in z-score in four to seven-year-old girls was shown to be associated with an increase in CMFPs. This is to say that in young girls (the findings were not observed in boys), feeding style may change in response to weight gain<sup>72</sup>. A child's obesity risk seems to be key in determining the relationship of parental feeding styles with regard to child weight status<sup>73</sup>. Faith and colleagues recruited participants (n=57 families) who were enrolled in an Infant Growth Study with children who were either low risk or high risk for obesity based on maternal weight prior to pregnancy. The children were followed from the age of three to the age of seven with measurements on parental feeding styles and attitudes being collected when the children were five years old and seven years old. Results revealed that higher restrictive feeding practices in parents appeared to develop when children (specifically girls) deemed to be at risk for obesity were at a high weight. Engaging in this level of restriction appears to then result in even more weight gain in the children, in effect exacerbating their high weight<sup>73</sup>. Furthermore, Dev and colleagues used an ecological model to determine risk factors for overweight/obesity in preschool-aged children, which led them to discover that parental restrictive feeding practices was one of three factors significantly associated with child overweight/obesity<sup>74</sup>. The researchers recruited the 329 parent-child dyads from the STRONG Kids longitudinal study and examined



their baseline self-reported data. Analysis showed that of the 22 previously identified risk factors, the three deemed statistically significant were child nighttime sleep duration, parental BMI, and parental feeding practices as a means to control weight during preschool-aged years. Children of parents employing these restrictive feeding practices were 1.75 times more susceptible to being overweight/obese. As stated above, use of restriction in this manner seems to only exacerbate the weight issue<sup>75</sup>.

Gemmill and colleagues explored a slightly different avenue of research, namely the association between a child's BMI and controlled feeding practices along with maternal psychological factors<sup>76</sup>. Using self-reported data regarding psychological wellbeing completed by mothers (n=203) during their pregnancy and two to seven years postpartum, the researchers determined that the association is still not completely definitive in predicting a child's BMI. In looking specifically at maternal depression, those who reported experiencing depression tended to use less controlled feeding practices whereas maternal anxiety tended to increase the level of restriction and controlled feeding practices over the child. Further research is still needed to better understand this association<sup>76</sup>.

In all, the published literature has revealed various ways in which maternal feeding styles are related to children's food intake and a child's weight status. Thus far, the relationships identified are not yet fully understood but provide several avenues of research. Further investigation is necessary in this area to acquire a greater depth of knowledge on the relationship between maternal feeding styles and a child's food intake and weight status.

### *Pretend Play*

Children engage in pretend play in a variety of contexts and often times employ their imagination to carry out this activity<sup>91</sup>. It is no surprise then that researchers have been interested

in how pretend play may impact children from a developmental standpoint. Sutherland and colleagues examined how children could gain generic knowledge through the act of pretense<sup>92</sup>. Conducting two experiments in which a fabricated animal called a “nerp” was used, experiment one involved 22 three to four-year-olds who watched scenarios wherein the researcher used pretend speech and sound effects to narrate the “nerp” puppet. One scenario involved the “nerp” disliking a carrot. Following the scenarios, the children were questioned to determine if they understood the basic facts given to them. In experiment two, 32 three to four-year-olds watched the “nerp” puppet in several scenarios but without any pretend speech and sound effects from the researcher. Results showed that the children did obtain generic knowledge from involvement in pretense<sup>92</sup>. Sutherland and colleagues followed this study with one that addressed how play could result in gaining generic knowledge and whether this learning from pretense is specific and selective<sup>93</sup>. In all, twenty-four preschool-aged children were included in the three experiments. Experiment one tested three to four-year-olds’ specificity with regard to an animal puppet show carried out by the researcher, and experiments two and three tested four and five-year-olds selectivity. Results showed that children do exhibit a level of specificity and selectivity when learning from pretense<sup>93</sup>.

As children develop, their style of play evolves, which allows them to act out hypothetical situations and gain a greater understanding of the world around them<sup>91</sup>. Children as young as 24 months are able to engage in pretend play by pretending to have such objects as a plate, food, or a drink and this ability increases with age<sup>77</sup>. When engaging in pretend play with toy foods, a child may mimic a cooking technique or consumption of a certain food based on observations demonstrated by parents and caregivers, although this has not yet been clearly established in the research literature. Conversely, it may be possible that engaging in pretend

play with toy foods may familiarize children with new foods, in effect serving as a form of exposure<sup>78</sup>. If that is the case, the types of toy food available to children could potentially have an impact on food preference development for better or worse. Matheson and colleagues found that upon observing preschool-aged children for one year while they played in toy kitchens, children relied most heavily on the physical traits of toy foods, such as shape, color, and texture when attempting to classify these foods<sup>79</sup>. Throughout the course of the year, children play-acted various behaviors, such as meal planning, food preparation, and eating. Some differences among play based on gender were reported, such as boys pretending to fix a broken appliance or girls tending to the baby doll<sup>79</sup>. Although observational in design, findings suggest the possibility that children's play with toy foods may play a role in development of their own food preferences and behaviors.

Limited research has explored the potential for toy food interactions to influence development of eating attitudes and food preference in young children. A pilot study of 19 toddlers in a childcare setting found that children requested more servings of fruits and vegetables during meal and snack times following a one-week intervention incorporating toy fruits and vegetables into pretend play scenarios focused on colors, food tasting, singing, and interactive play<sup>78</sup>. No other related intervention studies have been reported to date.

Observational studies have explored the home play food environment using different approaches. A cross-sectional survey of mothers (n=181) of preschool children described home toy food availability by gender and age in the context of the 2010 Dietary Guidelines for Americans<sup>80</sup>. Out of the mostly White, middle-income convenience study sample, 80.7% of mothers reported their children had toy foods in the household. There was a mean of 32 different types of toy food per household, and most frequently reported toy foods listed in descending

order by frequency were from the vegetables, fruit, grains, sweets/fats, protein, and dairy MyPlate food groups. Results from the survey also revealed that girls were significantly more likely to have toy food than were boys (89.9% and 71.7%, respectively)<sup>80</sup>.

Lynch conducted two studies of similar design to describe the types of toy foods with which children play and how young children act out play with toy foods. Both studies implemented a novel approach by qualitatively analyzing videos posted on the YouTube video website<sup>81,82</sup>. The videos were located using certain search criteria, but the YouTube users were not first enrolled and then asked to share their videos. The videos were viewed multiple times by the investigator to complete content analysis. In both studies, the children were estimated to be two to six years old based on their level of speech, appearance, and demeanor, although participant demographic data were not collected. The first study by Lynch included viewing a total of 115 videos to describe play behaviors in a toy kitchen and parent-child interactions in this setting<sup>81</sup>. The themes identified included ‘food preference development’, ‘children modeling parental roles’, ‘parents projecting gender roles’, and ‘mealtime preparation behaviors’. While some parents reinforced acceptance of nutritious foods and beverages such as the preparation of vegetables, soups, and green tea, others appeared to promote foods and beverages such as soft drinks, desserts, and processed foods. Modeling by the children was demonstrated in several scenarios, one being when a young girl made a pot of coffee after watching her father illustrate this task. Similarly, Matheson and colleagues observed modeling behaviors, such as meal planning, food preparation, and cleaning up, during the children’s engagement in pretend play in a toy kitchen<sup>79</sup>. Again in Lynch’s study, several children were classified as modeling the authoritative feeding style by offering healthy toy food items but allowing the parents to make a choice according to their preference<sup>81</sup>. The promotion of gender roles was observed as parents

interacted with boys and girls. In one YouTube video, Lynch noted that a father showed obvious displeasure in his son wearing an apron. A separate video included a mother encouraging a dieting behavior with her daughter. Nearly all of the videos had an element of mealtime preparation, which included washing hands, washing dishes, and practicing safety around sharp utensils and hot appliances. The pretend preparation and consumption of both healthy and unhealthy foods were observed, and the subtle hints that the parents gave towards certain foods may impact the child's desire to eat those foods<sup>81</sup>. Therefore, pretend play with toy foods may potentially provide an avenue for parents to reinforce food preferences and related behaviors, whether the result is promotion of healthy foods or, alternatively, of energy-dense nutrient-poor foods<sup>81</sup>.

In the second study by Lynch looking at the types of toy foods with which children interacted and food preparation methods utilized (n=101 videos), the prevalence of play food appearance in descending order by frequency was extras, fruits and vegetables, meats/alternatives, grains, and milk and dairy<sup>82</sup>. Foods and other items that were classified as extras included desserts, fast food, coffee, butter, salt, and sugar. Lynch observed that a majority of children were observed playing with conventional foods, many of which reflect the energy-dense nutrient-poor Western diets. Some children played with a few less common foods, such as cabbage, eggplant, and turnip<sup>82</sup>. The frequency of foods by food group varied in Lynch's study compared to the findings of Waters<sup>80</sup>. Specifically, Waters found vegetables, fruits, and grains to be most frequently reported whereas Lynch identified "extras" as most common. This difference could be due to a number of reasons. First, the data collection methods differed markedly. Waters collected self-reported data from mothers whereas Lynch observed and counted foods appearing in online videos. Both approaches offer advantages and disadvantages. The self-

reported data are more comprehensive, complete, and objective as a reflection of toy foods present in the home, but video footage, if representative of each child's usual play patterns, may better reflect the play foods with which children engage most frequently. Additionally, the grouping of foods differed in the two studies with Waters grouping by MyPlate food groups and Lynch grouping with an alternative approach wherein the "extras" group was a catch all group including salt, coffee, fast food, sweets, etc. that perhaps was the main contributing factor to the predominance of this group. These limited and differing findings suggest more data are needed, specifically direct observation of the full array of toy foods in the home setting and objective observation of frequency and type of play with each. In addition to simply looking at the types of toy food with which children engage, it is key to observe the ways in which they engage and how parents may contribute to this type of play, potentially in reinforcing food-related preferences and behaviors<sup>82</sup>.

Lynch's findings hint via reported observations that parental feeding style may be related to the toy food environment in the home and, as such, the role toy foods may play in reinforcing food preferences and eating behaviors may vary by feeding style. Research conducted by Waters, as part of the aforementioned cross sectional survey of 181 mothers found that mothers with the indulgent feeding style reported that their children had a greater number of toy foods overall and a greater number of toy foods categorized as vegetables at home than did mothers classified as one of the three other feeding styles<sup>80</sup>. Additionally, children of mothers classified as having the indulgent feeding style were reported as being significantly less food neophobic when compared to children of mothers classified as having the authoritarian feeding style. This latter point could have several explanations requiring further exploration. For example, mothers of children who like a wide variety of foods may feel less drive to pressure children to eat or to monitor their

food intake. Alternatively, the support provided via an indulgent feeding style could minimize development of neophobia. Conversely, it is possible that the high demandingness aspect of the authoritarian feeding style actually dissuades a child from trying a new food. Based on the literature regarding maternal feeding styles and food intake in young children, children of indulgent mothers were found to consume a higher amount of unhealthy food and less nutrient-rich foods<sup>62,63</sup>. Yet, this cross-sectional survey by Waters revealed children of predominantly White indulgent mothers had the greatest number of different vegetable toy foods in the home (8.7±6.4 compared to 5.7±5.0 among uninvolved mothers) and, interestingly, indulgent mothers reported that their children had the lowest preference for sweets and fats relative to children of authoritarian mothers, although this did not reach statistical significance ( $p=0.055$ )<sup>80</sup>. One explanation in this sample is that scores on the dimension of responsiveness, associated with indulgent and authoritative feeding styles, were significantly and positively correlated with mothers' rating of "importance of health." The reason for discordance of the findings may be variation by sociodemographic characteristics or may be unique to this sample, but ultimately is unclear and bears further investigation.

In comparing and contrasting the findings from both Lynch and Waters, it is important to note particular limitations of the study design employed by Lynch<sup>81,82</sup>. As cross-sectional design using self-reported data, the study by Waters<sup>80</sup> interesting findings for further exploration (the purpose of this proposal) but cannot be used to definitively describe the toy food environment in the home or to establish a cause-effect relationship between maternal feeding styles, toy food interactions, and food preferences. Likewise, while the methodology employed by Lynch is novel and provides unique qualitative data on children's play with toy foods and their interactions with their parents in a toy kitchen environment, inherent limitations do make the

findings difficult to interpret. Identification, viewing, coding of video content, and thematic development was completed by a single investigator, thus lacking key controls to establish reliability and validity of findings. Additionally, demographic data are not available on the parents and children included in these studies, which limits generalizability. Nonetheless, the findings are derived from a natural setting and do contribute to the very limited research in this area.

The observations made by Lynch do tie in well with research on the role of parents in development of general pretend play skills in young children. Keren and colleagues tested the link between toddlers' ability to participate in symbolic play and parental style of dyadic and triadic play<sup>83</sup>. Dyadic play involves the child and the parent while triadic play involves both parents and the child. The sample involved (n=35) three-year-old children and their parents, and they were observed and video recorded at home for two parent-child free play periods. The results were in keeping with the typical play often seen in boys and girls. While the girls displayed nurturing themes, the boys engaged in more aggressive behavior. The mothers promoted thoughtful and encouraging play with both daughters and sons, whereas the fathers demonstrated physical and manufacture-based play. The children's amount of symbolic play was forecasted using the mothers' and fathers' helpful and inventive style during the dyadic play. Throughout the triadic play period, children's symbolic play was forecasted by co-parenting that included independence and agreement. It was discovered, however, that child intelligence did have an independent influence on symbolic play while occupied in triadic play. The researchers concluded that a child's ability to take part in symbolic play is derived from the parents' competence of play. The study results are regarded as preliminary given the small sample size, but the results have opened up new areas of research<sup>83</sup>.



While research into the role, if any, of pretend play with toy foods in development of food habits in young children is in its infancy, there is at present no published research on parental observations and perceptions of this potential role, which may help to explore the potential for toy food as a means of supporting development of healthful eating habits in young children and to identify education and intervention targets. Additionally, based on initial cross-sectional survey results, further research could be important in identifying how and why maternal feeding style may be related to the presence and representation of healthfulness of toy foods available to preschoolers in the home. Play is such a crucial component of a child's development, and the effects, if any, of playing with toy foods are not well documented. This proposed study employs a mixed-methods approach, which involves both qualitative and quantitative data collection. The qualitative approach is rich in dialogue, detail, and is hypothesis generating, which will help to elucidate areas for intervention development and testing. The quantitative component strengthens the project by providing concrete numerical data, which are precise and reasonably independent of the investigator. Currently, there is no documented research on the maternal observations and perceptions with regard to their preschool-aged children's interactions with toy food in the home environment. This thesis will explore this new area specifically among mothers classified as being either high or low on each of the two dimensions of 'control/demandingness' and 'warmth/responsiveness'.

## **RESEARCH QUESTIONS**

The objectives of the proposed study are to:

1. Describe mothers' observations of their preschool-aged children while engaged in pretend play with toy foods and related materials.
2. Describe mothers' perceptions as to how pretend play with toy foods relates to real life experiences of preschool-aged children.
3. Describe mothers' observations and perceptions regarding pretend play with toy foods and relate these to maternal feeding style.

## REFERENCES

1. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of obesity and trends in body mass index among US children and adolescents, 1999-2010. *JAMA*. Feb 1 2012;307(5):483-490.
2. Russell CG, Worsley A. Do children's food preferences align with dietary recommendations? *Public health nutrition*. Nov 2007;10(11):1223-1233.
3. Birch LL. Effects of peer models' food choices on eating behaviors on preschoolers' food preferences. *Child Development*. 1980;51(2):489-496.
4. Birch L, Fisher JO. Development of eating behaviors among children and adolescents. *Pediatrics*. 1998;101:539-549.
5. Pliner P, Pelchat M, Grabski M. Reduction of neophobia in humans by exposure to novel foods. *Appetite*. 1993;20(2):111-123.
6. Birch LL, McPhee L, Shoba BC, Pirok E, Steinberg L. What kind of exposure reduces children's food neophobia? Looking vs. tasting. *Appetite*. 1987;9(3):171-178.
7. Cooke L. The importance of exposure for healthy eating in childhood: a review. *J Hum Nutr Diet*. 2007;20:294-301.
8. Sullivan SA, Birch LL. Pass the sugar, pass the salt: Experience dictates preference. *Developmental Psychology*. 1990;26(4):546-551.
9. Gregory JE, Paxton SJ, Brozovic AM. Maternal feeding practices predict fruit and vegetable consumption in young children. Results of a 12-month longitudinal study. *Appetite*. Aug 2011;57(1):167-172.
10. Hughes SO, Power TG, Orlet Fisher J, Mueller S, Nicklas TA. Revisiting a neglected construct: parenting styles in a child-feeding context. *Appetite*. Feb 2005;44(1):83-92.
11. CDC. Basics about childhood obesity. 2012; <http://www.cdc.gov/obesity/childhood/basics.html>.
12. CDC. Overweight and obesity. 2012; <http://www.cdc.gov/obesity/data/childhood.html>.
13. WHO. Preventing chronic diseases: a vital investment.33-87.
14. Juonala M, Juhola J, Magnussen CG, et al. Childhood environmental and genetic predictors of adulthood obesity: the cardiovascular risk in young Finns study. *The Journal of clinical endocrinology and metabolism*. Sep 2011;96(9):E1542-1549.
15. CDC. Causes and consequences. 2012; <http://www.cdc.gov/obesity/adult/causes/index.html>.
16. CDC. A growing problem. 2012; <http://www.cdc.gov/obesity/childhood/problem.html>.
17. Birch L, Savage JS, Ventura A. Influences on the development of children's eating behaviours: From infancy to adolescents. *Can J Diet Pract Res*. 2007;68:1-11.
18. Ricketts CD. Fat preferences, dietary fat intake and body composition in children. *European Journal of Clinical Nutrition*. 1997;51:778-781.
19. Fisher JO, Mitchell DC, Smiciklas-Wright H, Birch LL. Parental influences on young girls' fruit and vegetable, micronutrient, and fat intakes. *Journal of the American Dietetic Association*. 2002;102(1):58-64.
20. Brug J, Tak NI, te Velde SJ, Bere E, de Bourdeaudhuij I. Taste preferences, liking and other factors related to fruit and vegetable intakes among schoolchildren: results from observational studies. *The British journal of nutrition*. Feb 2008;99 Suppl 1:S7-S14.

21. Skinner JD, Carruth BR, Bounds W, Ziegler PJ. Children's Food Preferences. *Journal of the American Dietetic Association*. 2002;102(11):1638-1647.
22. Carnell S, Haworth CM, Plomin R, Wardle J. Genetic influence on appetite in children. *Int J Obes (Lond)*. Oct 2008;32(10):1468-1473.
23. Llewellyn CH, van Jaarsveld CH, Boniface D, Carnell S, Wardle J. Eating rate is a heritable phenotype related to weight in children. *AM J Clin Nutr*. Dec 2008;88(6):1560-1566.
24. Steinle NI, Hsueh W, Snitker S, et al. Eating behavior in the Old Order Amish: heritability analysis and a genome-wide linkage analysis. *AM J Clin Nutr*. 2002;75(1098-1106).
25. Neale BM, Mazzeo SE, Bulik CM. A twin study of dietary restraint disinhibition and hunger: An examination of the eating inventory (three factor eating questionnaire). *Twin Research*. 2003;6(6):471-478.
26. Llewellyn CH, van Jaarsveld CHM, Johnson L, Carnell S, Wardle J. Nature and nurture in infant appetite: analysis of the Gemini twin birth cohort *AM J Clin Nutr*. 2010;91(1172-1190).
27. Breen FM, Plomin R, Wardle J. Heritability of food preferences in young children. *Physiology & Behavior*. 2006;88:443-447.
28. Bartoshuk LM. Chemical senses. *Annu Rev Nutr*. 1994;45(419-449).
29. Wardle J, Cooke L. Genetic and environmental determinants of children's food preferences. *The British journal of nutrition*. Feb 2008;99 Suppl 1:S15-21.
30. Dinehart ME, Hayes JE, Bartoshuk LM, Lanier SL, Duffy VB. Bitter taste markers explain variability in vegetable sweetness, bitterness, and intake. *Physiol Behav*. Feb 28 2006;87(2):304-313.
31. Birch L. Development of food acceptance patterns in the first years of life. *Proceedings of the Nutrition Society*. 1998;57:617-624.
32. Addressi E, Galloway AT, Visalberghi E, Birch LL. Specific social influences on the acceptance of novel foods in 2-5-year-old children. *Appetite*. Dec 2005;45(3):264-271.
33. Desor JA, Maller O, Andrews K. Ingestive responses of human newborns to salty, sour, and bitter stimuli. *Journal of Comprehensive and Physiological Psychology*. 1975;89(8):966-970.
34. Kalat JW, Rozin P. "Learned safety" as a mechanism in long-delay taste-aversion learning in rats. *Journal of Comparative and Physiological Psychology*. 1973;83(2):198-207.
35. Cooke LJ, Haworth CMA, Wardle J. Genetic and environmental influences on children's food neophobia. *AM J Clin Nutr*. 2007;86(428-433).
36. Houston-Price C, Burton E, Hickinson R, et al. Picture book exposure elicits positive visual preferences in toddlers. *Journal of experimental child psychology*. Sep 2009;104(1):89-104.
37. Houston-Price C, Butler L, Shiba P. Visual exposure impacts on toddlers' willingness to taste fruits and vegetables. *Appetite*. Dec 2009;53(3):450-453.
38. Capretta PJ, Petersik JT, Stewart DJ. Acceptance of novel flavours is increased after early experience of diverse tastes. *Nature*. 1975;254.
39. Birch L, Marlin DW. I don't like it; I never tried it: effects of exposure on two-year-old children's food preferences. *Appetite*. 1982;3(4):353-360.

40. Savage JS, Fisher JO, Birch LL. Parental influence on eating behavior: conception to adolescence. *The Journal of law, medicine & ethics : a journal of the American Society of Law, Medicine & Ethics*. Spring 2007;35(1):22-34.
41. Drewnowski A. Taste preferences and food intake. *Annu Rev Nutr*. 1997;17:237-253.
42. Tuorila H, Meiselman HL, Bell R, Cardello AV, Johnson W. Role of sensory and cognitive information in the enhancement of certainty and liking for novel and familiar foods. *Appetite*. 1994;23(3):231-246.
43. Batada A, Wootan MG. Nickelodeon markets nutrition-poor foods to children. *American journal of preventive medicine*. Jul 2007;33(1):48-50.
44. Halford JC, Boyland EJ, Hughes GM, Stacey L, McKean S, Dovey TM. Beyond-brand effect of television food advertisements on food choice in children: the effects of weight status. *Public health nutrition*. Sep 2008;11(9):897-904.
45. Boyland EJ, Harrold JA, Dovey TM, et al. Food choice and overconsumption: effect of a premium sports celebrity endorser. *The Journal of pediatrics*. Aug 2013;163(2):339-343.
46. Boyland EJ, Halford JC. Television advertising and branding. Effects on eating behaviour and food preferences in children. *Appetite*. Mar 2013;62:236-241.
47. Hingle M, Kunkel D. Childhood obesity and the media. *Pediatric clinics of North America*. Jun 2012;59(3):677-692, ix.
48. Kotler JA, Schiffman JM, Hanson KG. The influence of media characters on children's food choices. *Journal of health communication*. 2012;17(8):886-898.
49. Keller SK, Schulz PJ. Distorted food pyramid in kids programmes: a content analysis of television advertising watched in Switzerland. *European journal of public health*. Jun 2011;21(3):300-305.
50. Bandura A. Health promotion from the perspective of social cognitive theory. *Psychology & Health*. 1998;13(4):623-649.
51. Bandura A. Health promotion by social cognitive means. *Health education & behavior : the official publication of the Society for Public Health Education*. Apr 2004;31(2):143-164.
52. Rossow I, Rise J. Concordance of parental and adolescent health behaviors. *Soc Sci Med*. 1994;38(9):1299-1305.
53. Murashima M, Hoerr SL, Hughes SO, Kaplowitz SA. Feeding behaviors of low-income mothers: directive control relates to a lower BMI in children, and a nondirective control relates to a healthier diet in preschoolers. *AM J Clin Nutr*. May 2012;95(5):1031-1037.
54. Wyse R, Campbell E, Nathan N, Wolfenden L. Associations between characteristics of the home food environment and fruit and vegetable intake in preschool children: a cross-sectional study. *BMC public health*. 2011;11:938.
55. Harper LV, Sanders KM. The effect of adults' eating on young children's acceptance of unfamiliar foods. *Journal of Experimental Child Psychology*. 1975;20:206-214.
56. O'Connell ML, Henderson KE, Luedicke J, Schwartz MB. Repeated exposure in a natural setting: a preschool intervention to increase vegetable consumption. *Journal of the Academy of Nutrition and Dietetics*. Feb 2012;112(2):230-234.
57. Gross SM, Pollock ED, Braun B. Family influence: key to fruit and vegetable consumption among fourth- and fifth-grade students. *Journal of nutrition education and behavior*. Jul-Aug 2010;42(4):235-241.

58. Cullen KW, Baranowski T, Rittenberry L, Cosart C, Hebert D, Moor Cd. Child-reported family and peer influences on fruit, juice and vegetable consumption: reliability and validity of measures. *Health Education Research*. 2001;16(2):187-200.
59. Baumrind D. Current patterns of parental authority. *Developmental Psychology Monograph*. 1971;4(1):1-103.
60. Ventura AK, Birch LL. Does parenting affect children's eating and weight status? *The international journal of behavioral nutrition and physical activity*. 2008;5(15).
61. McGowan L, Croker H, Wardle J, Cooke LJ. Environmental and individual determinants of core and non-core food and drink intake in preschool-aged children in the United Kingdom. *Eur J Clin Nutr*. Mar 2012;66(3):322-328.
62. Hoerr SL, Hughes SO, Fisher JO, Nicklas TA, Liu Y, Shewchuk RM. Associations among parental feeding styles and children's food intake in families with limited incomes. *The international journal of behavioral nutrition and physical activity*. 2009;6:55.
63. Hennessy E, Hughes SO, Goldberg JP, Hyatt RR, Economos CD. Permissive parental feeding behavior is associated with an increase in intake of low-nutrient-dense foods among American children living in rural communities. *Journal of the Academy of Nutrition and Dietetics*. Jan 2012;112(1):142-148.
64. Kroller K, Warschburger P. Associations between maternal feeding style and food intake of children with a higher risk for overweight. *Appetite*. Jul 2008;51(1):166-172.
65. Vereecken CA, Keukelier E, Maes L. Influence of mother's educational level on food parenting practices and food habits of young children. *Appetite*. Aug 2004;43(1):93-103.
66. Kremers SPJ, Brug J, de Vries H, Engels RCME. Parenting style and adolescent fruit consumption. *Appetite*. 2003;41(1):43-50.
67. Pearson N, Atkin AJ, Biddle SJ, Gorely T, Edwardson C. Parenting styles, family structure and adolescent dietary behaviour. *Public health nutrition*. Aug 2010;13(8):1245-1253.
68. Hughes SO, Shewchuk RM, Baskin ML, Nicklas TA, Qu H. Indulgent feeding style and children's weight status in preschool. *Journal of developmental and behavioral pediatrics : JDBP*. Oct 2008;29(5):403-410.
69. Hughes SO, Power TG, Papaioannou MA, et al. Emotional climate, feeding practices, and feeding styles: an observational analysis of the dinner meal in Head Start families. *The international journal of behavioral nutrition and physical activity*. 2011;8:60.
70. Rhee KE, Lumeng JC, Appugliese DP, Kaciroti N, Bradley RH. Parenting styles and overweight status in first grade. *Pediatrics*. Jun 2006;117(6):2047-2054.
71. Cachelin FM, Thompson D. Predictors of maternal child-feeding practices in an ethnically diverse sample and the relationship to child obesity. *Obesity (Silver Spring)*. Aug 2013;21(8):1676-1683.
72. Rhee KE, Coleman SM, Appugliese DP, et al. Maternal feeding practices become more controlling after and not before excessive rates of weight gain. *Obesity (Silver Spring)*. Sep 2009;17(9):1724-1729.
73. Faith MS, Berkowitz RI, Stallings VA, Kerns J, Storey M, Stunkard AJ. Parental feeding attitudes and styles and child body mass index: prospective analysis of a gene-environment interaction. *Pediatrics*. Oct 2004;114(4):e429-436.
74. Dev DA, McBride BA, Fiese BH, Jones BL, Cho H. Risk factors for overweight/obesity in preschool children: an ecological approach. *Child Obes*. Oct 2013;9(5):399-408.

75. Ma L, Lillard AS. Where is the real cheese? Young children's ability to discriminate between real and pretend acts. *Child Development*. 2006;77(6):1762-1777.
76. Gemmill AW, Worotniuk T, Holt CJ, Skouteris H, Milgrom J. Maternal psychological factors and controlled child feeding practices in relation to child body mass index. *Child Obes*. Aug 2013;9(4):326-337.
77. Frahsek S, Mack W, Mack C, Pfalz-Blezinger C, Knopf M. Assessing different aspects of pretend play within a play setting: Towards a standardized assessment of pretend play in young children. *British Journal of Developmental Psychology*. 2010;28(2):331-345.
78. Hansen-Petrik MB, Tucker AP, Nodell HA. The influence of play fruits and vegetables on fruit and vegetable intake among toddlers. *FASEB J*. 2007;21.
79. Matheson D, Spranger K, Saxe A. Preschool Children's Perceptions of Food and Their Food Experiences. *Journal of nutrition education and behavior*. 2002;34(2):85-92.
80. Waters JM. Describing home play food availability among preschoolers within a nutritional context: Relationships with gender, food preferences, food neophobia, and maternal feeding styles. 2011.
81. Lynch M. Playing with food. A novel approach to understanding nutritional behaviour development. *Appetite*. Jun 2010;54(3):591-594.
82. Lynch M. Familiarizing with Toy Food: Preliminary Research and Future Directions. *Journal of nutrition education and behavior*. Aug 18 2011.
83. Keren M, Feldman R, Namdari-Weinbaum I, Spitzer S, Tyano S. Relations between parents' interactive style in dyadic and triadic play and toddlers' symbolic capacity. *American Journal of Orthopsychiatry*. 2005;75(4):599-607.
84. Sebastian RS, Cleveland, L. E., Goldman, J. D., Moshfegh, A. J. Trends in the Food Intakes of Children 1977-2002. *Consumer Interests Annual*. 2006;52:433-434.
85. Ervin RB, Kit BK, Carroll MD, Ogden CL. Consumption of added sugars among U.S. children and adolescents, 2005-2008. 2012(87):1-8.
86. CDC. NCHS Data Brief. February 2012 2012(87).
87. Fox MK, Condon E, Briefel RR, Reidy KC, Deming DM. Food consumption patterns of young preschoolers: are they starting off on the right path? *Journal of the American Dietetic Association*. Dec 2010;110(12 Suppl):S52-59.
88. Pliner P. The effects of mere exposure on liking for edible substances. *Appetite*. 1982;3:283-290.
89. Sullivan SA, Birch LL. Infant dietary experience and acceptance of solid foods. *Pediatrics*. 1994;93:271-277.
90. Tibbs T, Haire-Joshu D, Schechtman KB, et al. The relationship between parental modeling, eating patterns, and dietary intake among African-American parents. *Journal of the American Dietetic Association*. 2001;101(5):535-541.
91. Smidt S. *Playing to Learn: The Role of Play in the Early Years*. Vol 3. New York: Routledge; 2011.
92. Sutherland SL, Friedman O. Preschoolers acquire general knowledge by sharing in pretense. *Child Dev*. May-Jun 2012;83(3):1064-1071.
93. Sutherland SL, Friedman O. Just pretending can be really learning: children use pretend play as a source for acquiring generic knowledge. *Dev Psychol*. Sep 2012;49(9):1660-1668.

**SECTION II**

**MANUSCRIPT**



## **DISCLOSURE**

This article will be submitted to the Journal of Nutrition Education and Behavior for review.

Contributions by the authors: Kori Higgins completed the research and co-wrote the manuscript, and Melissa Hansen-Petrik oversaw the formatting and research design while co-writing the manuscript as well.

## ABSTRACT

Maternal feeding styles have been linked to dietary intake patterns in young children. Additionally, pretend play with toy foods provides a promising means of promoting development of healthy eating patterns in this age group and the potential of it to play a positive role in the home environment may, in part, be related to maternal interactions with the child during pretend play. The purpose of the present study was to explore maternal perceptions of pretend play with toy foods in the home environment relative to maternal feeding style. Specifically, our objectives were to employ a mixed-methods approach to 1) describe maternal observations of their preschool-aged children while engaged in pretend play with toy foods and related materials, 2) describe maternal perceptions as to how pretend play with toy foods relates to real life experiences of preschool-aged children, and 3) describe mothers' observations and perceptions regarding pretend play with toy foods and relate these to maternal feeding style. Mothers of two to five-year-old children (n=25) were recruited via Facebook posts, online mother's groups, recruitment flyers to childcare centers, and emails sent to a local database of mothers. Eligible mothers were invited to complete an online survey to collect sociodemographic data, classify the mothers by feeding styles, and gather their observations and perceptions regarding pretend play activities with toy food and related materials in the home via a series of open-ended questions. Patterns emerging from qualitative analysis of the mothers' responses in combination with information on feeding style from the Caregiver's Feeding Styles Questionnaire (CFSQ) suggest that mother's interactions with their children and perceptions of the role of pretend play contrast by the dimensions of demandingness and responsiveness. Further exploration of the interplay between mothers and children in the pretend play environment will help to clarify how the role

of pretend play with toy foods in promoting healthy eating may vary with maternal feeding styles.

## INTRODUCTION

The prevalence of obesity among children in the United States is one of the nation's most serious health concerns, with greater than 12% of two to five year olds classified as obese<sup>1</sup>. The rise in obesity among children over the past three decades corresponds with a concurrent shift in dietary intake patterns characterized by a greater consumption of energy-dense and nutrient-poor foods rather than nutrient-dense foods<sup>2</sup>. Fostering development of healthy dietary habits early in life has the potential to promote life-long health and reduce risk of obesity and related comorbid conditions.

As children are more likely to choose foods they enjoy<sup>3</sup> and food preferences established in childhood tend to persist to adolescence and adulthood, understanding how food preferences develop in the early years is key to identifying points of intervention to effectively promote lifelong healthy eating. The development of food preferences has been shown to be impacted by several factors, including genetics<sup>4,5</sup>, food neophobia<sup>6</sup>, parental and peer modeling<sup>7,8</sup>, repeated food exposure<sup>9</sup>, media<sup>10,11</sup>, and maternal feeding styles<sup>12</sup>.

Repeatedly exposing a child to a novel food has been shown to increase acceptance of that food<sup>9</sup>. This exposure can occur through various means, including visual exposure<sup>13</sup>, touch<sup>14</sup>, taste<sup>14</sup>, and smell<sup>14</sup>. For example, research has demonstrated that exposure via picture books increases children's visual preference for unfamiliar foods<sup>15,16</sup>. Additionally, it has been shown that with repeated food exposure, specifically taste exposure, food neophobia, which is the apprehension to try a new food<sup>6</sup>, can be reduced; thus, allowing a child to be more willing to try a new food<sup>17</sup>. Pretend play with toy foods is common among young children and provides another potential means of "exposure" to new foods. As compared to picture books, toy foods offer more tangible possibilities beyond visual exposure to include tactile experience and role-

playing potential. Nevertheless, toy foods have been little explored as a means of promoting healthy food choices. One small pilot study employed a three-week intervention within the childcare setting involving play with toy fruits and vegetables and found that toddlers requested more fruit and vegetable servings post intervention as compared to pre-intervention<sup>18</sup>. More recently, two qualitative studies by Lynch described children's behaviors within the toy kitchen environment as observed by accessing publicly available videos posted on YouTube<sup>19,20</sup>. She identified the following themes based on her observations of the children: 'food preference development', 'children modeling parental roles', 'parents projecting gender roles', and 'mealtime preparation behaviors'<sup>20</sup>. Her findings are consistent with toy foods playing a role in the development of young children. The type of toy food children play with may reflect their food preferences or play a role in encouraging them to try new foods. There are limited data available in this area, but Lynch observed in the YouTube videos that 'extras' were the most commonly appearing foods followed by fruits, vegetables, meats/alternatives, grains, and milk and dairy, which contrasts with findings from another study indicating the toy foods most commonly found in the home included (in descending order by frequency) vegetables, fruits, grains, sweets/fats, proteins, and dairy<sup>21</sup>. This discrepancy is likely due to differences in data collection methodology (appearance in videos vs. maternal report) and methods of categorizing foods. Because of the potential role of toy foods in the development of food preferences and healthy eating and the very limited research in this area thus far, further investigation into the role of toy foods is necessary.

Research indicates that maternal feeding style is related to children's dietary habits and weight status<sup>22,23</sup>. Initial work done by Baumrind with later expansion of the concept by Maccoby and Martin<sup>24</sup> established recognition of four parenting styles, 'authoritative',

‘authoritarian’, ‘indulgent’, and ‘uninvolved’, based on the dimensions of “demandingness” and “responsiveness”<sup>22</sup>. Demandingness denotes the extent of control, expectations, and monitoring that parents impose on their children, while responsiveness indicates the level of participation, acknowledgement, and warmth shown towards the child<sup>12</sup>. These four parenting styles have since been linked with parental feeding styles<sup>12,22</sup>. The ‘authoritative’ feeding style is marked by both high demandingness and high responsiveness, which signifies a balance between the controlling and attentive aspects of parenting, so a parent will both set limits and expectations but remain aware of and responsive to the child’s hunger and satiety cues. The ‘authoritarian’ feeding style is characterized by high demandingness but low responsiveness; thus, the parent will impose strict guidelines and will rely more upon external controls such that the child may be forced or coerced to consume certain foods. The ‘indulgent’ feeding style is low on demandingness but high on responsiveness, so the child is not given limits. Rather than serve as a disciplinarian, the parent serves as a resource, so limitations on how much food to consume, whether dessert is allowed or not, what foods the child is to eat, and so forth are not set. The parent will support the child’s choices. Lastly, the ‘uninvolved’ feeding style is characterized by low demandingness and low responsiveness, so the child is not given direction or support when being fed. Instead, the child is expected to make decisions on what and how much to eat on one’s own without any guidance<sup>12,22</sup>.

Although data are limited, a possible relationship between maternal feeding styles and play with toy foods in young children has been investigated. For example, in Lynch’s qualitative study of children in YouTube videos, she described that children who offered healthy food choices as modeling the authoritative feeding style<sup>20</sup>. Waters, in a survey of 181 mothers, found that 89.6% of mothers classified as having the indulgent feeding style reported their children as

having toy foods at home compared to 73% of authoritarian, 75% of uninvolved, and 80.8% of authoritative mothers (NS). More specifically, children of indulgent mothers had significantly more vegetable toy foods than children of mothers classified as having the uninvolved feeding style ( $p=0.04$ )<sup>21</sup>. However, both of these investigations have limitations in their ability to describe the extent and nature of the relationship between maternal feeding style and how toy foods may play a role in the development of young children – especially as it pertains to development of healthy eating habits. Qualitative exploration of this relationship in the early stages offers the possibility of engaging mothers to share their observations and perceptions of their children with respect to the pretend play environment.

Therefore, this innovative pilot study aimed to gather via an online survey the observations of mothers of young children when their children are engaged in pretend play with toy foods and related materials, how the mothers are involved in this play, how this play relates to the children's real world experiences, and what the mothers perceive the children learn through these experiences. Scoring of the two underlying dimensions of demandingness and responsiveness were also determined to explore pattern variations in the mother's responses. The findings have the potential to provide a foundation for eventual development of effective interventions to promote healthy eating among young children via exposure to healthy foods through toy foods representation of healthy foods.

## **STUDY DESIGN AND METHODOLOGY**

### ***Subjects***

Prior to conducting the study, the research protocol was approved by The University of Tennessee Institutional Review Board for Protection of Human Subjects. Participants included a sample of mothers with an oldest child between the ages of two and five years and who reported

the presence of toy food in the home during screening. Participants were recruited electronically via Facebook posts, online mother's groups, emailing recruitment flyers to childcare centers in the Knox County, Tennessee area for distribution to parents, and through a local database of mothers. A total of 83 participants completed the screening survey, and of those, 43 met eligibility requirements and were invited to complete the full survey. Of the 43 eligible, 26 (60.4%) successfully completed the survey in its entirety. In the final data analysis, 25 surveys were included after one survey was excluded due to unusable data. The excluded participant answered the open-ended questions with regard to both children in the household; thus, it was not possible to discern which information pertained to the oldest child.

### ***Data Collection***

Data collection began in March 2013 and was completed in October 2013. Eligibility was determined using an online screening survey that addressed the following criteria:

- 1) Females with firstborn children between the ages of two and five.
- 2) Between the ages of 18 and 40 at the time of the first child's birth.
- 3) Presence of pretend play materials at home including items such as toy kitchens, toy restaurants, toy foods, and the oldest child must engage in play with these materials at least once per week.
- 4) Internet access.
- 5) Active email account.
- 6) Ability to read English.



Individuals were excluded if their oldest child had been diagnosed with a developmental disability such as Down syndrome, brain injury, spina bifida, autism, or cerebral palsy as these developmental disabilities may affect a child's play patterns and food intake patterns. Children who had ever been diagnosed with diabetes, cancer, asthma, PKU, cystic fibrosis, or Celiac disease were excluded from the study due to modified dietary patterns, which may alter play patterns in the play food environment. Children with older siblings or who are multiples (twins, triplets, etc.) were also excluded due to potential influences on maternal perceptions due to prior parenting experience.

Individuals who screened eligible were sent an email that contained the link to the online survey along with a four-digit access code. Both the online screening survey and online survey were created in IBM SPSS Data Collection Interviewer Web 2013. Informed consent was included at the beginning of the survey, and if the participant chose not to complete it, they were able to opt out at that time. They were asked to complete the 20 to 30-minute survey within seven days of receiving eligibility status via the initial email. Those who were identified as eligible through online screening but who did not complete the online survey within seven days received one follow-up reminder email. Individuals who completed the survey were included in a drawing for store gift cards at the completion of the study.

### ***Instrumentation and Measures***

#### ***Instrumentation***

The online survey was pilot tested with mothers of preschool-aged children (n=15) enrolled at The University of Tennessee, Knoxville's Early Learning Center for Research and Practice in fall 2012 to test for accuracy, readability, and appropriateness of questions. In addition, expert panel review was employed to establish content validity. The expert panel

included three university faculty members with expertise in child development and in development of nutrition education programs for young children. Following final revisions based on the pilot survey and expert panel review, the survey included a series of questions regarding the child's engagement in pretend play, demographics, maternal feeding practices, and mother's personal concern for health.

### *Measures*

The first section of the online survey contained questions about the child's pretend play activities at home. Questions included types of toy foods, age at onset of play with these toy foods, frequency of play, and play between mother and child. The second section included open-ended questions aimed at gathering rich dialogue in relation to the mother's observations of their child's activities while engaged with toy foods and the toy food environment, how these activities correspond to the child's real life experiences, the mother's interactions with the child in the toy food environment, and perceived learning derived through pretend play (Table 1). Mothers were also asked, "How important is it to you that your child has toy foods and related toys at home?" with answer choices ranging from "not at all important" to "very important".

The key open-ended questions were created to further explore underlying constructs from the Caregiver's Feeding Style Questionnaire (CFSQ) to aid in understanding the mothers' perceptions and the potential relationship between feeding style and the role of toy foods and related items. The CFSQ is a validated tool used to assess child feeding practices<sup>49</sup>. It is comprised of 19 questions that relate to mealtime behaviors of the child and the mother. For example, the mother is asked, "How often during a meal do you 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")." The participant must answer using a five-point Likert scale with the choices "never",

“rarely”, “sometimes”, “most of the time”, or “always”. To determine the parameters for both high and low demandingness and responsiveness, median splits were calculated based on the participants’ answers. Once determined, the participants were also categorized into one of the four maternal feeding styles. The last question in this section was adapted from Boutelle and colleagues assessing maternal concern for healthy dietary habits, “How much do you personally care about eating healthful food?”<sup>85</sup>. Again, participants were asked to choose between “not at all” to “very much”.

**Table 1.** Open-ended Questions Asked in the Online Survey

Describe specific examples of what you have observed your child do when playing with toy foods, a child-sized toy kitchen, a child-sized toy restaurant set, or other related toys at home.
Describe any similarities you have noticed between what your child does during pretend play with these toys and what they do in real life in the kitchen or at meal and snack times.
What do you see as the main reasons for any similarities you described in the previous question?
Describe examples, if any, of what it is like when you and your child play with these toys together. What are some typical things that might happen? What does your child do and say? What do you do and say?
How did these particular toys come to be in your home?
Describe any of the toy foods which are your child’s favorites or ones that they seem to avoid. What do you see as some reasons why they favor or avoid these specific toy foods?
Describe what, if anything, you think your child learns from playing with toy foods and other related toys. Please be as specific as possible.
How, if at all, do you think your child’s play with toy foods and other similar toys differs because he/she is a boy/girl?
Is there any other information you would like to share about pretend play with toy foods and your child?

### ***Data Analysis***

Quantitative data were analyzed using SPSS (version 21.0, SPSS, Inc., Chicago, IL) to describe sociodemographic characteristics and categorize participants by the dimensions of demandingness and responsiveness based on the CFSQ as the small sample size limited ability to

analyze data based on the four feeding styles. Descriptive statistics were calculated. Independent t-tests were run to test for statistical differences between low versus high demandingness and low versus high responsiveness regarding concern for having toy foods in the home environment, maternal concern for healthful eating, and continuous variables describing sociodemographic characteristics. Chi square analysis was used to determine patterns in the qualitative data by the two dimensions and differences between the two dimensions in relation to categorical sociodemographic characteristics.

Qualitative data analysis was conducted using ATLAS.ti 7 software. Transcripts generated from responses to open-ended questions in the completed surveys were imported for review and analysis. Using inductive coding<sup>25</sup>, the primary coder and two co-coders independently coded the initial survey, merged their reports, and negotiated the development of an initial codebook. After independent coding of the next three surveys, adding new codes and refining existing codes as needed, the reports were again merged, and the three coders met again to negotiate addition of new codes and consolidation of the codes in the initial coding scheme. At this time, the second co-coder assumed the role of observer and served as the tiebreaker when consensus could not be achieved between the primary coder and the co-coder. The primary coder and co-coder continued to meet after independent review and coding of every three transcripts to determine inter-rater reliability, review coding, and achieve consensus. More codes were added, refined, consolidated, or subdivided into more precise codes as coding progressed. All coding was done without *a priori* knowledge of the participant's demandingness and responsiveness classifications. Inter-rater reliability was determined using the Coding Analysis Toolkit (CAT) each time that the coders' separate reports were merged. Standard comparisons were run prior to discussing the coded cases. As coding evolved, constant comparison was employed and

previously coded transcripts were recoded as needed to assure consistency of coding across all transcripts.

Once primary coding was complete, the primary coder and co-coders grouped related codes into code families representing specific themes. An initial meta-matrix (Table 8) was developed to display case-level data more concisely by code family and these data were subsequently partitioned by the dimensions of demandingness and responsiveness to allow for detection of patterns in the data via Chi square analysis.

## **RESULTS**

The survey sample included a total of 25 predominantly middle-income mothers with a mean age of  $29.8 \pm 4.9$  years. The mothers were predominantly White (80%), and the children were predominantly White (76.0%). There were 11 boys and 14 girls represented in the sample, with a mean age of  $2.6 \pm 1.0$  years. The sociodemographic characteristics of the participants are shown in Table 2. There were no statistically significant differences in sociodemographic characteristics by either demandingness or responsiveness (Table 2). The most commonly reported types of toy foods and related items in the home environment were (in descending order by frequency) fruits (92%), vegetables (92%), and meats and protein foods (88%) (Table 3).

**Table 2.** Sociodemographic Characteristics of the Participants Stratified by Demandingness and Responsiveness

	Total sample (n=25)	Demandingness		Responsiveness	
		Low (n=13)	High (n=12)	Low (n=12)	High (n=13)
Age, y (mean [SD])	29.8±4.9	31.6±5.0	27.8±4.2	29.4±4.3	30.2±5.6
Race/Ethnicity, (n [%])					
White, non-Hispanic	20 (80)	11 (85)	9 (75)	11 (92)	9 (69)
Non-white	5 (20)	2 (15)	3 (25)	1 (8)	4 (31)
BMI, kg/m <sup>2</sup> (mean [SD])	28.1±8.7	27.4±7.3	28.9±10.3	27.7±10.3	28.5±7.3
Child sex, female, (n [%])	14 (56)	9 (64)	5 (36)	7 (54)	7 (58)
Employment status, (n [%])					
Home duties full time	13 (52)	8 (62)	5 (42)	6 (50)	7 (54%)
Unemployed	1 (4)	0 (0)	1 (8)	0 (0)	1 (8)
Student	2 (8)	1 (8)	1 (8)	2 (17)	0 (0)
Employed, part time	3 (12)	2 (15)	1 (8)	2 (17)	1 (8)
Employed, full time	6 (24)	2 (15)	4 (33)	2 (17)	4 (31)
Highest educational level attained, (n [%])					
High school or less	2 (8)	1 (8)	1 (8)	0 (0)	2 (15)
Some post-high school education	7 (28)	5 (38)	2 (17)	3 (25)	4 (31)
Bachelor's degree or higher	16 (64)	7 (54)	9 (75)	9 (75)	7 (54)
Annual household income (n [%])					
≤\$30,000	6 (24)	3 (23)	3 (25)	3 (25)	3 (23)
\$30,001-50,000	5 (20)	4 (31)	1 (8)	4 (33)	1 (8)
\$50,001-75,000	6 (24)	4 (31)	2 (17)	2 (17)	4 (31)
>\$75,000	5 (20)	2 (15)	3 (25)	2 (17)	3 (23)
Undisclosed	3 (12)	0 (0)	3 (25)	1 (8)	2 (15)
Marital status, (n [%])					
Married	19 (76)	10 (77)	9 (75)	10 (83)	9 (69)
Never married	6 (24)	3 (23)	3 (25)	2 (17)	4 (31)

T-tests and chi-square analysis were used to detect differences in continuous and categorical variables, respectively.

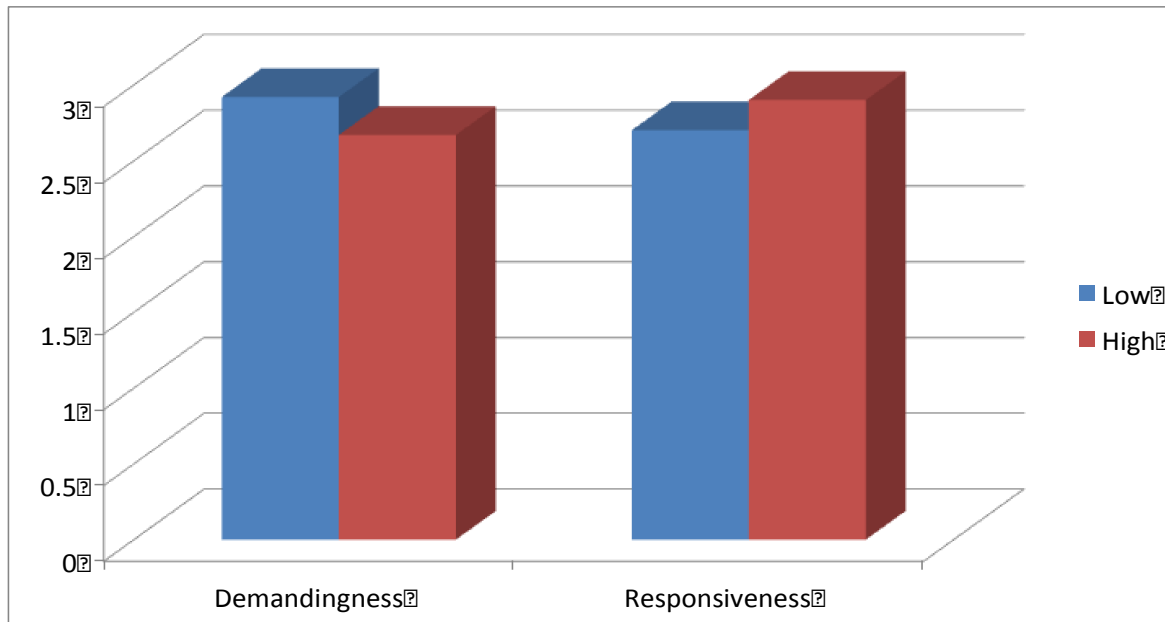
For the variable age, low versus high demandingness, p=0.053.

For the variable annual household income, low versus high responsiveness, p=0.059.

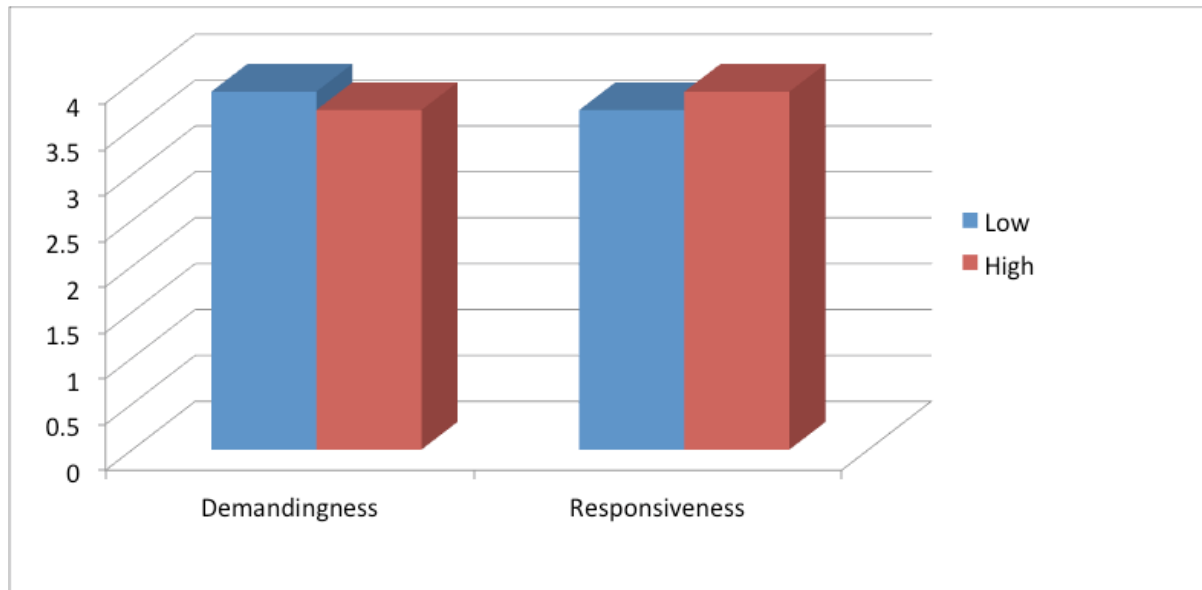
**Table 3.** Type of Toy Food in the Home Environment

Type of Toy Food*	N	Percentage
Toy fruits	23	92.0
Toy vegetables	23	92.0
Toy meats and protein foods such as chicken, fish, eggs, hamburgers	22	88.0
Toy kitchen (child sized)	21	84.0
Toy grain foods such as bread, noodles, rice, pancakes, rolls	18	72.0
Toy dairy foods such as milk and cheese	17	68.0
Toy desserts and sweets such as donuts, pastries, cookies, cake, ice cream	15	60.0
Toy mixed foods such as pizza, tacos, soup	9	36.0
Other related items	7	28.0
Toy shopping cart (child sized)	6	24.0
Toy grill (child sized)	2	8.0

\*Types of toy food present in the home are listed in descending order by frequency as reported by the participants (n=25).



**Figure 1.** Maternal Rating of “Importance of Toy Food in the Home” by Dimensions of Demandingness and Responsiveness.



**Figure 2.** Maternal Rating of “Importance of Healthful Eating” by Dimensions of Demandingness and Responsiveness.

Saturation was reached at case 23. It was at this time that no new codes were created. From the initial codes, four clear code families or themes emerged, which reflected content of the open-ended questions and types of observations and perceptions described by the mothers. The codes, representative text for each code, and code families, are shown in Table 4. The most frequently appearing codes were ‘food preparation’ (92%) and ‘feeding others,’ (88%), as indications of the types of activity children undertook during pretend play. Out of the study sample, 72% of mothers described that they observed their children playing with toy foods that they also chose to eat in the real food environment (play/real food preferences) (Table 5) as illustrated by the following quote:

“She likes to play with the foods that she likes to eat. She offers cookies for tea parties and fruits and vegetables for snacks. She often says that she’ll have hot dogs and give everyone else different things to eat.”



The most common activity that mothers described themselves undertaking during pretend play with their children was pretending to eat the toy foods (56%), coded as “eating.”

Due to the small sample size, mothers were not classified into feeding styles. Rather, mothers were classified dichotomously as high or low demandingness and high or low responsiveness in order to allow for separate examination of patterns within code families relative to these two dimensions (Table 5). When comparing across each of the four code families, more mothers classified as “low” with regard to demandingness, which is characteristic of authoritative and authoritarian parenting, described their children as helping with real cooking (“helps cook”) ( $p=0.027$ ). Other codes that reached near significance by demandingness included observations by mothers that their children were organizing within the pretend kitchen environment ( $p=0.055$ ) and that they were learning developmental skills through their pretend play experiences with toy foods ( $p=0.072$ ). These were reported less frequently in “low” demandingness group, which is characteristic of indulgent and uninvolved parenting.

When comparing low versus high responsiveness across each of the four code families, only ‘teaching about foods’ differed by dimension ( $p=0.035$ ), as depicted by the following quote:

“We talk about foods that are good to eat and things we may not want to eat too much of. During the serving of food during play, we often talk about manners. I hope that she is encouraged by play to try new foods.”

This code was identified six times in the “high” responsiveness group compared to once in the “low” responsiveness group (Table 5).

**Table 4.** Codes Organized by Code Families with Corresponding Quotes

Code Families	Codes	Example Quotes
<p align="center"><b>Learning From Play</b></p>	No perceived learning	"I'm not sure she learns anything. She does get really excited when I tell her it's yummy and she acts proud of herself and claps."
	General kitchen knowledge	"She has learned cutting. She learned the concept of sandwich. She gotten the procedure practice of washing, preparing, cleaning up."
	Developmental skills	"He learns eye-hand coordination and develops fine motor skills."
	Learning about foods	He is learning a lot of things. He has learned names of specific vegetables and how they look.
<p align="center"><b>Mother's Actions During Play</b></p>	Positive reinforcement	"Then I'll pretend to eat it and tell her how good it is - "OH, that's the best baked lettuce I've ever had!"
	"Eating"	"When he is finished cooking he asks us to taste it, which we do by pretending to take bites and make chewing sounds followed by loud, Yummy! Sounds".
	Passive participation	"Generally [she] cooks for me. She always makes me tea, coffee, and food"
	Orders food	"She says mommy, or sometimes m'am what do you want to order. I tell her and she pretends to write it down".
	Aids child in cooking	I often ask to help her prepare her meals and she gives instructions that usually star with, "all you have to do is..." or, "watch me"
	Teaching about positive behaviors	"During the serving of food during play, we often talk about manners."
	Teaching about foods	"We talk about foods that are good to eat and things we may not want yo eat too much of."
	Mother guides play	"Usually I'll ask her if she's going to make some food. She'll go get the food and start putting it on plates. I'll ask her "what did you make?" and she'll name the food on the plate."
<p align="center"><b>Similarities with Real Food Environmnet</b></p>	Helps clean	"She helps cook and clean in the kitchen at home."
	Helps cook	"She likes to help when we prepare meals so we often let her mix things if need be."
	Play/real food preferences	"She favors the desert foods and pizza and chicken. I think she likes these foods most because they are the most similar to her favorite real foods."

**Table 4.** (continued)

Code Families	Codes	Example Quotes
<b>Child's Actions in the Play Food Environment</b>	Cleaning	"She'll clean up and place all the food and plates in the cabinet."
	Organiziing	"He likes to put things in the cabinets."
	Food preparation	"She takes my order, goes and gets what food I say I want and puts it in a pan then onto the stove. She gets a plate and puts the food on it and serves the food."
	Feeding others	My daughter pretends to make meals on her toy kitchen and then gives them to me or her father.
	Eating	"He pretends to eat them as well as serve them to others"
	Shopping	There are times he'll say "What you want?" And I'll ask for something and he'll respond, "Oh, ok." and pretend to get it for me. Sometimes, he even responds by saying "All gone, gotta go to store!"
	Takes food orders	"She says mommy, or sometimes m'am what do you want to order."
	Grouping foods	"She categorizes the foods."
	Sharing	"Yes, my son loves to share his food with his "friends." He often brings a small toy such as Mickey Mouse to the table as we do not allow big toys at the table. He pretends to feed and share his food with his smaller toy the same way he would during play time."
	Directives	"sit down mommy, I make you dinner"
	Mealtime rules	"She has to have a tv tray or an open area at our dining table to put the plates of food on when they are done cooking."
	Dissimilarities	"She picks food that she eats and she picks foods that she doesn't too (like fish)"

**Table 5.** Code Frequency Within Code Families by the Dimensions of Demandingness and Responsiveness

	Demandingness		Responsiveness	
	Low (n=13)	High (n=12)	Low (n=12)	High (n=13)
<b>Child's Actions in the Play Food Environment</b>	Food preparation (13) Feeding others (12) Eating (6) Grouping foods (4) Sharing (3) Directives (2) Cleaning (2) Shopping (2) Takes food orders (2) Mealtime rules (1) Organizing (0)	Feeding others (10) Food preparation (10) Eating (6) Organizing (3) Cleaning (2) Directives (2) Grouping foods (2) Mealtime rules (2) Shopping (2) Sharing (1) Takes food orders (0)	Food preparation (11) Feeding others (10) Eating (5) Grouping foods (3) Shopping (2) Cleaning (3) Organizing (2) Takes food orders (2) Sharing (1) Mealtime rules (1) Directives (1)	Feeding others (12) Food preparation (12) Eating (7) Sharing (3) Grouping foods (3) Directives (3) Shopping (2) Mealtime rules (2) Cleaning (1) Organizing (1) Takes food orders (0)
<b>Similarities With the Real Food Environment</b>	Play/real food preferences (10) Helps cook (9)* Helps clean (3)	Play/real food preferences (8) Helps cook (3)* Helps clean (2)	Play/real food preferences (8) Helps cook (6) Helps clean (3)	Play/real food preferences (10) Helps cook (6) Helps clean (2)
<b>Mother's Actions During Play</b>	"Eating" (8) Positive reinforcement (6) Teaching about foods (3) Mother guides play (3) Passive participation (3) Orders food (1) Aids child in cooking (0) Teaching about positive behaviors (0)	"Eating" (6) Teaching about foods (4) Positive reinforcement (2) Passive participation (2) Aids child cooking (1) Teaching about positive behaviors (1) Mother guides play (1) Orders food (0)	"Eating" (6) Positive reinforcement (4) Passive participation (3) Teaching about foods (1)* Mother guides play (1) Orders food (1) Aids child in cooking (0) Teaching about positive behaviors (0)	"Eating" (8) Teaching about foods (6)* Positive reinforcement (4) Mother guides play (3) Passive participation (2) Aids child in cooking (1) Teaching about positive behaviors (1) Orders food (0)
<b>Learning From Play</b>	General kitchen knowledge (6) Learning about foods (4) Developmental skills (3) Controlling behavior (1) No perceived learning (0)	Developmental skills (7) General kitchen knowledge (2) No perceived learning (2) Learning about foods (1) Controlling behavior (0)	Developmental skills (5) General kitchen knowledge (4) Learning about foods (3) No perceived learning (2) Controlling behavior (1)	Developmental skills (5) General kitchen knowledge (4) Learning about foods (1) No perceived learning (0) Controlling behavior (0)

Codes are listed (in descending order) with the number representing the frequency of the codes as they appeared in the transcripts. \*p<0.05 denotes statistically significant differences between the low/high demandingness and low/high responsiveness, respectively. For the code organizing, low vs. high demandingness, p=0.055. For the code developmental skills, low vs. high demandingness, p=0.072.

## DISCUSSION

Research suggests that a child's likelihood of accepting a new food can be enhanced via multiple exposures to the given food, thereby possibly impacting food preferences and food intake<sup>1</sup>. However, toy food has not been closely examined as another potential means of exposure to new foods, specifically healthy foods, which could encourage the achievement of a healthy weight and lifelong health. To date, the scant literature has focused primarily on observations of children engaged in pretend play within the toy kitchen environment<sup>2,3</sup> and a pilot intervention aimed at improving fruit and vegetable intake within the childcare environment<sup>4</sup>.

The present study of predominantly White, middle-income mothers sought, for the first time, to describe how maternal perceptions and maternal feeding styles may be related to preschool-aged children's interactions with toy foods within the home environment. Our findings suggest that the actions that mothers observe their children undertaking during pretend play with toy foods are very similar across the dimensions underlying maternal feeding style. For example, mothers, regardless of demandingness and responsiveness, most frequently reported that their children participated in pretend food preparation and pretending to feed others, i.e. the mother, the father, or a stuffed animal. A majority of mothers (72%) noted that the toy foods children preferred to play with seemed to reflect their real-life food preferences, while some reported their children's play reflected their real-life experiences with cooking and cleaning. As far as their own participation in these play scenarios, mothers most often described pretending to eat, but some also described using the opportunity to teach about food. Others described a more passive role for themselves as observer or recipient with the active roles belonging primarily to the children. In response to the question about what they thought their children were learning

through this type of play, mothers most frequently described developmental skills such as shapes or colors. Others described learning of general kitchen knowledge, such as food needing to be cooked, how to use a knife, while others described their children as learning about food or learning nothing at all. While these aspects of children's pretend play with toy foods, the mother's interactions during play, the relationship to real life, and the mother's perceptions with regard to child learning appear largely similar across dimensions, maternal feeding style may provide an additional avenue toward understanding how mothers interact with their children during pretend play with toy foods in the home environment and what they perceive their children to be learning through pretend play.

In reviewing the findings in terms of demandingness, more mothers who scored low reported their children helped cook in the real kitchen ( $p=0.027$ ). Other observations did not achieve statistical significance, but are worth noting. For example, 25% of mothers who scored high on demandingness described their children as organizing ( $p=0.055$ ), i.e. putting away dishes and organizing the play kitchen during pretend play, compared to none of the mothers classified as low demandingness. Likewise, 58% of mothers classified as high with regard to demandingness perceived their children to be learning developmental skills ( $p=0.072$ ) from their pretend play experiences with toy foods compared to 23% of mothers classified as having low demandingness. This observation suggests that the greater level of maternal control associated with high demandingness, regarded as parent-centered, may entail limiting the child from taking part in kitchen activities. These findings are in keeping with the literature that reports the parenting and feeding styles in terms of parent-centered or child-centered<sup>5</sup>. However, there are other potential explanations for these findings. It is possible that the children of mothers scored as high on demandingness may not have exhibited much interest in helping cook in the real

kitchen. Therefore, these children may then not be as likely to demonstrate learning about food and acquiring general kitchen knowledge. Mothers who scored low on demandingness were also older on average, although this did not reach statistical significance ( $p=0.053$ ). However, it is feasible that older mothers, independent of feeding style, may have been open to children helping in the kitchen.

Mothers who scored high on responsiveness more frequently described teaching their children about foods ( $p=0.035$ ), which could suggest that the warm nature of the responsive dimension lends itself to more active support in promoting child learning. High responsiveness is characteristic of the authoritative and indulgent feeding styles, so it is possible that mothers with these feeding styles are likely to teach children about food through play with toy foods. However, this would need to be confirmed with a future larger study.

The findings of this novel preliminary study begin to describe for the first time how maternal feeding style may be related to young children's experiences in the pretend play environment. In particular, it suggests that the underlying dimensions of demandingness and responsiveness may relate more to how mothers interact with their children during pretend play, how much their children engage in cooking in the "real world," and possibly what they perceive their children to be learning during pretend play with toy foods. Low demandingness is characteristic of indulgent and uninvolved parenting styles, and mothers who scored low reported with greater frequency that their children helped cook in the real kitchen environment. The indulgent feeding style caters more to the child's wants and desires and does not restrict or provide boundaries while the uninvolved feeding style neither supports nor discourages the child's choices. Thus, these findings do align with these feeding style characteristics in that the child appears to be less limited from real kitchen activities. Furthermore, the finding that high

responsive mothers were more likely to describe teaching their children about food during pretend play suggests that a mother with the indulgent feeding style may contribute to young children learning more about food and cooking and that pretend play with toy foods plays a role in that development, although this requires further exploration. Regardless, it is consistent with findings by Waters that children of indulgent mothers had more play foods and significantly greater variety of vegetable toy foods<sup>6</sup>. It also aligns with recent findings by Papaioannou and colleagues in a low-income population who identified that indulgent mothers who also employed junk food restriction had preschool-aged children with the highest fruit and vegetable intake relative to others with other feeding styles<sup>7</sup>.

In contrast, with observations relative to responsiveness, high demandingness is characteristic of authoritative and authoritarian feeding styles, and the high demandingness group described their children as being engaged in more organizing activities in the play kitchen ( $p=0.055$ ) and more perceived their children to be learning developmental skills through their pretend play experiences ( $0.072$ ), although both of these findings were non-significant. Given that these feeding styles function more so on structure, if this finding is borne out in future research, perhaps this could be the underlying reason for the children's engagement in the task of organizing and the focus on general developmental outcomes.

### **LIMITATIONS TO THE STUDY**

Limitations of the present study include reliance upon a non-representative small convenience sample. A larger sample could have allowed for more complete discernment of patterns related to maternal feeding style beyond the two dimensions. While the online data collection yielded rich data and was suitable for an initial exploration in this area, future endeavors would benefit from a method allowing probing to a deeper level through greater



participant interaction. Despite this, there are several notable strengths. A validated instrument, the CFSQ, was employed to determine maternal feeding styles of the participants. Further, while the data were derived from self report rather than direct observation, this uniquely captures the mother's perceptions on what is happening during pretend play and in relation to pretend play. The results add new information about the role of toy food in the development of healthy eating in preschool-aged children.

### **IMPLICATIONS FOR RESEARCH AND PRACTICE**

Currently, little research exists regarding toy foods and their potential role in development of healthful eating habits in early childhood. Research has shown that maternal parenting and feeding styles are associated with children's food intake and weight status, but this relationship is still not fully understood. In addition, maternal feeding styles have been associated with differences in home toy food availability among preschoolers, with children of indulgent mothers being more likely to have toy food and having significantly more vegetable toy foods<sup>6</sup>. Pretend play serves as another form of exposure, which some research has shown to be beneficial in introducing children to new foods<sup>2,3</sup>. Therefore, toy foods could potentially contribute to the development of food preferences and healthy eating and the extent of this contribution may vary by feeding style. However, this possible phenomenon has yet to be explored in depth. Thus, more fully describing this relationship could open avenues for development of interventions employing child feeding strategies and toy food.

## **CONCLUSION**

In all, this research, based on self-reported data by mothers of preschool-aged children, offers initial evidence regarding the relationship between maternal perceptions on toy foods in the home environment and maternal feeding styles. This study adds to the limited number of studies that examine pretend play as another mechanism of exposure to new foods for young children. The results of this study show a possible link between pretend play with toy foods and food preferences, which could mean that toy foods may themselves play a role in various programs aimed to improve children's food preferences. Future research should focus on further exploring maternal feeding styles as they relate to toy foods as well as preschool-aged children's interactions with toy foods and food preference development.

## REFERENCES

1. Ogden CL, Carroll MD, Kit BK, Flegal KM. Prevalence of obesity and trends in body mass index among US children and adolescents, 1999-2010. *JAMA*. Feb 1 2012;307(5):483-490.
2. Sebastian RS, Cleveland LE, Goldman JD, Moshfegh AJ. Trends in food intakes of children 1977-2002. *Consumer Interests Annual*. 2006;52:433-434.
3. Russell CG, Worsley A. Do children's food preferences align with dietary recommendations? *Public health nutrition*. Nov 2007;10(11):1223-1233.
4. Steinle NI, Hsueh W, Snitker S, et al. Eating behavior in the Old Order Amish: heritability analysis and a genome-wide linkage analysis. *AM J Clin Nutr*. 2002;75(1098-1106).
5. Carnell S, Haworth CM, Plomin R, Wardle J. Genetic influence on appetite in children. *Int J Obes (Lond)*. Oct 2008;32(10):1468-1473.
6. Birch L. Development of food acceptance patterns in the first years of life. *Proceedings of the Nutrition Society*. 1998;57:617-624.
7. O'Connell ML, Henderson KE, Luedicke J, Schwartz MB. Repeated exposure in a natural setting: a preschool intervention to increase vegetable consumption. *Journal of the Academy of Nutrition and Dietetics*. Feb 2012;112(2):230-234.
8. Fisher JO, Mitchell DC, Smiciklas-Wright H, Birch LL. Parental influences on young girls' fruit and vegetable, micronutrient, and fat intakes. *Journal of the American Dietetic Association*. 2002;102(1):58-64.
9. Cooke L. The importance of exposure for healthy eating in childhood: a review. *J Hum Nutr Diet*. 2007;20:294-301.
10. Boyland EJ, Harrold JA, Dovey TM, et al. Food choice and overconsumption: effect of a premium sports celebrity endorser. *The Journal of pediatrics*. Aug 2013;163(2):339-343.
11. Kotler JA, Schiffman JM, Hanson KG. The influence of media characters on children's food choices. *Journal of health communication*. 2012;17(8):886-898.
12. Hughes SO, Power TG, Orlet Fisher J, Mueller S, Nicklas TA. Revisiting a neglected construct: parenting styles in a child-feeding context. *Appetite*. Feb 2005;44(1):83-92.
13. Birch L, Savage JS, Ventura A. Influences on the development of children's eating behaviours: From infancy to adolescents. *Can J Diet Pract Res*. 2007;68:1-11.
14. Drewnowski A. Taste preferences and food intake. *Annu Rev Nutr*. 1997;17:237-253.
15. Houston-Price C, Butler L, Shiba P. Visual exposure impacts on toddlers' willingness to taste fruits and vegetables. *Appetite*. Dec 2009;53(3):450-453.
16. Houston-Price C, Burton E, Hickinson R, et al. Picture book exposure elicits positive visual preferences in toddlers. *Journal of experimental child psychology*. Sep 2009;104(1):89-104.
17. Birch LL, McPhee L, Shoba BC, Pirok E, Steinberg L. What kind of exposure reduces children's food neophobia? Looking vs. tasting. *Appetite*. 1987;9(3):171-178.
18. Hansen-Petrik MB, Tucker AP, Nodell HA. The influence of play fruits and vegetables on fruit and vegetable intake among toddlers. *FASEB J*. 2007;21.
19. Lynch M. Familiarizing with Toy Food: Preliminary Research and Future Directions. *Journal of nutrition education and behavior*. Aug 18 2011.

20. Lynch M. Playing with food. A novel approach to understanding nutritional behaviour development. *Appetite*. Jun 2010;54(3):591-594.
21. Waters JM. Describing home play food availability among preschoolers within a nutritional context: Relationships with gender, food preferences, food neophobia, and maternal feeding styles. 2011.
22. Baumrind D. Current patterns of parental authority. *Developmental Psychology Monograph*. 1971;4(1):1-103.
23. Kroller K, Warschburger P. Associations between maternal feeding style and food intake of children with a higher risk for overweight. *Appetite*. Jul 2008;51(1):166-172.
24. Maccoby EE, Martin JA. *Socialization in the context of the family: Parent-child interaction*. Vol 4. New York: Wiley; 1983.
25. Miles MB, Huberman AM, Saldaña J. *Qualitative data analysis: a methods sourcecook*. 3 ed: Sage Publications, Inc.; 2014.

1. Cooke L. The importance of exposure for healthy eating in childhood: a review. *J Hum Nutr Diet*. 2007;20:294-301.
2. Lynch M. Familiarizing with Toy Food: Preliminary Research and Future Directions. *Journal of nutrition education and behavior*. Aug 18 2011.
3. Lynch M. Playing with food. A novel approach to understanding nutritional behaviour development. *Appetite*. Jun 2010;54(3):591-594.
4. Hansen-Petrik MB, Tucker AP, Nodell HA. The influence of play fruits and vegetables on fruit and vegetable intake among toddlers. *FASEB J*. 2007;21.
5. Stang J, Loth KA. Parenting style and child feeding practices: potential mitigating factors in the etiology of childhood obesity. *Journal of the American Dietetic Association*. Sep 2011;111(9):1301-1305.
6. Waters JM. Describing home play food availability among preschoolers within a nutritional context: Relationships with gender, food preferences, food neophobia, and maternal feeding styles. 2011.
7. Papaioannou MA, Cross MB, Power TG, et al. Feeding style differences in food parenting practices associated with fruit and vegetable intake in children from low-income families. *Journal of nutrition education and behavior*. 2013;45(6):643-651.

## **APPENDIX**

### **EXPANDED METHODOLOGY**

## STUDY DESIGN AND REVIEW

The use of a mixed methods study design was employed for this project. In doing so, it allowed for the collection of both participant sociodemographic data as well as rich dialogue pertaining to the maternal observations and perceptions on pretend play with toy foods. By collecting both forms of data, the results were expected to be more telling given that additional statistical analyses could be completed.

Initially, the qualitative piece of the study was to be conducted using in-depth telephone interviews to collect the rich dialogue from the mothers. However, after careful review of this approach the committee advised that the study be completed using an online survey tool. Given that research on maternal observations and perceptions regarding toy foods in the home environment is one of the first of its kind, an online survey was chosen as a suitable starting point. After completing this study in which initial findings are determined, developing an interview script would be the next logical direction for study.

### ***Instrumentation***

#### *Instrumentation*

The online survey tool was pilot tested in fall 2012 to establish comprehension and face validity among mothers of preschoolers. A total of 15 mothers of preschool-aged children enrolled at The University of Tennessee, Knoxville's Early Learning Center for Research and Practice were recruited via emails and flyers posted at the center and asked to complete the survey. Furthermore, an expert panel comprised of three university faculty members with expertise in child development and in development of nutrition education programs for young children were asked to review the survey to ensure content validity. Final revisions were completed based on the pilot survey feedback. The survey included questions on type of toy

foods in the home environment, frequency of pretend play with toy foods and of mother-child play with toy foods, CFSQ, maternal concern for having toy foods in the home and healthful eating, nine open-ended questions, and sociodemographic questions (Appendix B).

### *Subjects*

Subject recruitment was conducted through several means, and each one included the same explanation that asked the individual to complete the online screening survey to determine study eligibility. The first method involved posting on the Facebook page for KnoxMoms, an online community for mothers in Knox County, Tennessee and in the surrounding areas. Next, mothers, within the Knox County limits, listed in a local research database were each sent a recruitment email. The third approach involved sending recruitment emails to preschool-aged child care centers in the Knox County area who provided email contact information on their website. Lastly, two posts were published on the website Mommitt, an online community for mothers, which expanded data collection beyond the Knox County, Tennessee area.

### *Data Collection*

Periodically, the online screening survey was reviewed, and any participant who met the study criteria was sent an email alerting of eligibility status. The email contained the online survey link as well as a four-digit access code created so that participants could leave the online survey and return to complete it at a later time. Each instance when new online screening survey data were added, they were then copied and pasted into an Excel spreadsheet. The four-digit access code was recorded next to the corresponding participant in this document.

The online survey was reviewed at the same time when the online screening survey was accessed, and any new data were copied and pasted into an Excel spreadsheet. Data, specifically

the qualitative data, were reviewed to ensure that no data were missing. This was carried out until the final data was collected.

### *Data Analysis*

Although the study sample was not large enough to detect differences based on maternal feeding style, data analysis could be completed for the two dimensions of demandingness and responsiveness. Independent t-tests were used to detect differences between low and high demandingness and responsiveness with regard to continuous variables. In addition, Chi square analysis was used to identify patterns in the codes assigned to the qualitative data as well as to identify possible differences in categorical sociodemographic data by the two dimensions.

Inductive coding was implemented for coding the qualitative data in the ATLAS.ti program. Inductive coding involves creating codes as the researcher moves through the data rather than having an *a priori* list of codes<sup>25</sup>. This coding method was chosen given that this study is novel and no prior literature is in existence. Thus, it was not known what the data derived from the open-ended questions would reveal, so developing a codebook and revising the codes while moving through the transcripts was the best approach.

The primary coder and co-coder coded cases three at a time, merged files for assessment of intercoder reliability using CAT, then reviewed and discussed coding until consensus was reached, existing codes were revised, and new codes were added. Once the three cases were final, the ATLAS Hermeneutic Unit was emailed to the co-coder as a copy bundle for coding of the next three cases. This method was carried out until the final three cases were coded. Constant comparison was used throughout, and then each case was reviewed for a final time to ensure that any new applicable codes created after coding the earlier cases were added.



Once primary coding was complete, the primary coder and co-coder in conjunction with the second co-coder (faculty advisor) reviewed primary codes and discussed grouping of codes into code families or themes. In grouping together the codes, code families that pertained to the research questions became apparent. A case-by-case matrix (table 8) was constructed to identify which primary codes were coded for each participant. Each case was then identified as low/high demandingness and low/high responsiveness per the CFSQ results and the frequency of the codes within each of the four code families by the dimensions of demandingness and responsiveness was determined. Chi square analysis was used to identify significant differences in code frequency between the low/high groups for both dimensions.

## APPENDICES

**APPENDIX A**

**TABLES AND FIGURES**

**Table 6.** Pretend Play Activities with Toy Foods in the Home Environment

<b>Age when child began playing with toy foods and other related items</b>	<b>N</b>	<b>Percentage</b>
1 year	15	60.0
2 years	9	36.0
3 years	1	4.0
<b>Frequency of play with toy foods and related items</b>		
6-7 days/week	11	44.0
4-5 days/week	5	20.0
2-3 days/week	6	24.0
1 day/week	1	4.0
Rarely (less than 1 day/week)	2	8.0
<b>Length of play episodes with toy foods and related items</b>		
Less than 15 minutes	5	20.0
15-30 minutes	17	68.0
30-60 minutes	2	8.0
More than 60 minutes	1	4.0
<b>Frequency of mother-child play with toy foods and related items</b>		
6-7 days/week	3	12.0
4-5 days/week	9	36.0
2-3 days/week	7	28.0
1 day/week	2	8.0
Rarely (less than 1 day/week)	4	16.0

**Table 7.** Codebook of Inductive Codes with Corresponding Definitions

Code	Definition
<b>"eating"</b>	Mother describes herself "eating" while engaged in pretend play with play foods.
<b>Aids child in cooking</b>	Mother describes herself aiding the child in "cooking" while engaged in pretend play with play foods.
<b>Asks for feedback</b>	Mother denotes that the child asks for feedback regarding the food he/she has made.
<b>Canned food</b>	Mother mentions canned food.
<b>Child statements</b>	Mother quotes or paraphrases comments the child says during pretend play with play foods.
<b>Cleaning</b>	Mother mentions the child is engaged in cleaning in the pretend kitchen environment.
<b>Coffee</b>	Mother mentions coffee.
<b>Dessert</b>	Mother mentions dessert foods.
<b>Developmental skills</b>	Mother states the child is learning developmental skills during play food play, i.e. motor skills.
<b>Directives</b>	Mother describes when the child makes statements to direct the behavior of others. For example, "Sit down."
<b>Disconnect</b>	Mother describes the child's misunderstanding of the difference between play food aspects of the pretend kitchen versus real food aspects of the real kitchen, i.e. the kitchen sink.
<b>Dissimilarities</b>	Mother states the child plays with and pretends eating certain play foods but fails to choose them in real life.
<b>Eating</b>	Mother states when the child pretends to eat and/or drink play foods.
<b>Family</b>	Mother mentions family members or is unspecific when using the terms "we" or "us".
<b>Father</b>	Mother mentions the father of the child or her husband.
<b>Favorites</b>	Mother identifies foods classified as the child's favorites.
<b>Feeding others</b>	Mother describes when the child is serving pretend food to other people including the mother, father, sibling, pet, or stuffed animal.

**Table 7.** (continued)

<b>Code</b>	<b>Definition</b>
<b>Food preparation</b>	Mother describes when the child is cooking, putting foods on plates, etc. while in the pretend kitchen environment.
<b>French fries</b>	Mother mentions French fries.
<b>Friends</b>	Mother states friends supplied play foods for the home environment.
<b>Fruits</b>	Mother mentions a fruit or fruits.
<b>General kitchen knowledge</b>	Mother states the child is learning kitchen knowledge during play food play, i.e. cooking foods before eating them.
<b>Gift</b>	Mother mentions that the source of the play foods was a gift.
<b>Grains</b>	Mother mentions grains.
<b>Grandparents</b>	Mother mentions the child's grandparents.
<b>Grouping foods</b>	Mother describes the child grouping or categorizing foods together.
<b>Healthy choices</b>	Mother mentions healthy choices in relation to play foods.
<b>Helps clean</b>	Mother describes when the child assists with cleaning in the real kitchen.
<b>Helps cook</b>	Mother describes the child assisting or having desire to assist with cooking in the real kitchen environment.
<b>Hot dogs</b>	Mother mentions hot dog(s).
<b>Imagination</b>	Mother mentions child's use of imagination regarding pretend play with play foods.
<b>Importance of cooking</b>	Mother mentions thoughts/beliefs on necessity of cooking.
<b>Importance of health</b>	Mother highlights the importance of health regarding the child's growth.
<b>Learning about foods</b>	Mother states the child is learning about food during pretend play with play foods.
<b>Maternal perceptions</b>	Mother describes mother's interpretations of what is taking place.
<b>Mealtime rules</b>	Mother describes the behaviors that the child imposes during play. For example, sitting while eating, serving in a specific way, etc.
<b>Mimicking mother's behavior</b>	Mother describes when the child copies what he/she has seen the mother do.
<b>Mimicking observed behavior</b>	Mother states that the child is mimicking the behavior of others but those individuals are not well defined.
<b>Mixed dish</b>	Mother mentions unspecified dish comprised of a mixture of ingredients/food groups.

**Table 7.** (continued)

<b>Code</b>	<b>Definition</b>
<b>Mother</b>	Mother mentions herself.
<b>Mother guides play</b>	Mother describes herself guiding the child in their pretend play with play foods.
<b>No perceived learning</b>	Mother states she does not think the child is learning anything from pretend play with play foods.
<b>Non-favorite foods</b>	Mother mentions foods the child dislikes or does not recognize.
<b>Orders Food</b>	Mother states she orders food while engaged in pretend play with play foods.
<b>Organizing</b>	Mother describes when the child puts away items in the pretend kitchen.
<b>Passive Participation</b>	Mother does not play an active role while engaged in pretend play with play foods.
<b>Perceived gender role</b>	Mother states the role of gender or lack thereof in pretend play with play foods.
<b>Play/real food preferences</b>	Mother describes similarities between foods the child chooses in play and real food environments.
<b>Positive reinforcement</b>	Mother describes when positive reinforcement was used to encourage behaviors related to play food.
<b>Pretend friend</b>	Mother mentions pretend item, i.e. a doll or stuffed animal.
<b>Primary cook</b>	Mother states the primary food preparer.
<b>Protein</b>	Mother names a protein source.
<b>Purchased</b>	Mother mentions purchasing toy foods for the home environment.
<b>Random foods</b>	Mother describes an unnamed or assorted mix of foods.
<b>Sharing</b>	Mother describes the child sharing play food with others.
<b>Shopping</b>	Mother mentions the child pretends to shop for food.
<b>Similarities</b>	Mother compares the interactions with real food environment to interactions with the play food environment.
<b>Takes food orders</b>	Mother describes the child taking an order of either a food or drink. Also when the child is playing restaurant role-play.
<b>Tea</b>	Mother mentions tea.
<b>Teaching about foods</b>	Mother states she teaches the child about food while engaged in pretend play with play foods.
<b>Teaching positive behaviors</b>	Mother states she teaches the child positive behaviors while engaged in pretend play with play foods, i.e. manners.
<b>Vegetables</b>	Mother names a vegetable or vegetables.

**Table 8.** Meta-Matrix of Code Families, Corresponding Codes, and Scoring of Demandingness and Responsiveness

Cases	Dimensions		Code Families			
	Demandingness	Responsiveness	Mother's Actions During Play Positive Reinforcement "eating" Passive Participation Orders Food Aids Child in Cooking Teaching Positive Behaviors Teaching About Foods Mother Guides Play	Learning from Play No Perceived Learning General Kitchen Knowledge Developmental Skills Learning About Foods	Play Food Environment Cleaning Organizing Food Preparation Feeding Others Eating Shopping Takes Food Orders Grouping Foods Sharing Directives Mealtime Rules Dissimilarities	Similarities Helps Clean Helps Cook Play/Real Food Preferences
Case 1	H	L	"eating" positive reinforcement	no perceived learning	cleaning eating feeding others food preparation mealtime rules organizing	helps clean helps cook play/real food preferences
Case 2	L	H	passive participation		directives feeding others food preparation mealtime rules	helps clean helps cook play/real food preferences
Case 3	L	H	"eating" passive participation	general kitchen knowledge	feeding others food preparation	helps cook play/real food preferences
Case 4	L	L	"eating" orders food positive reinforcement		feeding others food preparation takes food orders	helps cook play real food preferences
Case 5	H	H	aids child in cooking teaching about foods teaching about positive behaviors		directives eating feeding others food preparation	helps cook
Case 6	L	L		general kitchen knowledge learning about foods	cleaning feeding others food preparation takes food orders	helps cook helps clean



**Table 8.** (continued)

Dimensions			Code Families			
Cases	Demandingness	Responsiveness	Mother's Actions During Play Positive Reinforcement "eating" Passive Participation Orders Food Aids Child in Cooking Teaching Positive Behaviors Teaching About Foods Mother Guides Play	Learning from Play No Perceived Learning General Kitchen Knowledge Developmental Skills Learning About Foods	Play Food Environment Cleaning Organizing Food Preparation Feeding Others Eating Shopping Takes Food Orders Grouping Foods Sharing Directives Mealtime Rules Dissimilarities	Similarities Helps Clean Helps Cook Play/Real Food Preferences
Case 7	H	L	"eating" teaching about foods	general kitchen knowledge	dissimilarities eating organizing	
Case 8	L	H		general kitchen knowledge	eating feeding others food preparation sharing	
Case 9	L	L	passive participation	developmental skills	feeding others food preparation	helps cook play/real food preferences
Case 10	L	L	positive reinforcement	learning about foods	dissimilarities food preparation grouping foods	helps cook pla/ real food preferences
Case 11	H	H	"eating"	developmental skills	feeding others, food preparation	play/real food preferences
Case 12	H	H	teaching about foods	developmental skills	mealtime rules	play/real food preferences

**Table 8.** (continued)

Dimensions			Code Families			
Cases	Demandingness	Responsiveness	Mother's Actions During Play Positive Reinforcement "eating" Passive Participation Orders Food Aids Child in Cooking Teaching Positive Behaviors Teaching About Foods Mother Guides Play	Learning from Play No Perceived Learning General Kitchen Knowledge Developmental Skills Learning About Foods	Play Food Environment Cleaning Organizing Food Preparation Feeding Others Eating Shopping Takes Food Orders Grouping Foods Sharing Directives Mealtime Rules Dissimilarities	Similarities Helps Clean Helps Cook Play/Real Food Preferences
Case 13	L	H	"eating" mother guides play teaching about foods		eating feeding others food preparation grouping foods sharing	helps cook play real food preferences
Case 14	H	L	"eating"	no perceived learning	eating feeding others food preparation sharing	
Case 15	H	L	passive participation	developmental skills	feeding others food preparation grouping foods shopping	play/real food preferences
Case 16	H	H	"eating" mother guides play positive reinforcement teaching about foods	developmental skills learning about foods	feeding others food preparation grouping foods shopping	play/real food preferences
Case 17	H	L	passive participation	general kitchen knowledge	eating feeding others food preparation	play/real food preferences

**Table 8.** (continued)

<b>Cases</b>	<b>Demandingness</b>	<b>Responsiveness</b>	<b>Mother's Actions During Play</b> Positive Reinforcement "eating" Passive Participation Orders Food Aids Child in Cooking Teaching Positive Behaviors Teaching About Foods Mother Guides Play	<b>Learning from Play</b> No Perceived Learning General Kitchen Knowledge Developmental Skills Learning About Foods	<b>Play Food Environment</b> Cleaning Organizing Food Preparation Feeding Others Eating Shopping Takes Food Orders Grouping Foods Sharing Directives Mealtime Rules Dissimilarities	<b>Similarities</b> Helps Clean Helps Cook Play/Real Food Preferences
<b>Case 18</b>	L	L	"eating" mother guides play positive reinforcement	developmental skills general kitchen knowledge learning about foods	dissimilarities eating feeding others food preparation grouping foods shopping	helps cook play real food preferences
<b>Case 19</b>	H	L		developmental skills	dissimilarities feeding others food preparation	
<b>Case 20</b>	L	H	"eating" teaching about foods	learning about foods	eating feeding others food preparation grouping foods	play/real food preferences
<b>Case 21</b>	H	H		developmental skills	eating, feeding others, food preparation, organizing	helps cook play/real food preferences
<b>Case 22</b>	H	L	"eating"	developmental skills	cleaning directives feeding others food preparation	helps clean play/real food preferences

**Table 8.** (continued)

<b>Cases</b>	<b>Demandingness</b>	<b>Responsiveness</b>	<b>Mother's Actions During Play</b> Positive Reinforcement "eating" Passive Participation Orders Food Aids Child in Cooking Teaching Positive Behaviors Teaching About Foods Mother Guides Play	<b>Learning from Play</b> No Perceived Learning General Kitchen Knowledge Developmental Skills Learning About Foods	<b>Play Food Environment</b> Cleaning Organizing Food Preparation Feeding Others Eating Shopping Takes Food Orders Grouping Foods Sharing Directives Mealtime Rules Dissimilarities	<b>Similarities</b> Helps Clean Helps Cook Play/Real Food Preferences
<b>Case 23</b>	L	H	"eating" positive reinforcement	developmental skills	directives, feeding others, food preparation, imagination	play/real food preferences
<b>Case 24</b>	L	H	"eating", mother guides play, positive reinforcement, teaching about foods	general kitchen knowledge	cleaning dissimilarities eating feeding others food preparation	helps clean helps cook play/real food preferences
<b>Case 25</b>	L	H	"eating" positive reinforcement	general kitchen knowledge	child statements, eating, feeding others, food preparation, sharing, shopping	

## **APPENDIX B**

### **RECRUITMENT, FORMS, AND QUESTIONNAIRES**

### **Facebook Post**

Hello Moms, □ Researchers in the College of Education, Health, and Human Sciences at The University of Tennessee, Knoxville, invite mothers of children ages 2-5 to participate in a study to learn about mothers' experiences and perceptions of the role of pretend play in child development. Please complete a brief online survey to find out if you're eligible. Eligible mothers will be invited to complete an online survey about 20-30 minutes in length and those who complete the survey will be entered into a drawing to win one of five \$25 Wal-Mart gift cards. To find out if you're eligible to participate, go to <http://survey.utk.edu/mrIWeb/mrIWeb.dll?I.Project=THESSSCREENING> to answer a few quick questions.

Researchers at The University of Tennessee, Knoxville would like to invite mothers of children ages 2-5 to participate in a study

- **STUDY IS TO LEARN ABOUT MOTHER'S OBSERVATIONS OF PRETEND PLAY AND CHILD DEVELOPMENT:**
  - INCLUDES 10-15-MINUTE ONLINE SURVEY
  - \$5 WAL-MART GIFT CARD WILL BE GIVEN TO THOSE WHO COMPLETE THE ONLINE SURVEY
  - INFORMATION WILL BE KEPT CONFIDENTIAL

Playing and Learning About Your Food –  
the PLAYFood Project!

Contact Kori Higgins at [khiggin6@utk.edu](mailto:khiggin6@utk.edu) for more information

## **Pretend Play and Child Development Electronic Screening Survey**

### College of Education, Health, and Human Sciences

If you are eligible to participate in the study, you will be contacted by email with a link to the online survey and an access code within the next three days. If you have any questions, please feel free to contact Kori Higgins, Graduate Student, at khiggin6@utk.edu or Melissa Hansen-Petrik, Faculty Advisor, at phansen@utk.edu in the College of Education, Health, and Human Sciences. Thank you for completing the Pretend Play and Child Development Electronic Screening Survey!

Completion of this brief survey is voluntary and should take less than 5 minutes. Thank you for answering the following questions to find out if you are eligible to participate in our research study on pretend play and child development.

1. What was your age at the time of your first child's birth?

Numerical box accepting answers in the range of 0 to 99

2. What is the age of your oldest child

Numerical box accepting answers in the range of 0 to 99

Please answer the following questions about your oldest child only.

3. Is your child a multiple, such as a twin or triplet?

Yes

No



4. Does your child have pretend play items, such as plastic or wooden foods, a child-sized toy kitchen, grocery store, and/or restaurant set at home?

Yes

No

If yes, then a follow-up question pertaining to play frequency will be inserted.

How frequently does your child, on average, currently play with these pretend play items?

5-7 days/week

2-4 days/week

About 1 day/week

Rarely (less than 1 day/week)

Never

5. Has your child been diagnosed with a developmental disability such as Down syndrome, brain injury, spina bifida, autism, or cerebral palsy?

Yes

No

6. Has your child ever been diagnosed with diabetes, asthma, cancer, cystic fibrosis, PKU, or Celiac Disease?

Yes

No

7. Does your child have any food allergies?

Yes

No

Please provide an email address where you can be easily reached: \_\_\_\_\_

If you are eligible to participate in the study, you will be contacted by email with a link to the online survey and an access code within the next three days. If you have any questions, please feel free to contact Kori Higgins, Graduate Student, at [khiggin6@utk.edu](mailto:khiggin6@utk.edu) or Melissa Hansen-Petrik, Faculty Advisor, at [phansen@utk.edu](mailto:phansen@utk.edu) in the College of Education, Health, and Human Sciences. Thank you for completing the Pretend Play and Child Development Electronic Screening Survey! Please click [HERE](#) to submit your responses.

### **Email Text with Survey Code**

Email Subject: You are eligible to participate in the Pretend Play and Child Development Study!

Congratulations! Based on your responses to the screening questions for the Pretend Play and Child Development Study, you are eligible to participate in the online survey. Study participation involves completing a 20-30 minute online survey to share your observations and perceptions of your child related to pretend play. Once you have completed the online survey, you will be entered into a drawing to win one of five \$25 or one of ten \$10 Wal-Mart gift cards. To access the online survey, follow the link <http://survey.utk.edu/mriWeb/mriWeb.dll?I.Project=THEISSURVEY>. You will need to use this access code: ###. In using this code, you may exit and return to the survey at anytime while working to complete it. Please complete the survey within the next seven days. If you have any questions, please contact Kori Higgins, College of Education, Health, and Human Sciences, The University of Tennessee-Knoxville, at [khiggin6@utk.edu](mailto:khiggin6@utk.edu).

Thank you for your participation!

Kori Higgins

### **Reminder Email for Eligible Participants**

Email subject: Friendly reminder that you are eligible to participate in the Pretend Play and Child Development Study!

Based on your responses to the screening questions for the Pretend Play and Child Development Study, you were found to be eligible to participate in the online survey. Study participation involves completing a 20-30 minute online survey to share your observations and perceptions of your child related to pretend play. Once you have completed the online survey, you will be entered into a drawing to receive one of five \$25 or ten \$10 Wal-Mart gift cards. To access the online survey, use this access code: ##### and follow the link

<http://survey.utk.edu/mriWeb/mriWeb.dll?!.Project=THESSURVEY>. In using this code, you may exit and return to the survey at anytime while working to complete it. Please complete the survey within the next seven days. If you have any questions, please contact Kori Higgins, College of Health, and Human Sciences, The University of Tennessee-Knoxville, at [khiggin6@utk.edu](mailto:khiggin6@utk.edu)

Thank you for your participation!

Kori Higgins

## **Informed Consent**

Thank you for completing this survey! You have been entered into the drawing to win one of five \$25 Wal-Mart gift cards. Each winner will be contacted by email for mailing information for delivery of the gift cards. Thank you for your participation!"

Dear potential survey participant,

Congratulations on meeting the requirements for study participation. Researchers at the University of Tennessee, Knoxville, are interested in learning more about pretend play as it relates to development of 2-5 year old children. Participation in the online survey should take no more than 30 minutes of your time. Please save the survey link and access code in your email. If you wish to leave the survey and come back to it at a later time, you may use your access code to reenter the survey and complete it at your convenience.

Participation in this research study is strictly voluntary and you may refuse to participate or to answer any questions at any time with no penalty. There are no risks involved in your participation. Benefits entail providing information that will help those working with young children to better understand mother's experiences with pretend play activities in the home and potentially develop new teaching techniques for young children using pretend play. Individuals submitting complete surveys will be entered into a drawing to win one of five \$25 Wal-Mart gift cards. Winners will be asked to provide mailing information in order to receive the card. All identifying information will be deleted before study results are analyzed so that your responses will not be connected to you in any way.

If you have any questions at any time about the study you may contact the researcher Melissa Hansen-Petrik, at the University of Tennessee, 1215 West Cumberland Ave. Room 229, Knoxville, TN 37996-1920, and 865-974-6264. If you have questions about your rights as a participant, contact the Office of Research Compliance Officer at 865-974-7697.

By clicking “yes” below, you are providing your consent to participate in the study and will be connected immediately to the online survey.

Yes, I agree to participate in this research study.

No, I do not agree to participate in this research study.

**DOES NOT AGREE TO PARTICIPATE**

Thank you considering participation. Should you decide to complete the survey at a later date, you may access it via the link provided to you by email. Have a wonderful day

## Pretend Play and Child Development Survey

Thank you for completing this survey! You have been entered into the drawing to win one of five \$25 Wal-Mart gift cards. Each winner will be contacted by email for mailing information for delivery of the gift cards. Thank you for your participation!

Welcome to the Pretend Play and Child Development Survey! Please begin by answering a few questions about your child's pretend play activities at home.

1. What types of pretend play items does your child have at home? Please check the appropriate boxes below. All choices refer to child sized (not doll sized) items.
  - a. Toy fruits
  - b. Toy dairy foods such as milk and cheese
  - c. Toy vegetables
  - d. Toy meats and protein foods such as chicken, fish, eggs, hamburgers
  - e. Toy grain foods such as bread, noodles, rice, pancakes, rolls
  - f. Toy mixed foods such as pizza, tacos, soup
  - g. Toy desserts and sweets such as donuts, pastries, cookies, cake, ice cream
  - h. Toy kitchen (child sized)
  - i. Toy restaurant (child sized)
  - j. Toy grocery store (child sized)
  - k. Toy shopping cart (child sized)
  - l. Toy grill (child sized)
  - m. Other related items: (text box)

2. At what age did your child begin playing with the toys such as those listed in the previous question?
  - a. 1 year
  - b. 2 years
  - c. 3 years
  - d. 4 years
  - e. 5 years
  - f. Don't recall
3. How often does your child typically play with these toys in any given week?
  - a. 6-7 days/week
  - b. 4-5 days/week
  - c. 2-3 days/week
  - d. 1 day/week
  - e. Rarely (less than 1 day/week)
4. How long does each play episode with these toys typically last?
  - a. Less than 15 minutes
  - b. 15-30 minutes
  - c. 30-60 minutes
  - d. More than 60 minutes
5. How often do you play together with your child when he/she is playing with these toys?
  - a. 6-7 days/week
  - b. 4-5 days/week
  - c. 2-3 days/week



- d. 1 day/week
- e. Rarely (less than 1 day/week)

In the next section, we would like to learn about your child's experience with pretend play specifically involving toy foods, kitchens, restaurants, etc. Please provide as much detail and specific examples as possible for each question to help us understand what pretend play is like in your home.

1. Describe specific examples of what you have observed your child do when playing with toy foods, a child-sized toy kitchen, a child-sized toy restaurant set, or other related toys at home.
2. Describe any similarities you have noticed between what your child does during pretend play with these toys and what they do in real life in the kitchen or at meal and snack times.
3. What do you see as the main reasons for any similarities you described in the previous question?
4. Describe examples, if any, of what it is like when you and your child play with these toys together. What are some typical things that might happen? What does your child do and say? What do you do and say?
5. How did these particular toys come to be in your home?
6. Describe any of the toy foods which are your child's favorites or ones that they seem to avoid. What do you see as some reasons why they favor or avoid these specific toy foods?
7. Describe what, if anything, you think your child learns from playing with toy foods and other related toys. Please be as specific as possible.

8. How, if at all, do you think your child’s play with toy foods and other similar toys differs because he/she is a boy/girl?
9. Is there any other information you would like to share about pretend play with toy foods and your child?

**Please circle the number that represents how you feel about the following:**

How important is it to you that your child has toy foods and related toys at home?

	<b>Not at all important</b>	<b>Somewhat important</b>	<b>Important</b>	<b>Very important</b>
How important is it to you that	1	2	3	4

**Please tell us about mealtimes with your oldest child.**

How often during a meal do YOU:

		Never	Rarely	Sometimes	Most of the time	Always
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).	1	2	3	4	5
2.	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”).	1	2	3	4	5
3.	Encourage the child to eat by arranging the food to make it more interesting (for example, making smiley faces on pancakes).	1	2	3	4	5
4.	Ask the child questions about the food during dinner.	1	2	3	4	5
5.	Tell the child to eat at least a little bit of food on his or her plate.	1	2	3	4	5
6.	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”).	1	2	3	4	5
7.	Say something to show your disapproval of the child for not eating dinner.	1	2	3	4	5
8.	Allow the child to choose the foods he or she wants to eat for dinner from foods already prepared.	1	2	3	4	5
9.	Compliment the child for eating food (for example, “What a good boy! You’re eating your beans”).	1	2	3	4	5
10.	Suggest to the child that he or she eats dinner, for example by saying, “Your dinner is getting cold”.	1	2	3	4	5
11.	Say to the child “Hurry up and eat your food”.	1	2	3	4	5

12.	Warn the child that you will take away something <b>other than food</b> if he or she doesn't eat (for example, "If you don't finish your meat, there will be no play time after dinner").	1	2	3	4	5
13.	Tell the child to eat something on the plate (for example, "eat your beans").	1	2	3	4	5
14.	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").	1	2	3	4	5
15.	Say something positive about the food the child is eating during dinner.	1	2	3	4	5
16.	Spoon-feed the child to get him or her to eat dinner.	1	2	3	4	5
17.	Help the child to eat dinner (for example, cutting the food into smaller pieces).	1	2	3	4	5
18.	Encourage the child to eat something by using food as a reward (for example, "If you finish your vegetables, you will get some fruit").	1	2	3	4	5
19.	Beg the child to eat dinner.	1	2	3	4	5

How much do you personally care about eating healthful food?

	<b>Not at all</b>	<b>A little bit</b>	<b>Somewhat</b>	<b>Very much</b>
How much do you personally care about eating healthful food?	1	2	3	4

For the last section of the survey, please answer the following background questions about you and your oldest child.

1. What is the month of birth of your oldest child?

- a. January
- b. February
- c. March
- d. April
- e. May
- f. June
- g. July

- h. August
  - i. September
  - j. October
  - k. November
  - l. December
2. What is the year of birth of your oldest child?
- Numerical box accepting answers in the range of 0 to 2012
3. What is your child's ethnic background (may select more than one)?
- a. White, non-Hispanic
  - b. Black, non-Hispanic
  - c. Hispanic
  - d. Asian, Indian, or Pacific islander
  - e. American Indian, Alaskan Native, or Hawaiian Native
  - f. Other, please list: \_\_\_\_\_
4. What is your child's sex?
- a. Male
  - b. Female
5. How many younger brothers and/or sisters does this child live with at home?
- a. 0
  - b. 1
  - c. 2
  - d. 3 or more
6. What is your month of birth?

- a. January
- b. February
- c. March
- d. April
- e. May
- f. June
- g. July
- h. August
- i. September
- j. October
- k. November
- l. December

7. What is your year of birth?

Numerical box accepting answers in the range of 0 to 2012

8. What is your ethnic background (may select more than one)?

- a. White, non-Hispanic
- b. Black, non-Hispanic
- c. Hispanic
- d. Asian, Indian, or Pacific islander
- e. American Indian, Alaskan Native, or Hawaiian Native
- f. Other, please list: \_\_\_\_\_

9. What is your height in feet and inches?

Two text boxes to input information

10. What is your current weight in pounds?

Numerical box accepting answers in the range of 0 to 350

11. What is the highest level of education you have attained?

- a. Some high school
- b. High school diploma or GED
- c. Two-year degree, trade school or equivalent
- d. Some 4-year college
- e. Bachelor's degree
- f. Graduate or professional degree (i.e. Masters, PhD, JD, MD, etc.)
- g. Other, please list: \_\_\_\_\_

12. What is your current employment status?

- a. Home duties, full time
- b. Unemployed
- c. Student
- d. Retired
- e. Employed, part time
- f. Employed, full time
- g. Other, text box provided

13. What is your average gross annual household income?

- a. Under \$10,000
- b. \$10,001-\$20,000
- c. \$20,001-\$30,000
- d. \$30,001-\$40,000

- e. \$40,001-\$50,000
- f. \$50,001-\$75,000
- g. \$75,001-\$100,000
- h. Over \$100,000
- i. Prefer not to respond

14. What is your current marital status?

- a. Married
- b. Widowed
- c. Divorced
- d. Separated
- e. Never married

15. Does your child regularly participate in childcare or preschool outside your home? (If no, then the participant will automatically be taken to the end of the survey.)

- a. Yes
- b. No

16. How many hours does your child attend childcare or preschool in a typical week?

- a. Less than 5 hours per week
- b. 5-10 hours/week
- c. 11-20 hours/week
- d. 21-30 hours/week
- e. 31-40 hours/week
- f. More than 40 hours/week

THE END

## VITA

Kori Michelle Higgins was born in Knoxville, Tennessee to the parents of Joseph and Susan Higgins. She has a twin sister named Kaci Danielle Higgins. She was raised primarily in Oak Ridge, Tennessee, graduating with honors from Oak Ridge High School in May 2006. She earned her Bachelor of Science in Nutrition with a minor in Food Service System's Management at The University of Tennessee, Knoxville in May 2011. In August 2013, she completed The University of Tennessee, Knoxville's dietetic internship and block field experience. Kori is currently pursuing her Master's of Science in Public Health Nutrition at The University of Tennessee, Knoxville. Upon completion of her graduate work, she intends to take the Registered Dietitian examination, obtain licensure in the state, and search for a job within the nutrition field.