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The Home Food Environment During Infancy and Associations with Toddler Diet at Age 2  
Years

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## ABSTRACT

As childhood obesity rates continue to rise, it is important to study the modifiable factors that can contribute to this epidemic. Creating a positive home food environment starting as early as infancy can help create healthy dietary patterns. The purpose of this study is to examine how three controllable elements of the home food environment – family meals, out of home meals, and television exposure – during infancy impact dietary patterns in toddlerhood. Aims for the study were as follows: 1) To examine the association between the environment of family meals in infancy and toddler diet; 2) To examine association of the frequency of family meals in infancy and toddler diet; 3) To examine the association of the frequency of restaurant meals in infancy and toddler diet. This study is an observational, secondary analysis of the INSIGHT randomized control trial. Participants for the current study included 217 healthy mother-infant dyads recruited from a Central Pennsylvania maternity ward. At child age 44 weeks, mothers completed a Family Meals and TV questionnaire. A factor analysis was conducted and created three subscales for the Family Meals and TV questionnaire – time/priority for family meals, social aspect of family meals, and value of rules at family meals. Questions regarding television exposure and frequency of family meals were also assessed based on this questionnaire. At child age 2 years, mothers completed a semi-quantitative, 121-item Food Frequency Questionnaire to assess toddler diet. A latent class analysis was conducted to identify three toddler dietary classes - meat potatoes and added sugar (MPAS, 24.65% of the sample), high fruit and vegetables (HVF, 31.16% of the sample), and high juice low fruit and vegetable (JLFV, 44.19% of the sample). To test study hypotheses, linear models were conducted examining the associations between the home food environment in infancy and later toddler diet; when omnibus tests indicated

associations between these variables, follow-up logistic regressions were examined to specify the relation between the home food environment and odds of dietary class membership. H1a was supported: results indicate that parents' prioritization of family meals was associated with toddler dietary class (omnibus  $F = 3.66$ ,  $p = 0.01$ ). Specifically, parents who were higher on prioritization of family meals during infancy had toddlers who were less likely to be in the MPAS dietary class than the HFV or JLFV classes (odds ratio = 0.53, 95% CI = 0.34-0.82). H6 was supported: results indicate that meals eaten in restaurants during infancy was associated with toddler dietary patterns (omnibus  $F = 6.24$ ,  $p = 0.01$ ). Specifically, infants who ate more meals in restaurants were more likely to be in the MPAS dietary class than the HFV or the JLFV classes (odds ratio = 1.93, 95% CI = 1.3-2.7). Overall, our data indicate that some home food environment factors in infancy were linked with later toddler diet. Specifically, parents' prioritization of family meals, or emphasis on making sure they happen within the family, as well as limiting the amount of meals eaten outside of the home, may yield healthier dietary patterns for children. Since previous research has demonstrated the strong influence maternal dietary patterns have on children, future directions in this line of research should consider how maternal dietary intake impacts the child's home food environment. Further, research on the home food environment should also expand to examine child weight status as an outcome with dietary patterns as a mechanism.

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## Introduction

### *Background on Childhood Obesity*

About 14.7 million children and adolescents are experiencing obesity in the United States.<sup>1</sup> This disease has earned the title of public health crisis because of its associations with comorbidities.<sup>2</sup> Childhood obesity can put the body at risk of type 2 diabetes, cardiovascular disease, and hypertension. Given these health-related consequences of childhood obesity, for which the prevalence has quadrupled in the last 40 years, it is essential to study factors that have contributed to this crisis. In the current thesis, I focus on the home food environment in infancy, including the family meal environment as well as frequency of family meals in and outside the home, and relations to later toddler diet.

### *Overview of Home Food Environment*

Understanding the home food environment can be insightful for identifying factors in the home that have led to the multifaceted disease of childhood obesity.<sup>3</sup> See **Figure 1** for the current factors in the home food environment examined in this thesis. The home food environment is the setting in which children observe and learn behaviors that will determine how they navigate today's obesogenic culture.<sup>4</sup> Studying the home food environment is important because about two-thirds of children's diets are consumed in the home,<sup>4</sup> presenting the need to educate parents on *how* and *what* to feed their children. In the current thesis, I focus on *what* parents feed their children by examining toddler dietary patterns.

Previous research has developed conceptual frameworks to interpret the home food environment. Nepper and Chai (2015) wrote a conceptualization of the home food environment



that focused on the availability, accessibility, and visibility of healthy versus unhealthy foods in the home, as well as the frequency and quality of family meals.<sup>3</sup> Couch and colleagues (2014) broke the focus down to conceptualize factors of the physical and sociocultural aspects of the home food environment.<sup>5</sup> Physical aspects include availability of food and beverages within the home, and the sociocultural aspects include parenting styles and rules.<sup>5</sup> Rosenkranz and Dziewaltowski (2008) took another approach by focusing on the macro and micro level components of the political environment, sociocultural environment, and built/natural environments.<sup>4</sup> The political environment focuses on how the economy and policies impact food costs. At the macro level the political environment plays a role in food importation, production, and trade. At the microlevel the political environment impacts household socioeconomic status, which can impact food insecurity rates. The sociocultural environment for children is majorly provided by parents and caregivers. The macro level factors include cultural and ethnic consumption patterns, along with nationwide consumption trends such as increased tendency towards snacking and out of home eating. The micro level sociocultural factors include potential stress in home environment, parenting styles, family meals, parental education levels, and parental food preparation skills. The built and natural environments in this model influence distractions or awareness when eating. The macro level components include the community food landscape, which influences how food becomes available to be purchased and brought into the home. Micro level factors include the physical set up of the home kitchen, inclusion of a television in the kitchen, and convenience to accessing foods stored in the home. A reoccurring concept throughout multiple frameworks on the home food environment is that there are *controllable* factors that are influenced by decisions made within the household, and there are other *macro* factors with broader influence beyond the household.<sup>3,5,4</sup> In the current thesis, I

focus on the *controllable* factors. Further, all three frameworks identify both interpersonal and intrapersonal decisions as major influences in the home food environment. Public health nutrition often looks at determinants of behavior to conceptualize contributing factors to obesity or dietary behaviors. Infants and toddlers are not independent enough to buy, cook, and prepare their own meals and therefore are influenced by a lot of factors out of their control. Intrapersonal determinants are characteristics specific to the individual, such as taste preference,<sup>6</sup> emotional eating, and self regulation.<sup>7</sup> Intrapersonal determinants are often within the individual's control. Interpersonal determinants occur between the individual and someone else (*e.g.*, parents, caregivers), including factors such as parental cooking skills, time for meals, and family socioeconomic status.<sup>6</sup> Interpersonal determinants have more barriers to control because other people are involved.

Another related framework to the home food environment focuses on the ecological influences on the eating environment.<sup>8</sup> This framework put forth by Story and colleagues (2008) presents four environments that influence eating behaviors – individual, social, physical, and macrolevel.<sup>8</sup> The individual environment includes demographics, lifestyle choices, self-efficacy, and behavioral capacity. This can include individual nutrition related knowledge and attitudes. The social environment includes modeling and support of family, friends, and peers. Child diet may be influenced by observing modeling of eating behaviors and food types of those around them. The physical environment encompasses access, availability, and opportunities within the home, community, and for out-of-home eating settings. Child diet is influenced by types of foods available for sale as well as what food is brought into the home. The macro-level environment considers how policies and practices influence the food industry, health care systems, government support, economy, and cultural norms. Children's diets can be a result of food

marketing as well as food production and distribution. The individual, social, and physical environments are the more modifiable areas compared to the macro-level environment, but each plays a role in the atmosphere of the eating environment.<sup>8</sup> Given this conceptual framework on the home food environment and ecological influences on eating, this thesis focuses on three components of children's home food environments: family meal environment, frequency of family meals, and meals eaten out of the home.

Individual level factors may now be superseded by the strong influence of food environments when it comes to the rise in childhood obesity cases.<sup>8</sup> Food environments in and outside the home have experienced changes as a result of recent technology and new policies, along with economic changes and lifestyle shifts.<sup>8</sup> Specifically, today's food environment has shifted to offer copious choices of large portions of processed, convenient foods available in various settings throughout the day.<sup>8</sup> The demanding expectations of today's employees have impacted the home food environment by leaving parents less time to make and attend family meals and increased the frequency of out of home eating.<sup>8</sup> Growing use of technology in the past few decades has also come with an increase in food marketing, specific to children, impacting their preferences and thoughts for energy-dense foods.<sup>8</sup> Additionally, the expansion of the fast food industry has changed the home food environment by offering more opportunities for out of home eating.

Creating a positive meal atmosphere in the home food environment is particularly important to health outcomes during infancy and toddlerhood because of the infant's reliance on parents for feeding. When parents make choices that create an obesogenic home food environment, children's nutritional status, weight, and feeding behaviors are at risk of following.

## ***Diets of Children***

Children's dietary intake is largely shaped by the home food environment children were exposed to.<sup>5</sup> As a result of changes in the food environment at a national level, most diets of American children surpass the age appropriate recommendations for saturated fat, added sugar, sodium, and overall calorie intake.<sup>4</sup> Modifiable changes can be made to create a positive home food environment to improve the dietary patterns of children. Healthful dietary behaviors and patterns in children have been strongly associated with the availability and accessibility of healthy foods in the home, frequency of family meals, and parental intake and parenting practices.<sup>8</sup> Buying healthy foods, preparing, and storing them in a way that promotes child consumption has been associated with increased dietary intake of fruits and vegetables in children.<sup>8</sup> Modeling of parental intake and dietary behaviors has also been associated with healthy dietary intake of children.<sup>8</sup> Children need a supportive home food environment that not only allows for but also encourages healthy dietary behaviors in order to have healthful patterns of their own dietary intake.<sup>8</sup>

### ***Research Gap: Rare to Look at Patterns of Intake***

Consideration of intake patterns is an important aspect of nutrition research, yet this type of analysis is rare. Studying intake patterns can be a more informative assessment of nutritional status because it more closely mirrors a person's whole diet, rather than focusing on individual foods or food groups.<sup>9</sup> Food Frequency Questionnaires are a common method for assessing patterns of intake because they provide information about frequency and quantity of food intake for different food groups.<sup>10</sup> When patterns of child intake are studied in nutritional sciences research, a common pattern identified is an *Infant Dietary Guidelines* pattern. This pattern

includes frequent consumption of breastmilk, vegetables, fruit, meat, fish, and home prepared foods and is the pattern that most closely aligns to intake recommendations. Infants in this pattern also have low intake of commercial baby food and formula milk.<sup>11</sup> This dietary pattern was found to have a protective effect on child weight status by contributing to slower and smaller rate of infant growth in the first six months of life.<sup>10</sup> Another common pattern discussed is the Adult Foods pattern. This pattern lacks breastmilk, baby rice, and fruit and has a frequent consumption of bread, savory snacks, biscuits, squash, and cereals.<sup>11</sup> This dietary pattern leads to negative health outcomes because it energy dense and lacking important vitamins and minerals for growth.

### ***Shift from Infancy to Toddlerhood***

The period of growth and development from infancy to toddlerhood coincides with major changes in dietary needs. As such, following the dietary guidelines pattern is one way that parents can contribute to healthy growth.<sup>12</sup> Total energy needs increase from about 600 calories at 6 months of age to about 1300 calories at 4 years of age, with the major shift being from an all milk diet to consuming meals with the family.<sup>13</sup> From birth to 6 months of life the dominant source of energy and nutrients (around 91-98%) is recommended to be from breastmilk or infant formula. Beginning around 6 months, the diet of infants shifts to incorporate complementary foods, to introduce all food groups, in addition to the milk diet. Milk intake is contributing to about 69% of daily intake at 6-8 months, and then decreases to 26% by 21-24 months.<sup>13</sup> At 12 months the diet shifts to less baby food and more adult food, changes include: breastmilk to cow's milk, infant cereal to family cereal, and deep yellow and green vegetables to potatoes being the most common source of vegetables. In the time from 4-14 months, total daily energy

from food groups increases from 10-65%, and then slowly increases to 80% over the next ten months.<sup>13</sup> After 24 months, milk is no longer a major contribution to total energy intake in the toddler diet. The toddler dietary pattern includes an increasing percentage of fruit juice, grains, sweets, and mixed dishes.

The first 1,000 days of life are often referred to as the window of opportunity, because it is the most critical time period for influencing growth and development.<sup>14</sup> Rapid growth is seen in these 1,000 days from birth to early toddlerhood, before it slows and becomes steady.<sup>15</sup> From birth to 5 months, infants' length increases about 30% and then 50% more by month 12. Infants can be expected to grow up to 10 inches within their first year of life.<sup>15</sup> From birth to 5 months, infant's weight just about doubles their birthweight, and triples by month 12. For the first two months of life newborns are expected to grow about one ounce per day, and 1 pound per month beyond that.<sup>15</sup> The rate of this weight gain is an important determinant of future weight status and health. Rapid weight gain in the first year of life increases the risk of childhood obesity.<sup>16</sup>

## **Impact of the Home Food Environment on Toddler Diet**

### ***Family Meals and Family Meal Environment***

Although there are not official criteria for family meal studies, the definition written by Verhage and colleagues (2009) closely aligns with how this current study examined family meals. Essentially, the family meal can be seen as a social moment where food is eaten with at least one other family member.<sup>17</sup> In the position paper from the Academy of Nutrition and Dietetics on treating pediatric overweight and obesity, family meals are discussed as an avenue with which to promote children's healthy weight.<sup>18</sup> Structured, distraction free meals are highly valued and advocated for as treatment and prevention of obesity.<sup>18</sup> The family meal is one example of positive family routines that shape child's eating. To reap the benefits of family meals, only about 20 minutes of the day are needed for parents to be present and engage with their family members over a meal.<sup>19</sup>

While current studies have illustrated the positive outcomes of family meals, only about 30% of families regularly participate in them.<sup>12</sup> A meta-analysis of family meals for children and adolescents examined the frequency of family meals.<sup>20</sup> This study revealed that for families that eat at least 3 family meals a week, children have a lower likelihood of being overweight, consume less energy-dense foods, and have lower rates of disordered eating.<sup>20</sup> Further, there is an increased chance of fruits and vegetables being served during a family meal compared to when an individual meal served to the child.<sup>17</sup> This makes family meals particularly important in the early years of life, when the child's palate and taste preferences are still developing.

The meta-analysis concluded that family meals are normative events for younger children, making them more nutritionally beneficial.<sup>20</sup> In addition to the nutritional benefits, family meals also provide an opportunity for parents to implement structure into the home food

environment. Research indicates that a predictable, structured environment supports children's development.<sup>17</sup> When parents consume meals at the same time as their children they have the opportunity to model appropriate eating behaviors and table manners. Modeled eating and type of food availability have stronger influence on children's consumption patterns than solely parents giving verbal directions and encouragements.<sup>4</sup>

Limiting distractions (e.g., turning the television off) allows the family meal to be a moment for socialization. Turning the television off during family mealtimes is also associated with a higher likelihood of serving fruits or vegetables.<sup>21</sup> Talking with family members at meals also increases children's emotional security and family cohesion.<sup>19</sup> As such, it is clear that family meals benefit children's health and development in many ways, and that there are certain parenting practices that can bolster this effect (e.g., turning the television off). Due to the positive effect family meals on children's outcomes, family meals are an important aspect of the home food environment to examine.<sup>3</sup>

### ***Meals In/Out of the Home***

It is also important to evaluate family meals eaten outside of the home because for some Americans, this is the only time the whole family gets to sit down and eat together.<sup>22</sup> Although many parents know eating out of the home often leads to less nutritious options, these types of family meals are valued because parents are able to be present and not caught up in the cooking and cleaning of the meal.<sup>23</sup> "Out of home eating" has been defined as food or beverages prepared outside of the home for a family to eat together, including dine in and takeaway options.<sup>24</sup>

Eating out of the home has become an increasingly common occurrence for Americans.<sup>8</sup> For children 2-18 years old, restaurant and fast food meals make up 14.8% of total energy intake, which is more than the total intake from meals at schools and daycare centers.<sup>24</sup> Eating out of



home frequently is positively associated with over consumption of calories, fat, carbohydrates, added sugars, and sugar sweetened beverages.<sup>24</sup> As a result of the poor nutritional quality of out of home foods, many studies have found associations with frequency of out of home meals and weight gain and obesity.<sup>8</sup> Unfortunately, due to the fast paced American lifestyle and changing work environments, some Americans share the mindset that, fast food is a “necessary evil”.<sup>23</sup> Even parents who express knowledge about nutrition of out of home meals still purchase and feed them to their children out of convenience. Out of home eating is likely a contributor to overconsumption in the US.

Structure of meals and consumption patterns differ between family meals consumed in the home versus out of the home. This can be attributed to the different priorities of parents when creating the home food environment, versus businesses working to create profitable environments. Recent trends in the out-of-home eating environment have been heading in an obesogenic direction. As restaurants present larger portion sizes than in the past, Americans are encouraged to over consume calorie dense foods.<sup>8</sup> Often, restaurant entrees contain one half to one day’s worth of recommended calories.<sup>8</sup> When questioned about menu offerings, restaurant executives reported that healthier menu options would only be added if there was enough demand to increase sales and profits.<sup>8</sup> Due to the difference in environments in the home versus out of the home, it is important to educate parents on how to protect their children’s eating behaviors and dietary patterns to avoid developing obesogenic habits.

### ***TV Exposure***

Television is a common contributor to an obesogenic home food environment as it promotes sedentary behavior, viewing of food advertisements, and a distraction while eating.<sup>4</sup>

Due to the strong influence television has on the developing brain and the encouragement of sedentary lifestyle, guidelines have been set by the American Academy of Pediatrics. The general recommendation is that television and screen use should be avoided during infancy and early childhood.<sup>25</sup> If parents decide to allow their children to have screen time the American Academy of Pediatrics recommends limiting that time and turning off all screens during meals.<sup>25</sup>

Television exposure is also studied for its impact on consumption patterns. In the setting of family meals, eating while watching television has been associated with a higher calorie intake and less social interaction.<sup>26</sup> Parental perception of family meals impacts odds of television viewing during the meal. In a review paper that examined the relationship between family meals on infant and toddler health, one demonstration of low importance of family meals was from mothers who reported turning the television on to entertain the child while eating, allowing her time to complete other tasks.<sup>17</sup> Having the television on during meal time contributes to a negative home food environment by disrupting the structure of family meals and decreasing the odds of serving fruits and vegetables.<sup>17</sup> Other previous studies have shown high frequency of television watching during mealtimes is associated with family dietary patterns with higher proportions of total energy from snack foods, meats, and sodas.<sup>21</sup> When television is on during a family meal, it becomes a barrier to socializing with others at the table and it distracts the brain from recognizing feeding cues, both of which may contribute to children's unhealthy weight.

### ***Purpose of Current Study***

The typical diet of American children and the habits that are being created in the home food environment are great contributors to the childhood obesity epidemic. Examining

modifiable factors such as the family meal environment including TV exposure, as well as frequency of family meals eaten in and outside of home, can prevent unhealthy habits from forming. The purpose of this thesis is to evaluate the associations between the home food environment during infancy and dietary patterns in toddlerhood.

## Study Aims

***Aim 1:*** To examine the association between the environment of family meals in infancy and toddler diet.

***Hypothesis 1a:*** Parents' higher prioritization of family meals in infancy will be associated with healthier toddler dietary patterns.

***Hypothesis 1b:*** Parents' higher value of the social aspect of family meals in infancy will be associated with healthier toddler dietary patterns.

***Hypothesis 1c:*** Parent's higher value of rules at family meals in infancy will be associated with healthier toddler dietary patterns.

***Hypothesis 1d:*** Infants' exposure to television during mealtimes will be associated with less healthy toddler dietary patterns.

***Aim 2:*** To examine the association of the frequency of family meals in infancy and toddler diet.

***Hypothesis 2a:*** Children that eat more meals with their family during infancy will have healthier toddler dietary patterns.

***Aim 3:*** To examine the association of the frequency of restaurant meals in infancy and toddler diet.

***Hypothesis 3a:*** Children that eat more meals at a restaurant during infancy will have suboptimal dietary patterns in toddlerhood.

## Methods

### *Study Design and Participants*

This study was an observational, secondary analysis of a randomized control trial. The Intervention Nurses Start Infants Growing on Healthy Trajectories (INSIGHT) study was a randomized controlled trial testing the effectiveness of a responsive parenting (RP) intervention designed to prevent rapid infant weight gain against a matched-intensity safety control. Primiparous mothers and their healthy, term infants were recruited from a maternity ward in Central Pennsylvania. Dyads were randomized 10-14 days postpartum. Research nurses delivered intervention content at 4 home visits during the first year after birth, followed by clinical research center visits at ages 1 and 2 years, and phone calls at 1.5 and 2.5 years. Research nurses were blind to the randomization.

Participants were recruited for the parent study as mother-infant dyads from the Penn State Milton S. Hershey Medical Center maternity ward. Inclusion criteria for the mother included living within 50 miles from recruitment hospital, English speaking, greater than or 20 years of age, primiparous status, and having a full-term, singleton newborn. Exclusion criteria included relocation from Pennsylvania in the next 3 years, adoption or separation from birth mother, birth weight exceeding 2500 grams, or indication of growth retardation from a prenatal ultrasound. Significant health issues for mother or child were also grounds for exclusion. The sample size at the 44-week timepoint was 216 and the sample size at the 2-year timepoint was 229. The INSIGHT study was approved by the IRB: PRAMS034493EP for research involving humans.<sup>27</sup> It was also registered at [www.clinicaltrials.gov](http://www.clinicaltrials.gov) (NCT01167270).

### ***Responsive Parenting and Safety Control Interventions***

The intervention for the responsive parenting group included topics of infant sleep, feeding, soothing, and interactive play. The feeding component of the responsive parenting intervention revolved around parents recognizing hunger and fullness cues, only using food for hunger, introducing developmentally appropriate food, and establishing routines. These concepts taught parents the basics of structure-based feeding. The feeding component of the safety control intervention included messages such as breast milk storage and formula preparation for feeding, food safety, and choking prevention.

## **Measures**

### ***Demographics***

Demographic characteristics were collected at enrollment. Parents self-reported on race, ethnicity, highest education attained, and annual household income. Parental age, pre-pregnancy weight, and child sex were extracted from medical records.

### ***Family Meals***

Mothers completed the 32 item Family Meals and TV questionnaire at 44 weeks using REDCap, a secure data collection tool. This questionnaire assesses how often families eat meals together as well as beliefs about family meals. Thirteen of the 32 items were pulled from previous research. A factor analysis was conducted to create subscales. This factor analysis indicated there were three subscales: time/priority for family meals (6 items; e.g., “It is difficult to find time for a family meal [reverse scored]”;  $\alpha = 0.87$ ), social aspect of family meals (4 items; e.g., “Mealtime is a time for talking with family”;  $\alpha = 0.78$ ), value of rules at family meals

(2 items; e.g., “Manners are important at the dinner table”; analyzed as individual items).

Response options for all items on these subscales ranged from 0-4: from strongly disagree to strongly agree. Hypothesis 1a focused on the time/priority of family meals subscale. Hypothesis 1b focused on the social aspect of family meals subscale. Hypothesis 1c focused on the value of rules at a family meal subscale.

Hypothesis 1d was based on two study team developed questions assessing infant’s exposure to television during family meals: “At home, how often does your child eat a meal while watching television?” and “At home, how often is the TV on while your child is being fed/eating a meal (includes having TV on in the background?)” (response options for both questions ranged from 1-5; never to always).

Hypothesis 2a focused on frequency of family meals, based on two study team developed questions: “In the past week, how many times did your family have a meal together?” (response options ranged from 1-6; did not have a meal together to more than 7 times) and “How many times a day, on average, do you usually eat a meal with your child?” (response options ranged from 1 to 5; from 0 times a day to more than 3 times a day). Hypothesis 3a focused on meals eaten outside of the home and was based on two study team developed questions: “In the past week, how many times did your baby eat restaurant food at a restaurant?” and “In the past week, how many times did your baby eat take-out food delivered or carried out from a restaurant?”. Response options for both questions ranged from 1 to 6 (from my baby did not eat restaurant food to 8 or more times).

### ***Toddler Diet***

Mothers completed a semi-quantitative Food Frequency Questionnaire (FFQ) at child age 2 years using REDCap. The FFQ provided to participants was modified from the young child’s

Harvard Service FFQ.<sup>28</sup> Modifications allowed for incorporation of common foods young children consume and recording of intake over one week rather than four weeks. Frequency questions asked about 121 food and beverage choices, questions were followed with 9 response options. Options ranged from 0, 1, 2-3, 4-6 times per week or 1, 2, 3, 4-5, and 6 or more times per day. Numeric times per day values were calculated from the response options. Latent class analysis variables were made by dichotomizing intake of 8 common food groups from the FFQ. The 8 food groups consisted of: starch, fruit, vegetables, meat, juice, sugar sweetened beverages (SSBs), sweets, and fried potatoes. Dichotomization was based on meeting or not meeting recommended number of servings per day for each food group.<sup>29,30</sup>

### ***Statistical Analysis***

The analytic sample of  $n = 217$  was established by identifying participants who responded to both the Food Frequency Questionnaire and the Family Meals Questionnaire. During data preparation, no outliers were discovered.

A latent class analysis was conducted to identify patterns of toddler diet based on FFQ responses for 8 different food groups. This analysis revealed 3 different classes based on item response probabilities. The Meat, Potatoes, and Added Sugar class (MPAS, 24.65% of the sample), is characterized by high parent-reported consumption of meat, juice, SSBs, sweets, and fried potatoes. The High Fruit and Vegetables class (HVF, 31.16% of the sample), is characterized by high parent-reported consumption of fruits, vegetables, and starch. The High Juice, Low Fruit and Vegetables class (JLFV, 44.19% of the sample), is characterized by high parent-reported consumption of juice and low parent reported consumption of fruits and vegetables.



The primary responsibility of the author of this thesis included conducting a literature review, generating the aims and hypotheses, and writing the first draft of all sections. All descriptive and data analyses were completed using SAS Version 9.4 (SAS Institute Inc., Cary, NC, USA) with help from Drs. Erika Hernandez and Jennifer Savage Williams. To test study hypotheses, linear regression models were conducted examining the associations between the home food environment in infancy and later toddler diet; when omnibus tests indicated associations between these variables, follow-up logistic regressions were examined to specify the relation between the home food environment and odds of dietary class membership. Specifically, for Aim 1, linear regression models were used to examine associations between time/priority of family meals (Hypothesis 1a), social aspect of family meals (Hypothesis 1b), rules at family meals (Hypothesis 1c) and infants' television exposure during meals (Hypothesis 1d) and toddler dietary class. For Aim 2, linear regression models were used to examine the association between frequency of family meals during infancy and toddler dietary class (Hypothesis 2a). For Aim 3, linear regression models were used to examine the association between the frequency of restaurant meals during infancy and toddler dietary class (Hypothesis 3a). Follow-up logistic regressions were examined to specify the relation between the home food environment and odds of dietary class membership for any linear regression model that showed a significant omnibus test, indicating an association between that home food environment component in infancy and later toddler diet. Standard covariates (study group, child sex, race, ethnicity, education, annual household income, and marital status) were assessed using bivariate correlations and included in models if significantly correlated with a study variable at  $p < 0.05$ .

## Results

### *Participant Demographics*

As shown in **Table 1**, there were 216 participants with 50.93% male children. The majority of the children were White (92.59%) and not Hispanic (94.91%). Majority of mothers were also White (94.44%) and not Hispanic (93.35%). Most mothers were married (81.94%) and had at least some college education, with 29.63% having a graduate degree or higher. The majority of participants had a household income above \$50,000.

### *Descriptive Statistics for Study Variables*

Descriptive statistics for family meal and tv subscales are shown in **Table 2**. Descriptive statistics for frequency of family meals can be found in **Table 3**. Results indicate that in the past week, 26.50% of participants reported having 5-6 family meals together. Results indicate that on average 35.19% of mothers eat 1 meal a day with their child. Results indicate that 67.67% of children did not eat restaurant food in a restaurant in the past week. Results indicate that 88.41% of babies did not eat take-out food in the past week. Further, on average, participants had 4.24 family meals together in the past week and participants ate 2.96 meals with their children. In the past week, children ate restaurant food in the restaurant 1.44 times. In the past week, children ate restaurant take-out food 1.13 times on average.

Upon completion of the FFQ, participants were categorized into dietary classes. **Table 4** displays the descriptive statistics by class. Class 1, meat, potatoes, and added sugar (MPAS) consisted of 24.45% of participants. Class 2, high fruits and vegetables (HFV) consisted of 30.57% participants. Class 3, high juice, low fruits and vegetables (JLFV) consisted of 44.98% participants.

Bivariate correlations used to identify control variables can be found in **Table 5**.

### ***Results by Aim***

**Aim 1.** Aim 1 examined associations between the environment of family meals and toddler diet. Omnibus results from the linear regression model indicate that prioritization of family meals was significantly related to toddler diet ( $F = 3.66, p = 0.01$ ). Follow-up logistic regression models indicate that parents who were higher on prioritization of family meals during infancy had toddlers who were less likely to be in the MPAS dietary class than the HFV or JLFV classes (odds ratio = 0.53, 95% CI = 0.34-0.82). As such, hypothesis 1a was supported, see **Figure 2**. Family race and income were controlled for based on significant correlations.

Omnibus results from the linear regression model indicate that the social aspect of family meals was not significantly related to toddler diet ( $F = 1.13, p = 0.34$ ) and therefore no follow-up logistic regression models were conducted. Child ethnicity, maternal education, maternal marital status, and family income were controlled for based on significant correlations.

Omnibus results from the linear regression models indicate that parents' higher value of rules at family meals in infancy was not significantly related to toddler diet (item 17  $F = 1.27, p = 0.27$ ; item 18  $F = 0.27, p = 0.85$ ), and therefore no follow-up logistic regression models were conducted. Thus, this hypothesis was not supported. Child ethnicity, maternal education, maternal marital status, and family income were controlled for in the model using item 17 and maternal ethnicity was controlled for in the model using item 18 based on significant correlations.

Omnibus results from the linear regression models indicate that exposure to television during mealtimes in infancy was not significantly related to toddler diet (item 25  $F = .27, p = 0.93$ ; item 30  $F = 0.50, p = 0.48$ ) and therefore no follow-up logistic regression models were conducted. As such, this hypothesis was not supported. Study group, child ethnicity, maternal

age, and maternal education were controlled for in the model using item 25 based on a significant t-test (for study group) and significant correlations (for child ethnicity, maternal age, and maternal education). There were no covariates significantly associated with item 30, thus there were no controls for this model.

**Aim 2.** Omnibus results from the linear regression model indicate that the number of family meals eaten per week during infancy was not significantly related to toddler diet ( $F = 1.81, p = 0.17$ ). Child race was controlled for in this question based on significant correlations. Omnibus results from the linear regression model also indicate that the number of daily meals eaten with the child during infancy was not significantly related to toddler diet ( $F = 1.54, p = 0.18$ ). Maternal race, maternal age, maternal education, and household income were controlled for in this question based on significant correlations.

**Aim 3.** Omnibus results from the linear regression model indicate that the number of meals infants ate in a restaurant in the past week was significantly related to toddler diet ( $F = 6.24, p = 0.01$ ), see **Figure 3** (analyzed using question 4). Follow-up logistic regression models indicate that infants who ate more meals in restaurants were more likely to be in the MPAS dietary class than the HFV or the JLFV classes (odds ratio = 1.93, 95% CI = 1.3-2.7). However, omnibus results from the linear regression model indicate the number of takeout or restaurant delivery meals children ate in infancy was not significantly related to toddler diet ( $F = 2.17, p = 0.12$ ; analyzed using question 6). Household income was controlled for in this model based on significant correlations.

## Discussion

### *Summary of Key Findings*

Aim 1 investigated the environment of family meals during infancy and associations with later toddler diet. Results indicated that parent's higher prioritization of family meals during infancy was related to an overall healthier toddler diet. On the other hand, parent's higher value of the social aspect of family meals as well as higher value of rules during family meals were not related to toddler diet. Furthermore, infant exposure to television during mealtimes was also not related to toddler diet. Aim 2 examined family meal frequency during infancy and found no later associations with toddler diet. Aim 3 investigated the association of frequency of restaurant meals during infancy on toddler diet. Results found that more restaurant meals eaten during infancy was related to suboptimal toddler dietary patterns.

### *Aspects of a Positive Family Meal Environment*

One component of a positive family meal environment is prioritizing family meals, meaning that a parent is going out of their way to make these events happen. Therefore, it is not surprising that parents' higher prioritization of family meals was associated with healthier toddler dietary patterns. In general, family meal frequencies have been reportedly declining,<sup>19</sup> therefore parents need to plan for and prioritize family meals in order for these events to occur. Shifts in today's American workforce now include more dual earner households and single parent families, which have impacted the home food environment at the sociocultural microlevel.<sup>4</sup> These changes have become barriers to family meals by leaving less time after work and creating more fast-paced schedules to navigate. For parents who work longer hours, convenience often gets prioritized when it comes to meals.<sup>4</sup> In order for more parents to

prioritize family meals, awareness needs to be spread about the protective effects of family meals on their child's nutrition and health.

The priority of family meals subscale used in the current thesis is similar to subscales used in extant research on family meals. For example, in a study examining family meal patterns with disordered eating in adolescence, 2 of the 5 items used were the same as the current thesis.<sup>31</sup> Results from Neumark-Stainer and colleagues (2004) found that priority of family meals was the most consistent protective factor across analyses when studying disordered eating behaviors.<sup>31</sup> The authors speculate that the priority of family meals may be so robustly protective of disordered eating because it encompasses the socio-emotional aspect of family meals, beyond simple frequency of them. That is, parents who prioritize family meals may display this value in their parenting practices around food (e.g., displaying warmth around family meals when they do occur), which is not captured in a simple frequency count of family meals.

Higher value of the social aspect of meals, such as having conversations with family, is another component of a positive meal environment. In the current thesis, parent's higher value of the social aspect of family meals during infancy was not associated with healthier toddler dietary patterns. Given previous findings, these results were surprising. For example, other studies have found that family meals were associated with an increased sense of family cohesion.<sup>19</sup> The social aspect of family meals had previously been found to increase child emotional security and sense of familial belonging.<sup>19</sup> A potential reason for these results may be due to having a stressful family dynamic. Other research found that in some households, family meals are used as an opportunity to address conflicts.<sup>21</sup> Use of family meals for dispute of conflict may reduce family meal frequency and duration, have a negative impact on diet, and trigger ineffective coping skills.<sup>21</sup> Relationship stress between family members can create a negative, tense meal

atmosphere and can also impact how present and engaged parents are during the family meal.<sup>4</sup>

Future nutrition education messages should explain to parents the importance of avoiding using the family meal as a time for conflict resolution.<sup>21</sup>

Finally, parents' higher value of rules at family meals, such as displaying appropriate manners, is another component of a positive family meal environment. In the current thesis, parents' higher value of rules was not associated with toddler diet. Of note here is that in contrast to the two subscales previously discussed, value of rules was examined using two individual items rather than a subscale (i.e., "manners are important" and "we are expected to follow rules"), which may help to explain the null findings. Still, the lack of association is surprising. Value of rules at family meals may be a building block of parents' structure-based feeding, which is associated with protective effects on diet. Research from Gerards and Kermers (2015) on the home food environment found a positive association between fruit and vegetable consumption and family rules.<sup>32</sup> Similarly, a study by Couch and colleagues (2014) has found that household family food rules have positive associations with child dietary quality, as measured by high fruit and vegetable intake and low intake of high fat snacks and sugar sweetened beverages.<sup>5</sup> However, research from Lopez and colleagues (2018) found that use of supportive practices such as parental modeling of healthy behaviors may override the need for creating explicit household food rules.<sup>33</sup> This may be a potential reason Hypothesis 1c was refuted.

### ***Television Exposure***

As part of the home food environment, infants' exposure to television during mealtimes was examined, but was not associated with toddler dietary patterns. This prediction was based on previous research that found associations between television and obesogenic related outcomes

such as higher intake of fat and sodium in snacks, less fruit and vegetables, and frequent fast-food consumption.<sup>4</sup> Consuming food while watching television can lead to mindless eating, overeating, and a decrease in social interactions. Television serves as a distraction in the home food environment and can dilute the effectiveness of family meals,<sup>19</sup> but a potential reason this hypothesis was refuted is that the survey question focused specifically on television – no other electronic devices. In today’s media-saturated environment,<sup>8</sup> the impact of more interactive forms of technology also need to be considered. Today, tablets, smart phones, video games, and social media are all added levels of distraction within the household.<sup>19</sup> Children begin interacting with and using digital devices earlier and earlier in life. When asked about engagement with electronics and child screen time the following statistics were reported by parents for their children age 0-2 years ever using or interacting with the following devices: television 74%, tablet 35%, smartphone 49%, desktop or laptop computer 12%, and gaming device 9%.<sup>34</sup>

With more forms of available and accessible technology to infants and toddlers comes more opportunities for external influence on their developing eating behaviors and preferences. One example of this is advertising. The power of food marketing is another influential factor that often flies under parental radar when exposing young children to television and other media forms.<sup>8</sup> Starting as young as toddlerhood, brands begin aiming marketing towards children to increase brand loyalty and sales.<sup>8</sup> This is problematic because after watching advertisements, children are more likely to prefer and consume the product, and American advertisement patterns of children’s programs mostly consist of sugary products and fast-food.<sup>4</sup> Even if parents are doing what they can to create positive home food environments, their children may still be learning other preferences from advertisements, which can be limited by limiting infants’ and toddlers’ screen time and by turning the television off in the background.



Beyond the home food environment, systemic, more macro-level efforts to improve the health of our nation and work towards decreasing childhood obesity rates are underway; recommendations have been made to the food, beverage, and restaurant industry to emphasize healthier food and beverages when marketing to children.<sup>8</sup> Some other countries have actually already passed legislation on this matter and set regulations or bans on advertising less nutritious foods to children and families.<sup>4</sup>

### ***Frequency of Family Meals***

An integral component of the home food environment is how frequently family meals occur. In the current thesis, frequency of family meals during infancy was not associated with toddler diet. Since there is no agreed upon criteria for defining a family meal in the literature, this hypothesis was tested with two questions that use different wordings. One question asked about frequency of family meals per week and the other asked about the number of times per day the parent consumed a meal with the child. The literature review conducted for this study exposed discrepancies between definitions including: *when* a family meal occurs, *how often* is frequent, and *who* is required at the meal. Hammons and Fiese (2011) wrote that current research does not specify who creates the family structure necessary to consider an event a family meal.<sup>20</sup> Each family has their own dynamic and distribution of caregiving responsibilities, making it unclear who should be present for a family meal. Which meal of the day being studied was another point of variance, some research just considered dinner, while other studies also included breakfast and lunch.<sup>20</sup> The definition of “frequent family meals” also differed in each study, criteria ranged from 3 to at least 5 times a week. As a result, comparing outcomes of family meal research can be difficult depending on which criteria was prioritized in the definition of the

family meal.<sup>17</sup> A lack of clarity regarding what constitutes a family meal may help explain the lack of findings in the current thesis and should be addressed in future work.

### ***Out-of-Home Meals***

Lastly, the current thesis investigated the frequency of out-of-home meals as a component of the home food environment. As hypothesized, results indicated that infants who ate more meals at restaurants had suboptimal dietary patterns in toddlerhood. These findings align with previous research indicating that American parents have admitted that eating as a family happens more often outside the home than in.<sup>24</sup> The implications of out-of-home eating for child dietary patterns are notable, as the structure of meals and consumption patterns differ between in home meals versus out of home meals. Out of home eating is a great contributor to overconsumption in America. Previous research has found frequent out of home eating is positively correlated with overconsumption of calories, fat, carbohydrates, added sugars, and sugar sweetened beverages.<sup>24</sup> Parents' perceptions and knowledge of out of home meals vary greatly by person and situation. Even in instances of knowing that out of home eating is harmful to children's diet, some parents still choose to utilize it regardless. I discuss why below.

This thesis previously discussed macro-level differences between the type of home food environment parents strive to build versus the food environment restaurants and businesses have built. But there are also micro-level differences at play between parental and child priorities when eating out of the home. Studies have found that parents will prioritize a stress-free meal when they are at restaurants— even if they know it is at the expense of the child's nutrition.<sup>24</sup> Children prioritize foods that they view as “treats” or foods that they already know they enjoy. Teaching children to perceive healthy foods as treats is another challenge parents face.<sup>24</sup> Additionally, the tendency of neophobia for children is stronger outside of the home than inside<sup>24</sup>

– and parents encourage this tendency by telling their kids to order something they like so that they are not wasting their money.<sup>24</sup>

Another factor affecting consumption patterns out of home is the choices available. Parents with younger children are more likely to prefer quick service restaurants to prevent boredom or fussiness from their children.<sup>24</sup> Unfortunately, children's menus at quick service restaurants are often limited and consist of energy dense, fried, or plain foods. In a study evaluating parents' perception of out of home eating, parents generally reported children's menus were lower in nutritional quality when compared to the adult menu.<sup>24</sup> Parents recognized many options on the menu included processed meats but were concerned that the healthier items were priced too high.<sup>24</sup> Beyond the home food environment, offering healthy options at an affordable children's menu price is a crucial step in improving the nutrition quality of out of home meals.

### ***Strengths, Limitations, and Future Directions***

Several strengths can be observed in this study. The first strength of this study is that investigation of meals at home versus in the restaurant during both infancy and toddlerhood is a novel contribution. Previous research has often been focused on either meals at home or meals at restaurants in isolation, without examining them in the same study. The second strength of this study is looking at the home food environment at an earlier time point to predict later child diet. The shift from infancy to toddlerhood is an understudied time in child development, so longitudinal work in this domain is essential. Another strength of this study is looking at dietary patterns rather than intake of individual food items, as this type of analysis better represents nutritional status as a whole.

The first limitation is this study solely relied on maternal report, meaning no observations were done as part of this study. Inaccuracies in maternal report could result from answering out

of social desirability and recall bias.<sup>35</sup> Another limitation noted was lack of sample diversity, participants were predominantly White, educated, and middle class which makes findings difficult to generalize across the United States. Additionally, the questionnaires that were analyzed in this study were created by the research team, based on previous research, and are not validated instruments, indicating that results should be interpreted with caution. A factor analysis was conducted for the Family Meals and TV Survey, but should be expanded on in future research.

Although this current study focused on dietary patterns, previous research has identified that the home food environment is also a crucial influencer on child weight status. Broadly speaking, this work indicates that a positive home food environment yields children with healthier weight status.<sup>5,36</sup> Therefore, a future line of research is to examine the effect of the home food environment on child weight with child dietary patterns as a mechanism. Another direction for future work should consider maternal dietary intake patterns, considering the heavy influence of mothers' diet on infant diet.<sup>10</sup> The types of foods parents bring into the home for themselves impacts the taste preferences of their children. This is particularly important during the life stages of infancy and toddlerhood, where children rely heavily on their parents to provide food. Food accessibility within the home food environment has been positively associated with healthier dietary intakes in children.<sup>8</sup> Aspects of food accessibility include finding ways to facilitate child consumption of foods, such as visibility and location of foods as well as preparation such as cutting or peeling of foods.<sup>8</sup> Modeling of parental fruit and vegetable consumption has also been associated with increased intake for children, even when children had low taste preferences for fruits and vegetables.<sup>8</sup> Studying parental fruit and vegetable intake is an

important future direction because it may be the strongest predictor of child fruit and vegetable consumption patterns.<sup>8</sup>

### ***Conclusion***

In summary, findings from the current thesis suggest that creating a positive home food environment during infancy can be important for shaping optimal dietary patterns in toddlerhood. This current thesis supported that parents who prioritize family meals during infancy had toddlers with healthier diets. This can be attributed to the many nutritional and social benefits of family meals. Another conclusion from this study is that children who eat more restaurant meals during infancy will have suboptimal dietary patterns in toddlerhood. These findings are consistent with previous research on out-of-home meals due to the high energy density of children's menus, as well as shifts in structure when eating out-of-home meals. Many factors impact the home food environment, but it is important to educate parents on the modifiable factors that are within their control that can be improved to create the healthiest outcomes for their children.

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## Tables

**Table 1:** Participant Demographics

Participant Demographics (N = 216)		Frequency	Percent
Infant Sex	Male	110	50.93%
	Female	106	49.07%
Infant Race	African American	6	2.78%
	White	200	92.59%
	Native Hawaiian or Pacific Islander	1	0.46%
	Asian	5	2.31%
	Biracial	4	1.85%
Infant Ethnicity	Hispanic	11	5.09%
	Not Hispanic	205	94.91%
Mom Race	African American	5	2.31%
	White	204	94.44%
	Native Hawaiian or Pacific Islander	1	0.46%
	Asian	5	2.31%
	Other	1	0.46%
Mom Ethnicity	Hispanic	10	4.65%
	Not Hispanic	205	95.35%
Mom Education	High School Graduation or Less	14	6.48%
	Some College	49	22.69%
	College Graduate	89	41.20%
	Graduate Degree or Higher	64	29.63%
Marital Status	Married	177	81.94%
	Not Married	39	18.06%
Household Income Before Taxes	<\$10,000	5	2.31%
	\$10,000-\$24,999	14	6.48%
	\$25,000-\$49,000	20	9.26%
	\$50,000-\$74,999	64	29.63%
	\$75,000-\$999,999	45	20.83%
	≥\$100,000	63	29.17%
	Do Not Know	4	1.85%
Maternal Age	Mean	29.36	Standard Deviation
			4.48

**Table 2:** Descriptive Statistics for Family Meal and TV Subscales

Variable	N	Mean	Std Dev	Range
Time Priority for Family Meals <sup>1</sup>	233	2.86	0.71	1.17-4.00
Social Aspects of Family Meals <sup>1</sup>	233	3.72	0.39	1.75-4.00
We are expected to follow rules at mealtime. <sup>1</sup>	232	3.26	0.80	1.00-4.00
Manners are important at the dinner table. <sup>1</sup>	233	3.57	0.58	2.00-4.00
In the past week, how many times did your family have a meal together? <sup>2</sup>	234	4.24	1.37	1.00-6.00
How many times a day, on average, do you usually eat a meal with your child? <sup>3</sup>	233	2.96	0.92	1.00-5.00
In the past week, how many times did your baby eat restaurant food in a restaurant? <sup>4</sup>	232	1.44	0.74	1.00-6.00
In the past week, how many times did your baby eat take-out food delivered or carried out from a restaurant? <sup>5</sup>	233	1.13	0.39	1.00-3.00
At home, how often does your child eat a meal while watching television? <sup>6</sup>	233	1.54	0.77	1.00-4.00
At home, how often is the TV on while your child is being fed/eating a meal? <sup>7</sup>	231	1.85	0.69	1.00-4.00

*Notes.* <sup>1</sup>Response options ranged from 0-4 (from strongly disagree – strongly agree); <sup>2</sup>Response options ranged from 1-6 (from did not have a meal together to more than 7 times); <sup>3</sup>Response options ranged from 1-5 (from 0 times a day to more than 3 times a day); <sup>4</sup>Response options ranged from 1-6 (from my baby did not eat restaurant food in a restaurant to 8 or more times); <sup>5</sup>Six response options ranged from my baby did not eat take out food to 8 or more times; <sup>6</sup>Response options ranged from 1-5 (from never to always); <sup>7</sup>Response options ranged from 1-4 (from no feedings to all feedings).

**Table 3:** Descriptive Statistics for Frequency of Family Meals

	Frequency	Percent
<b>Question 1: In the past week, how many times did your family have a meal together?</b>		
Did not have a meal together	2	0.85%
1-2 times	23	9.83%
3-4 times	51	21.79%
5-6 times	62	26.50%
7 times	32	13.68%
More than 7 times	64	27.35%
<b>Question 2: How many times/day, on average, do you usually eat a meal with your child?</b>		
0 times a day	3	1.29%
1 time a day	82	35.19%
2 times a day	81	34.76%
3 times a day	55	23.61%
More than 3 times a day	12	5.15%
<b>Question 4: In the past week, how many times did your baby eat restaurant food in a restaurant?</b>		
My baby did not eat restaurant food in a restaurant	157	67.67%
1 time	51	21.98%
2 to 3 times	22	9.48%
4 to 5 times	1	0.43%
6 to 7 times	0	0.0%
8 or more times	1	0.43%
<b>Question 6: In the past week, how many times did your baby eat take-out food delivered or carried out from a restaurant?</b>		
My baby did not eat take-out food	206	88.41%
1 time	23	9.87%
2 to 3 times	4	1.72%
4 to 5 times	0	0.0%
6 to 7 times	0	0.0%
8 or more times	0	0.0%

**Table 4:** Descriptive Statistics by Toddler Dietary Class Identified by Using Latent Class Analysis

Class	Frequency	Percent
MPAS <sup>1</sup>	56	24.45%
HFV <sup>2</sup>	70	30.57%
JLFV <sup>3</sup>	103	44.98%

*Notes.* <sup>1</sup>MPAS = Meat, Potato, and Added Sugar, <sup>2</sup>HFV = High Fruits and Vegetables, <sup>3</sup>JLFL = High Juice, Low Fruits and Vegetables.

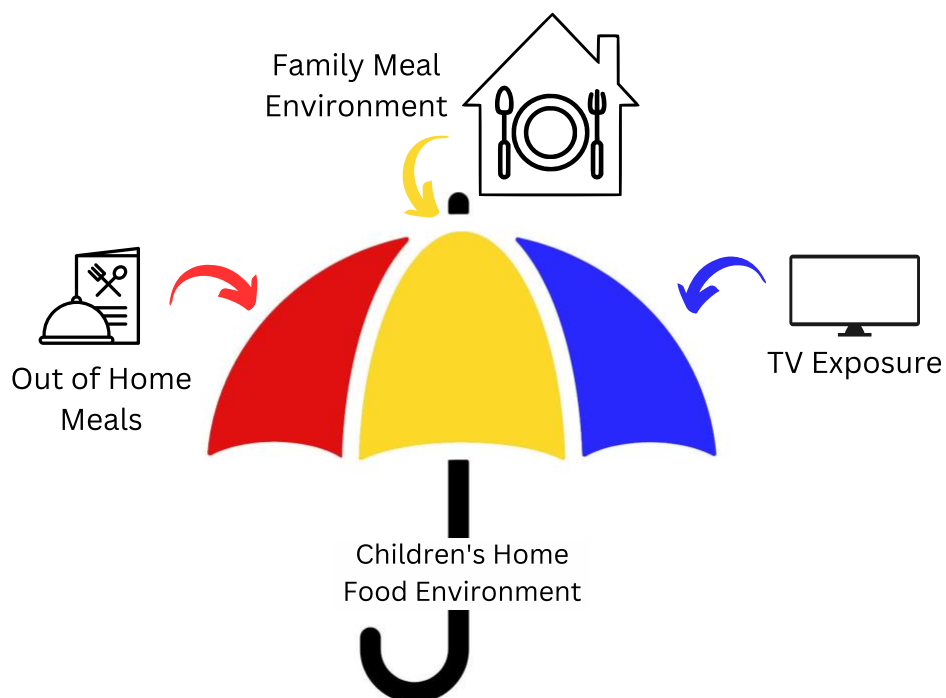
**Table 5:** Bivariate Correlation Coefficients between Study Variables and Covariates

	Baby Race	Baby Hispanic	Mom Race	Mom Hispanic	Mom Age At Recruitment	Mom Education	Married	Household Income
1. Time Priority of Family Meal Subscale	-.18**	-.01	-.14*	.02	.06	.03	.02	.13 <sup>†</sup>
2. Social Aspects of Family Meal Subscale	-.12 <sup>†</sup>	-.15*	.01	-.04	.07	.18**	.18**	.19**
3. Rules at Meal Time (Q17)	-.07	-.25**	.01	-.21**	.11 <sup>†</sup>	.16*	.13*	.15*
4. Importance of Table Manners (Q18)	.05	-.12 <sup>†</sup>	.04	-.14*	.04	.10	.08	.07
5. Meals Together in Past Week (Q1)	-.15*	-.06	-.09	.04	.10	.07	.07	.05
6. Meals per day with Child (Q2)	-.04	-.01	-.13*	.08	-.18**	-.18**	-.10	-.14*
7. Restaurant Meals in Past Week (Q4)	.02	-.11	-.04	-.10	-.02	-.05	-.01	-.03
8. Take Out Meals in Past Week (Q6)	.02	-.08	.02	-.08	-.01	.04	.07	.16*
9. Frequency of Child Eating Watching TV (Q25)	.09	.18**	.02	.21**	-.15*	-.15*	-.10	-.08
10. Frequency of TV Being on During Meals (Q30)	-.05	.03	.00	.02	-.02	-.02	-.09	-.05

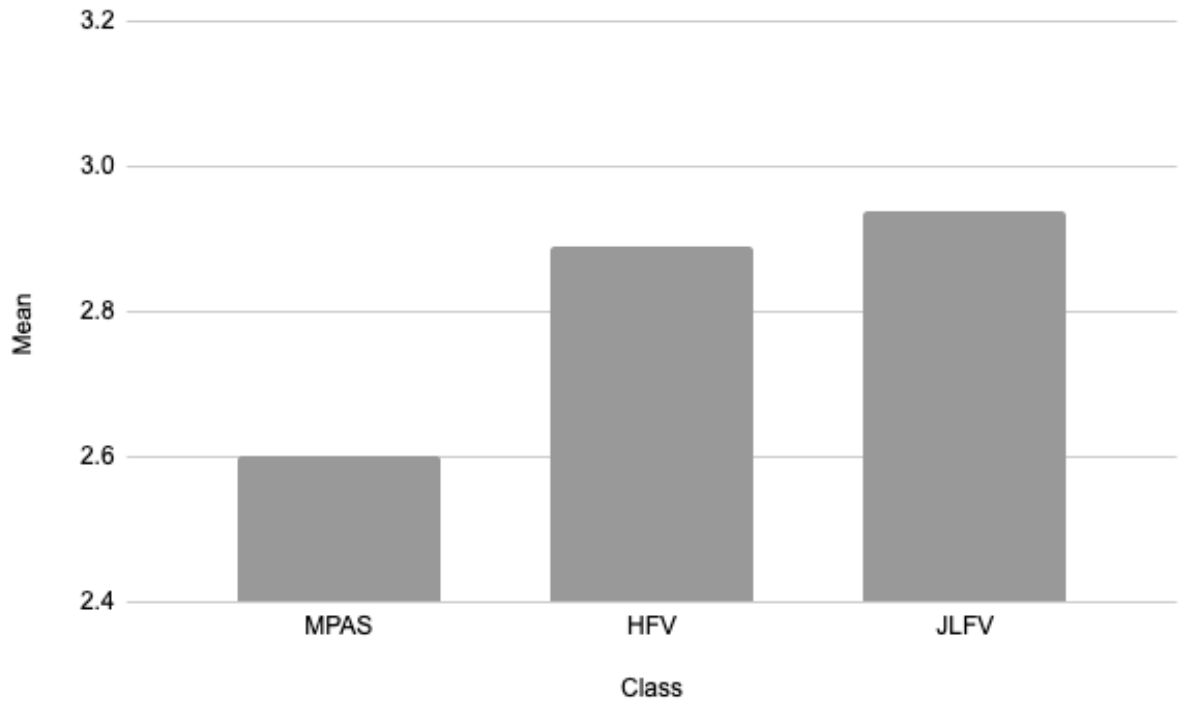
Notes. \*\*  $p < .01$ , \*  $p < .05$ , <sup>†</sup>  $p < .10$ .

## Figures

**Figure 1:** Conceptual Diagram of the Components of the Home Food Environment Examined in the Current Thesis



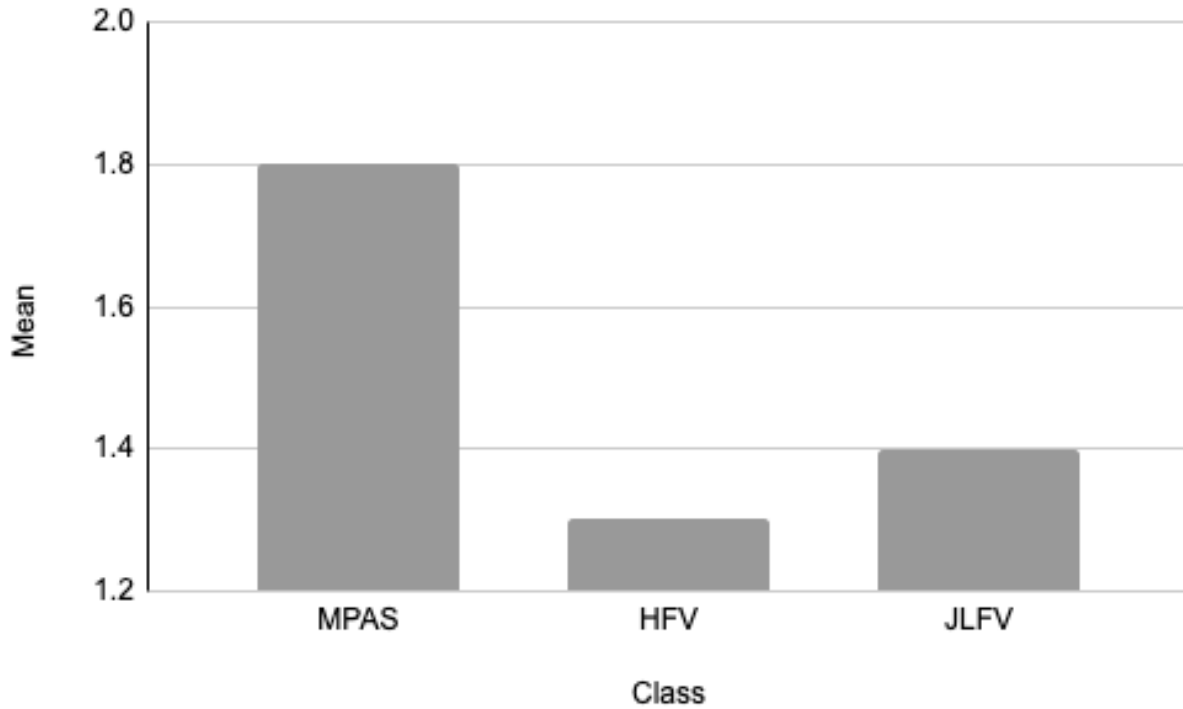
**Figure 2:** Mean of time and priority subscale of family meals during infancy in association to toddler dietary class.



*Note.* Example question from Time and Priority Subscale, “It is difficult to find time for a family meal [reverse scored]” from the Family Meals and TV survey.



**Figure 3:** Mean of frequency of restaurant meals during infancy in association to toddler dietary class.



*Note.* Parents' responses to "In the past week, how many times did your baby eat restaurant food at a restaurant?" from the Family Meals and TV survey.

# Sara Masker

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## EDUCATION

### **Bachelor of Science in Nutrition and Dietetics**

*The Pennsylvania State University, University Park, PA  
The Schreyer Honors College*

**Expected May 2023**

## NUTRITION RELATED EXPERIENCE

### **Center for Childhood Obesity Research – Undergraduate Research Assistant**

**Fall 2021- Present**

- Assist with ongoing research projects and launch individual research project for Honors Thesis.
- Train participants on how to use the provided mobile devices for ongoing research study.
- Participate in data entry and data collection, conduct literature reviews, and attend team meetings.

### **Camp Setebaid – Student Dietitian**

**July 2022**

- Improved nutrition care for campers with Type 1 diabetes.
- Practiced food safety when preparing and serving meals and snacks.
- Provided guidance to campers in counting carbohydrates before meals and offered substitutions when necessary.
- Created and presented a nutrition education lesson to campers.

### **ShopRite of West Milford – Summer Nutrition Intern**

**May-June 2022**

- Contributed to nutrition education presentations for various groups within the community.
- Led product demonstrations in the store, observed nutrition counseling sessions, discussed webinars, helped prepare recipes and food for health fairs.
- Communicated with other Dietitians, Dietetic interns, and ShopRite associates.

## WORK RELATED EXPERIENCE

### **The Graduate Hotel – Banquet Server/Waitress**

**Present**

- Provide outstanding guest experience by being attentive to guest needs and working with banquet team.

## VOLUNTEER EXPERIENCE

### **Center for Food Action**

**May – June 2021**

- Organized food donations, packed CFA grocery boxes, and helped with distribution to families.

## MEMBERSHIPS

Student Nutrition Association

Academy of Nutrition and Dietetics Student Member

## HONORS

Lane Honors Scholarship

Dean's List: Fall 2019, Spring 2020, Fall 2020, Spring 2021, Spring 2022, Fall 2022

Discover Penn State Award

The President's Freshman Award

## CERTIFICATIONS

ServSafe Food Protection Manager 2022-2027

CITI Human Subjects Research Certificate

CITI Responsible Conduct of Research Certificate

RAMP Server/Seller Training Certificate 2022-2024