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Quality Over Quantity: Positive Interactions During Family Meals In Food-Insecure Households Compensate For The Negative Impacts Of Household Chaos On Child Emotional Well-Being, But Not Diet Quality

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QUALITY OVER QUANTITY:
POSITIVE INTERACTIONS DURING FAMILY MEALS IN FOOD-INSECURE
HOUSEHOLDS COMPENSATE FOR THE NEGATIVE IMPACTS OF HOUSEHOLD
CHAOS ON CHILD EMOTIONAL WELL-BEING,
BUT NOT DIET QUALITY

by

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DEDICATION

I dedicate this research to my family. Thank you all for loving me so much and for being my inspiration to pursue this degree. Mommy, thank you so much for your example of faith, strength, dedication, and perseverance. I could not have completed this journey without you. I love you and will miss you. I cannot wait to see you again in Heaven! To Jake, I love you dearly and wish that you could be here to celebrate with me. To my grandparents, thank you for your prayers, love, and support. Granny, I miss you so much and thank you for always encouraging me, no matter how difficult the path grew.

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ABSTRACT

Family meals are important family activities that have many positive nutritional and emotional benefits for children. Positive family meal experiences may provide opportunities for children to strengthen emotional bonds, leading to a sense of security and, fostering improved children's self-regulation of healthier food intake and emotional well-being. Unfortunately, children in food insecure households experience higher amounts of chaos, lower diet quality, and worry about having enough to eat compared to children in food-secure households, all of which may affect both family meal frequency and interpersonal quality. Yet, the relationships between food insecurity, household chaos, and family meal frequency and interpersonal quality are not well understood. Thus, there were two aims for this dissertation study. First, to better understand relationships between household chaos and the regularity and quality of mealtime interactions for food insecure households. Second, to examine the associations between household chaos, the family meal experience (construction, frequency, and mealtime interactions), and child diet quality and perceptions of food insecurity for children living in food insecure households. The first study aim was accomplished by conducting semi-structured interviews about daily activities and family meals with 20 ethnically diverse parent-child (9-15 y) dyads living in food-insecure households in South Carolina. Interviews were recorded and transcribed verbatim. Data were analyzed using a grounded theory approach involving the constant comparative method with Nvivo 10 qualitative

data analysis software. The qualitative study results were used to refine the research questions and analysis for the second study aim. For the second aim, data from the Midlands Family Study and the Family Mealtime Study that contained surveys from 132 ethnically diverse caregiver-child (8-15 y) dyads living in food insecure households in South Carolina were used. The data also included a 24-hour recall from the children. Data were analyzed using a multiple mediator model, testing the family meal experience as mediators between household chaos and child outcomes, using STATA 13. Study one revealed that household chaos negatively impacts the construction and frequency of family meals, along with the mealtime interactions. Household chaos also indirectly impacted mealtime interactions through the strength of the interpersonal relationships. Families with poorer interpersonal relationships allowed chaos to negatively affect their mealtime interactions, whereas those with stronger interpersonal relationships sought meaningful interactions despite the chaos. In the second study, household chaos was significantly associated with child diet quality, even with the addition of the mediators. For child worry about food, the family meal experience did significantly mediate this relationship, with high quality mealtime interactions reducing child worry about food. However, television usage during meals was significantly associated with increased child worry about food. Understanding family meal experiences of children in food-insecure households highlights the importance of interpersonal relationships and regular positive mealtime interactions that may strengthen emotional connections in families to improve child health outcomes. The findings of this study also highlight the need for helping families reduce chaos for improved family functioning.

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CHAPTER 1

INTRODUCTION

Family meals are important opportunities to promote children's health and well-being. The family meal is associated with an improved physical and social development for children.¹⁻⁷ Children in families with regular family meals consume more fruits and vegetables, less sugar-sweetened beverages, and have a lower BMI than their peers who do not participate in regular family meals.⁸⁻¹² There is also evidence that these nutrition-related outcomes may persist into adulthood.^{10,13,14} Additionally, family meals often serve multiple purposes besides being a mechanism for eating, including emotional bonding and allowing for communication about chores, happenings and schedules or other family-related routines.¹⁵

Because family meals are important for child health and well-being, increasing understanding of factors that impact the frequency and quality of family meals and the impact this may have on child outcomes is imperative. The frequency and quality of family meals can differ among households for many reasons, including the experience of household food insecurity.¹⁶ Food insecurity refers to disruptions in the quality and quantity of the household food supply due to lack of financial or other resources. In 2014, 19.2% of U.S. households with children experienced food insecurity at some time in the previous 12-months, with a much higher prevalence for African-American households (26.1%) and Hispanic households (22.4%).¹⁷ The reported frequency of family meals in

food-insecure and minority households is often lower than that of food-secure and non-Hispanic white households,^{13,18} but it is unclear how food insecurity influences the frequency and interpersonal quality of family meals.⁸

When examining how household food insecurity impacts family meals and ultimately child outcomes, it is important to understand how food insecurity is experienced among different members of the household. Prior research has revealed that food insecurity is not experienced uniformly across all family members within a household, and that children are aware of their family's food insecurity, even if parents try to conceal their struggles.^{19,20} Many measures of food security are conducted at the household level and do not account for child perceptions or experiences, but children are often aware of their family's food insecurity. Children's awareness of food insecurity spans across three domains: cognitive, emotional, and physical.²⁰ Cognitive awareness of food security includes knowledge of changes in food quality and/or quantity and understanding the causes of food insecurity (e.g., a parent not working).²⁰⁻²² Emotional awareness includes feelings like worry, sadness, anger when experiencing changes in food quality and quantity.^{20,21} Feelings of hunger, pain, weakness, and fatigue are all ways children might physically be aware of food insecurity.²⁰⁻²²

A number of factors can impact family meals in food-insecure households. Specifically, household chaos, defined as homes exhibiting "unpredictable, non-routine, inconsistent, and non-contingent physical and social surroundings"²³ may disrupt family meal frequency and quality. Household chaos is conceptualized along two primary

dimensions, turbulence or instability (e.g., changes in households or caregivers or predictability of routines) and disorder (e.g., high levels of ambient noise, clutter, lack of structure and routine, excessive crowding, or changes in the household size and composition).^{24,25} Chaos in food-insecure households can come from multiple environmental influences, such as lack of routine and high unpredictability deriving from parent work schedules or reliance on public transportation.^{26,27} Although chaos is common in many home environments, with families pressed for time due to multiple work, school, and life demands, low-income households are more likely to face chaotic living conditions that can affect child development in multiple ways, including negative behavior and socioemotional adjustment.^{23,28-30} Chaos in food-insecure households can come from multiple environmental influences, such as lack of routine and high unpredictability deriving from parent work schedules, experiencing food shortages, and altered routines for both parents and children, including children assuming adult responsibilities (e.g., caring for siblings) or activities to acquire and manage food resources.^{26,27,31} Chaos can inhibit healthy emotional and psychological development among children, with greater household chaos leading to a reduced ability of children to self-regulate their emotions and behavior along with other developmental problems.^{32,33} Household chaos may also affect the frequency of these meals, and other aspects of organizing the family meal, such as parents using lower quality convenience foods as a way to cope with the demands of work, school, and family life.^{34,35}

While eating together as a family has been shown to be beneficial for children, the processes through which family meals yield positive benefits for children are unclear.

The quality of these mealtime interactions may be a factor in how family meals improve child health.^{36,37} Family meals provide children with structure, routine, and an opportunity for emotional connections.³⁶⁻³⁸ Positive mealtime interactions are associated with healthy child BMI, and positive parent-child interactions may buffer the negative impacts of poverty on child emotional well-being.^{37,39,40} Positive family meal experiences may provide opportunities for children to strengthen emotional bonds, leading to family unity, connectedness, and a greater sense of security, all of which foster improved self-regulation of healthier food intake in children and emotional stability.^{6,7,37,40,41} For families experiencing higher levels of household chaos, these mealtime interactions are often more negative and coupled with reduced parental warmth and responsiveness.^{15,33,42,43}

Experiencing food insecurity may disrupt family functioning by increasing household chaos, leading to reduced family meals and possibly affecting interpersonal dynamics during these mealtimes. Furthermore, it is unclear if the nutritional and emotional benefits of family meals hold true for children in food-insecure households. A better understanding of relationships between food insecurity, household chaos, family meals, and child outcomes is important to develop approaches for use in conjunction with food assistance to help families achieve long-term food security and healthy family functioning for the promotion of optimal outcomes in children. **The purpose of this study is therefore to understand how food-insecure caregivers and their children value, construct, and experience family meals and how household chaos is associated with the family meal experience and child diet quality, and child worry about food.**

Using a mixed-methods study design, the study purpose was accomplished through the following specific aims:

Specific Aim 1: To qualitatively investigate how family meals are valued, constructed, and experienced (e.g., affective and evaluative) by caregivers and their children living in food-insecure households and the role of household chaos in shaping these constructions and experiences.

The research questions guiding the study were:

1. What importance or value do caregivers and their children living in food-insecure households place on family meals?
2. How are family meals constructed from the perspective of caregivers and their children living in food-insecure households?
 - a. How frequently do caregivers and their children living in food-insecure households report having family meals?
 - b. How do caregivers and their children living in food-insecure households describe the quality of their family meals (e.g., how much time physically spent together, communication, parenting strategies, types of food)?
3. How does household chaos (e.g., lack of structure, disruptions to routine, ambient noise, frenetic activity) influence the construction of family meals from the perspective of caregivers and their children living in food-insecure households?
4. How do caregivers and their children living in food-insecure households describe their experiences with family meals?
 - a. What is their affective experience (e.g., emotional) of family meals?

- b. How do they evaluate their family meal experiences (e.g., success/failure)?
5. How do caregivers' perceptions of family meals compare with their children's perceptions?

Specific Aim 1 Methods

In order to answer the proposed research questions, twenty caregivers and a focal-child were interviewed separately about their experiences with family meals, household chaos, and food insecurity. The children in the study were between the ages of nine and fifteen. All participants were food-insecure. The caregiver interviews took approximately one hour long, and the child interviews were about 30 minutes long. Using a Grounded Theory approach⁴⁴, the data were analyzed using open, axial, and selective coding in NVivo 10 qualitative data analysis software. STATA 13⁴⁵ was used to calculate descriptive statistics of responses provided on the demographics questionnaire. Results from this study were used to refine the specific aim and research questions for study two. The analytic models were also refined to include insights from the results of this study. The manuscript describing study results is located in chapter four, section one.

Specific Aim 2: To examine relationships between household chaos, the family meal experience, and child outcomes of diet quality (healthy eating index) and worry about food. The family meal experience was conceptualized as: Construction (meal planning and use of convenience foods), frequency, and interactions (including television usage during meals).

Research questions:

1. How is household chaos associated with the family meal experience (construction, frequency, and interactions), diet quality, and worry about food for children living in food-insecure households?

Hypothesis 1.1. For food-insecure households with high levels of household chaos, we hypothesize that:

- a. Caregivers will report less meal planning.
 - b. Caregivers will report using convenience foods more often.
 - c. Caregivers will report fewer family meals.
 - d. Caregivers will report lower quality interactions during family meals.
 - e. Caregivers will report higher frequency of television watching during family meals.
 - f. Child diet quality will be lower.
 - g. Children will report more worry about food.
2. How does the association between household chaos, the family meal experience (construction, frequency, and interactions), affect child diet quality among children in food-insecure households?

Hypothesis 2.2. We hypothesize that the family meal experience will mediate the relationship between household chaos and child diet quality and child worry about food.

Figures 3.2, 3.3, and 3.4. describe the hypothesized relationships between independent variables, mediators, and dependent variables.

Specific Aim 2 Methods

The second aim was accomplished using existing data from the Midlands Family Study⁴⁶ and the Family Mealtime Study⁴⁷. The dataset contained items about family meal frequency, the interpersonal quality of family meals, household chaos, and caregiver use of convenience foods. There were also child measures of diet quality and worry about food. The children in this study were between the ages of eight and fifteen and all respondents lived in food-insecure households. Complete data was available for a total sample of 132 caregiver-child dyads. The data were analyzed as a multiple mediator model using the binary mediation macros in Stata 13.⁴⁵ The first outcome of interest was the association between household chaos and child diet quality, with the construction of family meals (meal planning and caregiver use of convenience foods), family meal frequency, and mealtime interactions (interpersonal quality of family meals and television usage during meals) modeled as the mediators. The second outcome of interest was the association between household chaos and child worry about food, with the above mediators as well. The manuscript describing study results is located in chapter four, section two.

Preview

The next chapter (chapter 2) includes a review of the literature on food insecurity, chaos, family meals, and child health and identifies important gaps in this literature. The third chapter, “Research Design and Methods” details the methodology used to achieve the study aims. The fourth chapter contains the study results in two manuscripts. The manuscript for specific aim #1 was prepared for submission to *Appetite* and the

manuscript for specific aim #2 was prepared for submission to *Pediatrics*. The fifth, and final chapter, summarizes the study results and presents a discussion about the research and its implications for future research and practice.

CHAPTER 2

BACKGROUND AND SIGNIFICANCE

Family Meals – Frequency and Quality

Eating together as a family has many positive benefits for children, such as improved emotional well-being, reduced depressive symptoms, and improved nutrition.^{6,7} By eating together, families can bond, developing family unity, connectedness, and stability.⁴⁸ The family meal is an important influence on child diet quality and other developmental outcomes, with regular family meals being associated with an improved physical and social development for the children in the family.¹⁻⁵ Higher frequency of family meals has also been linked improved diet quality through mechanisms such as reduced snacking behaviors and reduced disordered eating behaviors, and is also associated with healthier weight among children and adolescents.^{13,14,49,50} There is evidence indicating that these positive outcomes may persist into adulthood.^{10,13,14}

Additionally, family activities, such as family meals, often serve multiple purposes. Family meals support the opportunity for bonding as a family and allow for communication about chores, family member schedules or other family-related routines.^{15,43} Consequences of not having regular family meals include increased television watching, reduced fruit and vegetable consumption, and a reduction in the

ability to self-regulate energy intake, which has been linked to increased body fat and excess weight gain.^{7,51}

It has been posited that family meals work through two mechanisms to improve child development: organizational structures and emotional connections.³⁶⁻³⁸ The organization involved in planning a family meal can encompass meal planning, assignment of roles, behavior and attendance expectations, and the regularity of the routine itself.^{52,53} Most research on the benefits of family meals have focused on the benefits of *frequent* family meals,^{52,54,55} with little focus on the contextual factor that may explain why this family activity is so important. However, having a routine is not sufficient enough to make this time together beneficial, there also need to be positive emotional connections made during the meal.⁵⁶⁻⁵⁸ Strong emotional connections, particularly during mealtimes, can build a supportive environment for self-regulation of behavior and emotions while increasing a sense of security for children. These connections have also been associated with lower obesity risk for children and adolescents.^{36,59,60}

The quality of family meal interactions can be determined across three domains: communication, amount of control over eating behaviors exerted by the parent, and amount of activity level and distractions during the meal.⁴³ Clear and direct communication has been associated with positive child health outcomes. Positive communication experiences during the family meal can be related to the meal itself, various practical aspects of daily life, or involve expression of genuine concern about

other's ideas and feelings.^{43,61} Also the forms of communication, positive or negative, can directly impact both the family meal experience and child health, with negative forms of communication possibly leading to tension and arguments during the meal.^{39,43,62}

Another aspect of family meal quality is the amount of activity or distraction evident during the family meal itself. Distractions can be due to a parent frequently leaving the table to retrieve items from the kitchen, behavioral problems, talking on the telephone, watching television or using other electronics during the meal.^{43,63} These behaviors can influence the amount and types of communication experienced during the meal, and can reduced connectedness during this shared family activity.

Eating in front of electronic devices leads to reduced monitoring of actual food intake which may lead to increased consumption of food.^{7,64} Also, distracted eating during meals is associated with an increase in consumption of low nutrient, calorically dense foods and reduced consumption of vegetables during meal times.⁶³ Additionally, eating with distractions such as television or sporting events can lead to orosensory signals of satiety from being ignored and actual satiety being delayed, leading to increased caloric consumption.^{51,64}

The reported frequency of family meals in food-insecure households is often lower than that of food-secure households, but is the mechanisms underlying these relationships is unclear.¹⁸ One possible mechanism to explain the lower frequency of

family meals in food-insecure households is that these families are also vulnerable to high levels of household chaos that disrupt family routines, including family meals.

Food Insecurity in the United States

Experiencing food insecurity can lead to several negative health outcomes for children and their caregivers. Many households in the United States struggle with having enough food to eat, an experience termed, “food insecurity”. Food insecurity is defined as, “limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire food in socially acceptable ways”.⁶⁵ Food insecurity can be dynamic, with families’ food security status shifting over time. The United States Department of Agriculture’s U.S. Household Food Security Scale (U.S. HFSS) measures household food insecurity that arises from lack of financial resources to purchase food.⁶⁶ The U.S. HFSS classifies food insecurity into two categories: Low food-security and very low food-security.⁶⁶ Low food-security households (LFS) typically have problems with food access, but rarely experience reduced food consumption among its members. Very low food-security households (VLFS) experience not only food access issues, but also disruption in eating patterns and reduced food intake among its members.

Household food insecurity affects many Americans, yet often goes unnoticed because those affected may not present with traditional symptoms of malnourishment. In 2014, 14.0% of U.S. households experienced food insecurity at some point in the year.⁶⁶ Compared to the national rate, the prevalence of food insecurity was higher for: households with children (19.2%), single female-headed households (35.3%), single

male-headed households (21.7%), households headed by non-Hispanic Blacks (26.1%), and Hispanics (22.4%). Food-insecurity is also strongly associated with income, with low-income households experiencing higher rates of food insecurity. In about 9% of U.S. households, some level of food insecurity was reported for both children and adults. High rates of food insecurity in a country that produces more than ample quantities of food to feed its citizens is unacceptable. Reducing food insecurity has been set as a national priority and is a part of the Healthy People 2020 objectives.⁶⁷ The goal is to reduce household food insecurity to 6% and very low food security among children to 0.2% from 2008 baseline levels of 14.6% and 1.3%, respectively.

Measuring Food Insecurity

In the U.S., household food security status is measured using different scales and tools.⁶⁸ The United States Department of Agriculture (USDA) uses an 18-item household food security module to assess food security across multiple dimensions of food deprivation.⁶⁹ The dimensions included: psychological consequences of food insecurity; reductions in quality, variability, and desirability; and frequency of reductions in food intake for adults or children. The questions are framed to assess food security over the past twelve months and are asked of one adult in the household. The questions are divided into three sections, with a set of questions for the household, the adults in the household, and the children in the household. Some of the questions follow a yes/no response format, with a follow-up question to clarify the frequency of events (e.g. “almost every month”, “some months but not every month”, “only 1 or 2 months”). Most of the question responses are on a scale ranging from “Never true” to “Often true”.

Responses of “yes,” “often true,” “sometimes true,” “almost every month,” and “some months but not every month” are coded as affirmative. These affirmative responses are summed to create a raw score. For households with children, a raw score of three indicates food insecurity and a score of six indicates very low food security (also known as child hunger). To reduce respondent burden and to accommodate surveys that do not have adequate space, the National Center for Health Statistics recommended reducing the scale to six items.⁶⁹ The revised scale does not include a separate set of questions to measure food insecurity among children, and has been criticized for failure to detect severe forms of food insecurity.⁶⁸

The 18-item scale has been criticized for overestimating child hunger among households with dependents under age five, and for underestimating child hunger among households with children between six and seventeen.⁷⁰ Nord and Bickel⁷¹ proposed the Children’s Food Security Scale (CFSS) to overcome this problem. The CFSS consists of the eight child referenced items from the USDA scale. The questions are targeted towards parents and caregivers without any questions for the children to answer.

At times, some researchers may use a limited set of questions to assess food security. When a limited set of questions are used and participants affirm problems with having enough to eat, they are categorized as “food insufficient”.⁷² The use of one question to assess problems with having enough to eat has been used in several studies,^{73–75} and the use of one item has also proved to be a valid way of determining if a family has any problems with food access.^{72,76}

Having measures of child food security status that are only answered by adults in the household may provide misleading data because the measures assume that children experience the same problems and challenges with food insecurity.⁷⁰ Furthermore, these measures have only developed and pilot tested with adults and the final measures revised for the lower literacy of children. Parent responses to questions about child food security may not reflect the actual experiences of the child. Prior research has revealed that food insecurity is not experienced uniformly across all family members within a household, and that children are aware of their family's food insecurity.^{19,20} Parents may report that their child does not experience hunger or worry about food but the child may actually have these experiences. Many measures of food security are conducted at the household level and do not account for child perceptions or experiences. Children are aware of their family's food insecurity, with this awareness spanning across three domains: cognitive, emotional, and physical.²⁰ Cognitive awareness of food security includes knowledge of changes in food quality and/or quantity and understanding the causes of food insecurity (e.g., a parent not working).²⁰⁻²² Emotional awareness includes feelings like worry, sadness, anger when experiencing changes in food quality and quantity.^{20,21} Feelings of hunger, pain, weakness, and fatigue are all ways children might physically be aware of food insecurity.²⁰⁻²² Sometimes in response to food insecurity, children may employ strategies to extend the household's resources (e.g., saving food, eating at another house, and working to give money to parents).^{20,21}

There have been some attempts to measure food insecurity among children. One measure, the Child Food Security Survey Module (CFSSM) was developed from the Household Food Security Survey module by Connell and colleagues.²¹ This module was developed for use in children ages twelve to seventeen. By creating a child assessment based on questions that were designed for adults, the developers assume that children experiences of food insecurity are the same as adults. To alleviate this problem, Fram and colleagues¹⁹ developed an assessment with nine questions across two domains (awareness and responsibility) and six subdomains. The subdomains were cognitive, emotional, physical, participation, initiation, generation, and were established based on prior interviews with children at risk for food insecurity.²⁰ The assessment questions were cognitively tested and tested for accuracy. Children reported their food insecurity with high accuracy in four of the six domains (cognitive, emotional, physical, and initiation).

Food Insecurity and Child Health

The prevalence of food insecurity among households is of concern because children raised in food-insecure household face a myriad of disadvantages and negative outcomes throughout childhood. There is even evidence to suggest that these negative outcomes can begin in infancy and early childhood, with children in food-insecure homes experiencing poorer health status, more chronic illnesses, and hospitalizations.⁷⁷⁻⁸⁰ Children in food-insecure households also experience more frequent headaches, stomachaches, and colds.⁷³ Living in food-insecure household has also been linked to increased body mass index (BMI) among children, but the data are inconsistent.⁸¹⁻⁸³

In addition to the negative physical health outcomes associated with growing up in a food-insecure household, children in these households also face challenges with cognitive and socioemotional development, along with academic achievement. Children who grow up in impoverished and food-insecure households are more likely to experience internalizing (e.g., anxiety, fear, feelings of worthlessness) and externalizing (e.g., cheating, lying, arguing, or bullying) problems when compared to children in food secure households.^{78,84} Children in food-insecure homes often face more stressful, traumatic, and negative life events than their food secure counterparts.^{78,85} It is the accumulation and increased exposures of these negative life experiences that hinder socioemotional development, and increase the odds of children experiencing depression and anxiety.^{78,85,86} This accumulation of stress can also impact parent-child interactions, reduce parental responsiveness to a child's emotional needs and reduce instrumental support for a child's cognitive developmental needs.^{40,87-89}

As for cognitive development and academic achievement, children in food-insecure households tend to fare worse than their food secure counterparts, even when accounting for income, parental education, and the home environment.^{79,82,90-93} Food insecurity is also associated with iron-deficiency, which in turn leads to attention and memory problems, impaired motor development, and low energy levels.^{73,94-97} Children growing up in food-insecure households generally fare worse on standardized tests,⁸² are more likely to be in special education classes, and have a higher likelihood of repeating a grade.^{98,99} Also, children in food-insecure households are more likely to miss school, have difficulty participating in academic activities, and even have more difficulty getting

along with peers.^{79,90,100} Low-income mothers are also less likely to set high and appropriate developmental goals for their children and engage their children in competency building activities, resulting in poorer self-regulation and less academic and psychosocial competence.¹⁰¹

There appears to be a reciprocal relationship between physical health, socioemotional health, and cognitive development.⁷⁴ Experiencing food insecurity is a stressor in itself, and the additional stressor that accompany it can lead to poorer physical health, both in the short- and long-term, even when accounting for upward social mobility.⁴⁰ In addition to the physiological effects of stress on the body, chronic stress (and the actual stressors) can also lead to adverse coping mechanisms and behaviors that negatively impact health.^{102,103} Poorer physical health has also been linked to socioemotional problems as well.^{104,105} Academic achievement is affected by one's ability to regulate emotions and focus attention,¹⁰⁶ with children experiencing depression and difficulty controlling their emotions more likely to suffer academically.¹⁰⁷⁻¹¹⁰ Poor school performance has also been linked to the frequency and severity of socioemotional problems.¹¹¹

Child Health: Diet Quality

Another component of child health that is affected by household income and food security status is child diet quality.⁷ Diet quality refers to the nutritional quality and variety of foods a person consumes.¹¹² Diet quality measures allow for eating patterns to be scored and compared to national dietary guidelines. Child diet quality has both short-

and long-term physical health consequences, such as weight regulation and chronic disease risk.¹¹³ One way diet quality is measured is by using an assessment tool known as the Healthy Eating Index (HEI).¹¹⁴ Originally developed in 1995, this index takes into account all foods a person consumes, and scores them according to healthfulness based on the United States Department of Agriculture's Food Guide Pyramid. The index was also updated and tested for validity in 2005 (HEI-2005)^{115,116} and 2010 (HEI-2010)¹¹⁷. The HEI-2010 has been updated to reflect the 2010 Dietary Guidelines for Americans. To calculate HEI, foods are divided into twelve categories (originally ten categories), with each category receiving a score. These scores are then summed, and can range from zero to 100, with zero being the worse and 100 being the best possible score. HEI scores can be classified into three categories: good (score of 81 to 100), needs improvement (score of 52 to 81), and bad (score of 51 or below).

When examining the diet quality of children in the United States, most do not meet the recommended guidelines for fruit and vegetable intake and exceed the recommendations for added sugar intake.¹¹⁸⁻¹²⁰ Current fruit and vegetable recommendations for children range from one to two cups of fruit and one to three cups. However, an analysis of child diet from 2003 to 2010 using data from National Health and Nutrition Examination revealed that while fruit consumption increased, 60% of children did not meet the fruit recommendations and 93% did not meet the vegetable recommendations.¹²¹ In this sample, the average intake of fruit was 0.62 cup equivalents per 1,000 kilocalories and 0.53 cup equivalents per 1,000 kilocalories for vegetables. While fruit and vegetable intake may be low for the majority of children in the U.S.,

consumption of added sugar has increased over many years.¹²² Sources of excess sugar included soft drinks and juices, and higher consumption of these foods is associated with consumption of micronutrient-poor foods. There are also inverse associations between excess sugar sweetened beverages and dairy consumption among children under age five.¹²³ Excess sugar consumption is not only related to current diet quality, but is also associated with childhood obesity.^{124,125} This may be in part be due to the fact that consumption of these drinks is not as satisfying as actual food with similar energy density.¹²⁶ Since these drinks do not satisfy like other foods, children are more likely to consume more food to satisfy their hunger, and in turn, consumer a higher amount of calories.³

Although parents may try to shield their children from nutritional deficits, these disparate nutritional outcomes among children in food-insecure households still persist.^{127,128} Low-income children have lower HEI scores than higher income children for many reasons, including higher consumption of more energy-dense, nutrient-poor (EDNP) foods along with fewer fruits and vegetables.¹²⁸⁻¹³⁴ Food-insecure children also consume more fast food, more dietary fat, fewer family meals and breakfasts than their food secure counterparts.^{13,18}

Household Chaos

Household chaos, defined as homes exhibiting “unpredictable, non-routine, inconsistent, and non-contingent physical and social surroundings,”²³ is conceptualized along two primary dimensions, turbulence or instability (e.g., changes in households or

caregivers or predictability of routines) and disorder (e.g., high levels of ambient noise, clutter, lack of structure and routine, excessive crowding, or changes in the household size and composition).^{24,25} In order to cultivate sustained, healthy development, children need structured, predictable, and constant interactions with persons, tools (e.g., written language or methods for memorization¹³⁵), and symbols (e.g. language or diagrams¹³⁵) in the immediate environment.^{32,136,137} The frenetic activity, lack of structure, ambient noise, and predictability of routines in homes with chaos can interfere with these meaningful interactions. Chaos in food-insecure households can come from multiple environmental influences, such as lack of routine and high unpredictability deriving from parent work schedules or reliance on public transportation.^{26,27} Additionally, low-income and minority families, who have higher rates of food insecurity, are also more likely to reside in more crowded, noisy, and suboptimal living conditions leading to unpredictable events and high levels of distractions.^{138,139}

The study of chaos as an environmental contributor to child development stems from work by Bronfenbrenner and Crouter that aimed to understand multi-level and multidimensional aspects of a child's environment.¹⁴⁰ With this environmental approach to studying child development came a focus on the physical microenvironment, or the settings in which caregiver-child interactions occur.¹⁴¹⁻¹⁴⁵ When these environments are wrought with noise, crowding, and traffic (people coming and going in the home), the development and sustainability of proximal processes necessary for proper bonding and growth are often shortened or interrupted. The intensity of these proximal processes may also be negatively impacted by the stress and fatigue that results from parents and

caregivers having to contend with high amounts of chaos. These environmental factors can also affect parent behaviors, such as reducing warmth and responsiveness, increasing caregiver fatigue, and harsher parent-child interactions.^{42,144,146} Household chaos is likely to lead to negative child outcomes through multiple pathways, some of which are described below.

Measuring Chaos

Early measurement of household chaos in the physical micro-environment typically occurs through resource intensive multiple direct observations by researchers. In order to provide a lower-cost but still accurate measure of chaos in homes, Matheny, Thoben, and Wilson created a measure entitled, the ‘Chaos, Hubbub, and Order, Scale’.¹⁴⁷ The measure was developed to augment direct observations of certain aspects of the home environment in the Louisville Twin Study.

The CHAOS measure focuses on noise and confusion within the home environment and its questions were developed in a two-phase process. The first phase involved extracting content from narratives about chaotic households that were written by an experienced staff member. Other potential items were developed by querying staff members about features of chaotic homes. These two processes yielded 30 items. In the second phase, items were removed if they seemed to reflect negatively on participants’ physical home condition, quality of possessions, and sanitation. The items were then reworded to include common vernacular terms and to be applicable to all households with children, regardless of their ages. Through the second phase, the items were reduced

to fifteen yes/no statements for parents to answer. Seven of the fifteen items are reversed coded, and all items are summed to give households a score. Example statements include, “Our home is a real zoo” and “We almost always seemed to be rushed.” The measure had satisfactory internal consistency ($\alpha=0.79$) and test-retest reliability ($\alpha=0.74$) among parents of infants and toddlers.¹⁴⁶ The measure was also psychometrically tested by Dumas et al.³³ and had satisfactory internal consistency with mothers of preschoolers ($\alpha=0.83$) and caregivers of elementary-aged, minority students ($\alpha=0.81$). Over time, the measure has been adapted to a shortened to a six-item version with Likert scale responses.^{42,148–152}

How Chaos Impacts Family Functioning

Household chaos can inhibit healthy psychological development among children, with greater household chaos being associated to a reduced ability of children to self-regulate their behavior and other developmental problems.³² The mechanisms linking household chaos to child development likely involve reactions to stress and demands that cause parents to become less responsive to the needs of their children and increase tensions within the home.^{65,87,153} Family meals are associated with healthy child development, so frequency of these events is often used as a marker of family functioning and a venue through which to deliver positive parenting or child feeding interventions. The reported frequency of family meals in food-insecure households is often lower than that of food-secure households,¹⁸ but it is unclear how household chaos might influence family meal frequency. It is likely that typical family events, like family meals are negatively impacted by household chaos.

Household chaos is thought to impact family functioning in three ways: (1) Construction of family time; (2) frequency and disruption of family activities; and (3) the meaning created out of disruptions or irregular activities.¹⁵ Within a family there may be varying schedules or demands that can impact the frequency and quality of time spent together. Household chaos can also affect the frequency of family activities or create adverse conditions for families to accomplish their shared activities. As a way to cope with lack of routine deriving from parent work schedules, children may take upon more responsibilities in the home, including meal preparation, resulting in more use of low nutrient, high calorie, quick prep and convenience foods.^{26,27} Chaos may also affect other aspects of organizing the family meal, such as parents using convenience foods as a way to cope with the demands of work, school, and family life.^{34,35} Use of convenience foods may also impact child diet quality.^{34,35} High levels of ambient noise, such as a television playing during meals has been associated with a decrease in diet quality.⁶³ When scheduled family activities are interrupted or their frequency reduced due to chaos, feelings of powerlessness and lack of control result.^{15,154} All of these responses to household chaos are likely to have negative impacts on the frequency of family meals, which may exacerbate the impacts of household chaos on healthy child development.

Contributors to Family Meal Construction – Food Choice Coping Strategies

One component of the family meal experience that can be influenced by both chaos and food security status is how caregivers cope with their work and family demands when trying to provide meals for the family.¹⁵⁵ These food choice coping strategies^{34,35} involve choices about foods and meal preparation that reflect individual

agency and behavioral contexts for those choices. The four overarching food choice coping strategies are: meal planning, speeding up meals, individualized meals, or missing meals.^{34,35} Meal planning involves planning meals around work and family schedules. The amount of meal planning can vary by household, with some caregivers thoroughly planning meals while others choosing to address dinner when the time arises.¹⁵⁶ Speeding up meals includes the use of quick preparation, boxed, or convenience foods. Using convenience foods are ways caregivers can reduce the amount of time needed for preparing meals, but can be more expensive.¹⁵⁷ Individualizing meals involves use of fast food restaurants, cooking multiple food items to cater to multiple people (e.g. short-order cooking), and distracted eating away from the family table. Missing meals reflects the frequency of missing family meals due to work or other schedule conflicts. Food-insecure families might use these coping strategies more frequently to manage chaotic schedules or deal with food shortages.¹⁵⁸⁻¹⁶⁰ Meal planning has been associated with an overall healthy diet, whereas the other three coping strategies involve increased frequency in behaviors that are associated with poor diet quality, including reduced consumption of fruits and vegetables and increased percentages of kilocalories from fat.^{34,35} Meal planning and speeding up meals strategies are of particular interest because they have the potential to influence the frequency and nutritional quality of shared family meals.

Conceptual Framework

How families construct and experience family meals can influence the social, physical, and emotional benefits parents and children derive from their participation in these family events. Figure 2.1 depicts how poverty, household food insecurity,

household chaos, and perceptions of the value of family meals might impact the construction of family meals that are characterized across three dimensions: frequency, quality of interpersonal communication (including distractions such as television), and meal planning. It is hypothesized that these factors, both directly and through the construction of family meals would impact child diet outcome. The model also depicts how these factors ultimately shape the affective (e.g., emotional) and evaluative (e.g., success/failure) experiences of parents and their children. This conceptual framework was developed after a review of the literature and guided the development of research questions and data collection instruments.

Starting at the left, the model begins with poverty, the physical and social environment; these factors influence both household food security status and chaos. These factors are included because families experiencing poverty often live in environments with less access to affordable, nutritious foods.^{138,139} These environments often can contribute to increased experiences of chaos due to residential crowding, neighborhood noise, and crime for residents of urban areas.^{26,27,138,139}

Next, household chaos was conceptualized as four interrelated constructs: frenetic activity, predictability/unpredictability of routines, lack of routine and structure, and high level of ambient noise.^{24,25} Household chaos was modeled as having a bi-directional association with both food insecurity and the construction of family meals. This means that household chaos is both influenced by and influences food insecurity and the construction of family meals. Household chaos can also have an influence on the

construction of family meals by affecting the frequency of family activities and the preparation of foods for the meals (e.g., use of meal planning), and chaos may also affect interactions during the meal.^{15,32,43,59} this combination of effects have the potential to reduce child diet quality.

Next, experiencing food insecurity has the potential to disrupt daily activities and the home environment, such as when family members are hungry and fatigued and unable to complete usual tasks.^{31,161} Experiencing food insecurity also has the potential to negatively impact child diet quality directly and through family meals. Food shortages may reduce the frequency of family meals.

Lastly, the perceived value of family meals may influence how frequent family meals occur. There is evidence to suggest that parents and children who value family meals are more likely to have them.^{48,54} Also, perceived value may impact a person's evaluation of the time spent with family, especially when the values and expectations are rooted in previous experiences.

While there are links between household chaos and food insecurity and the construction of family meals, little is known about how food-insecure families experience shared meals and if the benefits of regular family meals are similar to those of food secure families. Additionally, little is known about how household chaos influences the interpersonal quality of family meals, child diet, and emotional responses to food insecurity. A better understanding of the relationships between food insecurity, household

chaos, and family meals are important to develop approaches for use in conjunction with food assistance to help families achieve long-term food security and healthy family functioning for the promotion of optimal outcomes in children.

The purpose of this study is to understand how food-insecure caregivers and their children value, construct, and experience family meals and how household chaos is associated with the family meal experience and child diet quality. The study addressed the following specific aims:

Specific Aim 1: To qualitatively investigate how family meals are valued, constructed, and experienced (e.g., affective and evaluative) by caregivers and their children living in food-insecure households and the role of household chaos in shaping these constructions and experiences.

Specific Aim 2: To examine relationships between household chaos, the family meal experience, and child outcomes of diet quality (healthy eating index) and worry about food. The family meal experience was conceptualized as: Construction (meal planning and use of convenience foods), frequency, and interactions (including television usage during meals).

The next chapter will detail the research design and methods used to accomplish these specific aims.

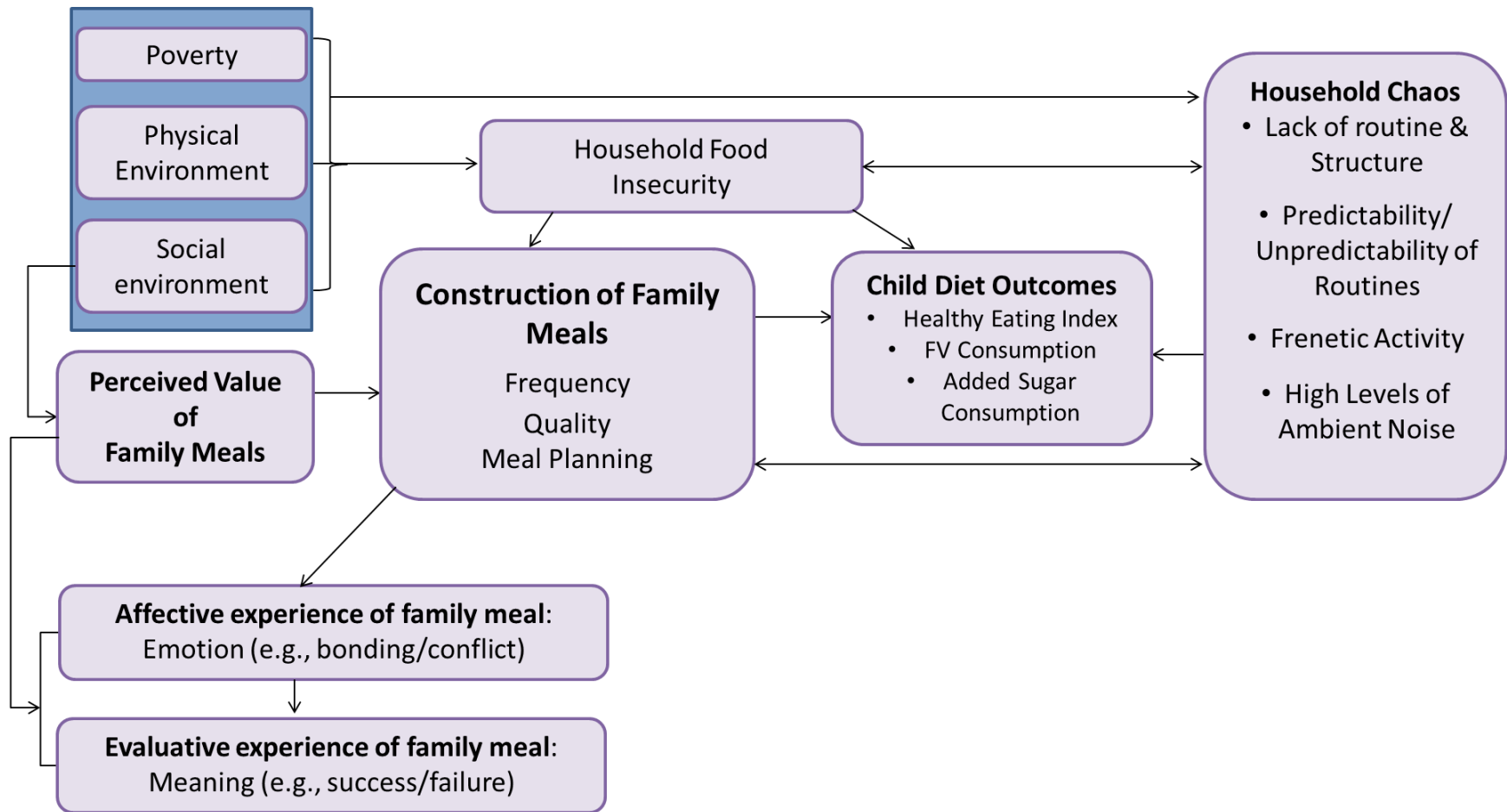


Figure 2.1. Original conceptual framework describing relationships between food insecurity, household chaos, family meals, and child outcomes

CHAPTER 3

RESEARCH DESIGN AND METHODS

This research utilized a sequential exploratory mixed methods design^{162,163} to better understand how food-insecure caregivers and their children value, construct, and experience family meals, and how relationships between family meals and household chaos influence children. In this sequential exploratory design, a qualitative study was conducted first, followed by a quantitative study. The development of the quantitative study's research questions and analysis was guided by the qualitative study. The quantitative study was also used to further explain or confirm the results from the qualitative study. In this study, in-depth qualitative interviews about the family meal experience were conducted with 20 caregiver-child dyads. Results from the analysis of qualitative data were used to guide the quantitative analysis of secondary data to examine relationships between household chaos, family meals, and child dietary intake and worry about food. A detailed description of the qualitative and quantitative methods is found below.

Study 1: Understanding the family meal experience and household chaos

The purpose of this study was to examine how families value, construct, and experience family meals, along with the social, physical, and emotional benefits caregivers and children derive from their participation in these family events. To

understand these experiences the Principal Investigator (PI) conducted interviews with 20 caregivers and their children separately. The rationale for interviewing caregiver and child dyads was to provide a comprehensive view of the family meal experience for food-insecure households from both a caregiver and child perspective. The data collection occurred between March and May of 2015 in Lexington and Richland Counties of South Carolina. The Institutional Review Board of the University of South Carolina approved the research protocol before data collection occurred.

The development of the research questions and data collection instruments was guided by a review of the literature and conceptual framework (Figure 3.1). The conceptual framework (Figure 3.1) depicts how poverty, household food insecurity, household chaos, and perceptions of the value of family meals might impact family meal frequency, and interpersonal. The model also depicts how these factors ultimately shape the affective (e.g., emotional) and evaluative (e.g., success/failure) experiences of caregivers and their children and the quality of child dietary intake.

The specific aim and research questions for study one are:

Specific Aim: To investigate how family meals are valued, constructed, and experienced (e.g., affective and evaluative) by caregivers and their children living in food-insecure households and the role of household chaos in shaping these constructions and experiences.

The research questions guiding the study were:

1. What importance or value do caregivers and their children living in food-insecure households place on family meals?
2. How are family meals constructed from the perspective of caregivers and their children living in food-insecure households?
 - a. How frequently do caregivers and their children living in food-insecure households report having family meals?
 - b. How do caregivers and their children living in food-insecure households describe the quality of their family meals (e.g., how much time physically spent together, communication, parenting strategies, types of food)?
3. How does household chaos (e.g., lack of structure, disruptions to routine, ambient noise, frenetic activity) influence the construction of family meals from the perspective of caregivers and their children living in food-insecure households?
4. How do caregivers and their children living in food-insecure households describe their experiences with family meals?
 - a. What is their affective experience (e.g., emotional) of family meals?
 - b. How do they evaluate their family meal experiences (e.g., success/failure)?
5. How do caregivers' perceptions of family meals compare with their children's perceptions?

The interviews conducted were a part of a larger study led by Dr. Edward Frongillo and funded by the US Department of Agriculture's (USDA) Research Innovation and Development Grants in Economics (RIDGE) program, and entitled, "Altered daily activities and shame resulting from children experiencing food insecurity

in rural South Carolina and Oregon.” The purpose of the RIDGE study was to better understand the altered daily activities and shame faced by food-insecure children. The RIDGE study involved 20 qualitative in-depth interviews with children between the ages of 9 and 15 in the greater Columbia, South Carolina metropolitan area. The research detailed in this dissertation includes data from the RIDGE study along with data from the interviews of each child participant’s parent or caregiver.

Recruitment Procedures and Eligibility Criteria

The PI recruited children and caregivers at settings such as public schools, afterschool programs, churches, community centers, household and child nutrition programs, classified advertisements and social media using flyers, e-mail announcements, and in-person recruitment. Those recruited via e-mail or flyer contacted the PI and were screened for eligibility over the phone before their interviews were scheduled.

Participants recruited in-person at food pantries were screened on-site before their interviews were scheduled. Maximum variation sampling was used to obtain a sample of eligible caregivers and their children who varied in race, educational attainment, income, caregiver marital status, household composition (e.g. immediate family members in one household or multiple generations in one household), and urban residence. Demographics of participants are provided in Table 4.1.

Eligibility criteria for the study was:

1. The focal child must be between the ages of nine and fifteen;

2. The family must reside in the greater Columbia, South Carolina Metropolitan Area;
3. The caregiver must be at least 18 year of age; and
4. The household must be food-insecure based on caregiver responses to the USDA's 18-item household food security screening tool.¹⁶⁴

Data Collection Procedures

After confirming eligibility, an interview date and time was scheduled. The PI aimed to schedule both the caregiver and the child interviews on the same day, but some interviews were scheduled on separate days if needed. Most participants were scheduled within a week of their screening date. The PI made a reminder call or sent an e-mail, based on participant preference, 24-48 hours before the scheduled interview.

Prior to the start of the interview, the PI provided an overview of the purpose of the study and what was required for participation to the caregiver and child before obtaining consent and assent. This was done to ensure that each participant understood his or her role and rights as a study participant. Each child participant signed an assent form and each caregiver participant signed a consent form and the child assent form. At the start of the child participant's interview, the child answered a brief, six item food security screener¹⁹. The interviews were held in a location most convenient for the participants, usually a public library or in the participants' home. Caregiver and child interviews were conducted separately, with caregivers given the option to stay during the child interview. The interviews were digitally recorded. After their respective interviews,

the caregiver participants completed a brief demographics questionnaire (Appendix E). Caregivers received \$20 cash incentive for their time and children received a \$15 gift card for their time.

Instruments

The PI along with her dissertation committee, and the RIDGE study team developed semi-structured interview guides to elicit caregiver and child experiences with food insecurity, family meals, and household chaos. The caregiver and child interview guides (Appendices C and D) were similar with the same key questions asked of both participants in order to allow for comparison between family members. The caregiver and child interview guides differed in terms of literacy level and some content; the caregiver interview guides contained questions about work and other caregiver-related responsibilities. The interview questions were guided by the conceptual framework (Figure 3.1), with the questions pertaining to household chaos developed based the literature on household chaos.^{23,25} The questions about household chaos were aimed at understanding the structure and routines of the household, the predictability of these routines, frenetic activity, and ambient noise..^{23,25} The interview guide was organized in the following manner:

- Household information (household size, and any changes in the number of children in the household)
- Description of a typical day (descriptions of work/school schedules, how activities are organized, household routines, amount of noise in the home, and any disruptions to planned activities or routines)

- Participant’s conceptualization of a family meal, frequency, and description of the family meal (including meal preparation, mealtime interactions, and any distractions to the family meal)
- Participant’s perceived value, importance, and evaluation of the family meal experience
- Participant’s experiences with food insecurity and how it affects daily activities and routines

For a full list of interview questions, please see Appendices C and D .

The sociodemographic questionnaire (Appendix E) was administered to the caregiver at the end of the interview and included questions on caregiver gender, age, race and ethnicity, highest level of education, home ownership status, zip code, total household income. Participants were also asked whether or not the family has ever participated federal and state financial assistance programs (e.g. electricity bill assistance or Temporary Assistance for Needy Families) and if the child receives free or reduced price school meals through the National School Lunch Program (a federal needs-based assistance program). Child age and gender were asked as a part of the eligibility screening questionnaire.

Data Analysis

All participants were assigned a unique identifier for use in the study. The interviews were transcribed verbatim using a professional service and verified by the PI. Transcription and data analysis co-occurred with data collection. Data were analyzed

using NVivo 10 qualitative analysis software¹⁶⁵, a qualitative software program that aids in organizing, analyzing, and interpreting data. STATA 13⁴⁵ was used to calculate descriptive statistics of responses provided on the demographics questionnaire.

While this was not a grounded theory study, a Grounded Theory approach was used to analyze the interviews. Open, axial, and selective coding strategies were employed in the analysis.⁴⁴ This approach was used because it allows the researcher to immerse his or herself in the data, allowing the data to answer the research questions and generate concepts and theories.¹⁶⁶ Both deductive and inductive methods were used to establish the categories in the codebook. Inductive, open coding method was used to code the interviews, with the themes around chaos guided by theory. Chaos was conceptualized based on work from Bronfenbrenner and Evans defining the construct as “systems of frenetic activity, lack of structure, unpredictability in everyday activities, and high levels of ambient stimulation.”¹³⁶ During the coding process, the PI examined activities and events in the lives of those interviewed, along with the emotions and sense of meaning evoked by the chaos.¹⁵ It was during the open coding process that the researcher explored the data for the major themes or categories of information (e.g., codes). From these codes and themes, the PI created a preliminary codebook (Appendix G). As each interview was analyzed, more categories were added to the codebook, with the application of constant comparison to allow for the systematic emergence of themes. After the initial round of coding, the PI summarized each participant’s responses about how family meals were constructed, the overall family meal experience, and their descriptions of chaos in their household. After summarizing each interview, the PI then

compared child and caregiver responses. These comparisons provided a more complete understanding of each family's experiences that aided in the axial and selective coding processes. Axial coding involved organizing codes into sub-themes. During selective coding, major overarching themes were identified, with subthemes collapsed where appropriate. The major themes were used for the development of a conceptual model (Figure 4.1) describing how household chaos impacts the family meal experience. Several steps were taken to ensure that findings were reliable. These included peer debriefing and consultation with the larger study team throughout data collection.^{44,167,168}

Study 2. Understanding relationships between household chaos, family meals, and child outcomes.

The results of the qualitative study revealed that both the interpersonal relationships in the home along with the quality of mealtime interactions were important influences on the family meal experience, in all households, regardless of the amount of chaos assessed. Parents and children frequently mentioned television viewing as an important element of the family mealtime experience. The qualitative study also revealed unique sources of chaos for food-insecure households, particularly how food shortages can disrupt activities. Many children also expressed awareness of their family's food insecurity and the consequences of experiencing food shortages. Some of the consequences of food insecurity included hunger, not feeling well, increased irritability among family members, and negative interactions. In terms of family meal frequency, caregivers and their children both describe shorter and less frequent family meals during times of food shortages. Results of the qualitative study also revealed that when

constructing family meals, caregivers were more likely to use convenience foods because they were low cost and required less time. Caregivers and children also revealed that the convenience foods, especially canned goods, were used more often in times of food shortages, either because they were cheap or because they were received from a benefactor (e.g. family, friend, or food pantry). Based on these findings, the specific aims and analytic models were refined to include understanding the role of interpersonal relationships during family meals on child diet and worry about food. Use of convenience foods was also added to the model along with meal planning as a way to capture some of the activities involved in the construction of family meals.

Specific Aim 2: To examine relationships between household chaos, the family meal experience, and child outcomes of diet quality (healthy eating index) and worry about food. The family meal experience was conceptualized as: Construction (meal planning and use of convenience foods), frequency, and interactions (including television usage during meals).

Research questions:

1. How is household chaos associated with the family meal experience (construction, frequency, and interactions), diet quality and worry about food for children living in food-insecure households?

Hypothesis 1.1. For food-insecure households with high levels of household chaos, we hypothesize that:

- a. Caregivers will report less meal planning.
- b. Caregivers will report using convenience foods more often.

- c. Caregivers will report fewer family meals.
 - d. Caregivers will report lower quality interactions during family meals.
 - e. Caregivers will report higher frequency of television watching during family meals.
 - f. Child diet quality will be lower.
 - g. Children will report more worry about food.
2. How does the association between household chaos, the family meal experience (construction, frequency, and interactions), affect child diet quality among children in food-insecure households?

Hypothesis 2.2. We hypothesize that the family meal experience will mediate the relationship between household chaos and child diet quality and child worry about food. Figures 3.2, 3.3, and 3.4 describe the hypothesized relationships between independent variables, mediators, and dependent variables.

This aim was accomplished through a secondary data analysis with combined data from two studies. Data were from the Midlands Family Study (MFS)⁴⁶ which sought to examine factors that protect children against VLFS, and the Family Mealtime Study (FMS)⁴⁷ which examined the association between various aspects of the social context of mealtime and dietary quality among children within food-insecure households. These studies were funded by the United States Department of Agriculture, Food and Nutrition Service Child Research Program. All data were collected in 2012.

Sample Description and Recruitment Procedures

The sampling framework for the Midlands Family Study was guided by food systems stakeholders, generating a list of over 1,646 potential recruitment sites (including traditional sites like grocery stores and emergency food providers).⁴⁶ These sites were then stratified by urban (n=776) and non-urban location (n=870). From this list, 218 of the stakeholders were contacted for permission to recruit from their site. After contacting a recruitment site, clients, participants, or customers were invited to participate through a flyer posted at the site or in-person by a member of the research team. Each recruited participant was allowed to invite up to four others for participation in the study. After consent to participate in the study was given, research team members then administered a brief screener to determine eligibility. All participants were given a \$5 gift card for their time, regardless of study eligibility. The screener took about ten minutes to complete and was administered either over the phone or in person. All responses were directly entered into a computer.

After contacting a recruitment site, clients, participants, or customers were invited to complete a brief screening questionnaire by employing a variety of methods (i.e., advertisements, letters, and setting up booths). This screening questionnaire was administered either in person (n=483) or over the phone (n=286; total screened=769). Respondents were invited to participate in the household survey if they: (1) had a child under 18 living in the household at least 50% of the time, (2) resided in one of the eight study counties, (3) had a total household income below \$100,000 per year, and (4) fell into one of the eligible food security categories (food secure, food-insecure, child

hunger). Survey participants were also able to invite up to three other participants to the study, subject to the same screening process. Researchers aimed for a target sample of 200 participants within each food security strata. The study staff screened 769 households in order to identify a final sample of 544 households, including 158 food secure, 207 food-insecure, and 159 child hunger families.

The Family Mealtime Study recruited a sub-sample of participants from the same stakeholders, recruiting some participants who also completed the MFS surveys. Three hundred and thirty-two people agreed to participate, and 193 completed a survey, for a response rate of 58.1%. The eligibility criteria were: legal custody of a child between the ages of 9 and 15, the child lived in the household at least 50% of the time, the respondent was age 18 or older, the respondent resided in one of the nine study areas (determined by zip code), household income below \$100,000 regardless of food security status, respondent affirmed at least three or more items on the Household Food Security Survey,¹⁶⁹ and respondent self-classified as either non-Hispanic African-American or non-Hispanic White. This survey included responses from both the participant and one child from the household.

For the purposes of this study, we only included data from those who participated in both studies and were food-insecure (either LFS or VLFS), which yielded a total sample size of 132 caregiver-child dyads.

Data Acquisition and Procedure

After eligibility was determined and consent granted, a survey time was scheduled. A member of the research team would then meet the participants in a predetermined location. Before the survey began, the research team member would explain the consent and assent form to the caregiver and child, and request their signatures if they understood and agreed to the terms. The child participant was chosen by the caregiver if there were multiple eligible children in the household. The caregiver and child survey was completed on the same day, but at different times. The caregiver could choose whether or not their child was present during their survey, and likewise, the caregiver could choose whether or not to be present during the child survey. The survey questions were read out loud by the interviewer and responses were entered into a computer survey form by a member of the research team. Participants were encouraged to ask questions if they arose. For completing the survey, participant received a \$20 gift card.

Measures and specification of variables

Measures from the Midlands Family Study:

Household Food Security Status. Food security status was measured using the 18-item Households Food Security Survey Module from the United States Department of Agriculture¹⁶⁴. This was completed by the primary caregiver at screening. Respondents were categorized as having low food security if their raw score was between three and five, and categorized as having very low food security if their raw score was six or greater.

Household Chaos: Household chaos was assessed by the primary caregiver using the Confusion, Hubbub, and Order Scale (CHAOS) developed by Matheny, Wachs, Ludwig, & Philips.¹⁴⁶ In this assessment, participants answer true or false to fifteen statements, seven of which are reversed coded. Example statements include, “There is often a fuss in our home,” and “No matter what our family plans, it usually doesn’t seem to work out.” The authors reported satisfactory internal consistency ($\alpha=0.74$) and test-retest reliability ($\alpha=0.74$).

Family Meal Construction: Meal planning strategies: The subscale assessing meal planning strategies was adapted from scale items created by Blake, Wethington, Farrell, Bisogni, & Devine³⁴ and Devine, et al.³⁵ The subscale contained three items, with responses ranging from “never” to “always”. These items asked about meal preparation methods such as preparing enough for leftovers, or preparing meals for cooking in advance. These responses ranged from “never” to “always” and were coded from 1-4, and an average score for all three questions were used for the analyses.

Family Meal Construction: Use of convenience foods. To explore how the use of convenience foods provided at family meals might impact child diet we used data from questions about strategies to reduce time to prepare family meals.^{34,35} Use of convenience foods at family meals was assessed using a 2-item subscale with responses ranging from “rarely” to “often” and were coded from 1-3. The questions asked about the frequency of

use for convenience and quick preparation food items such as canned and boxed food items. The average of the two items was used for analyses.

Measures from the Family Mealtime Study:

Participant Demographics. Primary caregivers were asked to report their age, race, highest level of educational attainment, employment status, marital status, number of adults in the household, number of children in the household, and age of the focal child. Caregivers were also asked if they currently receive benefits through the Supplemental Nutrition Assistance Program and the Women Infant, and Children’s assistance program.

Mealtime frequency. In order to assess the frequency family meals, we asked primary caregivers several questions from the Early Childhood Longitudinal Study-Kindergarten 1998-1999 survey¹⁷⁰. For frequency of family meals, we asked “In a typical week, please tell me how often your family eats the evening meal together.” Response categories were “never,” “sometimes,” “most of the time,” or “always” and were originally coded 1-4.

Mealtime interactions. To assess the quality of mealtime interactions, caregivers were asked about television usage during the meals along with questions the mealtime environment and interactions. To measure television usage during mealtime, we asked, “How often does your child watch TV or videos during mealtime?” Response categories were “never,” “sometimes,” “most of the time,” or “always” and were coded 1-4.

The second set of questions to measure family meal interactions were from the Attitude and Behavior Scale (FEABS) “atmosphere of family meals” subscales.¹⁷¹ This subscale contains five questions such as, “In my family, eating together brings people together in an enjoyable way.” Response categories were “strongly disagree,” “disagree,” “agree,” and “strongly agree” and were coded from 1-4. The subscale was summed and treated as a continuous variable, ranging from four to sixteen.

Child dietary intake and dietary quality. A trained interviewer collected a single 24-hour dietary recall from the children enrolled in the study. While it is an accurate assessment in children,¹⁷² it is subject to underreporting of caloric intake.¹⁷³ The 24-hour dietary recall has lower respondent burden compared to other dietary assessment methods, and is appropriate for those with lower literacy levels.^{174,175} The assessment can be completed unannounced, preventing a participant from changing his or her behaviors for the assessment. Usual intake can only be accurately assessed if a respondent completed multiple dietary recalls. Dietary intake data were collected and analyzed using the multiple pass method and Nutrition Data System for Research (NDSR) software developed by the Nutrition Coordinating Center (NCC), University of Minnesota, Minneapolis, MN¹⁷⁶. The dietary recalls were collected on all days of the week and varying times of the day. Overall dietary quality was assessed using the Healthy Eating Index (HEI)-2005¹¹⁶, a tool to measure compliance to the 2005 Dietary Guidelines for Americans. The HEI-2005 uses 12 separate components to evaluate consumption patterns per 1,000 kcals of each of the following: total fruit, total whole fruit, total vegetables, dark-green vegetables and orange vegetables or legumes, total grains, total whole grains,

milk, meat and beans, saturated fat, oils, sodium, and solid fats and added sugars. The HEI-2005 is a continuous measure with a range of 0-100 with a score of 0-51 being considered “bad,” 52-80 being considered “needs improvement,” and 81-100 being considered “good.” HEI scores were generated from NDSR nutrient output.¹⁷⁷

In this sample, the distribution of HEI scores being skew (i.e. there were no scores in the “good” range). Therefore, we grouped each participant in their respective categories based on score. The HEI categories of “bad” and “needs improvement” were coded as zero and one, respectively. Our results will be interpreted as odds of being in either the “bad” or “needs improvement” category, instead of predicting an overall HEI score. Although dichotomizing the scores would have reduced statistical power, there was still sufficient power to make inferences.

Child worry. In the child portion of the survey, we asked, “How often do you worry about food?” Response categories were “never”, “rarely”, “sometimes”, “most of the time”, or “always” and were originally coded 1-5. The responses were skew, and were dichotomized into “never or rarely” and “sometimes to always” and coded as zero or one, respectively with “never or rarely” as the reference category in the statistical models.

Data Analysis

For the mediation analyses, we conducted a multiple mediator model using the approach described by MacKinnon and colleagues¹⁷⁸ to examine associations between household chaos (independent variable), child Healthy Eating Index Score (dependent

variable) and child worry (dependent variable). The mediators for both models were family meal construction (meal planning and use of convenience and quick preparation foods), family meal frequency, and mealtime interactions (interpersonal quality of family meals score and television watching during meals).

For each dependent variable, we used the following protocol. First, we assessed the total effect (c) of household chaos on the dependent variable using logistic regression. Then we assessed the associations between household chaos and each mediator (a) using OLS regression. Lastly, using logistic regression, we assessed the direct effect (c') of household chaos on each dependent variable adjusting for the mediating variables (b). To reduce the potential for confounding, each model controlled for the respondent child's age, as well as the socioeconomic variables of caregiver race, caregiver educational attainment, and caregiver income.

If the association between household chaos and the dependent variable was mediated by the family meal experience (construction, frequency, and mealtime interactions), we would expect to see a reduction in the coefficient for household chaos when controlling for these factors. We would also expect to see an association between household chaos and each mediating variable. The total indirect effect of household chaos was computed by summing the effects of each mediating variable.

All analyses were completed using STATA 13 using the binary mediation macros.⁴⁵ Furthermore, to avoid Type I errors, we used bootstrapping (5,000 replications)

to produce bias-corrected confidence intervals testing the significance of the total, direct, and indirect effects.¹⁷⁹⁻¹⁸²

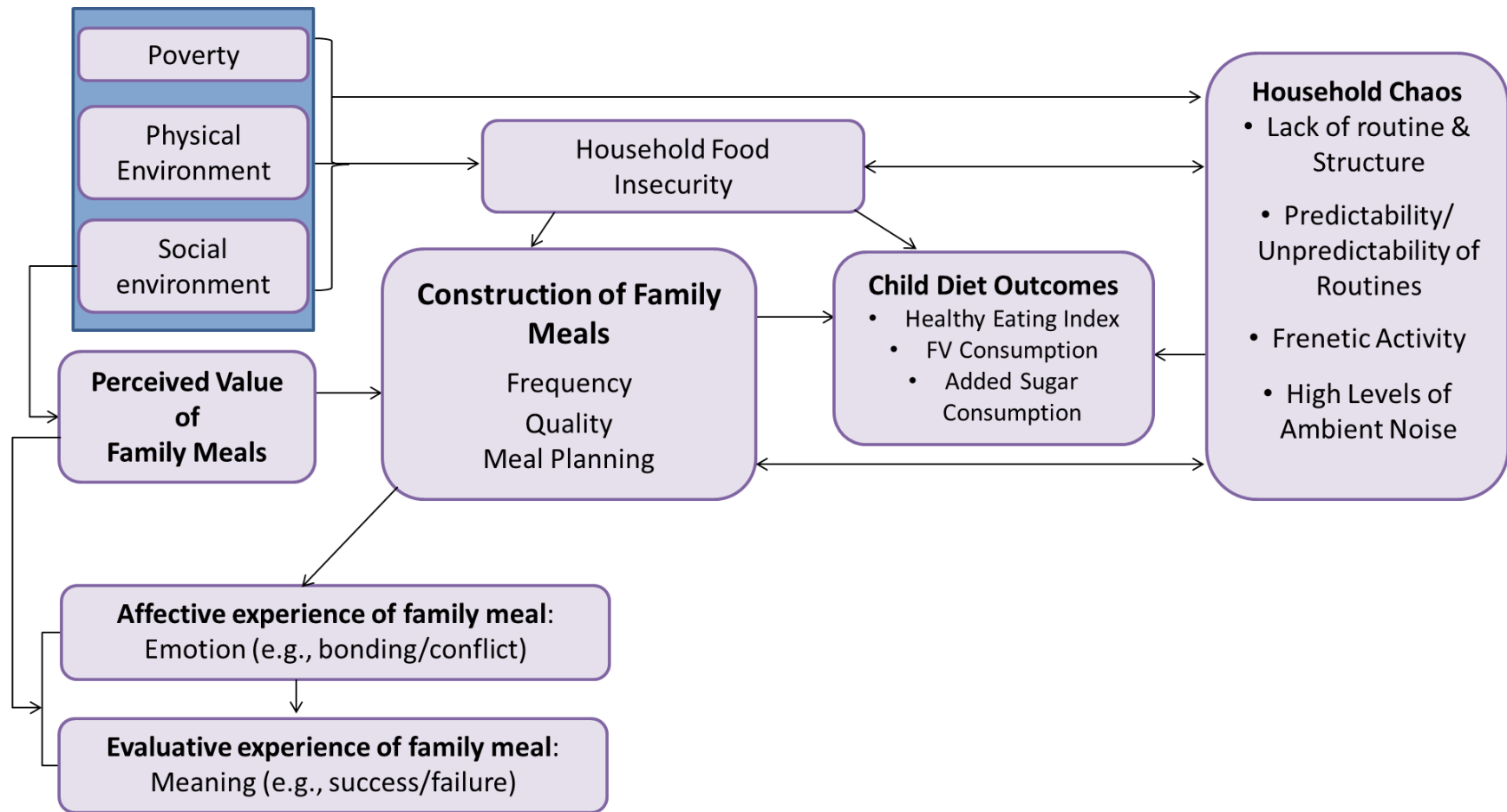


Figure 3.1. Original conceptual framework describing relationships between food insecurity, household chaos, family meals, and child outcomes

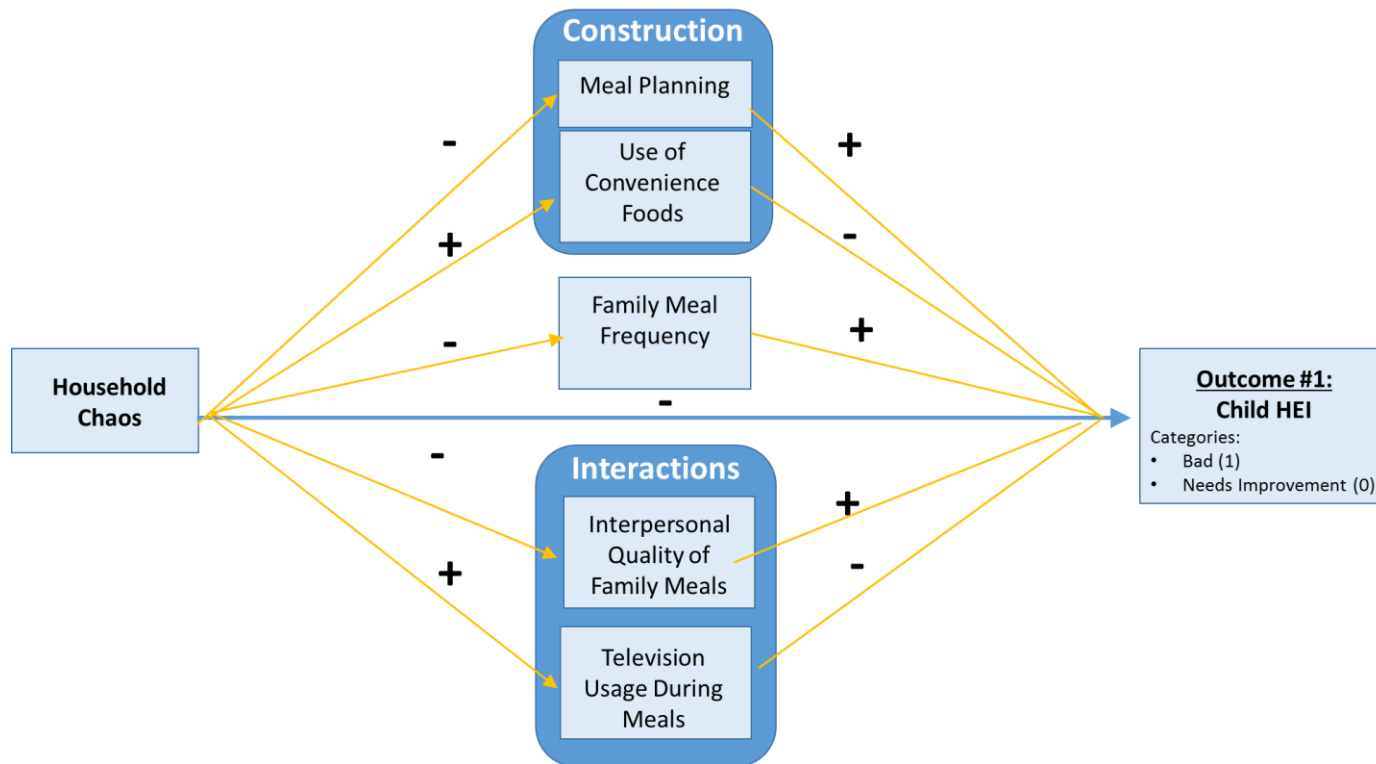


Figure 3.2. Analytical models with hypothesized relationships for household chaos to child diet quality with mediators.

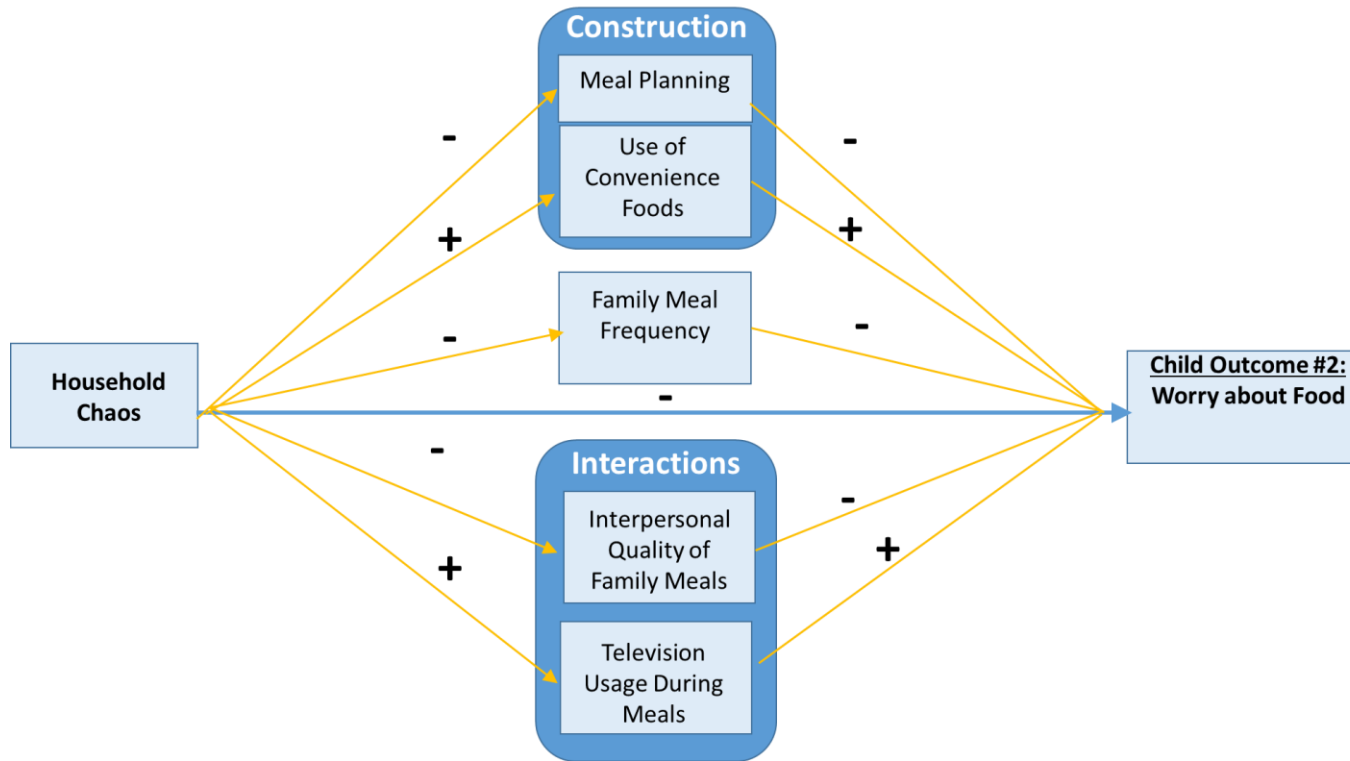


Figure 3.3. Analytical models with hypothesized relationships for household chaos to child worry about food with mediators.

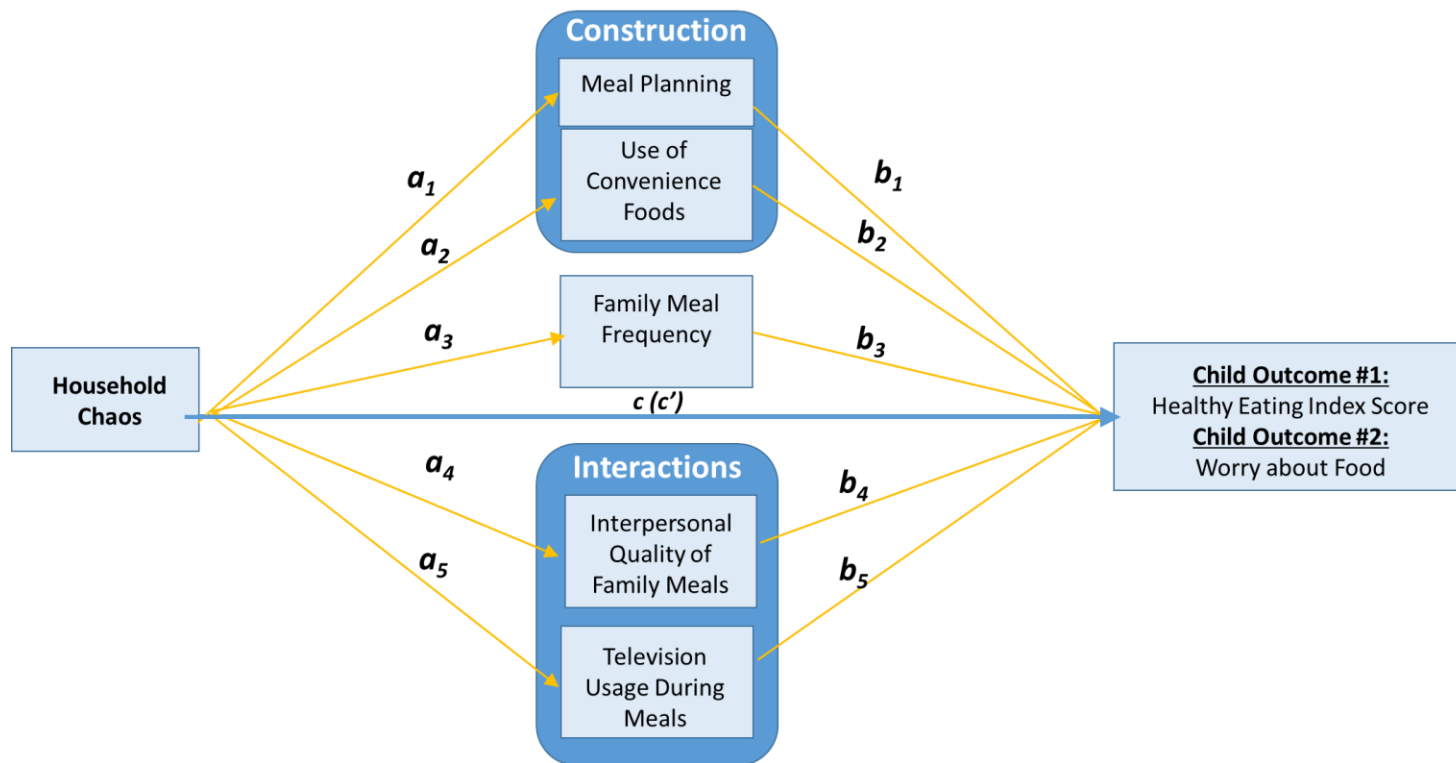


Figure 3.4. Analytical models showing mediation pathways for Specific Aim #2

CHAPTER 4

RESULTS

4.1. PAPER 1: UNDERSTANDING HOW CHAOS IMPACTS FAMILY MEAL STRUCTURE, FREQUENCY, AND INTERACTIONS IN FOOD-INSECURE HOUSEHOLDS¹

Abstract

Regularity of family meals is lower in households experiencing food insecurity, possibly due to higher amounts of chaos. This is a concern because regular family meals foster healthy physical and social development of children. Relationships between chaos and regularity and quality of family meal interactions are not well understood, particularly in food-insecure households. We studied family meal experiences of caregivers and children living in food-insecure households to better understand relationships between chaos and the regularity and quality of mealtime interactions using a qualitative study with 20 ethnically diverse caregiver-child (9-15 y) dyads living in food-insecure households in South Carolina. Caregivers and children participated separately in in-depth interviews about their daily activities, with an emphasis on their family mealtime experiences using

¹ Rosemond, T.N., Shapiro, C.J., Burke, M.P., Frongillo, E.A., Blake, C.E. To be submitted to *Appetite*

a semi-structured interview guide. Interviews were recorded transcribed verbatim. Data were analyzed using a Grounded Theory Approach in Nvivo 10. Food-insecure families described demands that increased chaos, including conflicts with work and afterschool schedules, food shortages, coping with poverty and food insecurity (e.g., working extra hours or seeking food assistance), and children visiting multiple homes, particularly when food was limited. All families experienced chaos, but stronger interpersonal relationships were described as the primary reason for enjoyable mealtime experience with few disruptions. These families viewed family meals as a shelter from chaos, leaving them feeling more connected afterwards. In contrast, families with poorer interpersonal relationships allowed chaos to further degrade mealtime interactions. Understanding family meal experiences of children in food-insecure households highlights the importance of interpersonal relationships and regular positive mealtime interactions that may strengthen emotional connections in families to improve child health outcomes.

Introduction

Family meals are important opportunities to promote children's health and well-being. The family meal is associated with improved physical and social development for children.¹⁻⁷ Children in families with regular family meals consume more fruits and vegetables, less sugar-sweetened beverages, and have a lower BMI than their peers who do not participate in regular family meals.⁸⁻¹² There is also evidence that these nutrition-related outcomes may persist into adulthood.^{10,13,14} Additionally, family meals often serve multiple purposes besides being a mechanism for eating. They also support family

bonding and allow for communication about chores, family member schedules or other family-related routines.¹⁵

Because family meals are important, increasing understanding of factors that impact the frequency and quality of family meals have on child outcomes is imperative. The frequency and quality of family meals can differ among households for many reasons, possibly including the experience of household food insecurity.¹⁶ Food insecurity refers to disruptions in the quality and quantity of the household food supply due to lack of financial or other resources. In 2014, 19.2% of U.S. households with children experienced food insecurity at some time in the previous 12-months, with a much higher prevalence for African-American households (26.1%) and Hispanic households (22.4%).¹⁷ The reported frequency of family meals in food-insecure and minority households is often lower than that of food-secure and non-Hispanic white households,^{13,18} but it is unclear how food insecurity influences family meal frequency or quality.⁸ Furthermore, it is unclear if all of the benefits associated with family meals hold true for low-income and food-insecure families.⁶

A number of factors can impact family meals in food-insecure households. Specifically, household chaos, defined as homes exhibiting “unpredictable, non-routine, inconsistent, and non-contingent physical and social surroundings”¹⁹ may disrupt family meal frequency and reduce the interpersonal quality of these mealtime interactions. It is important to note that household chaos is not merely the absence of routine, but also the predictability of pre-determined routines. Household chaos is conceptualized along two

primary dimensions, turbulence or instability (e.g., changes in households or caregivers or predictability of routines) and disorder (e.g., high levels of ambient noise, clutter, lack of structure and routine, excessive crowding, or changes in the household size and composition).^{20,21} Household chaos can impact family functioning in three ways: (1) construction of family time, (2) frequency and disruption of family activities, and (3) the meaning created out of disruptions or irregular activities.¹⁵ Chaos in food-insecure households can come from multiple environmental influences, such as lack of routine and high unpredictability deriving from caregiver work schedules or reliance on public transportation.^{22,23} Additionally, low-income and minority families are more likely to reside in more crowded, noisy, and suboptimal living conditions leading to unpredictable events and high levels of distractions.^{24,25} Household chaos can inhibit healthy psychological development among children, with greater amounts of chaos leading to a reduced ability of children to self-regulate their behavior and other developmental problems.^{26,27}

While eating together as a family is beneficial for children, the processes through which family meals might result in positive benefits for children are unclear. The quality of these mealtime interactions may be a factor in how family meals improve child health.^{28,29} Positive mealtime interactions are associated with healthy child BMI, and positive caregiver-child interactions may buffer the negative impacts of poverty on child well-being.²⁹⁻³¹ One possible mechanism underlying the association between family meal frequency and child health outcomes is the presence of stronger emotional connections among family members. Positive family meal experiences may provide opportunities for

children to strengthen emotional bonds, leading to family unity, connectedness, and a greater sense of security, all of which foster improved self-regulation of healthier food intake in children.^{29,31,32} For families experiencing higher levels of chaos, these mealtime interactions are often more negative and coupled with reduced parental warmth and responsiveness.^{15,27,33,34}

Experiencing food insecurity may disrupt family functioning by increasing household chaos, leading to reduced family meals and may possibly affect the interpersonal dynamics during these mealtimes. It is not well understood how food-insecurity and household chaos can impact the quality of these interactions. A better understanding of relationships between food insecurity, household chaos, and family meals is important to develop approaches for use in conjunction with food assistance to help families achieve long-term food security and healthy family functioning for the promotion of optimal outcomes in children.

The purpose of this study was to examine how families value, construct, and experience family meals, along with the social, physical, and emotional benefits caregivers and children derive from their participation in these family events. We used qualitative in-depth interviews in a sample of food-insecure caregiver-child dyads to investigate how family meals are valued, constructed, and experienced, along with the role of household chaos in shaping these constructions and experiences. This study was conducted as a part of a larger qualitative study examining how food insecurity alters the daily activities and experiences of children.

Methods

Sample

For this study, 20 caregiver-child dyads were interviewed separately about their daily experiences, with emphasis on the family meal experience, using a semi-structured interview guide. The rationale for interviewing caregiver-child dyads was to provide a comprehensive view of the family meal experience for food-insecure households. Only one caregiver and one child per household were allowed to participate in the study.

Procedure

Children and caregivers were recruited from settings such as public schools, after-school programs, churches, community centers, food pantries, and through social media using flyers, e-mail announcements, and in-person recruitment. A maximum variation sampling strategy was used to obtain a sample of eligible caregivers and their children who varied in race, educational attainment, income, caregiver marital status, household composition (e.g., immediate family members in one household or multiple generations in one household), and urban residence. Eligibility criteria were a caregiver age eighteen or older with a child between the ages of nine and fifteen residing in the greater Columbia, South Carolina metropolitan area. Families also had to meet the food insecurity thresholds on the USDA's 18-item household food security module.³⁵ For a family to meet the level of "Low Food Security" (LFS), the caregiver had to affirm at least three items on the module, indicating that the family had reduced quality, variety, and desirability of diet with little or no reductions in actual intake. Households classified

with “Very Low Food Security” (VLFS), a caregiver had to affirm at least eight items on the module, indicating disrupted eating patterns and reduced food intake.

The interviews were conducted individually, but caregivers were allowed to stay in the room with their child during his or her interview if desired. The interviews were digitally recorded for accuracy during the transcription process. After the interviews, the caregiver completed a brief demographics questionnaire. The interviews were held in a location convenient for the participants, usually in a quiet area at a public library or in the participants’ home. The study occurred between March and May of 2015. The Institutional Review Board of the University of South Carolina approved the research protocol before data collection occurred.

Instruments

The semi-structured interview guides were developed to elicit caregiver and child experiences with food insecurity, family meals, and household chaos. The questions pertaining to household chaos were developed based on the literature about household chaos.^{19,21} The caregiver and child interview guides were similar with the same major questions asked of both participants in order to allow for comparison between family members. The caregiver and child interview guides differed in terms of literacy level and the caregiver interview guides contained questions about work and other caregiver-related responsibilities. The interview guide was pre-tested before use in this study.

In addition to the interview guide, a sociodemographic survey assessed caregiver gender, caregiver age, caregiver race and ethnicity, highest level of education, home ownership status, zip code, total household income. Child age was collected at the time of recruitment to determine eligibility for the study. Participants were also asked whether or not the family has ever participated federal and state financial assistance programs (e.g. electricity bill assistance or Temporary Assistance for Needy Families) and if the child receives free or reduced price school meals through the National School Lunch Program (a federal needs-based assistance program).

Data Analysis

All interviews were assigned a unique identifier for use in the study. Next, the interviews were transcribed verbatim using a professional transcription service and verified by an experienced study team member. Transcription and data analysis co-occurred with data collection. Each interview was analyzed separately, and then caregiver and child interviews were compared. Data were analyzed using NVivo 10 qualitative analysis software.³⁶

While this was not a grounded theory study, a Grounded Theory approach was used to analyze the interviews. Open, axial, and selective coding strategies were employed in the analysis.³⁷ This approach was used because it allows the researcher to immerse his or herself in the data, allowing the data to answer the research questions and generate concepts and theories.¹⁶⁶ Both deductive and inductive methods were used to establish the categories in the codebook. Inductive, open coding method was used to code

the interviews, with the themes around chaos guided by theory. Chaos was conceptualized based on work from Bronfenbrenner and Evans defining the construct as “systems of frenetic activity, lack of structure, unpredictability in everyday activities, and high levels of ambient stimulation.”¹³⁶ During the coding process, the PI examined activities and events in the lives of those interviewed, along with the emotions and sense of meaning evoked by the chaos.¹⁵ It was during the open coding process that the researcher explored the data for the major themes or categories of information (e.g., codes). From these codes and themes, the PI created a preliminary codebook (Appendix G). As each interview was analyzed, more categories were added to the codebook, with the application of constant comparison to allow for the systematic emergence of themes. After the initial round of coding, the PI summarized each participant’s responses about how family meals were constructed, the overall family meal experience, and their descriptions of chaos in their household. After summarizing each interview, the PI then compared child and caregiver responses. These comparisons provided a more complete understanding of each family’s experiences that aided in the axial and selective coding processes. Axial coding involved organizing codes into sub-themes. During selective coding, major overarching themes were identified, with subthemes collapsed where appropriate. The major themes were used for the development of a conceptual model (Figure 4.1) describing how household chaos impacts the family meal experience. Several steps were taken to ensure that findings were reliable. These included peer debriefing and consultation with the larger study team throughout data collection.^{44,167,168}

Results

Of the 20 caregivers interviewed, two were fathers, one was a grandmother, and seventeen were mothers. There was an even distribution of boys and girls interviewed. The mean age was 41.9 years for the caregivers and 12.7 years for the children (Table 4.1). Seventy-five percent of the caregivers and children interviewed were African-American, 25% of the caregivers and 10% of the children were Caucasian, and 15% of the children were two or more races. Half of the participants interviewed had very low food security (VLFS) according to the USDA 18-item household food security module.³⁵ Half of the participants had low food security.

Family meals in food-insecure households

The frequency and experiences of family meals varied across households (Table 4.2), with some families not having any shared meals due to work and afterschool scheduling or differences in food preferences. Of the 20 families, two did not eat together at all. The other eighteen families normally ate together at least once a week. Two families only ate together for breakfast, one family ate all three meals together most days, and sixteen families only ate together during dinner. When eating together, some families ate in the kitchen while others ate in their den or living rooms. The entire family eating together in the kitchen at the same time was not possible for four of the families interviewed. Two of these families ate in the living room instead, whereas two families split up and ate in both the living room and kitchen.

The quality of foods served during family meals also varied depending on availability of food. One mother described meals at the beginning of the month as having several vegetables, but by the end of the month, the meals were primarily rice and beans or other canned foods. One mother joked that when food was low, “*That’s when the canned salmon comes out*” (P117). Most caregivers, and a few children, said their mealtimes were shorter when there was less food available. When preparing meals, only one mother resorted to meal planning as a way to help allocate scarce food and time resources. Several caregivers mentioned using convenience foods, especially during food shortages.

Many of the families interviewed described their family meals as a way to connect with each other, discuss personal and school-related activities, and participate in other activities like games. Not all families found enjoyment during their family meals. Eight families reported that arguments or conflicts occur regularly during mealtimes and four caregivers expressed behavior problems among children during their meals. When behavior problems and arguments occurred, caregivers varied in the management techniques used. Some reported spanking, yelling, and separating children, effectively ending the meal itself. The results of these negative interactions during the meal left both caregivers and children more stressed, with some caregivers leaving the table to “breathe” and calm down.

In addition to the differences in mealtime interactions, families varied in use of electronic devices at mealtimes, including television, cell phones, tablets, or computer.

For caregivers that banned electronic devices (n=11) during the meal, they did so to reduce distractions and increase social interaction. Many families ate together in front of a television (some all of the time, others occasionally), even coordinating their dinnertimes around a favorite television show or movie. When eating in front of a television, cell phones were allowed (or no-cell phone rules were not enforced during these times), even if they were banned during meals at the table. Conversely, some caregivers found that television was a distraction, with one or more family members physically present at the table but watching television in another room or leaving the meal altogether to watch television. Disagreements on which show or movie to watch also led to families eating in separate rooms (with televisions) during mealtimes. In some households, television was a welcome distraction from the physical effects of hunger in times of food shortages, especially among children.

Interpersonal relationships drive family meal interactions

Some caregivers and children described their home lives as overall peaceful with everyone working together to accomplish tasks in the household. In these households, there may have been conflicts from time to time, but the family members reconciled quickly to maintain unity and peace. The children in these households described a close-knit relationship with their caregivers, and valued being able to openly communicate with their caregivers. The caregivers also commented about being open and honest with their children, and in turn were grateful that their children reciprocated this communication. There was also a desire to be united and strong as a family to make it through various challenging situations.

The caregivers in households with strong interpersonal relationships enjoyed spending time with their children around a meal, watching them grow and mature and seeing their children interact with one another. Mealtimes were seen as an enactment of ideals or expectations for families, particularly for caregivers who may have had abusive or negative upbringings. One caregiver described her family's daily meals together as important because *"...In my head, that's what families do [eat together] (P113)."* Another mother said, *"It just, it just make me feel good as a mom, to know that at dinner time my boys sitting at the table, we together. They're not in the street." (P111)."*

Families also described eating together as a way to draw closer to one another, offering an additional sense of security knowing that everyone made it home safely: *"I like just all three of us sitting together it just makes me happy... I guess it's kind of the highlight of our day when we're all three together and at peace, you know we're home, everybody is home safe and sound." P117*

Both the caregivers and children in these homes described enjoying being with caregivers and siblings (if applicable), and saw their mealtimes as one way to connect and communicate, escaping the busyness of life: *"It's always something that goes on that she's telling me about and I'm just thankful that we have that open communication where she's still able to come to me at this time to let me know what's really going on, so. And that's the reason why I said it's [eating together] very important to me, because this is*

where she knows when we sit down, the guards are down and everything is very relaxed and open.” P118

This [eating together] is really important, because that's the time when, like, none of us are doing anything. We're all just sitting together, like, talking with each other and talking about, like, what goes on in each other's lives...” C101

Conversely, some families described a home life filled with interpersonal distress. In these homes, the atmosphere was often tense, with arguments and behavior problems abounding. During times of financial challenges, these negative interactions increased. In these families, positive communication and conflict resolution was difficult to achieve, resulting in arguments and a desire for separation in order to have “peace and quiet.” In these household, siblings argued often, with one mother reflecting that her children’s arguing and poor relationship almost mimic her relationship with her spouse.

“The children yell. Um, my husband and I might yell sometimes too... My husband and I that get frustrated with that and have not mastered the art of de-escalation. We both typically try to not escalate. But they're our kids and they push our buttons. Um, so probably more often than not, we end up yelling too.” P108

“So that sibling rivalry, that arguing, that stupid – I would be in a room and I would just hear 'em, and I'm like they, they arguing over who made the Kool-Aid or who didn't make the Kool-Aid or ate the last, last piece of meat that I cook or you know ... And as much as

I hate to say it I'm like, I'm saying the back of my mind when is this child going back to school so I can have this peace and quiet in my house?" P120

Families who described strained interpersonal relationships reported minimal, yet stressful, interactions during family meals. Some described family members bringing stressors, frustrations, and anger to the meal, resulting in conflict. For these families, eating together served as a reminder of the family's dysfunctions and poor conflict resolution strategies. Some caregivers and children said conflict and stress before the meal would actually lead to the family eating separately, with one child admitting to rushing through his meal to avoid eating dinner with his mother if he was mad at her. Conflicts and arguments at meal times sometimes went from verbal to physical, with caregivers having to end the meals early to resume peace. Feelings of guilt, failure, and frustration over the meal experience were common among these families and resentment or apathy towards family meals were described by some children.

"[Eating together] sometimes it reveals – or reminds me of what some of our dysfunctions are and how we deal with each other and the kids and raised voices from frustration and stuff like that... Sometimes I need to step away for a minute... and if it's not a smooth meal, sometimes I feel like I just need to kinda go to my room by myself for a few minutes and just breathe a little bit." P108

“Usually the times when we don't get together is when mom is doing overtime or when like we're kind of mad at each other for something so I like go eat in my room and then mom eats in a living room.” C116

“The arguing [during dinner] ... makes me really stressed. It adds to the stress I already have with school.” C102

“My 10-year-old loves to argue, so it is very rare that he doesn't have a nice hot topic to argue about, um, at any given time. Besides verbally arguing, they [her boys] sometimes get physical with each other,— it scares me, and I hate it. So if things start getting physical, I really kinda flip out. [I] usually tell everybody to, ‘Shut up! I've had it! I can't take anymore! If you can't be nice, just go to your room!’” P102

When comparing caregiver and child responses, there was consensus on the descriptions of overall relationship quality and interpersonal mealtime interactions. The children were aware of the interpersonal challenges in their families. Some of the children felt at-fault for some of the “bad moods” experienced at home. The caregivers also expressed the interpersonal challenges, but also reflected more about how these negative interactions made them feel about themselves and their overall parenting ability. Caregivers in families with positive interpersonal relationships and mealtime interactions viewed eating together as an accomplishment and affirmation that they are doing “something right” as a caregiver.

Household chaos in food-insecure households

Some food-insecure families described their lives using words like, “stressful” and “out of control”. Caregivers and children in these households described trying to manage multiple activities that were often disrupted, making any types of advanced planning difficult, including meal planning. In these households, family members felt as if they were pulled in multiple directions and disconnected from one another, with different activities competing for time and attention. There were also descriptions of noisy homes, with the television playing in the background throughout most of the day and many homes experiencing noise due to arguing. Only one mother described neighborhood related noise that affected some household activities.

The contributors of household chaos fit within the dimensions of turbulence or instability and disorder described in the literature.^{20,21} When examining the dimension of turbulence or instability, these families describe demands that increased household chaos such as conflicts with work and afterschool schedules and disruptions due to illness (both chronic and acute). Experiencing food shortages also led to disruption in daily activities, with caregivers employing strategies to improve financial stability and food insecurity that interfered with household and other responsibilities. These strategies included working extra hours or overtime, spending a long amount of time applying for and waiting for food or financial assistance, returning to college to improve long-term financial stability, changing jobs or work hours, and in one case, tenant farming. Frustration at how their attempts to improve their family’s quality of life caused more stress and chaos for caregivers in these households. Children also experienced chaotic

schedules, spending their time out of school in multiple homes, usually due to variations in the caregiver's work schedule or when experiencing food shortages.

Descriptions of turbulence and instability:

"We know what's going on on a daily basis, but it just feels very disorganized. And when I recently quit my other job that I mentioned to work, um, as a nurse in the hospital, I was thinking of my family in that I would be working less hours. But the reality is, I'm not sure I'm doing anybody – I'm not sure it's as good of a decision as I hoped it would be, because it is just so much harder dealing with the inconsistency in my schedule." P108

"Well, we did had SNAP benefits, EBT... And then you have to come down every so many, um, months, and it got to the point where they were like every couple months, you need to come in, you need to come in, you need to come in. Well, I can't afford that, that's not something that I can do. My job only allows me to be off so much during that time, so then that went." P112

(When describing her husband's epilepsy) "And most times when they have those type of seizures, and they fall, and they hit their head, they don't really too much come out of them. So I be – my main fear is to leave him at home alone. I try not to let him be home alone too much, so that stops a lot. It keeps me from going to do a lot of things. I have to reschedule some things, but, uh, I would rather reschedule than to come home and something bad happened." P105

For the disorder dimension of household chaos, children and caregivers described homes that were noisy, with arguing inside or loud (and sometimes violent) neighbors. Caregivers in homes with a lot of noise described not being able to think or altering their schedule to minimize interactions with noisy neighbors. For the children who spent time in multiple homes, they experienced inconsistent rules or inconsistent enforcement of rules across these households. Because of the difference in rules, some caregivers became frustrated and decided to not enforce their normal household rules outside of the home.

Descriptions of disorder:

“Yeah, he [son], is a boundary pusher and tester. So, you know, he'll eat things at my mom's house that – and ask for things that he knows I wouldn't give him at home. My parents wouldn't handle it well if I said, “Okay, he can't have this or this. Make sure he eats this,” and I have to kinda let them do it how they want.” P108

“No, no electronics at the table, is supposed to be the rule, and... I used to have a very solid rule about no – the TV was not on during mealtime, but since things have become so chaotic and people eating at different times, I kinda slacked up a little bit.” P102

How Household Chaos Impacts Family Meals

In these households, the experience of chaos impacted family meals in three ways: the family meal structure, frequency, and mealtime interactions. The effects of chaos did not appear to be equally distributed among all families in the study. Chaos directly impacted how family meals were experienced, but also impacted mealtime

interactions based on the interpersonal relationships within the households (Figure 4.1). It appears that experiencing chaos put additional strain on poor interpersonal relationships by leading to more negative interactions and family meal experiences. It was these interactions (either positive or negative) that also influenced family meal frequency.

The Impact of Chaos on Family Meal Structure and Frequency

The families in this study discussed lives with much frenetic activity, caregivers and their children going to and from multiple activities and homes each day. Due to this frenetic activity, the location of family meals could vary from day to day. Some children ate dinner at up to three separate households each week, while others may have eaten in the car going to or from an activity. Some of the caregivers and children mentioned that their kitchens were too small for everyone to sit together, resulting in the family eating in multiple locations throughout the house. Many of these households had the television on throughout the day and in multiple rooms, leading to eating around the television, family members leaving the table to watch television, or family members physically being present at the table, but watching the television in a nearby room.

When experiencing food shortages or a reduction in the quality of foods available, the children often ate in a den or living room, a bedroom, or went to another household for food. For those who still ate together, the meal was shorter and oftentimes the caregivers ate after their children to ensure that the children consumed enough food. Some children would eat at a grandparent's house or a friend's house when food is low, without disclosing their lack of food at home. In some cases, eating at outside events

would be the only dinner available to the child. Not all children took advantage of this opportunity, however, further frustrating a caregiver when the child wanted to eat but there was nothing in the home. Experiencing food shortages also affected the frequency of family meals, with families choosing not to eat together or shortening the time they spent together.

“My sister... she gets hunger pains real bad and she'll just call grandma or grandpa and they'll give us a ultimatum like, they'll be like, 'Um you either starve at your house or come over to our house and eat.' And but the only thing is that we have to stay over their house until mom comes and sometimes mom's working late and things go, you know like not scheduled, and we have to stay over there.” C114

“[When we don't have enough to eat, we] nonchalantly get leftover food from my parents' house... They don't – they didn't know that we were needing it the way we did.”

P108

“And then like what gets me sometimes is, um, like it's our – like if a member in or church or something invites us for dinner, and I tell them to eat while we're there, you know, and they don't like what they have, they don't eat it, and so I'm like, 'Okay. You know if we go home you're not gonna – there's nothing to eat there so you're not gonna get anything...’” P116

How Household Chaos Impacts Family Meal Interactions

The chaotic lives families experience often leaves them feeling disconnected, and the mealtime experience was not as productive for bonding and strengthening family relationships. This was especially evident among children who ate in multiple homes. While children may have eaten with relatives or step-siblings, these were still relatively unfamiliar people. Also, eating in the car or at events during times of food shortages did not foster an environment for open communication among family members. Due to the competing demands of life, this family time was often forfeited, leading to little or no family meals during the week for some families. In homes with poor interpersonal relationships, when families did eat together, stressors from life were often brought to the dinner table, fueling arguments or leading to very little communication. Sometimes these arguments led to abruptly ending the meal.

One mother admitted to using homework as an escape from the tense family meal setting: *“Just um, the given situation. Um, that’s probably like the biggest challenge, because I think I’d be more apt to get away from books, get away from everything, if I didn’t have that to constantly deal with [the arguing]. That would be a lot easier, because that’s just kind of my way of just putting everything else out, and it’s just easier.” P112*

In response to describing family meals now that a cousin has moved in, one girl said: *“Well, my brother he don't like eating with us for some reason. He'll come out after everybody is gone. He just doesn't like her (their cousin). I don't like her sometimes, but*

I'm more soft hearted when it comes to her because I try to understand why, like she's upset with us most of the time.” C118

Caregivers and children who described stronger interpersonal relationships also mentioned competing with various sources of chaos when attempting to eat together. There was a desire to eat together most, if not every day, while a realization that current life demands did not always allow this to happen. But despite the actual frequency, the positive interactions were valued above all else. Caregivers in these households acknowledged having to be flexible and needing to make a dedicated effort to get everyone together, but felt then end result was worth the sacrifice.

“For me, it, you get away from the cares of the world, you know? You're getting away from the worries and the cares and you just enjoy being with your family, with your wife and your children.” P102

“Eating together is important. Our family, I'm sure all families, where we feel especially busy and run in so many directions, and we all always agree that it's time to eat. It can be incredibly time consuming, but we've decided that it's worth it” P113

“Even when we have good days or bad days we still eat together...” P111

One mother's efforts to maintain regular family meals after moving in with a relative: *“We (she and her daughter) talk about trying to solidify our schedule the way*

we used to ... Sometimes everything is not as we planned, but usually we try to stick to it. Sometimes it works, sometimes doesn't. Sometimes you just gotta get caught up in a different routine.” P118

When experiencing food shortages, participants saw eating together as a reminder of what the family did not have, which sometimes caused more frustration and guilt for the caregivers, especially when children expressed their own opinions and frustrations about not having enough money or food. In homes with poorer interpersonal relationships, eating together during times of food shortages led to some family members not wanting to spend time together or talking less during the meals.

“Now, it – when – during that time when it happens (food shortages), nobody likes to talk. Everybody’s just eating their portions or what, and take a bath, and go to bed.” P105

“...if you don’t have enough food, you don't want to sit down and eat together” P104

The duration of family meals was shorter for all families experiencing food shortages, regardless of the interpersonal relationships. In homes with poor interpersonal relationships, it was often said that when both money and food were low, attitudes were worse, frustrations and stress led to family members isolating themselves, and both the home and mealtime environment were described as tense experiences. Both children and caregivers interviewed reflected on how tense the home environment is during times of

financial challenges. One child said, “*The roof comes off the house,*” due to the frustrations and arguments over finances.

“Well, it’s kind of just like a madhouse basically, because my mom and dad kind of just talk, like arguing with each other about how we’re going to get food, and me and David just don’t really do anything... The arguing [during dinner] ... makes me really stressed. It adds to the stress I already have with school.” C102

When viewing the responses across dyads, both caregivers and their children gave consistent responses about the family meal experience. The caregivers provided more information about the difficulties they experienced providing for their children, and how lack of food personally affected them. There were differences in how caregivers discussed food insecurity with their children; some tried to hide their lack of food (e.g., going to a family member’s house or cutting food into smaller pieces to give the appearance of more food), while others were upfront with their children. Some children noticed differences in their caregiver’s demeanor during times of food shortage, while others were oblivious to any financial struggles their caregivers faced.

Discussion

This study examined the impact of household chaos on family meals. From the interviews conducted, chaos was conceptualized as activities and events that were unpredictable, households with little routine or order, very little environmental stability (e.g., children in multiple homes with different caregivers or moving frequently), along

with the feeling or meaning created from these experiences (e.g., stress, frustration, or guilt). We saw that household chaos impacts the structure and frequency of the actual meals, and the mealtime interactions. However, the effects of chaos on mealtime interactions also depended upon the interpersonal relationships within families (both in and outside the context of family meals).

Multiple work and school-related demands can interfere with families having multiple meals together each week. These disruptions to family activities are consistent with the current literature about the competing demands families face when trying to eat together. It is important to note that chaos is experienced across many types of households, but there appeared to be additional sources of chaos that are not just unique to low-income households,^{20,21,33} but also food-insecure households. These unique sources of chaos in food insecure homes include facing food shortages and strategies to improve financial stability and access to food. Some of the families faced food shortages, which altered daily activities including the family meal. There were also caregivers who, in their attempts to improve financial stability and access to food, inadvertently contributed to further disruption to their family's daily activities (e.g., later meal times, eating meals at different time, children under the care of multiple adults, etc.).

This research has also deepened our understanding of the reasons for fewer family meals in food-insecure households. Consistent with previous literature, family meal frequency was affected by competing time demands and food shortages,⁶ but through this

study, we see how frequency is impacted, particularly through chaotic environments and poor family mealtime interactions.

The findings of this study shed light on how household chaos impacts the quality of mealtime interactions for food-insecure families, particularly how the family's interpersonal dynamics are important in creating and shaping these mealtime experiences. In these households, strong interpersonal relationships appeared to drive family meal interactions. When navigating chaotic lifestyles, families with stronger interpersonal relationships worked to maintain regular family meals and positive mealtime interactions. These families found their time together as a sanctuary from the stresses and negative realities of life and as a component of "being a family." While the actual number of family meals per week may have been few, these families tried to maximize the quality of these interactions.

Strong interpersonal relationships and regular family meals are positively linked with several positive socioemotional and academic outcomes among youth.^{1-5,40} But for some families, when confronted with multiple disruptions and activities, eating together merely provided another opportunity for additional negative interactions, thus magnifying underlying interpersonal distress and conflicts. The findings of this study illustrate how household chaos and interpersonal relationships outside of the mealtime setting can positively or negatively influence the mealtime interactions that are so crucial to child development and obesity risk.^{29,32}

From this study, we see a need to understand how one form of chaos may spur other disruptions to activities, ultimately affecting how family meals are experienced. While it is true that many families experience chaos, experiencing poverty and food insecurity appear to add an additional layer of disruption and instability for families.²⁶ Experiencing instability and frequent disruptions make it difficult for caregivers to have consistent, positive, and meaningful interactions with their children, including those during family meals. Experiencing instability and frequent disruptions may negatively affect interactions in the household, particularly among families with poor interpersonal relationships. These additional negative interactions have the potential to lead to more disruption. Future efforts to promote family meals in food-insecure households should take in to consideration these linkages and how well-intentioned efforts to reduce chaos and increase family meal frequency may disrupt these fragile family systems. It is also important to consider how some factors related to poverty and food insecurity (e.g., caregivers who work long, irregular shifts or experiencing food shortages) are sources of chaos and may affect the implementation of interventions or a family's ability to adopt new practices. Future efforts should also consider efforts to improve interpersonal relationships within households as a mechanism, in conjunction with reducing chaos, to increase family meal frequency and improve mealtime interactions.

Limitations

The interviews in this study are reflective of 20 food-insecure families living in one geographic area of the Southeastern United States. We garnered the experiences of a variety of family types (e.g., minority and blended families) along with caregiver-child

dyads, which offer a more comprehensive view of the home environment. Future qualitative studies should be conducted in other regions of the country and with more diverse ethnic groups.

Conclusion

For food-insecure families, experiencing household chaos negatively impacts the structure and frequency of family meals, along with mealtime interactions. The lower frequency of family meals in food-insecure households may be due to influences of chaos on mealtime interactions, not just a lack of time, money, or food. Through this study, we saw that chaos negatively impacted the quality of family meal interactions, both directly and indirectly through pre-existing interpersonal relationships. Findings reveal the importance of strengthening family interpersonal relationships and reducing household chaos to promote high quality family meals that are important for positive child emotional well-being.

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Table 4.1. Participant demographics (n=40)

	Caregiver (n=20)	Child (n=20)
Mean Age (SD)	41.9 (1.8)	12.7 (0.5)
Gender		
Female	90.0% (18)	50.0% (10)
Male	10.0% (2)	50.0% (10)
Race/Ethnicity		
NH White	25.0% (5)	10.0% (2)
NH Black	75.0% (15)	75.0% (15)
NH Mixed Race	-	15.0% (3)
Relationship to Child		
Mother	85.0% (17)	
Father	10.0% (2)	
Grandparent	5.0% (1)	
Household Food Security Status		
Low Food Security	50.0% (10)	
Very Low Food Security	50.0% (10)	
Household Income		
>\$16,000	25.0% (5)	
\$16,000 – \$34,999	50.0% (10)	
\$35,000 – \$49,999	10.0% (2)	
\$50,000 – \$74,999	15.0% (3)	
Mean Household Size	4.18 (0.4)	
% Home Ownership	35% (7)	
% Receiving Free or Reduced Price	70.0% (14)	
School Lunch		
% Received SNAP	65.0% (13)	
% Received WIC	35.0% (7)	
% Received TANF	10.0% (2)	

Note: Definitions of abbreviations: SNAP: Supplemental Nutrition Assistance Program; WIC: Women, Infant, and Children; TANF: Temporary Assistance for Needy Families.

Table 4.2. Household characteristics stratified by level of household food security

(n=20).

	Low Food Security (n=10)	Very Low Food Security (n=10)
Number of Family Meals Each Week		
Never	2	-
1 – 4 times per week	6	8
>4 times per week	2	2
Family Meal Location		
Only at Dining Table	3	5
Only in Living Room	1	1
Both Dining Table and Living Room	4	4
No Family Meals	2	-
Television Usage during Family Meals		
No Television	3	3
Some Television	5	7
No Family Meals	2	-
Household Chaos		
Low Chaos	6	5
High Chaos	4	5
Interpersonal Relationships		
Positive	7	3
Negative	3	7
Arguments during Family Meals		
Sometimes/Frequently	3	5
Rarely/Never	5	5
No Family Meals	2	-

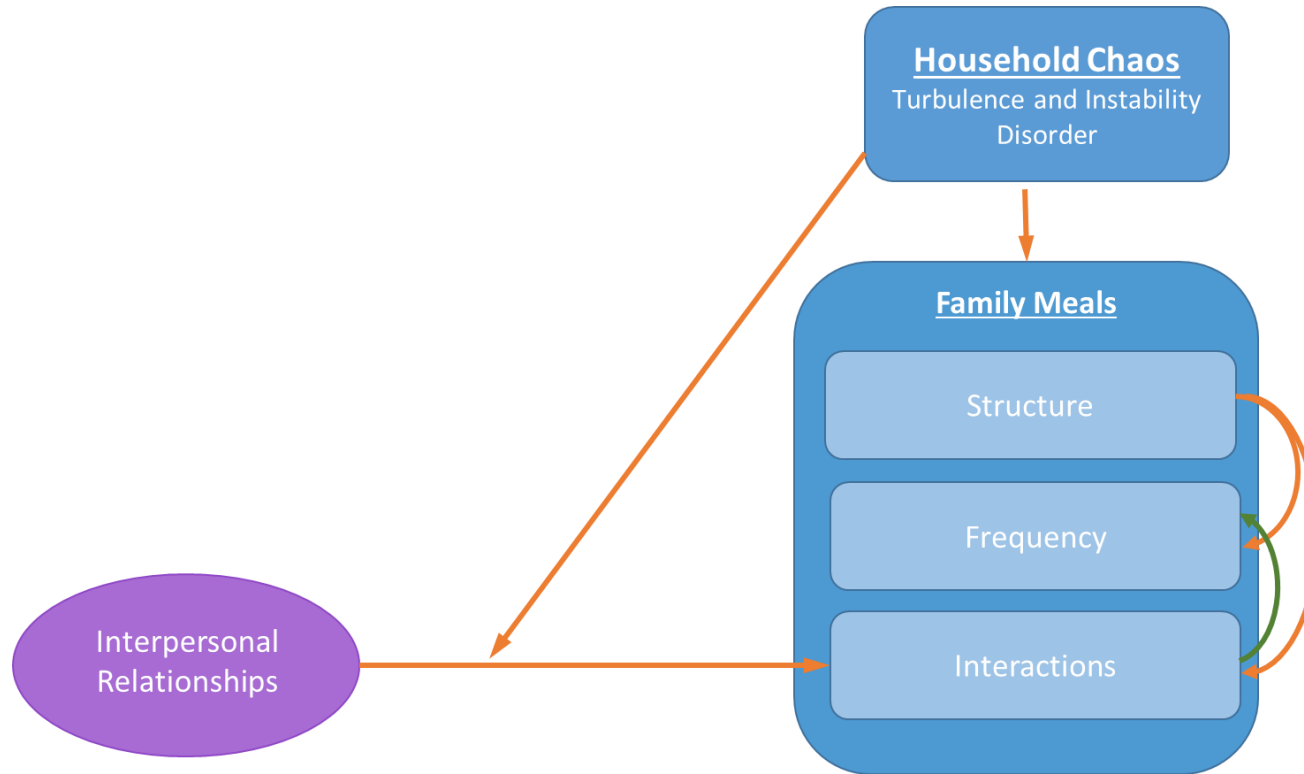


Figure 4.1. Conceptual framework detailing the relationships between household chaos and family meals (Developed from participant responses)

4.2. PAPER 2: CHAOS AND FAMILY MEALS IN FOOD INSECURE HOUSEHOLDS: UNDERSTANDING HOW THE MEALTIME ENVIRONMENT CAN AFFECT CHILD DIET QUALITY AND WORRY ABOUT FOOD²

Abstract

Family meals are important family activities that have many positive nutritional and emotional benefits for children. One possible reason for these benefits are interactions among family members. Children in food insecure households also experience higher amounts of chaos, lower diet quality, and may also experience worry about having enough to eat, all of which may affect the construction of family meals, the frequency of family meals, and mealtime interactions. The purpose of this study was to examine if the family meal experience (construction, frequency, and mealtime interactions) mediate the relationship between household chaos and child diet quality (Healthy Eating Index Score) and worry about food, a possible indicator of the emotional consequences of food insecurity. Household and family meal data were from Midlands Family Study and the Family Mealtime Study. Combined, these studies included data from 132 ethnically diverse caregiver-child (8-15 y) dyads living in food insecure households in South Carolina. The dataset also included a 24-hour recall from the children. Data were analyzed as a multiple mediator model using STATA 13. Family meal frequency was not significantly associated with household chaos or any of the child outcomes. Household chaos was significantly associated with child diet quality, even when controlling for all

² Rosemond, T.N., Shapiro, C.J., Burke, M.P., Frongillo, E.A., Blake, C.E. To be submitted to Pediatrics

mediators. For child worry about food, the family meal experience did significantly mediate this relationship, with the interpersonal quality of meals reducing child worry about food. However, television usage during meals and use of convenience foods by caregivers increased child worry about food. Understanding family meal experiences of children in food-insecure households highlights the importance of positive mealtime interactions that may strengthen emotional connections in families to improve child health outcomes.

Introduction

Household food insecurity is a prevalent problem in the United States, with 19.2% of households with children experiencing food insecurity at some time in 2014.¹ Household food insecurity is used to identify a household that has challenges accessing food or food shortages, and is often classified into two categories: Low food-secure (LFS) and very low food-secure (VLFS).¹ Members of LFS households typically have problems with food access and disruption in eating patterns and reduced food intake among its members, but rarely experience reduced food consumption. The impact of LFS and VLFS extend to children's growth and development, with children living in food-insecure households experiencing poorer educational, socioemotional, behavioral and physical health outcomes as compared to children in food secure households.²⁻⁶

Prior research has revealed that food insecurity is not experienced uniformly across all family members within a household, and that children are aware of their family's food insecurity.^{2,7} Many measures of food security are conducted at the

household level and do not account for child perceptions or experiences. Children's awareness of their family's food insecurity can manifest itself physically (e.g., hunger or tiredness), emotionally (e.g. worry or sadness), and cognitively (e.g., knowing that food is running low or seeing variations in food quality).⁷ Children may also employ coping strategies to help save food in the household (e.g., eating away from home or eating less food), oftentimes unbeknownst to their parents.^{2,7,8}

In addition to having an awareness of food insecurity, children with growing up in a food-insecure households face challenges with socioemotional development, nutrition, and physical health. Children who grow up in impoverished and food-insecure households are more likely to experience internalizing (e.g., anxiety, fear, feelings of worthlessness) and externalizing (e.g., cheating, lying, arguing, or bullying) problems when compared to children in food secure households.^{9,10} These children often face more stressful, traumatic, and negative life events than their food secure counterparts.^{9,11} The accumulation and increased exposures of these negative life experiences hinder socioemotional development, and increase the odds of these children experiencing depression and anxiety.^{9,11,12} Parent-child interactions are also affected by experiencing food insecurity, financial instability, and multiple stressors, resulting in reduce parental responsiveness to a child's emotional needs and reduce instrumental support for a child's cognitive developmental needs.¹³⁻¹⁶

Experiencing food insecurity can also negatively impact diet quality, or the nutritional quality and variety of foods consumed.^{17,18} Child diet quality has both short-

and long-term physical health consequences, such as weight regulation and chronic disease risk.¹⁹ Although nationwide, children do not consume enough fruits and vegetables, children in food-insecure households eat even fewer fruits and vegetables, yet often consume more energy-dense, nutrient-poor (EDNP) foods, which can increase obesity risk.^{6,20-22} Food insecurity is also associated with iron-deficiency, which can affect energy levels and academic performance.²³⁻²⁷ These nutritional outcomes occur despite parental efforts to shield their children from nutritional deficits.^{22,28}

In addition to the negative consequences of food insecurity, low-income households often experience high amounts of household chaos, defined as home environments that exhibit “unpredictable, non-routine, inconsistent, and non-contingent physical and social surroundings.”²⁹ Although chaos is common in many home environments, with families pressed for time due to multiple work, school, and life demands, low-income households are more likely to face chaotic living conditions that can affect child development in multiple ways, including negative behavior and socioemotional adjustment.²⁹⁻³² Chaos in food-insecure households can come from multiple environmental influences, such as lack of routine and high unpredictability deriving from parent work schedules, experiencing food shortages, and altered routines for both parents and children, including children assuming adult responsibilities (e.g., caring for siblings) or activities to acquire and manage food resources.³³⁻³⁵ Residing in crowded, noisy, and suboptimal living conditions can lead to additional unpredictable events and high levels of distractions for low-income and food-insecure families.^{36,37} Higher levels of chaos not only affect the amount of activity and predictability of routines

in the household, but can also negatively affect interactions among family members, further affecting child development.³⁸⁻⁴⁰

As a way to help support a child's physical, emotional, and cognitive development, families are encouraged to eat together often. Family meals are associated with positive nutritional outcomes in children such as improved fruit and vegetable intake, reduced snacking behaviors, reduced disordered eating behaviors, and healthy weight among children and adolescents.⁴¹⁻⁴⁴ For children, family meals are generally also associated with improved emotional well-being, fewer depressive symptoms, and increased self-esteem.^{17,45} It is posited that family meals work through two mechanisms to promote healthy child development: organizational structures and emotional connections.⁴⁶⁻⁴⁸ The organization involved in planning a family meal can encompass meal planning, assignment of roles, behavior and attendance expectations, and the regularity of the routine itself.^{49,50} Having a routine, however, is not enough to make this time together beneficial; positive emotional connections during the meal are also needed.⁵¹⁻⁵³ Strong emotional connections, particularly during mealtimes, can build a supportive environment for the development of children's self-regulation of behavior and emotions while increasing a sense of security for children. It is important for these connections to thrive in settings with open communication and few distractions, such as television.³⁴ These connections have also been associated with lower obesity risk for children and adolescents.^{48,54,55}

While the frequency of family meals in food-insecure households differs from that of food secure households,⁵⁶ it is unclear if the nutritional and emotional benefits of family meals extend to children living in food-insecure households. Household chaos may affect the frequency of routines such as family meals and may influence family mealtime interactions, and as described above, both routine and emotional connections are important ways that family meals promote healthy child development. Chaos may also affect other aspects of organizing the family meal, such as whether or not caregivers use meal planning techniques or convenience foods when balancing meal needs of the family with the demands of work, school, and family life.^{57,58} The amount of meal planning can vary by household, with some caregivers thoroughly planning meals while others choosing to address dinner when the time arises.⁵⁹ Using convenience foods are ways caregivers can reduce the amount of time needed for preparing meals, but can be more expensive.⁶⁰ Use of convenience foods may also impact child diet quality, especially increasing the percentage of kilocalories consumed and intake of dietary fat.^{57,58}

The first aim of this study was to test associations between household chaos and child diet quality and household chaos and child worry about food (a potential indicator of food insecurity). The second aim of this study was to see if the construction of meals (use of convenience foods and meal planning), frequency of family meals, and the mealtime interactions (the interpersonal quality of family meals and television watching during meals) mediate these relationships. We hypothesized that chaos was negatively associated with child diet quality, but that more frequent family meals and higher

interpersonal quality would result in higher child diet quality. We also hypothesized that use of convenience foods would be higher in households with more chaos, resulting in reduced child diet quality. We hypothesized the inverse relationship for meal planning, with less planning in homes experiencing chaos, but that meal planning would be associated with improved child diet quality. Lastly, we hypothesized that household chaos would be positively associated with child worry about food, but that frequent family meals and family meals with higher interpersonal quality would reduce this worry.

Methods

Data were from the Midlands Family Study (MFS)⁶¹ which sought to examine factors that protect children against VLFS, and the Family Mealtime Study (FMS)⁶² which examined the association between various aspects of the social context of mealtime and dietary quality among children within food-insecure households.

Sample

Participants for the Midlands Family Study were recruited from a variety of sites, including grocery stores and emergency food providers through a flyer posted at the site or in-person by a member of the research team. After consent to participate in the study was given, research team members then administered a brief screener to determine eligibility. This screening questionnaire was administered either in person or over the phone. All participants were given an incentive, regardless of study eligibility. The screener took about ten minutes to complete and was administered either over the phone in person. All responses were directly entered into a computer. Inclusion criteria were:

(1) had a child under 18 living in the household at least 50% of the time, (2) resided in one of the eight study counties, (3) had a total household income below \$100,000 per year, and (4) fell into one of the eligible food-security categories (food secure, food-insecure, child hunger). For a detailed description of the sampling and recruitment strategy, see Liese et. al.⁶¹

The Family Mealtime Study recruited a sub-sample of participants from the same stakeholders, recruiting some participants who also completed the MFS surveys. Three hundred and thirty-two people agreed to participate, and 193 completed a survey, for a response rate of 58.1%. The eligibility criteria were: legal custody of a child between the ages of 9 and 15, the child lived in the household at least 50% of the time, the respondent was age 18 or older, the respondent resided in one of the nine study areas (determined by zip code), household income below \$100,000 regardless of food security status, respondent affirmed at least three or more items on the Household Food Security Survey,⁶³ and respondent self-classified as either non-Hispanic African-American or non-Hispanic White. This survey included responses from both the participant and one child from the household.

For the purposes of this study, we only included data from those who participated in both studies and were food-insecure (either LFS or VLFS), which yielded a total sample size of 132 caregiver-child dyads.

Measures

From the Midlands Family Study, we used the following measures:

Household Food-Security Status. Food-security status was measured using the 18-item Households Food Security Survey Module from the United States Department of Agriculture⁶⁴. This was completed by the primary caregiver at screening. Respondents were categorized as having low food security if they affirmed between three and five items in the Household Food Security Survey Module, and categorized as having very low food security if they affirmed six or more items.

Household Chaos: Household chaos was assessed by the primary caregiver using the Confusion, Hubbub, and Order Scale (CHAOS) developed by Matheny, Wachs, Ludwig, & Philips.⁶⁵ In this assessment, participants answer true or false to fifteen statements, seven of which are reversed coded. Example statements include, “There is often a fuss in our home,” and “No matter what our family plans, it usually doesn’t seem to work out.” The measure had satisfactory internal consistency ($\alpha=0.74$) and test-retest reliability ($\alpha=0.74$).

Family Meal Construction: Meal planning strategies: The subscale assessing meal planning strategies was adapted from scale items created by Blake, Wethington, Farrell, Bisogni, & Devine⁵⁷ and Devine, et al.⁵⁸ The subscale contained three items, with responses ranging from “never” to “always”. These items asked about meal preparation methods such as preparing enough for leftovers, or preparing meals for cooking in

advance. These responses ranged from “never” to “always” and were coded from 1-4, and an average score for all three questions were used for the analyses.

Family Meal Construction: Use of convenience foods. To explore how the use of convenience foods provided at family meals might impact child diet we used data from questions about strategies to reduce time to prepare family meals.^{57,58} Use of convenience foods at family meals was assessed using a 2-item subscale with responses ranging from “rarely” to “often” and were coded from 1-3. The questions asked about the frequency of use for convenience and quick preparation food items such as canned goods and boxed food items. The average of the two items was used for analyses.

From the Family Mealtime Study, we used the following measures:

Participant Demographics. Primary caregivers were asked to report their age, race, highest level of educational attainment, employment status, income, marital status, number of adults in the household, number of children in the household, and age of the child who participated in the study. Caregivers were also asked if they currently receive benefits through the Supplemental Nutrition Assistance Program and the Women Infant, and Children’s assistance program.

Mealtime frequency. To assess the frequency family meals, we asked primary caregivers several questions from the Early Childhood Longitudinal Study-Kindergarten 1998-1999 survey⁶⁶. For frequency of family meals, we asked “In a typical week, please tell me how

often your family eats the evening meal together.” Response categories were “never,” “sometimes,” “most of the time,” or “always” and were coded 1-4.

Mealtime interactions. To assess the quality of mealtime interactions, caregivers were asked about television usage during the meals along with questions the mealtime environment and interactions. To measure television usage during mealtime, we asked, “How often does your child watch TV or videos during mealtime?” Response categories were “never,” “sometimes,” “most of the time,” or “always” and were coded 1-4.

The second set of questions to measure family meal interactions were from the Family Eating Attitude and Behavior Scale (FEABS) “atmosphere of family meals” subscale.⁶⁷ This subscale contains five questions such as, “In my family, eating together brings people together in an enjoyable way.” Response categories were “strongly disagree,” “disagree,” “agree,” and “strongly agree” and were coded from 1-4. The subscale was summed and treated as a continuous variable, ranging from four to sixteen.

Child dietary intake and dietary quality. A trained interviewer collected a single 24-hour dietary recall from the children enrolled in the study. Dietary intake data were collected and analyzed using the multiple pass method and Nutrition Data System for Research (NDSR) software developed by the Nutrition Coordinating Center (NCC), University of Minnesota, Minneapolis, MN⁶⁸. The dietary recalls were collected on all days of the week and varying times of the day. Overall dietary quality was assessed using the Healthy Eating Index (HEI)-2005⁶⁹, a tool to measure compliance to the 2005 Dietary Guidelines

for Americans. The HEI-2005 uses 12 separate components to evaluate consumption patterns per 1,000 kcals of each of the following: total fruit, total whole fruit, total vegetables, dark-green vegetables and orange vegetables or legumes, total grains, total whole grains, milk, meat and beans, saturated fat, oils, sodium, and solid fats and added sugars. The HEI-2005 is a continuous measure with a range of 0-100 with a score of 0-51 being considered “bad,” 52-80 being considered “needs improvement,” and 81-100 being considered “good.” HEI scores were generated from NDSR nutrient output.⁷⁰

Due to the distribution of HEI scores being skew, we grouped each participant in their respective categories based on score. Each child was assigned to their respective HEI category, with “bad” and “needs improvement”, and coded as zero and one, respectively. No child in this study scored in the “good” range. Our results will be interpreted as odds of being in either the “bad” or “needs improvement” category, instead of predicting an Although dichotomizing the scores would have reduced statistical power, there was still sufficient power to make inferences.

Child worry. In the child portion of the survey, we asked, “How often do you worry about food?” Response categories were “never”, “rarely”, “sometimes”, “most of the time”, or “always” and were originally coded 1-5. Because the responses were significantly skewed, the responses were then dichotomized into “never or rarely” and “sometimes to always” and coded as zero or one, respectively with “never or rarely” as the reference category in the statistical models.

Data Analysis

For the mediation analyses, we conducted a multiple mediator model using the approach described by MacKinnon and colleagues⁷¹ to examine associations between household chaos (independent variable), child Healthy Eating Index Score (dependent variable) and child worry (dependent variable). The mediators for both models were family meal construction (meal planning and use of convenience and quick preparation foods), family meal frequency, and mealtime interactions (interpersonal quality of family meals score and television watching during meals).

For each dependent variable, we used the following protocol. First, we assessed the total effect (c) of household chaos on the dependent variable using logistic regression. Then we assessed the associations between household chaos and each mediator (a) using OLS regression. Lastly, using logistic regression, we assessed the direct effect (c') of household chaos on each dependent variable adjusting for the mediating variables (b). To reduce the potential for confounding, each model controlled for the respondent child's age, as well as the socioeconomic variables of caregiver race, caregiver educational attainment, and caregiver income.

If the association between household chaos and the dependent variable was mediated by the family meal experience (construction, frequency, and mealtime interactions), we would expect to see a reduction in the coefficient for household chaos when controlling for these factors. We would also expect to see an association between

household chaos and each mediating variable. The total indirect effect of household chaos was computed by summing the effects of each mediating variable.

All analyses were completed using STATA 13 using the binary mediation macros.⁷² Furthermore, to avoid Type I errors, we used bootstrapping (5,000 replications) to produce bias-corrected confidence intervals testing the significance of the total, direct, and indirect effects.^{73–76}

Results

There were 132 caregiver-child dyads in the study sample (Table 4.3). Fifty-eight percent lived in households with low food security and most households received benefits from the Supplemental Nutrition Assistance Program. The mean age of caregivers was 39.5 and 12.0 for children. Most child participants were non-Hispanic black. There was an even split of male and female child participants, but almost all of the caregivers interviewed were female.

For mealtime-related behaviors, 81% of primary caregivers said that their family eats dinner together most of the time or always and 31% of primary caregivers said that these meals were in front of a television most of the time or always (Table 4.4). The mean interpersonal quality of family meals score was 16.4, with scores ranging from eleven to twenty. For household chaos, the mean score was 4.6, with a range of zero to fifteen. For primary caregiver's use of convenience foods, the mean score was 2.2, with a range of one to three. Child HEI averaged 52.3, with 51% of participants in the “needs

improvement” category. Thirty-six percent of child participants said that they worry about food at least sometimes.

Bivariate associations (Tables 4.5 and 4.6) between each mediator and the dependent variables along with testing of the *a* paths for each mediator revealed that both frequency of family meals and meal planning strategies were not significantly associated with either the independent or dependent variables. These two variables were thus removed from the final models, leaving interpersonal quality of family meals, television usage during meals, and use of convenience foods as mediators. For the *a* paths of each mediation model (Figures 4.2 and 4.3), household chaos was significantly associated with the interpersonal quality of family meals ($p=0.04$), television watching during meals ($p=0.01$), and the use of convenience foods ($p=0.01$).

Dependent Variable #1: Child Healthy Eating Index Score

Overall, results of this mediation analysis showed that household chaos was significantly associated with diet quality ($p=0.01$), even with the addition of mediators ($p=0.01$). As household chaos increased, participants had a 15% increased odds of reporting a Healthy Eating Index (HEI) score in the “bad” category (Table 4.7). None of the mediators were significantly associated with HEI score in the final models. There were also no significant mediation pathways in this model (Figure 4.2 and Table 4.8).

Dependent Variable #2: Child worry about food

When examining the relationship between household chaos and child worry about food while adjusting for our three mediators, the interpersonal quality of meals significantly reduced child worry by 20% ($p=0.01$). Watching television during meals was associated with a 1.53 (1.03-2.30) increased odds of child worry about food. The use of convenience foods also significantly increased child worry about food, with an odds ratio of 2.37 (1.16-4.83). In addition to the mediators, the child's age was significantly associated with reduced worry about food. The total indirect effect of household chaos through these mediators was significant with an odds ratio of 1.09 (1.06 – 1.39). Both the total effect and direct effect of household chaos on child worry were not significant, but the coefficient was reduced from 0.06 to -0.02 with the addition of the mediators, indicating mediation. For a diagram of each mediation pathway, see Figures 4.2 and 4.3.

Discussion

In summary, our results indicate that child diet quality was significantly associated with household chaos. Both the total and direct effect of household chaos on healthy eating index scores in children were significant, however, none of the indirect effects of the mediators were significant. In contrast, the interpersonal quality of family meals, including television use during meals and use of convenience foods, were significantly associated with child worry. The interpersonal quality of meals reduced the odds of children worry about food, whereas use of convenience foods and watching television increased the odds of worry. After controlling for all confounders, family meal

frequency was not significantly associated with household chaos, child HEI category, or worry about food.

These results tell us that the effects of household chaos on child diet quality extend beyond the family meal itself. Also, it appears that the interpersonal quality of meals may not be enough to overcome the negative effects of chaos and other factors related to child diet. One possible explanation for how household chaos may impact child diet is the variety of locations outside the home in which children consume food that is the direct result of chaotic schedules, poor predictability of routines, and changes in caregivers. For children in food-insecure households experiencing chaos, mealtime frequency and location can vary throughout the day, from day-to-day and week-to-week, especially when food shortages occur. In an earlier qualitative study of household chaos and family meals,⁷⁷ both caregivers and children reported that they varied their eating locations depending on whether food was available or not in their own households. Some of the decisions were made at the point when hunger set in and they sought out friends and relatives who had food. Future studies should examine not only the usual dietary intake of children, and the general location, but how changes in location and the reasons for those changes may affect child diet quality.

We found that for children in food-insecure households experiencing chaos, having family meals with positive interpersonal interactions was significantly associated with reduced worry about food, whereas television watching during meals was significantly associated with increased worry about food. The direct and total effects of

household chaos on child worry was not significant. Reasons for not having a significant direct or indirect effect could include suppression, inconsistent mediation, or the possibility that household chaos exhibits a stronger effect on the mediators than on child worry, leading to a stronger indirect effect and nonsignificant direct and total effects.⁷⁸

Study results extends our understanding of how family meals that include positive mealtime interactions can provide a sense of security among children in food-insecure households,⁵¹⁻⁵³ possibly reducing the negative impact of food insecurity on child well-being. It is unclear how these interactions function to reduce child worry about food, and future studies should examine mealtime interactions to understand this relationship. It is possible that caregivers who exhibit more authoritative parenting styles and use a healthy balance of control and responsiveness in their interactions,⁷⁹ provide mealtime environments that protect children from some of the negative impacts of food insecurity and household chaos that results from poverty. More research is needed to understand how parenting style and caregiver-child interactions can reduce worry about food for children.

The finding of television use during meals being associated with increased worry at first glance appears puzzling. However, previous research has shown that children and adolescents watch more television when experiencing food shortages as a way to cope and forget about their hunger.^{8,35} This has the potential to be a negative coping mechanism since television watching is linked to increased snacking behaviors and is a form of sedentary behavior.⁷ Unfortunately, television during meals also distract from

caregivers and their children engaging in positive interactions that are essential for child well-being.

Household chaos was negatively associated with the interpersonal quality of family meals and positively associated with television use during meals and the use of convenience foods. In these households, if chaos was greater, the interpersonal quality of family meals was lower, which is an area of concern because these positive interpersonal experiences are important for child socioemotional development.³⁰ Previous work has shown that in more chaotic homes, relationships between caregivers and children are often strained and suffer from negative interactions.^{30,77,80} These strained interactions may bleed over to the mealtime experience, creating a stressful environment, and our findings also demonstrate an association between chaos in the home and mealtime interactions, further extending our knowledge of how household chaos may negatively impact the home eating environment and healthy child development.

While the significant association of chaos with use of convenience foods for meals may indicate that caregivers use these kinds of foods in response to their hectic schedules, it may also be an indicator to children suggesting that the household food supply is low and cause worry. Previous qualitative work by the author revealed that both children and caregivers admit to using boxed and canned foods, especially in times of financial challenges as a low-cost way to feed the family.⁷⁷ Qualitative work by Fram et al.,⁷ has shown that children are aware of how the variety and quality of foods served changes in times of sufficiency versus insufficiency. Their work also showed that

children can contrast how the types of food available in the home vary throughout the month based on when food assistance (e.g., SNAP benefits) are received.

Strengths and Limitations

Our study provided important insights into how chaos impacts children's family meal experiences in food insecure households, however, there were some limitations to our study. They include the use of cross-sectional data, which reduces our ability to determine causality. We are also unable to understand how experiencing food shortages may affect child diet quality and the family meal environment since the data are cross-sectional. We also only used one item to assess child emotional perceptions of the food environment as a potential indicator of food insecurity. We also did not have sufficient data on other key constructs such as parenting style or the number of food shortages experienced by the family. Furthermore, participant recall bias can influence the quality of information collected by the researcher during the nutrition assessment. Strengths of this study include the use of responses from both caregivers and their children, which allow for us to understand the impact of chaos and family meals on children directly. A 24-hour dietary recall was also used, it is a validated method of dietary assessment that allowed us to measure compliance to food pyramid standards.

Conclusion

The results of this study indicate that for food-insecure families experiencing chaos, family meals that include high quality interpersonal interactions, less television and less frequent use of convenience foods can reduce child worry about food, which is

an emotional response to food insecurity. Our results also indicate that the interpersonal quality of family meals in these food-insecure households does not compensate for the negative impact of household chaos on child diet quality. Findings also showed that the frequency of family meals did not impact child diet quality or worry about food. Future studies should investigate possible mechanisms in which household chaos affects child diet quality and how strong interpersonal interactions can reduce child worry about food.

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Table 4.3. Participant demographics (n=132)

	<u>Mean (SD) or Percentage</u>
Child Age	12.0 (2.0)
Child Gender	
Female	50.0%
Male	50.0
Child Race/Ethnicity	
NH White	14.4
NH Black	84.1
Other	1.5
Caregiver Age	39.5 (10.6)
Caregiver Gender	
Female	94.7
Male	5.3
Caregiver Race/Ethnicity	
NH White	13.6
NH Black	86.4
Household Food Security Status	
Low Food Security	58.3
Very Low Food Security	41.7
Caregiver's Educational Attainment	
High School Diploma or Less	46.2
Some College	33.3
College Degree or Higher	20.5
Caregiver's Marital Status	
Single/Never Married	42.5
Married	27.5
Widowed	2.5
Divorced/Separated	27.5
Caregivers Employed at Least Part-Time	47.7
Mean Household Size	4.4 (1.4)
% Received SNAP Benefits[±]	80.3
% Received WIC Benefits[§]	15.2

[±] Supplemental Nutritional Assistance Program

[§] Women, Infant, and Children

Table 4.4. Household and mealtime characteristics (n=132)

	Mean (SD) or Percentage
Frequency of Family Meals	
Never	1.5% (2)
Sometimes	16.7 (23)
Most of the time	36.4 (48)
Always	44.7 (59)
CHAOS Score (Range: 0 - 15)	4.6 (3.8)
Child Healthy Eating Index Classification	
Bad (HEI≤51)	49.2% (65)
Needs Improvement (HEI between 52 and 80)	50.8 (67)
Frequency of Child Worry about Food	
Never	38.6% (51)
Rarely	25.8 (34)
Sometimes	31.1 (41)
Most of the time	1.5 (2)
Always	3.0 (4)
Interpersonal Mealtime Quality Score (Range: 11 – 20)	16.4 (2.5)
Television during Meals	
Never	25.0% (33)
Sometimes	43.9 (58)
Most of the time	15.2 (20)
Always	15.9 (21)
Frequency of Using Convenience Foods (Range: 1 – 3)	2.20 (0.6)

Table 4.5. Bivariate results for child Healthy Eating Index (HEI) category and the independent, mediating, and control variables.[§]

	Child HEI: Needs Improvement (n=67)	Child HEI: Bad (n=65)
Household Chaos*	5.40 (4.3)	3.81 (3.1)
Meal Planning*	2.20 (0.6)	1.99 (0.6)
Use of Convenience Foods	2.10 (0.6)	2.30 (0.6)
Family Meal Frequency	3.15 (0.8)	3.34 (0.8)
Interpersonal Quality of Family Meal	16.37 (2.4)	16.43 (2.6)
Television Use During Meals	2.28 (1.0)	2.15 (1.0)
Child Age	11.84 (1.9)	12.15 (2.1)
Caregiver Race		
African-American	89.55%	83.08%
White	10.45%	16.92%
Caregiver Income		
<\$10,000	55.22%	60.00%
\$10,000 – \$25,000	28.36%	23.08%
>\$25,000	16.42%	16.92%
Caregiver's Educational Attainment		
High School Diploma or Less	49.25%	43.08%
Some College	32.84%	33.85%
College Degree or Higher	17.91%	23.08%

*Significant at $p < 0.05$

[§]Note: Bivariate analyses were conducted using chi-square tests for categorical outcomes and t-tests for continuous outcomes.

Table 4.6. Bivariate results for child worry about food and the independent, mediating, and control variables.[§]

	Child Worry: Never or Rarely (n=85)	Child Worry: Sometimes to Always (n=47)
Household Chaos	4.21 (3.9)	5.27 (3.7)
Meal Planning*	2.02 (0.6)	2.25 (0.6)
Use of Convenience Foods*	2.09 (0.6)	2.40 (0.5)
Family Meal Frequency	3.33 (0.8)	3.09 (0.8)
Interpersonal Quality of Family Meal*	16.81 (2.5)	15.66 (2.4)
Television Use During Meals*	2.05 (0.9)	2.53 (1.1)
Child Age*	12.26 (1.9)	11.51 (2.1)
Caregiver Race		
African-American	84.71%	89.36%
White	15.29	10.64
Caregiver Income		
<\$10,000	58.82%	55.32%
\$10,000 – \$25,000	17.65	40.43
>\$25,000	23.53	4.26
Caregiver’s Educational Attainment		
High School Diploma or Less	44.71%	48.94%
Some College	34.12	31.91
College Degree or Higher	21.18	19.15

*Significant at $p < 0.05$

[§]Note: Bivariate analyses were conducted using chi-square tests for categorical outcomes and t-tests for continuous outcomes.

Table 4.7. Final logistic regression results for household chaos for child diet and child worry about food

	Outcome: Child HEI Category			Outcome: Child Worry		
	β	$SE \beta$	e^{β}	β	$SE \beta$	e^{β}
Household Chaos	0.14*	0.06	1.15*	-0.02	0.06	0.98
Interpersonal Quality of Family Meals	0.06	0.08	1.06	-0.22*	0.08	0.80*
Television Usage during Meals	-0.31	0.20	0.74	0.43*	0.21	1.53*
Use of Convenience Foods	0.51	0.33	1.67	0.86*	0.36	2.37*
	$\chi^2(8)=16.69, p=0.033$			$\chi^2(8)=25.51, p=.001$		

*Note: All models adjust for caregiver race, level of education, income, and child age.

Table 4.8. Summary of direct, indirect, and total effects for mediation analyses

Outcome	Coefficients	95% Confidence Intervals
Child Healthy Eating Index		
Direct Effect	0.142*	0.044 – 0.464
Total Indirect Effect	-0.003	-0.109 – 0.092
Indirect Effect via Interpersonal Quality	-0.007	-0.077 – 0.016
Indirect Effect via Television Watching	-0.019	-0.117 – 0.006
Indirect Effect via Use of Convenience Foods	0.023	-0.012 – 0.136
Child Worry about Food		
Direct Effect	-0.024	0.001 – 0.145
Total Indirect Effect	0.093*	0.061 – 0.331
Indirect Effect via Interpersonal Quality	0.027*	0.001 – 0.145
Indirect Effect via Television Watching	0.027*	0.001 – 0.134
Indirect Effect via Use of Convenience Foods	0.040*	0.010 – 0.170

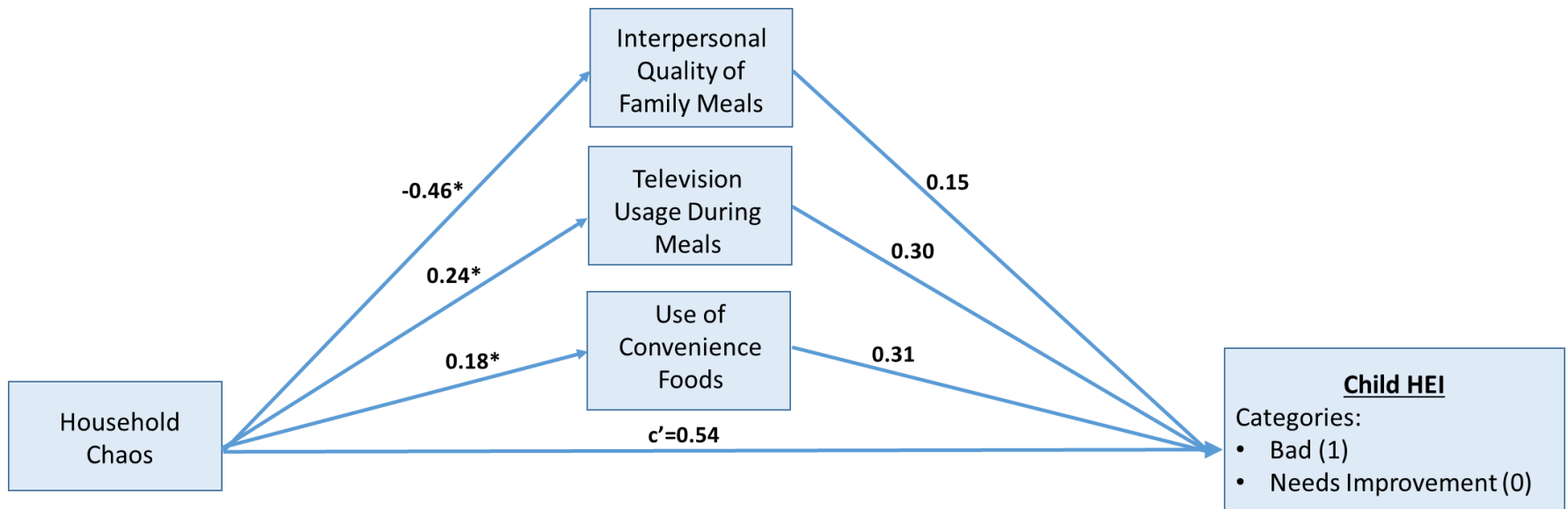


Figure 4.2. Mediation analysis results for chaos to child diet quality (standardized coefficients shown)

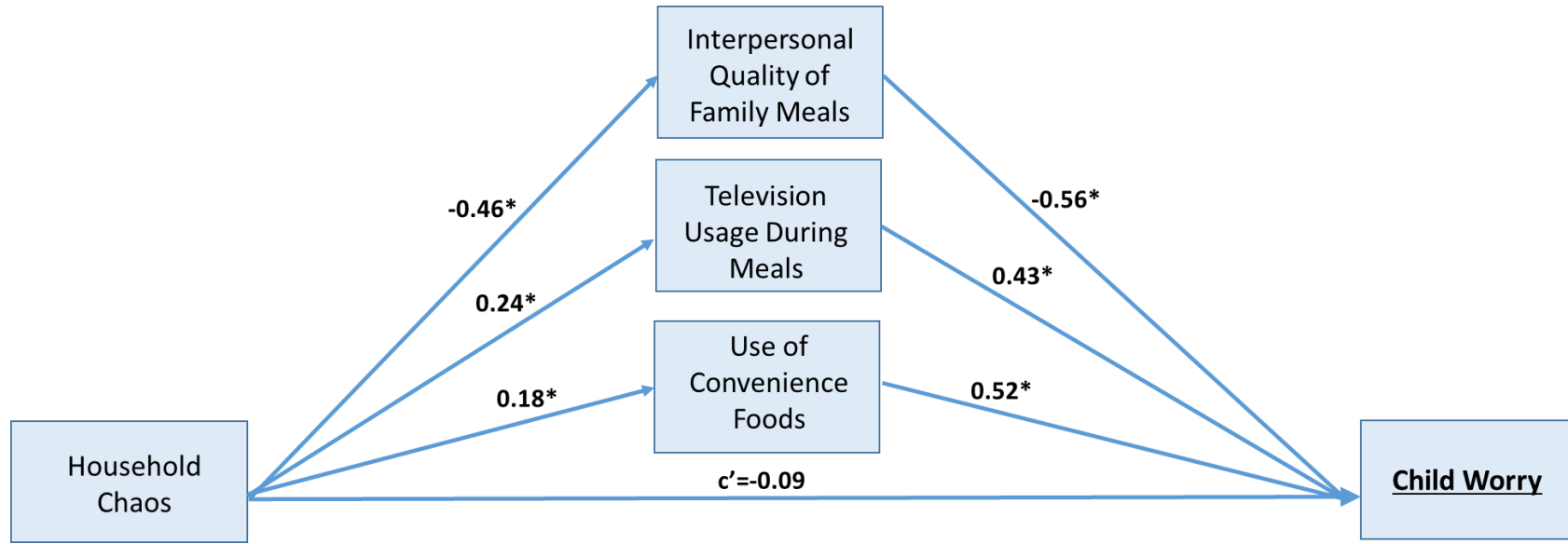


Figure 4.3. Mediation analysis results for chaos to child worry about food (standardized coefficients shown)

CHAPTER 5

SUMMARY, IMPLICATIONS AND RECOMMENDATIONS

The purpose of this study was to understand how food-insecure caregivers and their children value, construct, and experience family meals and how household chaos is associated with the family meal experience and child diet quality using a mixed-methods study design. The first study was qualitative and involved semi-structured interviews with 20 caregiver-child dyads. The overarching research questions and interview guides were guided by a review of the literature and the resultant conceptual framework. The specific aim for the first study was to qualitatively investigate how family meals are valued, constructed, and experienced (e.g., affective and evaluative) by caregivers and their children living in food-insecure households and the role of household chaos in shaping these constructions and experiences.

Based on the interviews, chaos was conceptualized as activities and events that were unpredictable, households with little routine or order, very little environmental stability (e.g., children in multiple homes with different caregivers or moving frequently), along with the feeling or meaning created from these experiences (e.g., stress, frustration, or guilt). Household chaos directly impacted the structure, frequency of the actual meals, and mealtime interactions as well. Furthermore, chaos impacted mealtime interactions directly and through family interpersonal relationships families (both in and outside the context of family meals).

For the families in this study, chaos was described as feeling stressed, feeling out of control, living with constant distractions or disruptions, and having little or no ability to plan future activities. The contributors to chaos varied, and included caregivers working irregular hours, multiple activities for children, and noise in the home or neighborhood. Multiple work and school-related demands interfered with families having multiple meals together each week, with some participants resigned to have fewer family meals while desiring more time together.

The disruptions to family activities (including family meals) described by the participants are consistent with the current literature about the competing demands families face when trying to eat together and about chaos in low-income households.^{24,25,42} There appeared to be additional sources of chaos that were unique to food-insecure households, including facing food shortages and strategies to improve financial stability and access to food. Some of the families faced food shortages, which altered daily activities including the family meal. There were also caregivers who, in their attempts to improve financial stability and access to food, inadvertently contributed to more disruption to their family's daily activities. Some of these activities included seeking food and financial assistance, taking on a second job or working overtime, and returning to school for a new career or career advancement. In terms of seeking food and financial assistance, some caregivers lamented about the time and effort required to obtain and maintain these benefits. One caregiver admitted that she had to stop receiving financial assistance because it required her to miss work too often.

Chaos impacted family meals in three ways: structure, frequency, and the mealtime interactions. First, with regard to meal structure, caregivers found it difficult to plan meals due to multiple work and life demands, and opted to use convenience foods, especially during times of food shortages. Experiencing food shortages also affected the quality of food served along with the locations where families eat. Some families resorted to eating out or at events as a way to find low cost or free food. Second, in terms of frequency, eating together was not possible for some families due to lack of physical structures like a dining room. Many of the children in the study also spent time at multiple homes throughout the week, especially during times of food shortages, further hindering the possibility of eating together as a family. The families in this study described how it was difficult to come together for a meal because life was so hectic, a sentiment that has been expressed in other studies.^{35,183} With regards to mealtime interactions, respondents admitted to being stressed and some report having more strained interactions among family members, both in and outside of the family meal when experiencing high amounts of chaos, including food shortages.

Household chaos also indirectly impacted mealtime interactions through the strength of the interpersonal relationships. Families with poorer interpersonal relationships allowed chaos to negatively affect their mealtime interactions, whereas those with stronger interpersonal relationships sought meaningful interactions despite the chaos. For some families, strong interpersonal relationships was related to increased family meal frequency. These families viewed eating together as an enjoyable activity, despite the extra effort it may require to spend time together. Eating together was also

viewed as a sanctuary from the stresses and negative realities of life. While the actual number of family meals per week may have been few, these families tried to maximize the quality of these interactions. These results highlight the need to better understand how interpersonal relationships may affect the family meal experience, specifically how these relationships may be protective of important family traditions in the midst of food insecurity or high amounts of chaos. Most literature examining family meal benefits have emphasized frequency,^{36,55,184,185} with a recent attempt to understand the underlying mechanisms that cause family meals to be so beneficial. Some work has examined mealtime interactions as contributors to child outcomes such as weight and diet quality,^{37,58,186} or have examined measures of family connectedness or cohesion as control variables.⁵⁴

From this study, we see a need to understand how one form of chaos may spur other disruptions to activities, ultimately affecting how family meals are experienced. While it is true that many families experience chaos, experiencing poverty and food insecurity appear to add an additional layer of disruption and instability for families.³² Experiencing instability and frequent disruptions make it difficult for caregivers to have consistent, positive, and meaningful interactions with their children, such as family meals. Experiencing instability and frequent disruptions may negatively affect interactions in the household, particularly among families with poor interpersonal relationships. These additional negative interactions have the potential to lead to more disruption. Future efforts to promote family meals in food-insecure households should take in to consideration these linkages and how well-intentioned efforts to reduce chaos

and increase family meal frequency may disrupt these fragile family systems. It is also important to consider how some factors related to poverty and food insecurity (e.g., caregivers who work long, irregular shifts or experiencing food shortages) are sources of chaos and may affect the implementation of interventions or a family's ability to adopt new practices. Future efforts should also consider efforts to improve interpersonal relationships within households as a mechanism, in conjunction with reducing chaos, to increase family meal frequency and improve mealtime interactions.

The results of the qualitative study revealed that both the interpersonal relationships in the home along with the quality of mealtime interactions were important influences on the family meal experience, in all households, regardless of the amount of chaos assessed. Many children also expressed awareness of their family's food insecurity and the consequences of experiencing food shortages. Some of the consequences of food insecurity included hunger, not feeling well, increased irritability among family members, and negative interactions. Children also expressed worry and stress about their family's financial struggles and lack of food, and that for some, eating together magnified these feelings. Children in families with poorer interpersonal relationships were also aware of the stress and arguments among caregivers during times of food shortages and financial challenges. Children also reported watching more television during periods of food shortages as a way to distract from hunger. In terms of family meal frequency, caregivers and their children both describe shorter and less frequent family meals during times of food shortages.

Results of the qualitative study also revealed that when constructing family meals, caregivers were more likely to use convenience foods because they were low cost and required less time. Caregivers and children also revealed the convenience foods, especially canned goods were used more often in times of food shortages, either because they were inexpensive or because they were received from an outside source (e.g. family, friend, or food pantry). Many caregivers expressed being unable to plan due to their busy lifestyles or uncertainty about food resources. Many of the decisions surrounding meal preparation were completed on the way home or when arriving home from work. For some, meal planning involved deciding where to eat outside the home when food was limited. Some of the decisions were made at the point when hunger set in and children or their caregivers sought out friends and relatives who had food. Some families incorporated activities, such as church or community events, into their schedules because it was a guaranteed meal.

Based on these findings, the conceptual framework was revised to include child emotional health, particularly worry about food as an outcome (Figure 5.1). Worry about food is a possible indicator of the emotional awareness children may experience in response to food insecurity.¹⁹ The revised framework reflected the model developed from results of study 1, with the addition of the child outcomes. The model reflects a view of the family meal experience across three domains: construction, frequency, and interactions, with interpersonal relationships directly affecting mealtime interactions. Household chaos was hypothesized to impact the family meal experience and child outcomes directly. Household chaos was also hypothesized to impact mealtime

interactions based upon the interpersonal relationships in a family. As in the previous model, household chaos was also predicted to impact child diet through the family meal experience. With the addition of child worry about food, household chaos was hypothesized to increase worry about food, but that positive mealtime interactions would reduce the magnitude of this association. Since many caregivers discussed using convenience foods as a way to manage both time and food resources, use of convenience foods was conceptualized as a component of the family meal construction

The study one findings and revised conceptual framework were used to revise the analytic model for the second study to include worry about food as an outcome and use of convenience food as a potential mediator. The second study, a quantitative study, involved an analysis of data from 132 caregiver-child dyads about their family meals, experience with chaos, child diet quality, and child worry about food. For this study, household chaos was the independent variable and child diet quality and worry about food were the dependent variables. Family meal construction (meal planning strategies and use of convenience foods), frequency of family meals, mealtime interactions (interpersonal quality of family meals and television watching during meals) were conceptualized as mediators of the relationships between household chaos and child outcomes. The specific aim and research questions for study two were to examine relationships between household chaos, the family meal experience (construction, frequency, and mealtime interactions), and child outcomes (diet quality (healthy eating index) and worry about food).

In this study, we aimed to extend the findings of manuscript one by examining how household chaos could affect both child diet quality and worry about food. We also aimed to extend prior work examining how the interpersonal quality of family meals is associated with child obesity risk.³⁷ Household chaos was not associated with family meal frequency or meal planning strategies. This is contrary to our findings from the qualitative study and contrary to previously published work about household chaos and the frequency of family activities.^{15,32} Household chaos was negatively associated with the interpersonal quality of family meals and positively associated with television usage during meals and the use of convenience foods. This tells us that in the households surveyed, as chaos increases, the interpersonal quality of family meals decreases and more television is watched during meals. This is concerning because positive mealtime interactions are important for child socioemotional development,²⁸ and may potentially be beneficial for child diet and obesity risk.³⁷ Previous work has shown that in more chaotic homes, relationships between caregivers and children are often strained and suffer from negative interactions.^{15,28} Results from Study 1 also revealed negative interactions in the presence of chaos.

Household chaos was significantly associated with child diet quality, even with the addition of mediators to the model. Based on these findings, for the food-insecure families in the study, the negative impact of household chaos on child diet extends beyond the family meal, and that frequency of family meals and mealtime interactions may not be strong enough to overcome these effects. Possible reasons for these findings include children and families eating at multiple locations, especially in times of food

shortages.¹⁸ In the qualitative study, children and caregivers received foods from a variety of sources, including relatives, food pantries, and events, all of which could contribute to diet quality outside of the family meal. Also, the actual routine of eating a meal may be unpredictable due to food insecurity or hectic schedules. The quality of food served and consumed may also be impacted by a chaotic lifestyle, especially when children eat in different households throughout the week or food quality changes in times of financial instability.¹⁸

As for child worry about food, an emotional outcome of food insecurity, having family meals with positive mealtime interactions was significantly associated with reduced worry about food, whereas television watching during meals was significantly associated with increased worry about food. Frequency of family meals was not related to child worry. In this sample of food-insecure children, eating together in an environment with positive interpersonal interactions may have provided children a sense of security among children in food-insecure households,⁵⁶⁻⁵⁸ possibly reducing child worry about food. Although we could not have a variable measuring interpersonal relationships, we did see similar outcomes among households with strong interpersonal relationships in the qualitative study. For those families, there was an effort to create high quality interactions to bond and disconnect from the negative realities of life. Many of these participants discussed that after eating together they (or a family member) felt happier, even if they approached the dinner table upset or sad. It is unclear how these mealtime interactions function to reduce child worry about food, and observational studies may be necessary to understand how these interactions improve child worry. It is possible that

caregivers who exhibit more authoritative parenting styles and use a healthy balance of control and responsiveness in their interactions¹⁰¹ provide mealtime environments that protect children from some of the negative impacts of food insecurity and household chaos that results from poverty. More research is needed to understand how parenting style and caregiver-child interactions or exposure to interactions between family members can reduce worry about food for children.

As for television usage during meals being associated with increased worry, it is plausible because previous research has shown that children and adolescents watch more television when experiencing food shortages as a way to cope and forget about their hunger.^{31,187} Children in the previous qualitative study also described television as a coping mechanism against hunger, with some children watching more television during times of food shortages. Television was also used as a distraction from mealtime interactions, interactions that could be beneficial for child emotional well-being.

As stated above, use of convenience food was a significant mediator between chaos and child worry about food. This relationship could be driven by children's awareness of changes in foods available in the home in times of food shortages, which has been documented by Fram et al.²⁰ Also, in the qualitative interviews caregivers said that in times of need, they received convenience foods, especially canned goods, from relatives, friends, or food pantries. Some even bought more convenience foods to help stretch tight financial resources. Buying and receiving convenience foods and less fresh

produce among food-insecure populations has been documented,¹⁸⁸⁻¹⁹⁰ and but until now, it has not been shown to impact non-diet outcomes in children.

Public Health Significance

The findings of this study are significant because they reveal how household chaos can shape the family meal experience, including the quality of mealtime interactions for food-insecure families. Strong interpersonal relationships and regular family meals are positively linked with several positive socioemotional and academic outcomes among youth.^{1-5,191} Family meals are an important investment for families that reap many benefits for children, and it is posited that the routine and interpersonal interactions are the driving factors behind their significance.³⁶⁻³⁸ The findings of this dissertation study show how the family's interpersonal dynamics are important in creating and shaping these mealtime experiences, particularly in the context of food insecurity and chaos, but that the biggest benefit may be improved child emotional well-being. This research has also deepened our understanding of the reasons for fewer family meals in food-insecure households, which extend beyond competing work-life demands or low resources^{6,15} to also include chaotic environments and poor family mealtime interactions. Findings reveal the importance of reducing chaos in food-insecure households to foster interpersonal relationships that promote positive child emotional well-being.

Strengths and Limitations

This study employed a sequential exploratory mixed-method design that allowed for the responses of caregivers and children in food-insecure households to aid in the development research questions and testing of hypotheses. The findings of the quantitative study supported the results of the qualitative study, and also helped us to understand how the factors related to the family meal experience affected child outcomes. The qualitative study also gave insight to how chaos might influence the family meal experience, including mealtime interactions. In addition to the mixed-methods study design, both studies contained data from caregivers and children in a variety of family types (e.g., minority and blended families). This allows for a more comprehensive view of the home environment, and in the qualitative study, it helped us to understand how chaos and food insecurity are experienced by children. In addition to both studies having data from caregivers and children, the two populations were very similar in terms of child age, caregiver income, and racial background. The caregivers in the qualitative study were primarily mothers, whereas there were a mix of step-parents and other relatives in the quantitative study. The two populations were also from the same metropolitan area. Another study strength is the use of 24-hour diet recalls to assess child diet quality. This is a valid method for assessing of usual intake, and is appropriate for use in children.

Study limitations include the use of cross-sectional data, which reduces our ability to determine causality. We did not have sufficient data on other key constructs such as family cohesion, interpersonal relationships, parenting style. These are constructs that can help us understand more about the interpersonal relationships and their association with

the family meal experience and child outcomes. We also did not have a measure of the number of food shortages experienced by the family, which could have an impact on both child diet and worry about food. Furthermore, the outcome variable, “child worry about food” was used as a potential indicator of a child’s emotional response to experiencing food insecurity. Future studies could benefit from use of a multidimensional food security screener like that created by Fram, et al.¹⁹ We are also unable to understand how experiencing food shortages may affect child diet and the family meal environment since the data are cross-sectional, specifically if there are any cyclical trends in child diet quality or worry. There was only one 24-hour dietary recall collected from the children, which could increase variability, but should not affect our ability to make inferences about diet quality. Furthermore, participant recall bias can influence the quality of information collected by the researcher during the nutrition assessment. The interviews in this study are reflective of 20 food-insecure families living in one geographic area of the Southeastern United States. Future qualitative studies should be conducted in other regions of the country and with more diverse ethnic groups.

Conclusion and Implications for Future Research

Through this dissertation study, we have gained a deeper understanding of the sources of chaos for food-insecure households, particularly how experiencing food shortages and employing strategies to improve food security disrupt family activities. We have also learned more about how family meals are constructed and experienced in food-insecure households. Through both studies, the mealtime interactions emerged as an

important contributor to how the meals were experienced and how they could impact child emotional well-being in homes experiencing chaos.

There is still uncertainty about how household chaos is associated with child diet quality, future studies should also examine possible linkages between household chaos and child diet quality along with mechanisms through which the interpersonal quality of meals can influence child diet quality and obesity risk. Both the qualitative and quantitative study revealed that the key contributors to a child's diet quality are outside of the family meal. It is important that we investigate the usual dietary intake of children in food-insecure homes, but also go deeper to understand how changes in location of meals consumed and the reasons for those different locations may affect child diet quality. This may help researchers and practitioners give tailored information about promoting healthy eating among food-insecure children.

Future work on increasing family meal frequency should also examine ways to help families reduce chaos and improve interpersonal relationships. From the qualitative study, many families experienced increased chaos while attempting to improve their food security and financial stability. These caregivers experienced negative trade-offs between trying to provide for their children and supporting the emotional well-being of their children through reduced family meals and other interactions. Time spent obtaining financial and food assistance was mentioned multiple times as disruptors to family and work life. This is something to note for assistance program planners, and may require

adjusting the time requirements for program admittance in order to help reduce additional burdens on resource strapped families.

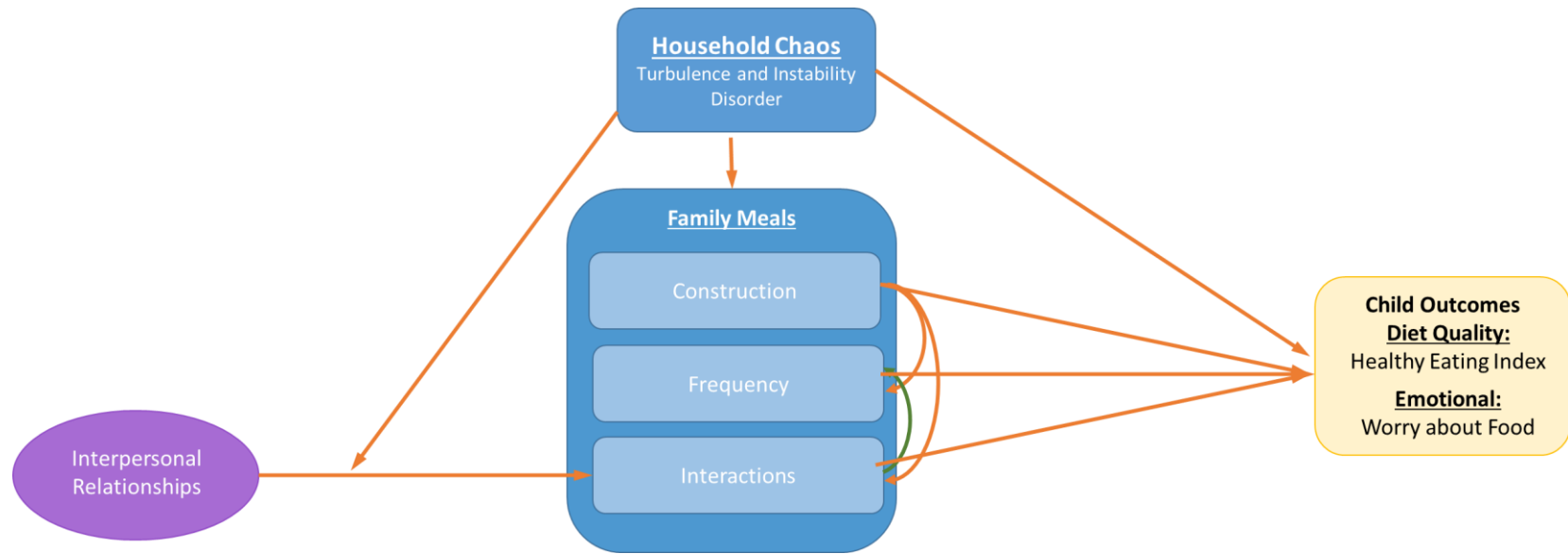


Figure 5.1. Revised conceptual framework based on Specific Aim #1 Results

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APPENDIX A – CAREGIVER CONSENT FORM FOR INTERVIEWS

Daily Activities for Families in SC

Informed Consent

Introduction: *Daily Activities for Families in SC* is a research project being conducted at the University of South Carolina by Tiara N. Rosemond in the School of Public Health. You are invited to participate in this study, and this form explains why we are doing the study and what would be involved in being a participant. Participation in this study is completely voluntary. There will be no negative consequences for deciding not to participate. Choosing not to participate will not affect your involvement in any programs or any services you may receive, now or in the future. If you decide to participate, you can change your mind at any time. You should read this form carefully, and ask the researcher any questions you may have before making a decision to participate.

Purpose: The purpose of this research is to understand the day-to-day experiences of families that are at risk for food insecurity, or reduced access to affordable, nutritious foods. We will interview different parents of children between the ages of 9 and 15. We will interview people who live in different areas, some more rural and some more urban, as well as people of different race and ethnic backgrounds.

Procedures: *As a participant, you will complete one interview with a small questionnaire about you and your household (e.g. your age, race/ethnicity, gender, and number of children):*

- ✓ The interview will last between an hour and an hour and a half.
- ✓ The interview will be audio taped and the researcher will take some notes during the interview.
- ✓ We will ask questions about your family's interactions with each other and about the availability (or lack) of food in your home.
- ✓ In appreciation for your time, we will give you \$20 upon completion of the interview.

Potential risks: You may feel uncomfortable talking about some things that go on from day to day. And you may feel embarrassed to talk about any difficulties you feel you have encountered while doing these activities. Loss of confidentiality is a risk, but we will do everything in our power to ensure that you and family are never personally identified.

Potential benefits: You may feel good about having an opportunity to talk about their activities and experiences.

Confidentiality: We will make every effort to maintain confidentiality. You will be assigned a unique ID number that will be on all study documents. We will never store this consent form with

the audio recordings or interview transcripts. We will use what you tell us as part of the data for our research, and we will keep

that data confidential. We will transcribe the audio-files, and all files will be stored in the Discovery I building on the University of South Carolina Campus. Only research team members will be able to see these files. We will never use your name, and if you share any information with us that might allow others to identify you, we will modify or delete that information in our data. Records that identify you and the consent form signed by you, may, however, be inspected by the University's Institutional Review Board. The results of this research study may be presented at meetings or in publications; however, your identity will not be disclosed.

Contact Persons:

For more information regarding this research you should contact Tiara Rosemond at (803) 777-1902.

If you have any questions about your rights as a research subject, you may contact: Lisa Johnson, Office of Research Compliance, University of South Carolina at (803) 777-6670.

Participant Statement

I have read (or have had read to me) the contents of this consent form and have been encouraged to ask questions. I have received answers to my questions. I voluntarily give my consent to participate in this study. I have received (or will receive) a copy of this form for my records and future reference.

Participant Signature: _____ Date: _____

Researcher Signature: _____ Date: _____

APPENDIX B – ASSENT FORM FOR INTERVIEWS

Daily Activities for Children in SC

Informed Consent for Minor Participants

Introduction: The study, *Daily Activities for Children in SC*, is a research project being conducted at the University of South Carolina by Drs. Ed Frongillo and Christine Blake in the School of Public Health. Your child is invited to participate in this study, and this form explains why we are doing the study and what would be involved in being a participant. Participation in this study is completely voluntary. There will be no negative consequences for deciding not to participate. Choosing not to participate will not affect you or your child's involvement in any programs or any services you may receive, now or in the future. If your child does decide to participate, s/he can change their mind at any time. You and your child should read this form carefully, and ask the researcher any questions you may have before making a decision to participate.

Purpose: The purpose of this research is to understand the daily activities of children who are at risk for food insecurity, or reduced access to affordable, nutritious foods. We will interview different children between the ages of 9 and 15. We will interview people who live in different areas, some more rural and some more urban, as well as people of different race and ethnic backgrounds.

Procedures: *As a participant, your child will complete one interview:*

- ✓ The interview will last between an hour and an hour and a half.
- ✓ The interview will be audio taped and the researcher will take some notes during the interview.
- ✓ We will ask questions about your family's interactions with each other, the availability (or lack) of food in your home, and how your child feels about difficult situations that may arise in your home.
- ✓ In appreciation for your child's time, we will give him/her a \$15 gift card upon completion of the interview.

Potential risks: Your child may feel uncomfortable or shy to talk about some things that go on from day to day. Your child might feel embarrassed to talk about any difficulties they feel they have encountered in their activities. Loss of confidentiality is a risk, but we will do everything in our power to ensure that your child and family are never personally identified. If you would like

to have a copy of the interview questions, please feel free to contact Dr. Christine Blake at (803) 777-1484.

Potential benefits: Your child may feel good about having an opportunity to talk about their activities and experiences.

Confidentiality: We will make every effort to maintain confidentiality. Your child will be assigned a unique ID number that will be on all study documents. We will never store this consent form with the audio recordings or interview transcripts. We will use what your child tells us as part of the data for our research, and we will keep that data confidential. We will transcribe the audio-files, and all files will be stored in the Discovery I building on the University of South Carolina Campus. Only research team members will be able to see these files. We will never use you or your child's name, and if he/she shares any information with us that might allow others to identify him/her, we will modify or delete that information in our data.

Records that identify you and your child and the consent/assent form signed by you may, however, be inspected by the University's Institutional Review Board. The results of this research study may be presented at meetings or in publications; however, your identity will not be disclosed. *While we intend to keep everything that we learn confidential, if your child leads us to believe that he/she is being abused or neglected, we will report this to the appropriate authorities.*

Contact Persons:

For more information regarding this research you should contact Dr. Christine Blake at (803) 777-1484

If you have any questions about your rights as a research subject, you may contact: Lisa Johnson, Office of Research Compliance, University of South Carolina at (803) 777-6670.

Participant Statement

I have read (or have had read to me) the contents of this consent form and have been encouraged to ask questions. I have received answers to my questions. **Parents:** I voluntarily give my consent for my child to participate in this study. I have received (or will receive) a copy of this form for my records and future reference. **Minor Participant:** I voluntarily give my assent to participate in this study.

Participant signature: _____

Date:

Parent/Guardian signature: _____

Date:

Researcher signature: _____ Date: _____

Script/letter for younger children

Dear Child,

Thank you for speaking with me today. I want to tell you about a research study from the University of South Carolina. We are interested in learning more about you and the things you do every day. We will ask questions about your family, daily activities, experiences with getting food to eat, and feelings about difficult situations. You may enjoy talking to us about these things, but if you don't, you can stop answering our questions at any time. You do not have to finish this interview and may stop at any time for any reason. If you would like, your parent is able to sit with you during the interview. For helping us out today, we'll give you a \$15 gift card.

To help us get all of the things you say, we will record this interview. But all of your responses are private – we will never tell anyone what you said. Your name will not be on anything related to today's interview. Instead, I'll put a special number on everything related to today's interview. All of your interview materials will be kept in a locked office in the Discovery I building at USC.

While we will try to keep everything you say private, if we fear that you are being harmed in any way, we will call someone for help. This is to make sure that you are well taken care of at home.

If you have any questions feel free to ask now. If you have questions later you and/or your parent can call Dr. Christine Blake at (803) 777-1484. If you have any questions about how things went today, you may contact: Lisa Johnson, Office of Research Compliance, University of South Carolina at (803) 777-6670.

Thank you,
[Research Staff Member Name]

APPENDIX C – CAREGIVER INTERVIEW GUIDE

Introduction: Thank you for agreeing to talk with me. My name is Tiara Rosemond and I am a doctoral student in Public Health. I am talking to parents and caregivers about meal times and how families interact during these times. I will ask you some questions about how often your family eats together, what goes on during these times, and how you feel about these shared meal times. There are no right or wrong answers. I just want to hear what you think. You don't have to answer any question you don't want to, and you can stop the interview at any point. If you have any questions during our discussion, please feel free to ask and I will do my best to answer your question. I am going to turn on the recorder, is that okay? Okay, great, let's get started.

1. Tell me about your household. Who do you live with?

- a. How are you related to [person]?
- b. How many children do you have? How old are your children?
 - i. Do any of these children live with another parent or family member from time to time? If so, how often do they stay in your home? How was the schedule determined?

2. What's a typical day during the week like for your family?

- a. Do you work at least part-time for wages outside of the home? Can you tell me about your job? How many hours a week do you work? Are your work hours a set schedule or do they vary from week to week? Do you usually work days, evenings, or overnight? Do you have a second job? Can you tell me about your second job? Have your employment hours changed significantly in the past year? Has your employment status changed in the past year? What is your average commute time to and from work?
- b. What activities/events are routine or regularly scheduled for your family?
 - i. What afterschool programs does your (focal) child participate in? How often does s/he participate in this activity? How does s/he get to and from this activity? Are your other child(ren) involved in afterschool activities? How often? How do they get to and from this activity?
 - ii. How often are these activities/events stopped or interrupted?
- c. How would you describe the amount of noise in your home?
- d. How are the day-to-day activities and tasks organized in your home?

- i. Who keeps things organized in your home? How does s/he/you keep things organized?

- e. What might change the typical daily activities in your home? What things make it better? What things make it worse
3. **Please think about [name of child who is in the study] when answering the next few questions. How many days has s/he missed school this week? This marking period? This year?**
 - a. What are the main reasons s/he missed school?
 - b. How do you feel about him/her missing school? How do you think s/he feels about missing school?
4. **What does “eating together as a family” mean to you? Does your family eat together? If so, can you tell me about the times you eat together? Who is there and what is going on?**
 - a. When do you eat together?
 - b. How often do you eat together?
 - c. Where do you eat together? Out/home? Which room in the house?
 - i. *If not at a dining table, Why do you eat there?*
 - d. How is the food served when you eat together (e.g. family style or buffet)?
 - e. How long do you usually eat together?
5. ***If family does not eat together, why doesn't your family eat together?***
 - a. How is food served in your house?
 - b. When does your family usually eat?
 - c. Where do people in your house usually eat?
6. **When eating together as a family, who is responsible for preparing the food you will eat together?**
 - a. What types of foods are typically served during this time?
 - b. Are meals planned in advanced?
 - c. What influences the types of foods served during this time (e.g. individual preferences, shortage of food, etc.)?
 - d. Who is responsible for other tasks related to eating together as a family (e.g. setting the table)?
7. **How important is it for your family to eat together? Why? Can you describe to me what would make eating together ideal? Who? What? When? Where? How?**
8. **Would you like to eat together as a family more or less? Why?**
 - a. What is the ideal number of times you would like to eat together as a family each week?

- i. *If respondent wants more family meals, what are the reasons why you do not eat together (use number given) times a week?*
 - b. Do you face any challenges when trying to eat together on a regular basis? What challenges? (e.g., shortage of food or scheduling)
- 9. Okay, thank you for that information. Now I would like to hear more about what happens before, during, and after the times you eat together. First, think of a typical time that you eat together with family.**
 - a. What is usually going on before your family eats together?
 - b. What do you and other family members typically do while eating together? [e.g., talk, watch TV, phone, homework? Other]?
 - c. What usually happens after your family eats together?
- 10. How would you describe the way your family talks to each other while eating together?**
 - a. What types of things does your family talk about while eating together?
 - b. What would you change about the way you family members talk to each other while eating together? Why?
 - c. What would you keep the same about the way your family talks to each other while eating together? Why?
- 11. Sometimes families may have distractions come up while eating together. How might your family be disrupted while eating together?**
 - a. What are distractions do you deal with while your family is eating together? [probes: Cell phone? Homework? Reading? Television? People? Pets? Fighting? Other?]
 - b. How do these disruptions and distractions affect the time you spend eating together?
- 12. What kinds of challenges do you experience with other people while your family is eating together? With children? How do you handle any child behavior problems during this time?**
- 13. What are the positive things you can say about eating together as a family? What are the negative things you can say about eating together as a family?**
 - a. How do you feel after your family meals?
- 14. What else can you tell me about your time eating together as a family that I did not ask about that will help me understand what meals are like with your family?**

15. Has your family ever experienced times when there was not enough food for everyone? *If yes, How often does this happen? How do you feel about not having enough food for everyone to eat?*

- a. How does not having enough food affect your daily schedule or routine?
 - i. How do these changes make you feel?
- b. What are some ways you try to get more food when there isn't enough available?
 - i. How do you feel about using these resources?
- c. How does not having enough food affect your child(ren)'s daily schedule or routine (e.g., going to an afterschool program, more chores, babysitting a sibling)?
 - i. How do you think your children feel about these changes?
 - ii. Do you think your children know when there isn't enough food in the house? How do they know?
- d. How does not having enough food affect the times you eat together as a family?

Thank you for taking the time to speak to me. What other things do you think I should know about your family's activities and the food you have at home?

APPENDIX D – CHILD INTERVIEW GUIDE

Child Interview Guide

Introduction: Thank you for coming to talk with me. My name is Tiara Rosemond and I am a doctoral student at USC. I am talking to kids like you about your family, food, and the things you like to do. There are no right or wrong answers. I just want to hear what you think. You don't have to answer any question you don't want to, and you can stop the interview at any point. If you have any questions during our discussion, please feel free to ask and I will do my best to answer your question. I am going to turn on the recorder, is that okay? Okay, great, let's get started.

16. What kinds of things do you like to do after school? [Icebreaker]

17. Tell me about your family. Who do you live with?

- a. How are you related to [person]?

18. What's a normal day during the week like for your family?

- a. What you do from the time you wake up until the time you go to bed during the week? On the weekend? What times do you usually do these things?
 - i. How often do are these things stopped or interrupted?
 - ii. What may cause things at home to be stopped or interrupted? What things make it better? What things make it worse?
- b. How would you describe the noise in your house?
- c. How organized (or ordered) are things in your house?
 - i. Who keeps things in order at your house? How does s/he keep things in order?

19. Does your family usually eat together? If so, can you tell me about the times you and your family eat together? Who is there and what is going on?

- a. When do you eat together?
- b. How often do you eat together?
- c. Where do you eat together? Out/home? Which room in the house?
 - i. *If not at a dining table, Why do you eat there?*
- d. Who cooks dinner during the week when your family eats together? On the weekends?

- e. Who makes your plate?
 - i. Does your plate look like you want it to? If not, why?
 - ii. Who picks what foods go on your plate?
- f. How long do you usually eat together?

20. If family doesn't usually eat together, Why doesn't your family usually eat together?

- a. How is food usually served in your home?
- b. When do you usually eat? When do your brother (s)/sister(s) and parent(s) eat?
- c. Where do you usually eat? Where do your brother (s)/sister(s) and parent(s) eat?

21. Think of a time when you usually eat together with your family.

- a. What is happening before this time?
- b. What do you and other family members usually do during the time you eat together? [e.g., talk, watch TV, phone, homework? Other]?
- c. What do you do after you and your family eat together?

22. What are the best things about eating together as a family? What are the not so good things about eating together as a family?

- a. How do you feel after you eat with your family?

23. How important is it for you to eat with your family? Why? What would make this time together good? What makes it not so good? Would you like to eat together as a family more often or less often? Why?

24. Does your family talk a lot or a little when you eat together? Can you describe the way your family talks to each other when you are eating together?

- a. What does your family talk about when you are eating together?
- b. What would you change about the way your family members talk to each other when you eat together? Why?
- c. What would you keep the same about the way your family talks at the family meal? Why?

25. Let's think about a time when there isn't enough food for everyone in your home to eat, what is that like? Do you know anyone who doesn't have enough food to eat?

26. Do you have all the food that you want to eat? If not, why not? What foods or meal(s) would you like to eat, but you don't have at home? (or, but it's not available?)

- a. When does this happen? All year long? Or just at some times? (when may be a season, certain time of the month, etc.)
- b. How do you feel when do you don't have enough food?

27. When there isn't enough food at home, how do you know? How does not having enough food at home make you feel?

- a. What do your parent(s) do differently when there isn't enough food at home?
 - i. How do these changes make you feel?
 - ii. How do you think these changes make your parent(s) feel?
- b. What do you do differently when there isn't enough food at home? What kind of things do you have to do around the house (e.g. watch a sibling, cook, more chores) when there isn't enough food to eat?
 - i. How do these changes make you feel?
- c. How does not having enough food change how your family eats together?
 - i. Do you eat together less often? How are the foods served different than when you have enough food to eat?

28. When you have enough food at home, what kinds of things do you like to do during the week (e.g., visiting friends, playing video games, watching television, using a computer, playing a sport, or taking a nap)? What about afterschool? On the weekend?

- a. Is this the activity you're most likely to do? Why?
- b. How do you feel when you are doing this activity (e.g., running) _____?
- c. If you need to (run or whatever activity)_____some more, do you do it?
(Repeat for all activities mentioned by the child)

29. When you don't have enough food at home, what kinds of things do you like to do during the week? What about afterschool? On the weekend? Is what you do different compared to when there is enough food to eat? How so? Why are things different?

30. Example activities to ask the child about

- Walk to & from school
- Play during recess
- Have PE class
- Play sports
- Garden
- Take care of siblings
- Cook
- Wash and dry clothes
- Buy food
- Run errands
- Work to earn money
- Play video games

- Wash dishes
- Clean
- Sweep
- Watch television
- Use the computer
- Sleep in the afternoon

31. What kinds of things do you skip doing when you don't have enough food?

32. How many days have you missed school this week? This marking period? This year?

- a. What are the main reasons you miss school?
- b. How do you feel about missing school?

33. What does being ashamed mean to you? What does being embarrassed mean to you? Can you tell me about one time that you felt ashamed or embarrassed?

34. Have you ever seen another child feel ashamed (or embarrassed) for getting food? Why do you think he/she felt ashamed?

- a. Would you feel okay getting food like him/her? Why or why not?
- b. If you had to get food from [use responses given by participant] what would you do to not feel ashamed?
- c. What are some ways you've had to get food when there wasn't enough at home (e.g. borrow from another house, eat with others, or get a gift or donation from someone else)?
 - i. How did you feel when you got food from these places? Did others know you got food from these places? If so, how did you feel about them knowing? How did they make you feel about getting food?

35. Does anyone ever make you feel ashamed? Why?

- a. Are there any children that make you feel ashamed? How so?
- b. Are there any family members, who are grown up, that make you feel ashamed? How so?
- c. Are there any grown ups, who are not family members, that make you feel ashamed? How so?

36. Last question, what's your favorite game to play?

Thank you for taking the time to speak to me. What other things do you think I should know about your food and meals?

APPENDIX E – CAREGIVER DEMOGRAPHIC QUESTIONNAIRE

Thank you for completing this questionnaire. For each question, please put a checkmark (✓) in the box next to your response. Feel free to be open and honest as there are no right or wrong answers to these questions. All of your answers will be kept private Thank you and let's begin!

1. Do you have a child between the ages of 9 and 15 years old? Yes No

2. Are you: Male Female

3. What is your age? _____

4. What is your ethnicity?
 Hispanic
 Non-Hispanic

5. What is your race?
 African American/Black
 American Indian/Alaska Native
 Asian/Pacific Islander
 White
 Multiracial
 Other (please specify) _____

6. What is the highest level of education that you have completed?
 Grades 8 or less (elementary/middle)
 Grades 9 to 11 (some high school)
 Grade 12 or GED (high school graduate)
 College 1 year to 3 years (some college or technical school)
 Undergraduate degree (four year degree)
 Graduate Degree

7. Do you own or rent your home?
- Own
 - Rent
 - Other arrangements (explain: _____)
8. What is your zip code? _____
9. Place an X next to the category of your total household income.
- Less than \$16,000
 - \$16,000 to \$34,999
 - \$35,000 to \$49,999
 - \$50,000 to \$74,999
 - \$75,000 or more
10. Does your child(ren) received free or reduced lunch at school? Yes No
11. Have you ever received any of these benefits?
- Women Infant and Children (WIC)
 - Supplemental Nutrition Assistance Program (SNAP)/Food Stamps
 - Temporary Assistance for Needy Families (TANF)
 - South Carolina Low Income Home Energy Assistance (SC LIHEAP)

APPENDIX F – CHILD FOOD SECURITY ASSESSMENT

Child Food Security Assessment:

Thank you for taking this survey! Below are some statements that children have made about their food situation. For each statement, please say whether this happened to you **MANY times**, **1 or 2 times**, or **NEVER** in the **last year (12 months)**. Please circle the answer that best fits your situation.

1. We can't get the food we want because there is not enough money.	Many times	1 or 2 times	Never
2. I worry about how hard it is for my parents to get enough food for us.	Many times	1 or 2 times	Never
3. I worry about not having enough to eat.	Many times	1 or 2 times	Never
4. I feel hungry, because there is not enough food to eat.	Many times	1 or 2 times	Never
5. I get really tired, because there is not enough food to eat.	Many times	1 or 2 times	Never
6. I try not to eat a lot so that our food will last.	Many times	1 or 2 times	Never

APPENDIX G – PRELIMINARY CODEBOOK

Nodes

Name
Behavior problems
Chaos Outside of Meal Times
Coping with Chaos
Description of Chaos
Disorder
Evaluation of Chaos
Instability or Turbulence
Outcomes of Chaos
Transportation
Description of Neighborhood
Unsafe Neighborhood
Worry about children's safety
Financial Frustrations and Feelings about food insecurity
Household Characteristics
Blended Family
Living with one caregiver
Multiple Generations in HH
One Family in HH
Single Parent HH
Two Families in One HH
Ideal Mealtime Experience
Desires or wants during mealtimes
Family Actually Eating Together
Less conflict
Less stress in planning and prep of meal
less talking
Positive or Enjoyable Conversations
Timing of meals
Impact of dysfunction on children
Interpersonal problems
Interpersonal problems during meal times
Meal Planning and food prep
Mealtime Characteristics
Affective Experience
Chaos During Meal Times
Coping with Chaos
Disruptions to Mealtime
Evaluation of Chaos
Frenetic Activity

Nodes

Name	
<input type="checkbox"/>	High Level of Ambient Noise
<input type="checkbox"/>	Lack of Structure Or Routine
<input type="checkbox"/>	Predictability of Routines
<input type="checkbox"/>	Does Eat Together
<input type="checkbox"/>	Does Not Eat Together
<input type="checkbox"/>	Frequency
<input type="checkbox"/>	Importance or Value of FM
<input type="checkbox"/>	Location
<input type="checkbox"/>	Quality
<input type="checkbox"/>	Behavior problems during meal times
<input type="checkbox"/>	Conflict or arguments during meals
<input type="checkbox"/>	Electronic Devices at table
<input type="checkbox"/>	Meals as a multi-purpose family activity
<input type="checkbox"/>	Negative Eating experience
<input type="checkbox"/>	No Electronic Devices
<input type="checkbox"/>	Other distractions
<input type="checkbox"/>	Positive Eating Experience
<input type="checkbox"/>	Running out of food
<input type="checkbox"/>	Talking
<input type="checkbox"/>	TV during meals as a family activity
<input type="checkbox"/>	Negative Stress Coping