

CHILDHOOD TO EARLY ADOLESCENCE:
HOW ARE FOOD CHOICE PROCESSES DEVELOPING AND INFLUENCED
DURING THIS TRANSITION PERIOD?

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CHILDHOOD TO EARLY ADOLESCENCE: HOW ARE FOOD CHOICE
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Early adolescence is a fascinating and complex life stage that signifies the transition from childhood to adolescence and includes the commencement of many important biological, cognitive, and social transitions. Observations of dietary patterns during this life stage indicate that early adolescents have poor overall diet quality, resulting in serious implications for development and long-term health. The purpose of this project was to explore and describe how early adolescents are navigating, constructing, and being influenced during food and nutrition activities. Qualitative and quantitative approaches were used to examine early adolescent food choice in three studies. The first study used in-depth qualitative interviews (n= 30) to explore the emergence of direct, proxy, and personal agency within the context of early adolescent food choice and food activities. The second study was a quantitative analysis of a national representative sample (n= 853) to examine association between family demographics, food choice values, and dietary outcomes. The final study combined photo-elicitation and in-depth interviews (n= 30) to explore early adolescent food routines. Results showed the importance of parental influences, food environments and social structures, and provided new information about how early adolescents are developing food-related agency and control in food activities and food choice processes during their transition from childhood to adolescence.

BIOGRAPHICAL SKETCH

Erin Marie Green completed secondary school in Chico, California in 2003. She began working full-time after high school in foodservice where the experience of managing diverse individuals was formative in her career outlook and future interests in nutrition and food equity for all individuals.

Erin attended California State University- Chico, where she graduated with Honors in General Education and Summa Cum Laude for both her Bachelor of Science degree in Exercise Physiology and her Bachelor of Science degree in Nutrition and Food Sciences. In 2009, Erin completed her dietetic internship through the Veterans Affairs Healthcare System in San Diego, California, and became a Registered Dietitian in 2010. Erin worked in a variety of domestic and international settings including as a registered dietitian at WIC (Women, Infants, and Children), and she completed two years as a public health volunteer in Peace Corps- Albania.

After returning from Peace Corps, Erin began her PhD training at Cornell University, with her real-world experiences confirming her interests in helping communities and connecting with individuals of all ages about nutrition. Erin pursued this goal by obtaining her PhD training in the Division of Nutritional Sciences, with a concentration in Community Nutrition. In August 2018, Erin became a Lecturer and the Community Nutrition Coordinator for the Cornell Dietetic Internship, allowing her to combine her experience as a registered dietitian and knowledge of social science perspectives on food and nutrition.

Dedicated to the young participants and their families for generously and graciously
volunteering their time and experiences

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CHAPTER 1

INTRODUCTION

Early adolescence (approximately ages 10-14 years) is a fascinating and complex life stage that signifies the transition from childhood to adolescence (Blinn Pike, 2003; Steinberg, 2011). Adolescence is second only to that of infancy for its significant pace of growth and developmental changes in such a short time period, and early adolescence is when many fundamental biological, cognitive, and social transitions commence (Kipke, 1999; Smetana et al., 2006). However, unlike infants, early adolescents are active participants in their development and everyday realities, and the influences on early adolescents across multiple domains are increasingly important to development and health (Steinberg, 2011). Food and nutrition behaviors are important during this transition period because patterns of dietary behaviors and food choice decisions can impact the current and future health of early adolescents (Christoph et al., 2019; Dorn et al., 2019; van Jaarsveld et al., 2007). The studies reported here add to a growing body of research that recognizes the unique life stage of early adolescence when considering nutrition behaviors by exploring influences on nutrition-related activities and how early adolescents navigate food choices.

1.1 Importance of Early Adolescence

Adolescence is commonly defined as the life stage that occurs from ages 10 to 20 years old. Contemporary views of adolescence divide this life stage into three age categories: early, middle, and late adolescence (O'Donohue et al., 2013; Sawyer et al.,

2012; Steinberg, 2011; Story and Stang, 2005). Focusing specifically on the early adolescent phase is crucial because so many transitions are happening simultaneously during these years that can be overwhelming and potentially challenging for children and their families (Hanewald, 2013; Smetana, 2011). Although some changes, such as those associated with puberty, are relatively predictable for many, how an individual is affected by the onset of puberty, its timing, and other transitions is highly individualized and dependent on a multitude of factors (Dorn et al., 2019; Eccles, 1999; Mendle et al., 2019). Early adolescence is an especially important time period because they are dealing with being not quite a child anymore but not yet a full-fledged adolescent, which can have social, psychological, and physical implications for youth and nutrition behaviors.

Socially, early adolescence represents an important transition in the lifespan because this phase encompasses transitions in social roles and the transition from elementary to middle school in the United States. This social shift can result in fluctuation in self-concept, emotional challenges, and changing time demands for many youth (Akos, 2002; Chung et al., 1998; Onetti et al., 2019). During the middle-school years, early adolescents strive to become more independent, with food and nutrition being one area where they may attempt to increase control in decision-making (Daddis, 2011a; Wray-lake et al., 2010). Social relationships and their perceived roles in the family and other social contexts start to undergo changes as well, and self-esteem and individuality related to one's peers and family subtly begin to shift as peers become more critical in decision-making processes over time (Anderson et al., 2000; Eccles, 1999; Hanewald, 2013). Although middle school has

the potential to be a very stressful and confusing time for early adolescents, it also represents an opportunity to intervene as youth explore new social worlds and confront many social tasks for the first time. Therefore, understanding how early adolescents perceive food choice, and how they make decisions related to nutrition during these seminal years is important.

1.2 Early Adolescence and Nutrition

Nutritional transitions, needs, and concerns related to early adolescence are also significant during this formative life stage because the United States continues to confront the simultaneous problem of obesity and emergence of eating disorders during adolescence.

The prevalence of obesity doubled from 1988-1994 (10.5%) to 2013-2014 (20.6%) for adolescents aged 12 to 19 years old, and extreme obesity increased from 2.6% to 9.1% in this same time period (Ogden et al., 2016). A recent analysis of NHANES (National Health and Examination Survey) data from 1999 to 2014 also concluded there is no evidence of a decline in obesity prevalence for children and adolescents in the United States, with all categories of obesity increasing over time, specifically for adolescents (Skinner et al., 2016). This is important because research indicates that there is an 80% chance of an obese adolescent becoming an obese adult, and adolescence is thought to be a critical period when the presence of obesity increases the risk of many adulthood diseases such as diabetes, hypertension, cardiovascular disease, depression, and sleep apnea (Daniels et al., 2005; Dietz, 2004; Guo et al., 2002; Lobstein et al., 2004; Reilly and Kelly, 2011; Whitaker et al., 1997).

Early adolescent eating behaviors also include the opposite side of the spectrum of obesity, with disordered eating becoming more prevalent throughout adolescence (Canadian Paediatric Society, 2004; Dea and Abraham, 1999). Eating disturbances can occur for both genders and research suggests the transitions between early to middle adolescence, and middle to late adolescence are particularly vulnerable periods during which eating abnormalities may arise as body dissatisfaction and dieting become more prevalent (Craike et al., 2016; Dea and Abraham, 1999; Jáuregui-Lobera et al., 2018). A better understanding of daily eating routines for adolescence may provide important insights for both obesity and eating disorder prevention efforts.

The biological and physical demands of early adolescence result in changing nutritional demands and increased needs (Promotion, 2013; Reedy and Krebs-Smith, 2010; Story and Stang, 2005). Prior to puberty, nutrient needs are usually similar for both sexes, but needs increase sharply and become more gender-specific in early adolescence and beyond (Bonnie, 1985; Rogol et al., 2000; Story and Stang, 2005). Generally, nutrient needs do not depend solely on chronological age and needs will parallel growth rates and pubertal timing, with multiple factors influencing macronutrient and micronutrient needs throughout adolescence (Story and Stang, 2005). Energy and protein needs increase in adolescence as well as micronutrients associated with growth such as vitamin C, vitamin A, calcium, iron, and zinc (Giovannini et al., 2000; Story and Stang, 2005).

Despite increased nutritional needs to support development in early adolescence, dietary trends continually indicate that many youth have poor overall diet

quality and overconsumption of low nutrient density foods (Haughton et al., 2016; Pearson et al., 2009a; Promotion, 2013; Story and Stang, 2005). Diets are often low in key food groups such as fruits, vegetables, and whole grains (Briefel and Johnson, 2004; McGill et al., 2015; Munoz et al., 2004). As a result diets are also commonly inadequate for several key nutrients including vitamin A, vitamin E, folate, iron, zinc and calcium (Drewnowski and Rehm, 2013; Kim et al., 2014; Munoz et al., 2004; Story and Stang, 2005). Moreover, researchers consistently observe detrimental eating habits becoming more prevalent during adolescence, such as skipping meals, increasing “junk food” consumption, eating more meals outside the home, and adopting food fads (Bassett et al., 2008; Contento et al., 2006; Pearson et al., 2009a; Poti et al., 2014; Mary Story et al., 2002; Videon and Manning, 2003).

Inadequate intakes of key food groups along with increased intakes of calorically dense, high sodium, high fat foods is of concern because this dietary pattern is associated with many preventable chronic diseases (Croll et al., 2010; Irwin et al., 2002; Lytle and Kubik, 2003; Ness and Powles, 1997; Reddy and Katan, 2004). Although adolescence is normally a period of relatively good health, many of the habits adolescents create and the food choices they make during these seminal years will impact them later in life. Additionally, in the past several decades traditionally adult onset diseases such as obesity and diabetes are now being identified during adolescence (Centers for Disease Control and Prevention, 2010; Fagot-Campagna et al., 2000; O’Donohue et al., 2013). This has serious implications for adolescent development and public health. The physical changes of puberty are already accompanied by many social changes and interactions. In addition, some adolescents

are simultaneously faced with an increased risk of depression, decreased quality of life, and a decline in self-esteem due to obesity-related issues (Schwartz and Puhl, 2003; Schwimmer et al., 2015; U.S. Department of Health and Human Services, 2001). These nutrition-related risks during such a critical time of personal and physical development make understanding early adolescents' perspectives regarding food choice and nutrition behaviors necessary for future prevention efforts.

1.3 Theoretical Background

This dissertation research was guided by the lifecourse perspective and the Food Choice Process Model. This combination provided a strong framework for investigating the development of early adolescents' food choice processes and the influences on nutrition behaviors within real world contexts for participants.

First, the lifecourse perspective provided a well-established approach for examining lives as they unfolded across time and different contexts, and it offered an appropriate set of concepts to better understand the role of food choice and decision-making in different experiences described by early adolescents (Devine et al., 1998; Elder, 1994; Wethington, 2005). Second, the Food Choice Process Model, a constructivist model, has identified multiple factors and processes that shape an individual's food choice behaviors (Furst et al., 1996). This model suggests individuals have a variety of ways of managing food choices based on both life course experiences, influences, and personal food systems (Furst et al., 1996; Sobal & Bisogni, 2009; Sobal, Bisogni, Devine, & Jastran, 2005; Sobal & Bisogni, 2009; Travis, Bisogni, & Ranzenhofer, 2010). The model guided all research aims, but due

to the breadth of concepts in the Food Choice Process Model, only some -concepts were explored with early adolescents in this research.

1.3.1 Lifecourse Perspective Concepts

Transitions and trajectories were the two main concepts from the lifecourse perspective that informed this research project because of their relevance to development during early adolescence.

Transitions, which make up the first concept, were defined as changes in social roles or responsibilities, and were examined primarily with young participants as the process of moving from elementary to secondary school (Wethington, 2005). The concept of transitions also allowed for further examination of the shifts in social roles related to nutrition such as cooking activities during the transition to middle school. Transitions were considered because human development and psychology literature highlights early adolescence as an important time for establishing a sense of identity, developing self-esteem, and moving beyond the micro-world of childhood. This transition signifies a time when youth frequently start comparing themselves to their peers and their desire for autonomy and control becomes central to many decisions (Eccles, 1999; Gutman and Eccles, 2007; O'Donohue et al., 2013; Urda and ; Klein, 1998).

Transitions are often highly individualized processes and include crucial biological and cognitive transitions such as becoming more self-conscious and having increased decision-making abilities (Blos, 1967; Burton, 2007; Eccles et al., 1991; Pavlova et al., 2011; Steinberg and Silverberg, 1986). Social transitions are often prominent in adolescence and can be impacted by transitions occurring in other

domains as social transitions deal not only with how the individual sees themselves in a given context but how others view them as they transition (Steinberg, 2011). How early adolescents and others react and interact in the domain of food as transitions occur may have important implications for the youths' food choice processes.

Despite substantial evidence that the transition from elementary to middle school represents a challenging time for a majority of individuals, the literature related to this concept often lacks adequate information about the role of food and nutrition (Akos, 2002; Anderson et al., 2000; Lord and Eccles, 1994). Nutrition researchers have examined some of these issues, especially as they relate to parent-child relationships, home food environments, and healthy eating barriers for adolescents (Bassett et al., 2008; Borra et al., 2003; Contento et al., 2010; Holsten et al., 2012; Ventura and Birch, 2008; Young et al., 2004). There are also a few nutrition studies that have examined the process of how beliefs and behaviors evolve with early adolescents, and even less information regarding how transitions impact food choice. Lifecourse perspective thoughtfully addresses the influence of other individuals and a variety of important contextual factors, facilitating a greater understanding of food choice during the transition from childhood to early adolescence (Viner et al., 2012; Wethington, 2005).

Trajectories were central to this research and represented the second lifecourse concept. Trajectories represent stable and changing patterns of behavior or health across time, as well as social factors associated with the maintenance of health, such as the social network or social integration trajectory of an individual (Elder, 1994; Wethington, 2005). Trajectories in different domains of life tend to develop together

in a consistent way across the life course so as to reinforce each other. Thus, efforts to change a behavior in one domain may not be long-lasting if other trajectories are not also shifting.

Another important consideration specific to early adolescence is that trajectories of intellect and maturity differ across early to late adolescence. While intellect rises over the course of development, psychosocial maturity plateaus at a low level across most of adolescence and only rises near the end (Steinberg, 2008; Sunstein, 2008). This gap between intellectual abilities and psychosocial maturity may help explain adolescent behavior to some degree, suggesting youth are able to logically reason through situations but may not have the maturity to act based on sound reasoning. This was considered when examining food choice processes of early adolescents in each research aim.

1.3.2 The Food Choice Model Concepts

Most research with the Food Choice Model (Figure 1.1) examines adult food choice, and this research used specific concepts from the model to apply similar ideas to early adolescent food choice. Concepts from the Food Choice Model that informed this research project included background factors, influences, social factors, and resources. These concepts were chosen because they are commonly studied concepts in nutrition research with youth, and appropriate for this age group. Routines, from the personal food systems section of the model, was also included because this concept is relevant to early adolescent food choices and is understudied for this age group.

Contexts were important considerations because they are integral to understanding the context in which food choices occur (Devine, 2005; Sobal &

Bisogni, 2009). Context can be defined in this project as the broader environments influencing everyday food choices and can include both social and physical aspects that shape food choice (Sobal and Bisogni, 2009; Wethington, 2005). Contexts have the potential to both facilitate and constrain food choice and may impact the development of food choice processes for early adolescents. Race/ ethnicity, socioeconomic status, family structure, and region of residence have been associated with nutrition differences across adolescence, and were considered in the development of this research (Caprio et al., 2008; Davis, Bennet, Befort, & Nollen, 2014; Kumanyika & Grier, 2006; Larson, Eisenberg, Berge, Arcan, & Neumark-Sztainer, 2015; Lee, Harris, & Lee, 2013; Miech et al., 2006).

Influences represent a broad category of factors in the Food Choice Process Model that impact food choice for individuals in multiple ways including social factors, context, ideals, resources, and personal factors (Sobal & Bisogni, 2009; Sobal et al., 2005). For this project, social factors and resources early adolescents perceive as influencing food choice were the primary focus. Social factors are highlighted due to the interest in individuals and relationships perceived as important to food choice by early adolescents, and resources are emphasized because certain resources such as cooking skills, income, and time are important considerations when examining nutrition behaviors and food choice for this population.

Social factors, which are defined as the system of relationships of individuals that can constrain or facilitate food choice decisions, were used frequently in this research (Sobal and Bisogni, 2009). Eating is often a social act for individuals, and food choice must be negotiated and managed based on social factors in most

situations. Social factors relevant for early adolescents can include influences such as gender roles, identities enacted regarding food (i.e. “picky eater” or “vegetarian”), interpersonal relationships, and household food roles (Bisogni, Connors, Devine, & Sobal, 2002; Bourdeaudhuij, 1997; Furst et al., 1996). Social factors like the food choice process itself are expected to be dynamic and change over time. For example, as early adolescents transition from childhood to adolescence, it is common that they begin to eat outside the home more frequently and increasingly engage with peers (Bassett et al., 2008; Birch and Fisher, 1998; Bull, 1992; Contento et al., 2006). This changes the nature of many social factors that can potentially impact food choice, but a clear understanding of how early adolescents perceive and report on social factors related to food is unclear in the literature at this time.

Household social factors, including parents/caregivers, are arguably the largest influences on the child during the transition to adolescence, and parents/caregivers play an important role in early adolescent eating behaviors (Katzmarzyk et al., 2014; Loth et al., 2013; Reicks et al., 2015; Rodenburg et al., 2014; Scaglioni et al., 2011). Even as children age and the social contexts in which food choices occur undergo changes, parents/caregivers remain an important influence on their child, acting as prominent gate-keepers, role models, and sources of nutrition information (Bassett et al., 2008; Brown and Ogden, 2004; Ventura and Birch, 2008; Zarnowiecki et al., 2012).

However, parents perceive adolescence as a very difficult stage in terms of parenting practices and adolescent-parent relationships (Berge et al., 2015; Buchanan et al., 1990; Laursen and Collins, 2009; McElhaney et al., 2009; Smetana et al., 2006).

As a review of successful parent-focused interventions points out that parents often lack support when eating issues arise with their children, and parents lack information about “what they can do to encourage the development of a healthy, varied, and balanced diet” (Mitchell et al., 2013, p.91). Therefore, it is vital that we not only better understand the perspectives of current early adolescents but determine how best to reach and assist parents in supporting their child’s development of healthy eating behaviors. Ongoing obesity treatment research suggests that focusing on parent-centered interventions may be an effective treatment option for overweight or obese children (Boutelle et al., 2012, 2007; Golan et al., 2006; Loveman et al., 2015; Zarychta et al., 2016).

Furthermore, the food choice values of parents/caregivers may represent an important social influence on their child’s eating behaviors and ultimately the child’s formation of food choice values for themselves. Food choice values are “the considerations that people bring to food choice (i.e. taste, cost, health, convenience, relationships) and the particular meanings and feeling that people attach to these considerations” (Sobal & Bisogni, 2009, p.S42). Food choice values and value negotiations are considered to be largely conscious in comparison to many other daily decisions, although food choice values found to be a deliberate and thought-out choice in many situations (Furst et al., 1996; Furst, Connors, Sobal, Bisogni, & Falk, 2000; Sobal & Bisogni, 2009). The food choice values of adults in a household have the potential to affect household availability of foods for their child to choose from. Early adolescents are also still in the process of determining their own food choice values as their cognitive development is likely not advanced enough to make mindful decisions

entirely on their own. Therefore, parents and adult caregivers in a household serve as important role models for constructing food choice values for early adolescents.

Resources should also be considered when examining early adolescent food choice processes. Resources are defined as the assets that individuals consider in making food choice decisions (Sobal and Bisogni, 2009). These assets can be tangible or intangible, and resources are subject to fluctuations over time for individuals. Resources typically include financial resources (i.e. money), material resources (i.e. food equipment), human capital resources (i.e. food-related skills and knowledge), social resources (i.e. relationships), and cultural resources (i.e. values and traditions) (Furst et al., 1996; Sobal and Bisogni, 2009). The perception of availability or lack of availability of resources for an individual provides important information for the boundaries of food choice situations.

Likewise, resources can facilitate or hinder food choices, and different types of resources may be exchanged for others, like trading money for equipment or social connections for lack of personal skills (Sobal and Bisogni, 2009). In the case of early adolescents, human capital resources such as cooking skills and knowledge and financial resources may be particularly salient for youth based on research with adolescents of various ages (Hartmann et al., 2013; Hersch et al., 2014; Larson et al., 2006; Laska et al., 2011).

Finally, personal food systems are cognitive processes for food choice that develop over the life course and are important to consider when exploring food choice processes. Major components include the development of food choice values, negotiation and balancing of food choice values, classification of foods and situations,

and the development of strategies, scripts, and routines for recurring food decisions (Furst et al., 1996; Sobal & Bisogni, 2009). Personal food systems vary depending on previous experiences and the social context in which food choices are occurring.

Routines, which are defined as a “repetition in food/drink and other dimensions of eating episodes” may occur in sequences of episodes across days, weeks, seasons, or lives (Jastran et al., 2009), was the primary focus in Chapter 4.

Routines is a useful concept when examining early adolescent food behaviors because they provide individuals with structure and predictability and often impact food choices (Jastran et al., 2009; Laska et al., 2015). Routines also allow people to anticipate events, and research has demonstrated that routines can promote self-regulatory skills in children for behavioral problems such as aggression, poor impulse control, and noncompliance (Bater and Jordan, 2017). However, the food routines of early adolescents and the impact of these routines on eating behaviors is not well known as most research has focused primarily on adult and family food routines (Agrawal et al., 2018; Bisogni et al., 2007; Jastran et al., 2009; Tovar et al., 2013).

1.4 Early Adolescence and Food Choice Processes

Food choice processes was defined in this project as the series of steps taken to determine eating behaviors in a given context, with a focus on how food choice processes develop and are influenced during early adolescence in current food activities. Understanding how food choice processes develop is important because many of the physical changes of puberty begin in early adolescence, and these changes may have important influences on food choice processes for children and their

families (Smetana et al., 2006; Steinberg, 2011). Food choice processes are also important to the developmental process itself by offering a domain for individuals to safely test new developmental tasks (i.e. independent decision making, development of personal values and beliefs, etc.). Finally, compared to adults who typically have established personal food choice systems and values, early adolescents are still in the process of forming their own values related to food choices, which can impact health and eating behaviors both now and in the future.

Certain influences may become more or less salient for early adolescents in different food choice situations, and the factors influencing food choice processes during adolescence are multidimensional and not entirely clear. Few studies have looked at early adolescents' views regarding nutrition from their own perspective. In one study, interviews with adolescents (11-18 years) were conducted based on a simulated task to choose lunch items from a menu and give reasons for their choices (Contento et al., 2006). Results indicated that food choice involved various food decision-making rules, negotiations with family members, and interaction patterns with peers (Contento et al., 2006). Focus groups with low-income children (8-13 years) identified health beliefs, food characteristics, cooking ability, and mealtime practices as determinants of food choice (Heidelberger and Smith, 2014). Qualitative interviews concentrating on food choice in the home environment with adolescents (11-14 years) also found that food choice was influenced by various factors including hunger level, food preferences, time pressures, and expected physical consequences of a food (Holsten et al., 2012).

However, few studies have comprehensively examined early adolescent food

choice processes with a focus on understanding how youth construct food choices independently and in collaboration with others. Furthermore, no studies examining food choice have specifically explored the impact of the transition from childhood to early adolescence on food choice from the perspective of the early adolescent.

1.5 Research Approach

The overarching goal of this research was to understand multiple levels of influence on the food choice processes of early adolescents. The two main goals were to 1) explore who, what, and how early adolescents are influenced regarding food and nutrition decisions and to 2) examine the dynamic relationships between early adolescents, their parents/caregivers, and their food environments during this important life stage. The following aims guided the research:

Aim 1: Explore the emergence of direct, proxy, and personal agency within the context of early adolescent food choice and food activities.

Aim 2: Examine associations between NHANES (National Health and Examination Survey) Consumer Behavior variables, demographic characteristics, and reported early adolescent dietary outcomes.

Aim 3: Describe the food routines of early adolescents using photo-elicitation interviews.

The following chapters will address these research aims. Chapter 2 addresses Aim 1 using qualitative in-depth interviews and Bandura's three modes of agency: personal, proxy, and collective agency to explore the relationship between agency and food-related activities (Bandura, 2018, 2005). The following research questions

guided Chapter 2:

RQ 1. Under what circumstances do early adolescents engage in direct personal agency, proxy agency, and collective agency related to food and nutrition?

RQ 2. How do early adolescents describe direct personal agency, proxy agency, and collective agency occurring in their lives related to food and nutrition?

Chapter 3 addresses Aim 2 and uses a nationally-representative survey dataset to explore associations between family demographics, adult food choice values, and the early adolescent dietary outcomes of fruit, vegetables, dairy, and added sugar. These analyses were guided by the Food Choice Process Model, specifically exploring what food choice values, personal factors, and social factors are associated with early adolescent food choice processes and family food environments (Furst et al., 1996; Sobal and Bisogni, 2009). Data included both early adolescents and adults/respondents in the same household, and linear and logistic regressions were performed to examine the following hypotheses:

H1.1. Adults' food choice values will be positively associated with children's reported intake of fruits, vegetables, and dairy foods and inversely associated with children's reported intake of added sugars.

H2.1. Family income and respondent/adult education level will be positively associated with children's reported intake of fruits, vegetables, and dairy foods and negatively associated with children's reported intake of added sugar.

H2.2. Children from Non-Hispanic white households will have higher self-reported intakes of fruits, vegetables, and dairy foods, and lower reported intakes of added sugar.

H3.1. Respondents/Adults with stronger food choice values (consider a food choice value “very important”) will be more likely to have children who are younger, Non-Hispanic White, and have higher income and education levels.

Chapter 4 addressed Aim 3 and was informed by the results of Aims 1 and 2. Aim 1 provided important formative research about early adolescent food activities and highlighted the need for more information about routines and how early adolescents make food choices. Aim 2 provided important information for sampling considerations, specifically for obtaining a diverse racial/ethnic sample, based on consistent findings in Aim 2 that race/ethnicity is associated with a variety of food choice considerations. A qualitative approach that combined photo-elicitation and in-depth interviews was used to explore early adolescent food routines as well as other topics of interest for early adolescent food and nutrition behaviors.

Photo-elicitation is a qualitative method that has existed in fields such as anthropology and sociology for many years. It is based on the procedure of inserting photographs taken by a participant into a research interview as a cue (Clark-Ibanez, 2004; Harper, 2010; Lal et al., 2014). This method has been used with children and adolescents, but the technique has not been employed frequently for nutrition research in youth without pre-existing health conditions (Lachal et al., 2012a; Smith et al., 2012; Streng et al., 2004; F Wells et al., 2013). The use of photos in Chapter 4 was

important for providing a practical way for participants to compare and contrast aspects of their food routines across days, weeks, and their lives during interviews. Appendix B includes all materials used in Chapter 4 in order to provide details about the research process and experience for each participant. The following research questions were addressed for Aim 3:

RQ 1. How do early adolescents explain their food routine experiences?

RQ 2. What are the ways that early adolescents describe food routines in their daily lives?

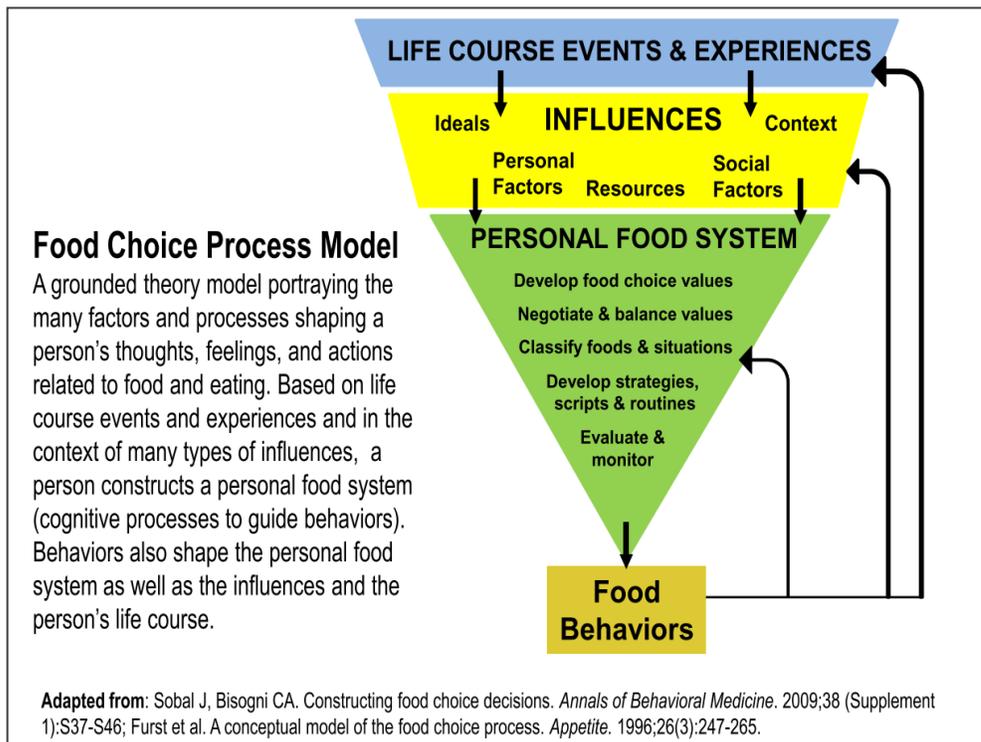
RQ 3. What influences do early adolescents identify when discussing their current food routines?

1.6 Summary

Results from this research highlight the complex nature of food choice processes for early adolescence. Influences such as parents/caregivers, family members, school environment, and levels of perceived food-related agency all have intersecting and important implications for food choice behaviors during this critical life stage.

Figure 1.1 The Food Choice Process Model

(Sobal & Bisogni, 2009)



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CHAPTER 2

PERSONAL, PROXY, AND COLLECTIVE FOOD AGENCY AMONG EARLY ADOLESCENTS

2.1 Introduction

Middle school in the United States typically includes grades 6-8 where students are ages 10-14 years. This period represents an important life transition from late childhood into early adolescence. Early adolescence is a life stage marked by the beginning of dramatic biological, psychological, and social changes, making it a critical period for health behavior development (Eccles, 1999; Hamburg, 1997; Smetana et al., 2006).

Nutritionally, early adolescence is important because as children become adolescents their diets tend to become less healthy in terms of quality, and they regularly do not meet nutrition recommendations for important food groups such as fruits, vegetables, and low fat dairy (Haughton et al., 2016; Nelson et al., 2009; Niemeier et al., 2006). Moreover, adolescents often make unhealthy food choices especially when left unsupervised, such as skipping meals and increasing junk food consumption (Contento, Williams, Michela, & Franklin, 2006; Linde, Wall, Haines, & Neumark-Sztainer, 2009; Reicks et al., 2015; Winpenny et al., 2017).

Early adolescence is often presented as a time of turmoil and stress, but it is more nuanced and also represents a formative period of exploration and growth for youth around multiple issues, including food and nutrition (Lipsky et al., 2017; Pedersen et al., 2013; Reicks et al., 2015; Wray-lake et al., 2016). It is a unique life

stage where shifts in social roles and influences may be markedly different and still developing compared to older adolescence and young adulthood. However, parents/caregivers and home environments remain a vital influence, with adolescents still consuming about 65% of their daily calories at home (Poti and Popkin, 2011). Furthermore, eating behaviors established during adolescence have been shown to persist into adulthood (Christoph et al., 2019; Fahlman et al., 2008; Pedersen et al., 2013). The complexity of adolescent development combined with the challenges of promoting the adoption of healthy behaviors requires careful consideration.

Agency, a key concept for Social Cognitive Theory, is useful for examining early adolescence in the context of food and nutrition (Bandura, 2001). Agency is defined as the ability to intentionally produce certain effects by one's actions, and can take many forms (Bandura, 2018). The concept of agency is constructivist and acknowledges the role that individuals play in their own development. Individuals create and negotiate their social worlds to various degrees depending on the context and their level of self-efficacy, and agency attempts to account for both the collective and bi-directionality of multiple influences on adolescents (Bandura, 2005). Given the complexity of food and nutrition decisions during early adolescence, as well as the potential influence of multiple factors simultaneously, further investigation of agency can offer important insights.

Bandura delineated three modes of agency useful for exploring food-related activities: personal, proxy, and collective agency (Bandura, 2018, 2005). Personal agency is defined as the capacity to “intentionally make things happen by one's actions” (Bandura, 2001, pg 13). An example of personal agency is making one's own

meal or purchasing food independently. Proxy agency is when an individual enlists those with access to resources, expertise, influence, or power “to act at their behest to secure outcomes they desire” (Bandura, 2001, pg 13). Examples of proxy agency include activities such as requesting foods or asking another individual to cook a meal they are not able to prepare themselves. Collective agency is when a group of people with shared intentions, knowledge, and skills act in an interactive and coordinated manner to produce a desired outcome (Bandura, 2001). For early adolescents, an example of collective agency is cooking a meal together with adults in a household. These three modes of agency provide a framework to help delineate and explain complex food choice activities and behaviors during a critical developmental period.

Bandura’s three modes of agency have been applied in some health-related research about young people. Personal agency has been explored with school-based research and some obesity prevention research to shed light on how personal agency and perceptions of the influence of self-efficacy can positively impact eating behaviors during adolescence (Baker et al., 2003; Contento et al., 2006; Reicks et al., 2015; Sutter et al., 2016). Research related to specific health concerns such as cancer or food allergies in adolescence has also drawn on the concept of personal agency, finding that perceived agency fluctuates depending on the environment and an individual’s reliance on others for choosing food (Davies et al., 2018; Stjerna, 2015). However, most research on personal agency during adolescence includes broader age ranges and different contexts, making it difficult to differentiate what happens at different developmental stages for adolescent food and nutrition decision-making.

Proxy agency has been studied as it relates to levels of self-efficacy in youth.

Some research focused on physical education and children's fruit and vegetable consumption used proxy agency to conceptualize the role of parents/caregivers in granting and creating opportunities for proxy agency and opportunities to develop self-efficacy for health behaviors (Dzewaltowski et al., 2010, 2007; Geller et al., 2009; Rosenkranz et al., 2007).

Collective agency research in health and nutrition research with adolescents is limited. A qualitative study of older adolescents (13-19 years) and adult caregivers did find that autonomy was co-constructed with adults and their children, with each resisting and responding to each other in different food choice situations (Bassett et al., 2008). However, the concept of collective agency should not be considered synonymous with co-constructed autonomy, and more research is needed to better understand the role of collective agency in food and nutrition behaviors and decision-making for youth.

Despite some research using Bandura's three modes of agency, few studies have applied all three modes of agency in one study and even fewer have specifically focused on understanding how early adolescents use agency to navigate food environments and make food choices. Insights elicited directly from early adolescents regarding food activities during their transition from childhood to early adolescence are also uncommon. Additional investigation of food-related agency directly with early adolescents is needed. The present study was part of a larger project involving interviews with parents/caregivers of middle school students and separate interviews with the students to assist in the development of nutrition messages for parents/caregivers. The child interviews were designed to clarify the food experiences

of early adolescents.

The objective of the research presented here was to identify areas in which youth reported food and nutrition related agency in their lives. Agency emerged as a major theme during initial analysis of the in-depth interviews with early adolescents and informed the development of the following research questions:

1. How do middle school students describe direct personal agency, proxy agency, and collective agency occurring in their lives related to food and nutrition?
2. Under what circumstances do middle school students engage in direct personal agency, proxy agency, and collective agency related to food and nutrition?

2.2 Methods

2.2.1 Participants

Purposive sampling was used to obtain diversity in gender, racial and ethnic background, and residential setting (urban vs. rural) (United States Census Bureau, 2016). Participants were recruited with the assistance of Cooperative Extension program staff who distributed flyers to program participant contacts and personal connections in their regions. Eligible participants must have been enrolled in a public middle school at the time of the study, which was approved by the Cornell University Institutional Review Board.

Interviews were conducted with 30 middle school children (43% male; 57% female) from both rural and urban areas. Self-reported demographic information was collected. Participants included one 10-year-old and balanced representation of participants aged 11-13 years (30% 11 years; 37% 12 years; 30% 13 years). There was

some variation in racial and ethnic identities, but most participants identified as non-Hispanic (83%) and white (57%). The remaining sample self-reported as Black (23%), Native American (3%), and Other (17%).

2.2.2. Interview Protocol

One-on-one interviews were conducted from fall 2014 through spring 2016 in private locations such as empty classrooms and private areas at libraries. All interviews were conducted in English using a semi-structured guide. Interviews ranged from approximately 30-60 minutes each and were audio recorded and transcribed verbatim. Following each interview, the researcher completed a field note form that detailed information such as interview location, any concerns about the interview, additional thoughts, and information about participant engagement during the interaction.

Each interview began with a modified free list activity in which participants verbally listed fruits, vegetables, and beverages usually consumed or usually available at home. Free listing is a technique often used to help define new information from participants (Brewer et al., 2002; Gravlee et al., 2012; Ryan et al., 2000). In this study, we used this method to ease the child into more difficult questions and provide the interviewer with a brief introduction to family food activities and information about participants' variety in fruit, vegetable, and beverage consumption. The free listing activity was followed by questions related to the constructs of parent/caregiver food and drink concerns, family food activities, school lunch, and current nutrition information sources. Probes like "Can you tell me more?" and "Can you give me an example?" were frequently used in all interviews. The interview guide evolved

slightly over time being further informed by participant language and perspectives. Additional open-ended probes were included, but questions about all the main constructs remained unchanged.

2.2.3 Analysis

Coding and data analysis were conducted iteratively in ATLAS.ti (version 7.0, 2012, ATLAS.ti Scientific Software Development GmbH, Berlin, Germany). After two interviews, the first three authors (Green, Gaines, and Hill) developed an initial codebook using a conventional content analysis approach (Elo and Kyngäs, 2007). Themes were largely based on interview guide topics and included activities of grocery shopping, cooking, consumption, and food and nutrition information seeking. Authors met after three more interviews to revise codes and definitions, including accounting for emergent themes such as agency.

Two researchers (Green and Gaines) then independently coded transcripts, meeting after every five transcripts to compare all codes. All discrepancies were discussed, edits were made to the codebook, and previous interviews were recoded to reflect final coding decisions. Agency codes were identified in text that indicated food and nutrition related actions performed by participants, as well as their siblings, peers, parents/caregivers, and other adults. Researchers then categorized participant-specific food and nutrition agency as either personal, proxy, or collective, using a closed coding system based on Bandura's definitions of agency (Bandura, 2005, 2001).

2.3 Results

Participants' food-and-nutrition agency emerged around four types of activities: grocery shopping, cooking, food and beverage consumption, and food and nutrition information seeking. The three modes of agency were exhibited to varying degrees within each activity category.

2.3.1 Grocery Shopping

Grocery shopping was defined as any activity of purchasing food, either prepared or non-prepared, from a physical location selling food items. Most early adolescents described some involvement in grocery shopping, although this ranged from limited involvement via simple food requests to shopping independently for personal or household food needs. Of the three modes of agency previously outlined, participants described personal agency occasionally and proxy and collective agency most often.

Personal agency was exhibited by four participants to a marked extent when using their own money to buy food for themselves and/or their household. Some foods purchased were those usually unavailable at home or foods their parents/caregivers did not approve of, such as this conversation with a 13-year-old-male:

Participant: We usually have milk and stuff around the house, and then if I have money or whatever I'll do, like, sports drinks.

Interviewer: But you buy those with your own money?

Participant: Yes, depending on which one it is. If it's like Gatorade or whatever my parents will get them for me if I want, but if it's like energy drinks I have to pay for them.

Those occasionally contributing to the household food supply used their money to purchase items they knew were needed. A 13-year-old female discussed her role saying, *“Well, I keep a list of what we need, and if I have money and my mom doesn’t, I’ll buy it... Like yesterday... I had money, and we needed peanut butter, and I like peanut butter sandwiches, so I bought peanut butter.”*

Proxy agency was displayed through food requests, and participants typically identified parents/caregivers as the vehicles through which their requests were realized. Before or during the shopping trip, many adolescents made requests because they were asked to contribute suggestions for meals like dinner or for specific foods like snacks or cereal. Others made food requests because they wanted specific items, and these requests were described in various ways. Many made occasional, simple food requests, like this 11-year-old female: *“Like, sometimes I ask for candy bars, since I don’t usually eat candy that often, and she’ll get me that every once in a while. And sometimes I ask for chips.”*

However, a few participants made demands, nagged adults to acquire a specific food item, or even tricked adults into buying foods. Some youth appeared to have had more confidence than others that they could demand foods they wanted, such as one 13-year-old female discussing how *“I make my mom buy me apple juice, because I’m the only one that likes it. Me and her like it, but she’s not, like, she doesn’t really drink it that much, so I usually just make her buy it.”* This demanding is different from other participants who attempted to trick their parents/caregivers into purchasing items or nagged their parents//caregivers to purchase foods, which may have indicated less perceived self-efficacy to negotiate with an adult proxy for what they wanted from a

store. For example, a 10-year-old male reported:

Participant: Sometimes I ask if I can get this and get that, and she says either yes or no. Sometimes I try to make her get it for me.

Interviewer: Oh yeah? Can you give me an example of when you try to make her get you something?

Participant: Well, I wanted to get a piece of candy, and I kept asking her, and I kept, like, telling her I wanted to get it. She said “No,” Then I said, um, then I just kept saying “Please”, and she said, “Fine, it just has to be small.

Underlying most of the proxy food requests, however they were accomplished, were participants navigating family rules and trying to negotiate to convince the decision-maker to do what they wanted. Participants usually had little perceived control in the final shopping outcomes, and many answered negatively when asked if they helped decide what food is purchased. However, some were asked if there were other ways they would like to be involved with grocery shopping, and most indicated satisfaction with their current role and did not want to be more involved or involved differently.

Collective agency was described in several ways. Most participants identified their parents or grandparents as the primary grocery shoppers, and most joined their families for shopping trips, although early adolescent’s level of involvement varied. A few participants who were generally more involved with cooking and engaged with meal planning were also involved in collective decision making about purchasing at the store. One 12-year-old-girl who made family dinners once a week at home explained how her family planned meals and shopped collectively:

Participant: We usually shop together on the weekends, but if I need to get, if

we need to get something for the meal, we'll just go to a store.

Interviewer: And so how do you help with shopping, or how involved are you?

Participant: Well, whenever I'm gonna make a meal, I pick out my stuff for it, or I tell my mom what I need.

Interviewer: But you came up with, with it all by yourself?

Participant: Yeah, well I also get inspired by shopping... Shopping for other dinners I see stuff, and I ask my dad if there's an open spot for dinner.

However, most common was shopping as a family activity in which children had roles like pushing the grocery cart, providing reminders about foods or brands to purchase, or retrieving food items. For example, when asked who does the food shopping for their household, a 13-year-old-female reported, *"All of us. Like, yesterday we went shopping, and my mom and little sister, they went shopping for the meals. And then me and my, um, older sister, we went shopping for, like, the snacks, and then we met up and went over all the foods that we got."*

2.3.2 Cooking

Cooking was defined in this study as any food preparation, thus activities like preparing meals and snacks, reheating leftovers, and packing lunches were all considered cooking. While most were involved in meal and snack preparation, participants' roles and beliefs about cooking varied. Descriptions of cooking activities frequently reflected both collective and personal agency, and proxy agency was exhibited in a few instances. It is also important to note that, overall, there was more enthusiasm by these early adolescents embedded in cooking conversations compared to other food activities. Therefore, more probes and conversations around cooking

took place in many interviews due to participants' ability and desire to expand upon the discussion of this activity.

Most participants said that they "liked" or "loved" cooking when asked about it, and the remaining participants either disliked or were relatively apathetic.

Interestingly, of the four who disliked cooking, two 12-year-old females described negative past experiences as part of their justification. For example, one was burned when she was younger, while another said that despite her grandmother's efforts to teach her for years, she didn't like cooking because of her perceived limited skill: "*I'll mess up the recipe. I'll burn stuff, or I'll forget to set the oven or check the food.*"

Although his opinion about cooking was unclear, an 11-year-old male also alluded to cooking skill, noting that he didn't help with cooking, "*Because I don't know how to cook.*"

Personal agency was reported by those who liked cooking and had positive collective cooking experiences. Many participants described increasing personal agency for cooking in recent years, often displayed in shifts from collective to personal agency. A 12-year-old female with much more personal cooking agency than many others said: "*I started cooking cause I'd been watching my mom. I helped my mom cook and was like 'Oh wow, that's how you cook it'. So then one day I started cooking, and then my mom and I cooked, like, fluffy eggs for my dad... And then I was cooking grilled cheese for everybody, and they were like, 'Oh wow you should just start cooking.' ... I'm like, 'I don't know if it's good or not because I never cooked.' ... So then I tried it, and I was like, 'It is good.' And then I started cooking meals for everybody.*"

Most participants described personal agency related to making school lunches, preparing snacks, making meals or “fending” for themselves, making family meals, and baking. Participants were making meals or fending for themselves if parents/caregivers were out or busy or if they were “really hungry” or “had to,” or if they did not “like” what was being served at home. In these instances, participants were often reheating leftovers or preparing simpler foods (e.g., sandwiches, tuna fish, ramen and other noodles, smoothies, toaster pastries, and brownies). When asked about cooking for himself, an 11-year-old male said, *“I mean, I already cook my foods when I get hungry because my parents told me to.... I’ll cook eggs, spaghetti, and chicken.”*

Although many participants described preparing meals for their family, it did not appear that they were consistently or exclusively responsible for meals. There were a few participants who independently prepared dinner for their families, but this level of personal agency was not common; most recalled isolated instances or noted that they cooked dinner meals occasionally. Participants were more frequently cooking breakfast or breakfast foods for the family such as a 12-year-old male would sometimes *“make, like, a breakfast for everyone, like bacon and eggs and toast. And sometimes I can make pancakes.”* A 13-year-old girl elaborated, *“I love making breakfast. I love making French toast and eggs and all of that.”* Breakfast foods appeared to be an accessible entry point into cooking, as many participants mentioned cooking eggs, and a 13-year-old male noted, *“It’s easiest to make eggs and bacon.”*

Proxy agency was not often discussed for cooking activities. Proxy agency typically included instances of asking someone to prepare a certain food or requests to

have an adult cook something for the participant because they were not able to do so on their own. This is different from collective agency where the child and parent/caregiver worked together to some degree and the child did not simply make a request. In most households, mothers were primarily responsible for cooking, although many participants reported shared cooking responsibilities between their mother and another family member. This was most often the adolescent's father, although a few identified grandparents or siblings as their proxies for cooking requests. It was also common for participants to be proxies for their parents/caregivers for cooking activities. Parents/caregivers would request their children help in the kitchen with small tasks such as setting the table or stirring something because they were not able to complete tasks themselves. Again, this was not a shared activity where both individuals approached the activity together, but it was instead a specific task to help decrease the burden on an adult. For example, a 13-year-old male described his mother requesting help with soup where "*I would have to put all the stuff in it and, like, watch it while she [mother] does something else.*"

Collective agency often centered around making meals with family members, and a few participants also described baking experiences. While participants were not specifically asked about the impetus for their contributions to collective cooking experiences, several offered descriptions representing a range of involvement, from cooperating with adult requests for help to enthusiastically volunteering their help in the kitchen. Along with her mother and brother, a 12-year-old female made snack bars that the family packed in their lunches, and a 13-year-old male baked bread with his father on some weekends. The primary role of most children in these joint cooking

activities was supportive and included activities such as measuring, chopping, stirring, adding ingredients, and watching over cooking foods to assist the supervising adult.

However, based on descriptions from a few participants, these collective cooking experiences served larger purposes than accomplishing the goal of feeding the family. One 12-year-old female shared that her father created a schedule for cooking and cleaning with the family to teach her cooking skills: *“Well, I don’t like to cook that much.... and my dad keeps telling me that I have to learn it, and so he made up a schedule when every other day me and my sister have to take turns helping our mother cook.”* Another participant’s parent used cooking experiences to teach skills beyond cooking. This 12-year-old female reflected on her struggle with math and how collective cooking experiences helped: *“I used to have my mom help me, and I used to cry over math because I would just stink at math, and the school math was just whew! Crazy! My mom taught me her way with cooking... so I have progressed in math and measuring and knowing fractions.... It was from my mom helping me to now she doesn’t have to.”*

2.3.3 Consumption

Consumption included intake-related activities during eating events and beliefs about peer and sibling intake. Personal agency was described by all participants. It was displayed when participants regulated their intake by deciding when and what to eat, such as choosing among foods offered during school lunch, and serving themselves or eating alternative foods if they disliked a meal at home. Collective and proxy agency were uncommon in children’s consumption descriptions in this sample.

Personal agency related to consuming school lunch was very common, and

over half of these adolescents reported eating school lunches most days of the week. Many could decide whether they ate lunch provided by school or brought their lunch from home. Participants decided when they would eat school lunch in various ways. Most based their choice on whether they liked the taste of school foods served, and decided by looking ahead at school menus at the beginning of the week or the night before. However, some participants ate school lunch everyday no matter what was served; others had specific days they would purchase school lunch because cycle menus helped them know what was served each week. A few participants also planned early in the year, such as an 11-year-old-male who described it this way: *“Usually like, in the first couple weeks I’ll eat everything and see what they have, and if it’s nasty I remember it so I won’t eat it.”*

When eating school lunches, early adolescents were able to independently select among options provided. Other people such as friends and adults did not seem to factor into these lunch decisions in this sample. Instead, taste and appeal of the food itself were more important to participants. An 11-year-old-female described how *“everyone else”* buys pizza, *“but I don’t really like it because it’s, like, I don’t know, like, it doesn’t taste like pizza. It tastes weird, like the cheese isn’t really melted, and the crust is like cardboard.”* It is also worth noting that, among participants receiving school lunch frequently, several mentioned that they did have more choices compared to elementary school, even if it was just getting a sandwich or a la carte option instead of the main meal.

Personal agency in the home environment was common and often more complex than school lunch consumption. Sometimes participants were choosing foods

independently, but other times consumption decisions were complicated by parent's influence and foods they provided at home. It was common for participants to discuss how they would choose foods independently when they didn't like a meal being served and would "*just look for leftovers so then they (family members) can eat what they want, but I'll just find something different*" as an 11-year-old-female described dinnertime in her household. Conversely, some participants were like a 10-year-old-male who said his parents try to get him to eat "*new vegetables and like fruits and stuff, but I didn't try it because I knew I wasn't going to like it.... Yeah, they said I should eat it, but I said I'm not going to like it, so I didn't.*" In this case, children displayed personal agency to refuse foods, which is also an important aspect of consumption agency to consider at this age. The role of parents/caregivers may also be shifting in important ways for some youth, such as a 12-year-old-male who described how parent role modeling for consuming vegetables has varied over time at home:

Participant: I'll be like, "I won't eat one [vegetable or bite of vegetable] if you don't eat one.

Interviewer: Okay, and does it usually work?

Participant: Sometimes. I remember when I was little, and I was with my dad and he was like, 'Eat your vegetables,' and I'm like, 'You eat them.' And so he put them in half, and he ate half and I ate half.

Interviewer: Do you still do that stuff like now that you're in sixth grade?

Participant: Sort of, yeah, but it doesn't work.

A small group of participants exhibited personal agency regarding dieting practices. A range of ages and both genders described actions they were taking for

themselves to limit food intake. A 13-year-old-female said, *“There’s this thing that I read about diets is that you have to switch up the foods you eat. But you can’t do it all the time, because then your immune system will get used to it and you won’t lose the weight. So I’ve been doing that, but I cut off all the junk food; I don’t like eating that.”*

Proxy agency emerged when there were participants who ate things at home because they knew they should for health reasons, even if they didn’t necessarily enjoy eating them, such as a 12-year-old-female who discussed how her mom talks to her about eating salads and how *“I still don’t want to, but I still ate it. I like forced myself to because I thought it was healthy for me.”* They described choosing to eat a food without another person forcing it on them, but in many cases their motivation was at least in part encouraged or informed by another person’s opinion or guidance. This suggests that proxy agency is often bidirectional and complex for many early adolescents, and the overwhelming influence of adults’ and parents’ opinions is important in the decision-making process.

Collective agency was discussed a few times when early adolescents brought up the topic of food decisions and dieting. Unlike some participants who described personal agency related to dieting, others were making major changes as a family or as a parent/child team. In one instance a 12-year-old girl describes this process: *“When me and my mom have talks that it’s really dangerous for me, especially young to get overweight and everything, and, yeah, me and her are starting the twenty one day fix on Monday... It’s basically like you go twenty-one days with eating healthy and like with workouts every day and everything and my mom has already done one round of it and she lost four pounds.... My whole family’s doing it this time!”*

Beyond dieting, there were also times that a participant had a consumption concern the family ultimately dealt with together. This was the case for a 13-year-old-male who initiated conversations about drinks with his family when he was in seventh grade because he wanted items with less caffeine and sugar, noting that his parents *“do encourage not all junk food, and I learned that after sixth grade because I was a little piggy.”* Interviewer: So you’ve changed some of your eating since you’ve been in junior high it sounds like? *Yes, a lot!”* In this instance, the child initiated a conversation about a consumption topic, but it was the family as a unit that ultimately initiated change in the household and supported the child’s initial interest in changing his eating behavior. Overall, most instances of collective agency and family decisions were framed as “we decide” to make diet changes and appeared to be occurring in households where participants and/or family members had weight concerns. Again, this was not common in our sample, but for those early adolescents who did discuss it, there was a sense that they were part of the process involving changes to family food decisions at least to some degree.

2.3.4 Food and Nutrition Information Seeking

Food and nutrition information seeking was defined as any behavior or activity where an individual or group of individuals attempted to answer a question or learn more about a food or nutrition-related topic. When asked directly, over half of the sample reported having no current questions related to nutrition, and when questions did exist, they were typically related to the specific contents and characteristics of foods such as how many calories or how much sugar was in a food or beverage. The most frequently reported sources of nutrition information included parents/caregivers

and school instructors/course work, with some reporting accessing nutrition information online. Collective and proxy agency were commonly discussed, but only a few participants described personal agency when searching for food and nutrition information.

Personal agency existed for a few who occasionally used the internet or magazines to find nutrition information independently. They usually asked questions similar to this 12-year-old female who reported looking up *“Like, what's the difference between junk food and then, like, healthy food?”* However, when participants were asked to name how they found nutrition information, the majority did not describe regularly used sources. Specifically, for information online, these participants used general search engines or could not remember specific websites, like this 13-year-old male who said, *“Kind of websites... I really don't know the names. I usually check in my history.”*

Proxy agency was common, and multiple participants described referring to an adult in their household, an older sibling, or a teacher at school to get answers to questions they had about food and nutrition. When asked what questions they had about nutrition, a common response was something similar to, *“My parents kind of cover that”* (12-year-old female). Teachers at school also appeared to play an important role by exposing children to information and new sources related to nutrition as part of coursework, such as one 13-year-old-female who discussed how *“We're learning about the digestion and stuff.... Cause we watched this movie Super-Size Me. It was an influence not to eat a lot of McDonald's.”* Teachers provided information the child would not have otherwise known about. Teachers also served as

direct information sources for some youth, and, rather than seeking it out independently, children went to a teacher to get information, like a 12-year-old-male who described his question about serving sizes: *“I asked my teacher, like, ‘What if there was two different kinds of pasta and the same serving size? Would they have different amounts of calories or something if nothing else is added?’”*

Collective agency was described by a few adolescents for food and nutrition information gathering in which they and adults in their homes looked up information together – primarily information for cooking activities. *“If we have any questions... Like, one time I made a cake, and I only had two eggs when I needed three, so my mom went on the Internet, and we found out that half of a banana equals one egg.”* (11-year-old female). Another participant described a different type of shared learning experience with her father where *“we have a Google-able moment, and he goes up, and he Googles it. He has like all these sites that he knows are good resources, and we’ll click on it, and he’ll be like, ‘Here you go’ and makes you read the paragraph, and then you know the answer.”* (12-year-old female)

2.4 Discussion

This study provides new understanding about three modes of agency: personal, proxy, and collective about food and nutrition activities from the perspectives of early adolescents. The findings provide insights about how all three modes of agency provide a broad understanding of food-related activities during the specific life stage of early adolescence. In this sample, social context and influences were important in food and nutrition decision-making processes for early adolescents. Results suggest

food-related agency is influenced primarily by family and school structures during early adolescence.

When interpreting the results, it is very important to recognize that each mode of agency did not exist independently from the other agency modes, and considering agency as a combination or interplay of modes for early adolescents is imperative because it provides important information about food choice process in everyday situations. Although results are presented in a non-overlapping way, the examples and quotes provided often indicated more than one mode of agency was occurring in a given situation. For example, consumption results often included both proxy and collective components as decisions and changes to the home environment were a process requiring time and multiple forms of agency for families. Personal agency emerged in areas such as cooking and consumption, but the role of parents/caregivers or the families' collective agency helped shape many food choices and cooking opportunities, allowing for personal agency to exist for the early adolescent in a variety of activities. Proxy agency also did not exist alone for participants, with some levels of personal agency and perceptions of self-efficacy for getting a proxy to act on their behalf being present for all four food activities discussed. As seen in other research, activities such as shopping and cooking are often a joint activity in childhood and adolescence, and it is important to understand how children are influencing and constructing each activity as part of the family and social unit because this can have important influences on dietary intake and family food decisions (Chu et al., 2013; Kümpel Norgaard et al., 2007; Larson et al., 2006).

Modes of agency overlapped and agency itself was often bi-directional and

context-dependent for participants. For example, cooking and nutrition information seeking activities were often initiated by both parents as well as their early adolescent depending on the context being described during interviews. In addition, social and environmental structures should not be considered separately when interpreting these results as human agency operates in conjunction within other systems and structures. This was evident in this study for activities such as consumption and cooking because descriptions were often part of structures such as school and home environments. The structures created by home environments often impacted the level and type of agency a participant could have for cooking activities, and the structure created by a school determined how and why many participants consumed certain foods. It is also supported by other constructivist approaches to human behavior beyond Bandura's agentic perspective approach, which all support the concept of individuals constructing and simultaneously being shaped by their environments and social structures (Alkire, 2009; Bronfenbrenner, 1994; Dyck and Kearns, 2006; Dziewaltowski, 2002). Results show that all three modes of agency in early adolescence are not experienced and expressed in the way they would be for an adult due to inherent structure and power dynamics among adults, social structures, and children during this life stage.

Multiple examples across agency modes suggested that young participants were perhaps never truly independent in grocery shopping, cooking, consumption, or nutrition information seeking activities because of established structures such as home environments and school structures. In this study, parental proxy agency as well as family collective agency shaped participant's food choices and decision making

throughout the results. However, this doesn't mean that participants were bystanders or simply a product of structures existing around them. Instead early adolescents were simultaneously shaping structures along with other individuals. Their experiences and descriptions of agency are important to recognize due to their inherent complexity during this life stage when they are confronted with many tasks for the first time in their lives. Understanding early adolescents' perspectives is critical to creating appropriate and tailored interventions for parents/caregivers and their children, and early adolescents' perspectives around agency provide important information about where to focus future intervention efforts.

Parents/caregivers were the main individuals providing structure and opportunities for early adolescents to gain personal agency in this study. This was also observed in a recent study with older adolescents and parents, whereby parents and adolescents engaged in different strategies to influence one another in a "give and take" around food choice (Bassett et al., 2008). This is important because parent-adolescent relationships go through noteworthy transformations during adolescence and evidence suggests that during early adolescence youth start to reject or challenge parental authority over personal issues like style choices or spending personal money (Daddis, 2011b; Smetana et al., 2006).

While complex issues in other domains besides food become increasingly important as adolescents mature, issues related to the food domain deserve attention because they involve a dynamic process that directly influences children's eating patterns and potentially their health. In addition, food choices may be considered personal to adolescents because they can use food choice to help develop a personal

identity or express themselves as they become more independent (Daddis, 2011; Ventura and Birch, 2008; Videon and Manning, 2003). Cooking and nutrition information seeking activities presented here highlighted this dynamic process as parents/caregivers were a primary information source but also used food experiences to help teach their children how to be more independent around food and nutrition. By just by being present or monitoring the adolescent in food-related activities they were able to contribute to their child's food choices and development of self-efficacy in ways that were not restricting choice or seen as authoritarian from the child's perspective (Smetana et al., 2006). This is important because parents/caregivers who believe they can contribute to their child's development of healthy habits may be able to help cultivate and facilitate the adolescent's potential to be self-efficacious more readily (Ardelt and Eccles, 2001; Bandura, 2005). This in turn is important to early adolescents as they become more confident in food-related activities and are exposed to new experiences. Despite increases in self-efficacy, having their parents/caregivers believe in them and their abilities remains important as they develop and learn how to monitor their own food and health behaviors throughout adolescence.

Strengths and Limitations

A major strength of this study is that it used a qualitative approach to gather information directly from early adolescents about the understudied topic of food agency. Additionally, the data analysis and presentation of results were guided by a well-established psychological perspective about agency that is appropriate when discussing early adolescent development (Bandura, 2018, 2001). A limitation is that the sample size was small and from one relatively small geographic area. While a

purposeful sample was obtained by balancing recommendations from previous qualitative research (Safman and Sobal, 2004) and resource availability, results are not generalizable. A second limitation is that while all major topic questions about grocery shopping, cooking, consumption, and knowledge were asked in each interview there were multiple interviewers. To address the issue of multiple interviewers, group meetings and field notes were discussed regularly by the team. This still may impact the consistency with which certain probes were used during interviews because some minor questions and probes related to agency were not always asked or asked in the same way. Finally, agency was not the main aim of the larger study from which this sample was drawn. More research is needed to further our understanding of nuances related to agency in early adolescence.

Implications for future research

Participant-informed information about food and nutrition areas in which early adolescents experience agency is crucial to inform research and develop interventions that most effectively support the development of healthful behaviors. A qualitative approach that focused on the perspectives of the specific stage of early adolescence allowed for an in-depth understanding of current food practices and perspectives. Future research should continue to directly engage with specific age groups so that adolescent eating habits and food choice processes can be better understood in the context of developmental stages. More research about how adolescents navigate food choice decisions and food experiences both within their families and outside the home environment is also needed. This study provided new understanding about how youth are operating independently, but how structures and other influences, such as

resources and personal factors, are influencing adolescent food choice in today's ever-changing food environments is still not known.

Family structure, social context, and parents/caregivers were primary influences in all three modes of agency for our participants, and experiences of complete personal agency and individual decision-making descriptions were rare for the early adolescents in this sample. Parents/caregivers and social structure were regularly entwined in participants' descriptions of food choice decisions. More research is necessary to understand how early adolescents and other adolescent groups are navigating food decisions as their social roles and view of themselves undergo changes. For example, it is unclear how food choice values such as importance of nutrition, health, price, or other topics may be influencing the development of personal food systems for youth separate from parents/caregivers and family structures (Sobal and Bisogni, 2009). More research is also needed to understand how diversity, social context, and puberty may be impacting food choice during adolescence since individual variations in development may create salient influences on youth eating practices and parent-adolescent interactions (Croll et al., 2002; Mendle et al., 2019; Mitchell et al., 2013; Olvera et al., 2015).

Finally, much of the literature on personal, proxy, and collective agency has focused on only one mode of agency or specific health-related behaviors such as exercise or vegetable consumption as it relates to agency (Baker, Little, & Brownell, 2003; Contento et al., 2006; Reicks et al., 2015; Sutter, Nishina, Scherr, Zidenberg-Cherr, & Ontai, 2016; Dzewaltowski et al., 2010). We found that by examining agency across all three modes simultaneously, as well as looking at multiple food

activities together, we could gather more information about structure and food choice processes for early adolescents and their families. Future research should consider the complex nature of food agency and consider multiple modes of agency in different arenas and multiple theoretical constructs to inform intervention efforts with youth.

2.5 Conclusion

These results suggest that all three modes of agency (personal, proxy, and collective) are important during early adolescent development and are differentially used in types of food activities. Understanding how each mode of agency operates as part of a larger social structure can provide important information for understanding and improving the food and nutrition behaviors of early adolescents.

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CHAPTER 3

ASSOCIATIONS AMONG ADULTS' FOOD CHOICES VALUES, SOCIODEMOGRAPHIC CHARACTERISTICS, AND EARLY ADOLESCENTS' DIETS IN THE SAME HOUSEHOLD IN THE NHANES CONSUMER BEHAVIOR FOLLOW-UP CHILD MODULES 2009-2010

3.1 Introduction

Early adolescence typically encompasses ages 10-14, and is a critical transitional period characterized by the initiation of various biological, social, and cognitive changes (Wigfield et al., 2005). In addition to physical growth and maturation, early adolescents express a growing desire for autonomy and experience shifts in self-esteem and individuality related to their peers and family (Anderson et al., 2000; Eccles, 1999; Hanewald, 2013; Steinberg, 2011). Importantly, health-related behaviors established during this developmental period can contribute to unhealthy behaviors and increased risk of chronic disease later in life (Craigie et al., 2011).

Research indicates that the quality of adolescents' diets worsens with increased consumption of energy-dense foods and inadequate intakes of important food groups such as fruits, vegetables, and low fat dairy products (Cavadini et al., 2000; Drewnowski and Rehm, 2014; Haughton et al., 2016; Maqbool et al., 2012; Pearson et al., 2009a; Reedy and Krebs-Smith, 2010). Moreover, researchers consistently observe detrimental eating behaviors becoming more prevalent in adolescence, such as skipping meals, increasing junk food consumption, and eating more meals away from home (Bassett et al., 2008; Contento et al., 2006; Pearson et al., 2009a; Story et al.,

2002; Videon and Manning, 2003).

Despite shifts in behavioral autonomy, parents and other adult caregivers still play a key role in shaping early adolescents' food choices (Contento et al., 2006; Draper et al., 2015). Parents act as prominent gate-keepers, role models, and sources of nutrition information throughout early adolescence (Bassett et al., 2008; Brown and Ogden, 2004; Ventura and Birch, 2008; Zarnowiecki et al., 2012). Several studies have highlighted the importance of food-related parenting practices on adolescents' food choices and eating behaviors (Loth et al., 2013; Reicks et al., 2015; Tabbakh and Freeland-Graves, 2016; te Velde et al., 2014).

Parental influence is arguably the most important influence on early adolescents because early adolescents are still consuming over half of their daily calories at home (Poti & Popkin, 2011). Therefore, parents and adults in the household are often responsible for establishing what foods are brought into the home and determining if healthy foods are available for their early adolescent for many eating occasions (Reicks et al., 2015; Story, Neumark-Sztainer, & French, 2002; Van Der Horst et al., 2007). Parent and adult food behaviors and practices at home have consistently been shown to be associated with diet quality and obesity-related dietary behaviors for youth. Research indicates that parental intake and education level have the most consistent associations with children's fat, fruit, and vegetable intakes across studies with children and adolescents (Van Der Horst et al., 2007).

Parent/caregiver influence is also important when considering early adolescent food choice and potential associations with early adolescent dietary intakes because parents and adults in a household often serve as role models for eating behaviors.

Eating is a social act, thus the social modeling of adults frequently present with early adolescents at mealtimes, such as the eating behaviors of parents, should be considered when examining early adolescent food choice processes (Cruwys, Bevelander, & Hermans, 2015; Higgs & Thomas, 2016). Parents are important influencers because they shape home food environments, but also because parental modeling of healthy and unhealthy intakes, whether intentional or unintentional, is often modeled directly by their children (Brown & Ogden, 2004; Palfreyman, Haycraft, & Meyer, 2014). This becomes less common as children become older adolescents and gain more independence and autonomy, but early adolescents are often like younger children and look to parent behaviors for cues for their own eating decisions (Bourdeaudhuij, 1997; Pedersen, Grønhøj, & Thøgersen, 2015; Reicks et al., 2015; Salvy, de la Haye, Bowker, & Hermans, 2012; Videon & Manning, 2003). For example, a recent study with adolescent-parent dyads found that parent influence, specifically modeling, was not only more important than peer influence with respect to fruit and vegetable intake, but modeling was also more important to adolescents than what their parents told them to do (Pedersen et al., 2015).

Furthermore, parent/caregivers' food choice values may represent an important social influence on adolescents' dietary habits beyond dietary intake. Food choice values are defined as "the considerations that people bring to food choice (i.e. taste, cost, health, convenience) and the particular meanings that people attach to these considerations" (Sobal and Bisogni, 2009,p.S42). These value negotiations may influence adolescents by affecting food-related decisions and/or household food availability or by shaping adolescents' food choice values (Furst et al., 1996; Sobal

and Bisogni, 2009). Food choice values of a parent or adult in a household are explored in this study with the rationale that the food choice values of parents may represent an important social influence on their child's eating behaviors and ultimately the child's formation of food choice values for themselves. Food choice values and value negotiations are considered to be largely conscious in comparison to many other daily decisions, with food choice values found to be a deliberate and thought-out choice in many situations (Furst et al., 1996; Furst, Connors, Sobal, Bisogni, & Falk, 2000; Sobal & Bisogni, 2009). The food choice values of adults in a household may therefore affect household availability of food, and what adults deem as important regarding food and nutrition may transpire to youth as they observe and begin to learn and develop their own food choice processes.

Resources are also important to consider given previous work that has shown direct links with dietary intakes and certain resources such as cooking skills, income, and time within a household. Resources are defined as the assets that individuals consider in making food choice decisions (Sobal & Bisogni, 2009). These assets can be tangible or intangible, and resources are subject to fluctuations over time for individuals. Resources typically include financial resources (i.e. money), material resources (i.e. food equipment), human capital resources (i.e. food-related skills and knowledge), social resources (i.e. relationships), and cultural resources (i.e. values and traditions) (Furst et al., 1996; Sobal & Bisogni, 2009). The perception of availability or lack of availability of resources for an individual provides important information for the boundaries of food choice situations. Likewise, resources can facilitate or hinder food choices, and different types of resources may be exchanged for others, like

trading money for equipment or social connections for lack of personal skills.

Previous research has demonstrated an association between food choice values and dietary quality among adults (Aggarwal et al., 2016, 2014; Beydoun and Wang, 2008; Pelletier et al., 2013). In addition, several qualitative studies have explored factors that affect food choice among adolescents, highlighting the importance of parental support (Cullen et al., 2003; Holsten et al., 2012; Neumark-Sztainer and Story, 1999; Stevenson et al., 2007). However, few studies have examined the influence of caregivers' food choice values on adolescent eating behaviors or focused specifically on early adolescents. To address these gaps, the present study aimed to examine associations among adults' food choices values, sociodemographic characteristics, and adolescent dietary intake using a nationally representative sample of US adults and early adolescents (10-15 years) in the same household.

3.2 Methods

3.2.1 Theoretical Framework

The present study used the Food Choice Process Model (Figure 1.1) (Furst et al., 1996; Sobal and Bisogni, 2009) as a guiding framework to explore associations among adults' food choice values, sociodemographic characteristics, and adolescents' dietary behaviors. This constructivist model identifies multiple factors and processes that shape an individual's food choice decisions and behaviors. However, few studies have used this model to examine food choice behaviors among early adolescents. We hypothesized that adolescents' food choices are influenced by caregivers' food choice values (social factors) and sociodemographic traits (personal factors). In addition,

caregivers' own food choice values are likely shaped by their own personal characteristics (e.g. gender and race) and available resources (e.g. household income).

The following are the hypotheses used in these analyses:

H1.1: Respondents'/adults' food choice values will be positively associated with children's reported intake of fruits, vegetables, and dairy foods and inversely associated with children's reported intake of added sugars.

H2.1: Family income and respondent/adult education level will be positively associated with children's reported intake of fruits, vegetables, and dairy foods and negatively associated with children's reported intake of added sugar.

H2.2: Children from non-Hispanic white households will have higher self-reported intakes of fruits, vegetables, and dairy, and lower reported intakes of added sugar.

H3.1: Respondents/adults with stronger food choice values (consider a food choice value "very important") will be more likely to have children who are younger, non-Hispanic White, and have higher income and education levels.

3.2.2 Study Design and Sample

The National Health and Nutrition Examination Survey (NHANES) is a cross-sectional, nationally representative survey used to assess the health and nutritional status of children and adults in the United States (Johnson et al., 2013). NHANES consists of two main components: 1) health interviews conducted in adult respondent's homes to assess demographic, socioeconomic, and behavioral characteristics and 2) health measurements completed in specially designed mobile centers (Johnson et al.,

2013). The present study used publicly available data from the 2009-2010 NHANES survey. We restricted our analyses to early adolescents (age 10-15 years) with valid 24-hour dietary recall, resulting in a sample of 863 adult respondents. Due to the use of de-identified, publicly available data, this study was determined to be exempt from review by the Cornell University Institutional Review Board (IRB).

3.2.3 Dietary Intake Measures

Dietary intake data were collected using the US Department of Agriculture's Automated Multiple Pass Method (AMPM) (USDA). The AMPM is a computerized method for collecting 24-hour dietary recalls that is designed to enhance recall accuracy and efficiency. The first NHANES recall was conducted during the mobile health examination by trained interviewers. Adolescents aged 11–15 years independently self-reported all foods and beverages consumed during the 24-hour period prior to interviews. Adolescent respondents younger than 11 years were required to have an adult present during the interviews. A second dietary recall was completed via telephone approximately 3 to 10 days later.

The USDA's Food Pattern Equivalent Database was used to create 37 component variables based on reported foods and beverages consumed (Bowman et al., 2013). The mean for each food component variable was determined across both days and aggregated to create an overall averaged score for the following dietary components: 1) fruit (cup equivalents/day); 2) vegetables (cup equivalents/day); 3) dairy (cup equivalents/day) and 4) added sugars (teaspoon equivalents/day). These four dietary components were chosen based on nutritional relevance for adolescents in the United States.

3.2.4 Food Choice Values Measures

Data about food choice values were obtained from the 2009-2010 Flexible Consumer Behavior Survey (FCBS) module, which provides information about individuals' knowledge, attitudes, and beliefs towards nutrition and food choices. The FCBS module was first added to NHANES in 2007 and consists of two components: 1) core questions asked during the NHANES household interview and 2) supplementary questions asked during a follow-up telephone interview (Johnson et al., 2013). Food choice values were assessed as part of the supplementary telephone follow-up module, and the FCBS 2009-2010 represents the most recent publicly available NHANES data set assessing adult food choice values for adults in the United States who have at least one child aged 1-15 years old living in their household.

For youth aged 10-15 years, FCBS phone follow-up data were collected at the family level, with responses corresponding to one adult representative from each household. Food choice values were assessed for adult respondents using 5 items in the FCBS supplementary module. Adult respondents were asked to rate the importance of (1) nutrition, (2) price, (3) taste, (4) convenience, and (5) food durability when purchasing foods using a 4-point response scale (very important, somewhat important, not too important, or not at all important). Responses to each question were dichotomized as "very important" or "other" in an attempt to explore potential differences between adult respondents with very strong and established food choice values as compared to others who did not share strong opinions for the same food choice values. Adult foodwork activities were also captured using two items from

the FCBS. These yes/no questions asked whether adult respondents were (1) the main food planner or (2) the main food shopper in their household.

3.2.5 Sociodemographic Measures

Adolescent sociodemographic characteristics included gender, age and race/ethnicity. Characteristics of adult respondents included gender, age, educational attainment (high school diploma or less, more than high school), and household income. Income was stratified into categories {<\$20,000; \$20,000-\$34,999; \$35,000-54,999; \$55,000-\$74,999; >\$75,000}. For adult respondents who only indicated whether their income was >\$20,000, a separate category was created to reflect unspecified incomes over \$20,000.

3.2.6 Statistical Analyses

All analyses were carried out using SAS version 9.4 with incorporation of survey weights to account for the multistage, cluster sampling design of NHANES (Johnson et al., 2013). FCBS food choice data were linked to NHANES dietary data and sociodemographic characteristics using specific participant sequence numbers.

Descriptive characteristics of all adolescents and adults in the study sample were summarized using means for continuous variables and frequencies (%) for categorical variables. Demographic characteristics were compared using Rao-Scott Chi-Square tests. To account for the skewness of dietary data, dairy and added sugar intakes were square root transformed while fruit and vegetable intakes were log transformed ($\log + 0.1$) before analysis. Separate transformation were completed based on examination of residuals for each outcome, and square root transformations were necessary to account for those with values of zero for fruit and vegetable intakes

in this sample.

Linear regression models were used to assess the associations of adolescent dietary intake with adults' food choice values and sociodemographic characteristics of the same household. Results were back-transformed for reporting purposes and ease of interpretation. Logistic regression models were used to examine associations between adolescent and adult sociodemographic characteristics and adults' food choice values. For all models, adult respondents who rated food choice influences as "very important" were used as the reference group.

3.3 Results

3.3.1 Sample Characteristics

After excluding participants with missing data (n=10), the final sample size for analysis was 853. This corresponds to the number of adult-adolescent dyads with complete data available on all measures of interest.

Sample characteristics by adolescent race/ethnicity are presented in Table 3.1. Adolescent respondents had a mean age of 12.6 years (SEM= 0.09) (53% girls; 47% boys). Adult respondents had a mean age of 42 years (SEM= 0.53), were primarily female (> 80%), and had attained more than a high school diploma (62%). Significant differences in household income and the gender and education level of adult respondents in the household were observed across adolescent racial/ethnic groups (Table 3.1). A greater proportion of non-Hispanic white adolescents came from household with incomes above \$55,000 compared with adolescents of other races/ethnicities.

Most adult respondents rated nutrition and taste as “very important” when making purchasing decisions (65% and 80%, respectively). The importance of price and food durability were more evenly split (price: 49% very important; durability: 45% very important), while only 28.1% of adult respondents rated convenience as very important. Food choice values differed significantly across adolescent race/ethnicity groups. Compared to non-Hispanic white adolescents, those from other racial/ethnic backgrounds (e.g. Hispanic, non-Hispanic black) were more likely to live with an adult who highly valued nutrition, price, convenience, and food durability (Table 3.1).

Mean fruit intake among adolescent respondents was 0.55 cup equivalents (95% CI= 0.46, 0.65) and mean vegetable intake was 0.81 cup equivalents (95% CI= 0.0.75, 0.88), which are lower than current USDA recommendations for this age group (1.5-2 cups of fruits /day; 2-3 cups of vegetables/day) (United States Department of Agriculture, 2018). Mean dairy intake (2.08 cup equivalents; 95% CI= 1.89, 2.28) was lower than the recommended 3 cups (United States Department of Agriculture, 2018). Mean added sugar intake was 17.7 teaspoon equivalents (95% CI= 17.16, 18.27) or approximately 283 calories, which exceeds the 2015-2020 Dietary Guidelines of less than 10% of calories per day from added sugars and the American Heart Association recommendation of 6 teaspoons or less of sugar per day for children (American Heart Association, 2019; DeSalvo, KB, Olson, R, & Casavale, 2016).

3.3.2 Adolescent dietary intakes, sociodemographic characteristics and adult food choice values

Results of the multiple linear regression analyses are presented in Table 3.2.

Mexican American adolescents had significantly higher fruit intakes ($\beta = 1.16$ cups, $p < 0.05$) and lower intakes of dairy ($\beta = -0.05$ cups, $p < 0.001$) and added sugars ($\beta = -0.27$ tsp, $p < 0.05$) as compared to non-Hispanic white adolescents. Non-Hispanic black adolescents consumed less dairy ($\beta = -.10$ cups, $p < 0.01$) than non-Hispanic white adolescents. No other significant race/ethnicity associations were observed (Table 3.2).

Adolescent dietary intakes were also significantly associated with adolescent gender, age, and household income (Table 3.2). Female adolescents had higher intakes of dairy ($\beta = 0.02$ cups, $p < 0.01$) and added sugars ($\beta = 0.26$ tsp, $p < 0.01$) as compared to males. Adolescents from higher income households consumed slightly less added sugar ($\beta = -0.21$ tsp, $p < 0.05$).

The importance of nutrition and taste when purchasing food emerged as key associations of adolescent dietary intakes. Adolescents living with an adult who highly valued nutrition had significantly higher intakes of fruit ($\beta = 1.23$ cups, $p < 0.05$), while adolescents living with an adult who highly valued taste consumed less dairy ($\beta = -0.006$ cups, $p < 0.05$) No significant associations were observed between adults' food choice values and adolescent intakes of vegetables or added sugars.

3.3.3 Adult food choice values and sociodemographic characteristics

Table 3.3 presents the results of the logistic regression analyses examining sociodemographic influences on adults' food choices. As compared to adolescent girls, boys were less likely to live with an adult who considered nutrition "very important" (OR: 0.61, $p < 0.05$) but more likely to live with an adult who reported convenience as "very important" when purchasing food (OR: 1.93, $p < 0.05$).

Adult male respondents were less likely to consider nutrition, taste, and convenience as highly important when shopping for food as compared to adult female respondents ($p < 0.05$ for all, Table 3.3). Similarly, younger adolescent respondents were slightly more likely to report nutrition and convenience as ‘very important’ factors (OR: 1.05, $p < 0.01$ for nutrition, OR: 1.04, $p < 0.001$ for convenience). Adults with household incomes above \$75,000 were less likely to value price as compared to those with incomes \$35,000-\$54,999 (OR: 0.238, $p < 0.01$). Adults in the lowest and highest income groups were significantly more likely to report taste as “very important” as compared to the reference group (\$35,000-\$54,999) (Table 3.3).

Lastly, adolescent race/ethnicity was significantly associated with all food choice values except taste. Compared with non-Hispanic whites, Mexican-American adolescents were considerably more likely to live with an adult who perceived price, nutrition, convenience and food durability as very important (Table 3.3). Similar correlations were observed for nutrition, convenience and durability among all other racial/ethnic groups (Table 3.3). However, importance of price was not significantly associated with other Hispanic or non-Hispanic black adolescents.

In summary, adult food choice values were only found to be positively associated with reported fruit intakes, and no other food choice values had significant associations for this sample. Family income and adult respondent education level were not significantly associated with reported intakes of fruit, vegetable, dairy foods, or added sugar. Children from non-Hispanic white households were also not found to have higher self-reported intakes of fruits, vegetables, and dairy foods, and lower reported intakes of added sugar compared to other race/ethnic groups. Finally, adult

respondents with stronger food choice values (consider a food choice value “very important”) were not more likely to be non-Hispanic White or have higher education levels.

3.4 Discussion

The present study provides a unique contribution to the existing literature. Unlike other analyses using NHANES, which focus primarily on adult and older adolescent food-related attitudes and decision-making, this exploratory research provides important information about associations within households about adult food choice values and early adolescent dietary intakes using a nationally representative sample.

Potentially important associations between the reported importance of nutrition to parents and their early adolescent’s fruit intake are highlighted. Although the dietary intake changes are clinically rather small they suggest that nutrition values may be associated with intake over time. Recent research also indicates that having health-oriented food rules at home is associated with older adolescents making healthier independent snack choices (Wang and Fielding-Singh, 2018). Furthermore, compared to similar analyses with adult populations, fewer food choice values considered to be “very important” were associated with our sample, indicating that the role of adult food choice values potentially varies when early adolescents are in the household (Aggarwal et al., 2016).

Interestingly, these analyses suggest that characteristics such as child age, parent education level, and family income are not substantially associated with

adolescent intakes. The role of income is often considered to be a contributing factor to diet quality and home food availability. Even though some studies have suggested fewer nutritional differences among children compared to adults, the lack of associations with diet outcomes in these data further suggests that early adolescent intake is a complicated process that deserves more research, as it is not necessarily class and income-dependent (Kirkpatrick et al., 2012; Masters et al., 2014). The lack of associations related to child age also indicates that nuanced behaviors and parent-child interactions may be occurring in households. Smaller studies showing shifts in decision-making and co-construction of food decisions that occur during adolescence support this conclusion (Bassett et al., 2008; Contento et al., 2006; Granner et al., 2004).

Across all analyses, child race/ethnicity was associated with many important facets of dietary intake for early adolescents. Adult food choice values also appear to be especially important when considering the level of importance for food choice values across race/ethnic groups in this study. There were significant differences among race/ethnic groups for all adult food choice values, with the exception of taste, which is supported by other recent research with adult populations (Aggarwal et al., 2016; Wang and Chen, 2011). These differences among race/ethnic groups suggest that considerations of race/ethnicity should be given more weight when interventions and messaging are developed across populations in the United States.

This study found that Mexican-American diets were associated with different intakes compared to non-Hispanic whites, which further supports research suggesting that Mexican-American diets may be healthier and more effective in meeting dietary

recommendations across some food groups such as total fruit, some vegetables, and total grains compared to non-Hispanic white children (Kirkpatrick et al., 2012; Wang and Chen, 2011; Zhang and Wang, 2012). Finally, the large differences observed among child race/ethnicity and adult food choice values contributes to research by emphasizing the variation among different groups and highlighting the need for specific and culturally appropriate nutrition education and other nutrition-focused interventions (i.e. environmental and policy interventions in different communities). Broadening future research to consider more non-traditional and ethnic diets and not assuming all parents/caregivers care equally about food choice values is potentially important when approaching families about nutrition in the United States.

Limitations of this study include the cross-sectional design and self-reported dietary intakes, with parents being included for some but not all intake procedures based on established NHANES protocols. This sample was also mostly adult female respondents, which potentially limits the sample representativeness. Dietary intake included all vegetables and fruits (e.g. fried potatoes and fruit juices), which may limit appropriate interpretation. Despite these limitations, there were many strengths in this study, including the averaging of two days of dietary recalls compared to many analyses that use only one 24-hour recall. Nationally representative data and the linking of adolescent and adult behaviors within a household and inclusion of sociodemographic characteristics also strengthen our understanding of this important topic with a relatively understudied age group.

3.5 Conclusions

This study provides new evidence about the importance of adult food choice values and household characteristics when considering the food environments of early adolescents. Not only did this study find associations between adult food choice values and some child dietary intakes, but findings suggest certain household characteristics, such as child race/ethnicity, are strongly associated with food choice values of adults in the same household. These findings support the need for more research about family dynamics and food and nutrition values in households when considering the nutrition and health of today's youth.

Table 3.1 Weighted Sample Characteristics by Adolescent Race/Ethnicity in the NHANES-Consumer Behavior Follow-Up Module 2009-2010 (n=853)

	Mexican-American (n= 258)	Other Hispanic (n= 98)	Non-Hispanic White (n=284)	Non-Hispanic Black (n=166)	Other Non- Hispanic (n=47)	
Adolescent Characteristics (%)						p-value*
Gender						
Male	45.1	44.7	49.9	39.9	41.1	0.268
Female	54.9	55.3	50.1	60.1	58.9	
Adult Characteristics (%)						
Gender						
Male	9.7	10.3	20.6	7.9	10.1	0.011
Female	90.3	89.7	79.4	92.1	89.9	
Education Level						
High school or less	72.5	53.5	25.1	48.5	42.1	<.0001
More than high school	27.5	46.5	74.9	51.5	57.9	
Annual Family Income						
Under \$20,000	26.2	17.7	9.5	28.1	14.5	<.0001
\$20,000 - \$34,999	30.4	30.6	9.5	31.2	23.3	
\$35,000 - \$54,999	17.2	11.6	14.0	12.0	12.3	
\$55,000 – \$74,999	6.1	9.9	10.5	8.2	14.4	
\$75,000 and over	10.4	25.2	49.6	14.7	28.5	
Unspecified (Over \$20,000)	19.7	7.9	6.9	5.8	6.9	

Main food shopper?						
Yes	90.1	91.8	93.2	88.7	89.9	0.657
No	9.9	8.2	6.8	11.3	10.1	
Main meal planner?						
Yes	91.2	86.4	92.0	92.3	90.1	0.688
No	8.8	13.6	8.0	7.7	9.9	
Nutrition						
Very important	80.7	80.6	55.7	74.1	91.1	<.0001
Somewhat/not at all important	19.3	19.4	44.3	25.9	8.9	
Taste						
Very important	78.3	82.5	78.8	82.0	83.9	0.885
Somewhat/not at all important	21.7	17.5	21.2	18.0	16.1	
Price						
Very important	68.1	61.9	38.9	62.6	73.4	<.0001
Somewhat/not at all important	31.9	38.1	61.1	37.4	26.6	
Convenience						
Very important	63.5	53.5	13.2	44.5	34.1	<.0001
Somewhat/not at all important	36.5	46.5	86.8	55.5	65.9	
Food Durability						
Very important	76.0	74.3	26.7	80.7	57.5	<.0001

Somewhat/not at all important	24.0	25.7	73.3	19.3	42.5
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*Significance based on Rao-Scott Chi-Square Tests

Table 3.2: Linear regression analysis of the associations of adolescent dietary intakes with sociodemographic characteristics and adult food choice values (n=853)

	Vegetables (cup eq.)	Fruit (cup eq.)	Dairy (cup eq.)	Added Sugar (tsp. eq.)
Adolescent Characteristics	β (95% CI)	β (95% CI)	β (95% CI)	β (95% CI)
Age (years)	0.95 (-0.90, 1.01)	-0.85 (-0.79, 0.92)	0.000 (-0.001, 0.001)	0.003 ^a (0.000, 0.012)
Race/Ethnicity				
Non-Hispanic White	ref	ref	ref	ref
Mexican American	1.01 (-0.79, 1.28)	1.16 ^a (0.90, 1.47)	-0.047 ^c (-0.100, -0.014)	-0.268 ^a (-0.927, -0.005)
Other Hispanic	0.94 (-0.63, 1.37)	1.05 (-0.71, 1.54)	-0.041 (-0.170, 0.000)	-0.081 (-0.675, 0.064)
Other Non-Hispanic	-0.80 (-0.56, 1.12)	0.96 (-0.48, 1.85)	-0.001 (-0.034, 0.016)	-0.005 (-0.321, 0.179)
Non-Hispanic Black	0.93 (-0.73, 1.18)	1.10 (-0.78, 1.53)	-0.098 ^b (-0.255, -0.015)	-0.004 (-0.233, 0.128)
Gender				
Female	ref	ref	ref	ref
Male	0.92 (-0.78, 1.08)	0.96 (-0.79, 1.16)	0.024 ^c (0.007, 0.051)	0.264 ^d (0.102, 0.500)

Adult Characteristics				
Age (years)	0.91 (-0.90, 0.92)	-0.90 (-0.88, 0.92)	0.000 (0.000, 0.000)	0.000 (-0.001, 0.000)
Gender				
Female	ref	ref	ref	ref
Male	1.13 (-0.86, 1.49)	-0.74 (-0.49, 1.09)	-0.013 (-0.059, 0.000)	-0.015 (-0.315, 0.103)
Educational Level				
More than high school/GED	ref	ref	ref	ref
High school/GED or less	0.98 (-0.72, 1.32)	-0.85 (-0.62, 1.15)	0.002 (-0.004, 0.023)	0.046 (-0.045, 0.408)
Annual Family Income				
\$35,000 - \$54,999	ref	ref	ref	ref
Under \$20,000	-0.88 (-0.55, 1.37)	-0.86 (-0.45, 1.60)	-0.010 (-0.060, 0.002)	-0.175 (-0.901, 0.013)
\$20,000 - \$34,999	-0.88 (-0.65, 1.18)	-0.85 (-0.33, 1.99)	-0.003 (-0.026, 0.004)	-0.073 (-0.698, 0.087)
\$55,00 – \$74,999	-0.87 (-0.55, 1.34)	-0.89 (-0.34, 2.10)	-0.003 (-0.034, 0.005)	-0.211 ^a (-0.707, -0.006)
\$75,000 or more	-0.89 (-0.72, 1.11)	-0.88 (-0.27, 2.46)	-0.004 (-0.034, 0.003)	-0.122 (-0.648, 0.011)
Over \$20,000	1.06 (-0.69, 1.60)	1.14 (-0.38, 3.10)	-0.007 (-0.009, 0.072)	-0.123 (-1.162, 0.143)

Price				
<i>(Somewhat-Not Important)</i>	ref	ref	ref	ref
Very Important	0.93 (-0.73, 1.18)	-0.73 (-0.45, 1.16)	-0.001 (-0.013, 0.001)	-0.067 (-0.337, 0.004)
Nutrition				
<i>(Somewhat-Not Important)</i>	1.04	1.23 ^a	0.005	-0.003
Very Important	(-0.79, 1.36)	(0.93, 1.63)	(0.005, 0.044)	(-0.110, 0.054)
Taste				
<i>(Somewhat-Not Important)</i>	1.07	0.97	-0.006 ^a	0.002
Very Important	(-0.90, 1.26)	(-0.66, 1.41)	(-0.020, 0.000)	(-0.036, 0.081)
Convenience				
<i>(Somewhat-Not Important)</i>	-0.76	1.05	0.000	0.107
Very Important	(-0.57, 0.99)	(-0.75, 1.45)	(-0.008, 0.016)	(-0.010, 0.565)
Food Durability				
<i>(Somewhat-Not Important)</i>	-0.90	-0.88	0.000	-0.048
Very Important	(-0.66, 1.21)	(-0.58, 1.32)	(-0.011, 0.011)	(-0.275, 0.008)
Main meal planner?				
<i>(No)</i>	0.91	1.18	-0.030 ^a	-0.100
Yes	(-0.68, 1.21)	(-0.73, 1.87)	(-0.098, -0.001)	(-0.613, 0.022)
Main food shopper?				
<i>(No)</i>	1.12	-0.74	0.016 ^a	0.000
Yes	(-0.84, 1.46)	(-0.38, 1.37)	(0.001, 0.052)	(-0.146, 0.119)

Reference categories are italicized in parentheses. ^a p <0.05, ^b p<0.01, ^c p<0.001, and ^d p <0.0001.

Table 3.3: Logistic regression analysis of the associations of adult food choice values with adolescent and adult characteristics (n=853)

	Price	Nutrition	Taste	Convenience	Food Keeping
Adolescent Characteristics	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Age	0.98 (0.88, 1.1)	0.93 (0.84, 1.03)	0.998 (0.85, 1.17)	0.92 (0.78, 1.09)	0.95 (0.85, 1.07)
Gender					
<i>(Female)</i>	0.98	0.61 ^a	0.84	1.93 ^a	1.04
Male	(0.64, 1.51)	(0.42, 0.89)	(0.39, 1.82)	(1.16, 3.22)	(0.57, 1.89)
Race/Ethnicity					
<i>(Non-Hispanic White)</i>	1.99 ^a	3.81 ^b	1.089	8.85 ^d	4.05 ^b
Mexican-American	(1.06, 3.73)	(1.86, 7.80)	(0.65-1.83)	(4.21, 18.61)	(1.62, 10.11)
Other Hispanic	1.99 (0.77, 5.13)	3.52 ^b (1.53, 8.09)	1.33 (0.41, 4.36)	6.59 ^c (2.93, 14.78)	5.26 ^c (2.33, 11.85)
Other Non-Hispanic	3.58 ^a (1.00, 12.81)	9.38 ^b (1.88, 46.92)	1.48 (0.62, 3.53)	2.91 ^a (1.09, 7.78)	2.71 ^a (1.16, 6.30)
Non-Hispanic Black	1.54 (0.75, 3.15)	1.96 ^a (1.03, 3.74)	1.19 (0.63, 2.22)	4.27 ^b (2.02, 9.03)	7.995 ^d (3.57, 17.91)
Adult Characteristics					
Age (years)	1.02 (0.99, 1.06)	1.05 ^b (1.02, 1.08)	1.00 (0.97, 1.04)	1.04 ^c (1.02, 1.07)	1.01 (0.98, 1.05)
Gender					
Female	Ref	Ref	ref	ref	Ref

Male	0.64 (0.24, 1.72)	0.16 ^b (0.05, 0.50)	0.40 ^b (0.23, 0.72)	0.36 ^a (0.17, 0.80)	0.34 (0.11, 1.04)
Respondent Education Level (<i>> High School</i>)					
Less than HS	0.10 (0.59, 1.67)	0.63 (0.33, 1.20)	0.83 (0.53, 1.29)	1.94 (0.71, 5.26)	3.79 ^c (2.17, 6.61)
Family Income (<i>\$35k-54,999</i>)					
Under \$20k	1.91 (0.87, 4.16)	1.61 (0.64, 4.04)	2.55 ^a (1.09, 5.97)	1.62 (0.54, 4.85)	0.73 (0.38, 1.40)
\$20k-34,999	1.05 (0.47, 2.35)	1.05 (0.39, 2.85)	1.49 (0.77, 2.90)	1.21 (0.42, 3.50)	1.19 (0.56, 2.53)
Over \$20k	1.19 (0.32, 4.49)	1.77 (0.33, 9.58)	0.997 (0.18, 5.67)	1.19 (0.31, 4.59)	0.45 (0.18, 1.12)
\$55k-74,999	1.01 (0.31, 3.34)	0.40 (0.15, 1.10)	0.878 (0.44, 1.77)	0.88 (0.23, 3.37)	0.61 (0.22, 1.67)
\$75k And Over	0.24 ^b (0.10, 0.56)	0.84 (0.35, 2.01)	2.80 ^a (1.04, 7.55)	0.73 (0.18, 2.93)	0.37 (0.107, 1.30)
Respondent Is Main Meal Planner (<i>No</i>)	0.64 (0.26, 1.58)	0.94 (0.44, 1.98)	0.55 (0.14, 2.25)	0.55 (0.19, 1.54)	1.13 (0.49, 2.60)
Respondent Is Main Food Shopper (<i>No</i>)	1.32 (0.42, 4.14)	0.85 (0.23, 3.22)	1.80 (0.66, 4.90)	0.42 (0.13, 1.45)	0.58 (0.21, 1.64)

Reference categories are italicized in parentheses. ^a p <0.05, ^b p<0.01, ^c p<0.001, and ^d p <0.0001.

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CHAPTER 4

EARLY ADOLESCENT FOOD ROUTINES: A PHOTO-ELICITATION STUDY

4.1 Introduction

Early adolescence (typically 10-14 years old) is a unique developmental period, marked by the onset of puberty, that coincides with important shifts in psychological development and social roles (Dorn et al., 2019; Eccles, 1999; Wray-Lake et al., 2010). Early adolescent development is a highly individualized process, and the roles of food routines are important to consider, because independent decision-making and increased social influences are emerging during this transition period (Reicks et al., 2015; Story et al., 2002; Wigfield et al., 1991). Food routines can have important impacts on the health and well-being of youth early in life, and create subsequent food routines that persist into adulthood (Christoph et al., 2019; Dorn et al., 2019).

A food routine is defined as a “repetition in food/drink and other dimensions of eating episodes” and this repetition may occur in sequences of eating episodes across days, weeks, seasons, or lives (Jastran et al., 2009). Routines are a useful concept when examining early adolescent food behaviors, because they provide individuals with structure and predictability, often impact food choices, and contribute to the development of personal identity (Jastran et al., 2009; Laska et al., 2015). Routines also allow people to anticipate events, and research has shown that routines can promote self-regulatory skills in children for behavioral problems such as aggression,

poor impulse control, and noncompliance (Bater and Jordan, 2017). However, the food routines of early adolescents and the impact of these routines on eating practices are not well understood.

A better understanding of current food routines of early adolescence is needed as the problems of obesity and eating disorders that often begin during adolescence, are simultaneously confronted. The prevalence of obesity in the United States has doubled from 1988-1994 (10.5%) to 2013-2014 (20.6%) for adolescents aged 12 to 19 years old, and extreme obesity also increased from 2.6% to 9.1% in this same time period for adolescents (Ogden et al., 2016). This is important because adolescent obesity is associated with an increased risk of type 2 diabetes, hypertension, sleep apnea, social exclusion, depression, and increased disease rates in adulthood (Guo et al., 2002; Lobstein et al., 2004; Reilly and Kelly, 2011). Adolescent eating behaviors also include disordered eating, which becomes more prevalent over the course of adolescence (Canadian Paediatric Society, 2004; Dea and Abraham, 1999). Research suggests the transitions between early to middle adolescence, and middle to late adolescence are particularly vulnerable periods during which eating abnormalities may arise as body dissatisfaction and dieting become more prevalent (Craike et al., 2016; Dea and Abraham, 1999; Jáuregui-Lobera et al., 2018). A better understanding of daily food routines for adolescents may provide important insights for both obesity and eating disorder prevention efforts.

Much of the previous research about early adolescent eating practices focuses on factors that influence food choices in home and school environments. Parental influences and household food environments are the most frequently studied, as early

adolescents are estimated to be consuming up to 65% of their calories at home, compared to older adolescents who are typically eating away from home more often (Poti and Popkin, 2011). Parental health behaviors and practices are a major influence on adolescent eating patterns, and generally appear to have a positive and health protective effect (Gevers et al., 2015; Reicks et al., 2015; Salvy et al., 2011). Parents/caregivers typically have control of the home food environment, deciding what foods are available and establishing rules regarding diet quality and quantity. Furthermore, parents' own eating behaviors are often modeled by their adolescents, even when the parent/caregiver is not present (Gevers et al., 2015; Holsten et al., 2012; Rasmussen et al., 2006; Reicks et al., 2015; Salvy et al., 2011).

Some research has also examined parents/caregivers and family processes in the development of eating behaviors of children and adolescents. Larger family size has been found to mitigate some traditional gender roles of parents such that the father's caretaking and cooking roles may increase, and this may have implications for parent modeling of some eating behaviors (Fiese et al., 2002). Research about family meals indicates that meals during adolescence are highly variable, being the norm for some families and not others depending on a variety of factors. However, evidence suggests diet quality is usually healthier when adolescents are eating family meals at home with adults present at mealtimes (Jones, 2018; McCullough et al., 2016; Neumark-Sztainer et al., 2008; Videon and Manning, 2003). The routine of regular family meals seems to provide protection against unhealthy behaviors in some families, and a greater frequency of family meals is associated with less fast food consumption, fewer unhealthy weight control behaviors, lower risk of binge eating,

and higher self-esteem for adolescents (Berge et al., 2018). Research about family meals also suggests that family meals vary based on culture (Wilk, 2010).

Other possible influences on adolescent food choice are peers, food environments outside the home, and after-school activities. Peers appear to gain more influence as adolescents age, and may impact lunch and snack choices as well as dieting behaviors (Contento et al., 2006; Salvy et al., 2012, 2007; Sutter et al., 2015). However, most research exploring peer influences on food behaviors includes a large age range for adolescents. This makes it difficult to specifically determine the role of peers for early adolescents because social transitions and the importance of peers may differ depending on the phase of adolescence.

Locations outside the home such as corner stores, schools, and after-school programs have been explored in research examining settings for childhood obesity and food behaviors of adolescents. Schools often provide a majority of daily calories for students on weekdays, but research is mixed about healthfulness of these meals and a la carte items, as well as the impact on adolescent diets (Cohen et al., 2013; Kubik et al., 2005, 2003; Poti et al., 2014; Watts et al., 2015b). Locations such as corner stores and after-school programs are not commonly studied in early adolescent research, but studies of somewhat older adolescents suggest that after-school activities may influence eating behaviors. For example, recent research found that adolescents aged 13-18, who were not involved in any after-school activities, reported higher intakes of sweets and trans-fats compared to adolescents involved in one after-school activity, and if they were involved in multiple activities, they reported lower total energy, fat, and sugar intake (Perez et al., 2017). Another study of only female adolescents found

that participation in sports affected the frequency, timing, location, and social composition of family mealtime routines (Travis et al., 2010). However, more research is needed to understand what foods early adolescents are eating away from home during after-school activities.

Previous research considers possible influences on eating routines in early adolescence, but further investigation is needed to understand the complexity of food routines. Further investigation is needed to understand food routines because there may be important changes occurring as early adolescents undergo social and biological transitions. The present study used photo-elicitation to investigate adolescent food and eating routines. Photo-elicitation was chosen to study current food routines of early adolescents because the photos can provide a practical and easy way for participants to compare and contrast aspects of their food routines across days, weeks, seasons, and their lives. Photo-elicitation is a qualitative method that has been used in fields such as Anthropology and Sociology for many years, and it is based on the concept of including a photograph taken by a participant into research interviews (Clark-Ibanez, 2004; Harper, 2002; Lal et al., 2014). This method has been used in research with children and adolescents, but the technique has not often been used for nutrition research in youth without pre-existing health conditions (Lachal et al., 2012; Smith et al., 2012; Streng et al., 2004; Wells et al., 2013). By using their own photos, youth can describe different influences on food routines, and they can ground their descriptions around a photo to better help them explain their food routines.

The objective of this study was to examine current influences on and experiences with food routines during early adolescence. Three main research questions guided this research:

- 1.) How do early adolescents explain their food and eating routine experiences?
- 2.) What are the ways that early adolescents describe food routines in their daily lives?
- 3.) What influences do early adolescents identify when discussing their food routines?

4.2 Methods

4.2.1 Participants

Study participants were recruited through Cornell Cooperative Extension staff, local school administrators, and personal contacts in upstate New York. Flyers were also placed in public areas frequented by youth including libraries, corner stores, and public youth centers. Participants were purposively sampled with a focus on gender, location, and race/ethnicity. All participants were enrolled in a public middle school at the time of the study, spoke English as a first language, and were between 10 and 14 years old. Each parent/caregiver signed a consent form, and then each child participant signed an assent form before beginning the research project. All procedures and interview guides were approved by the Cornell University Institutional Review Board.

The final sample consisted of 30 participants (14 males and 16 females), and balanced representation from rural and urban areas (53% rural; 47% urban) (United States Census Bureau, 2016). Most of the sample was non-Hispanic (90%) and approximately half of participants self-identified as White (47%). Black participants made up 20% of the sample, one identified as Asian, and 30% identified as

other/multi-ethnic. The Other/multi-ethnic category included two Black/White participants, and one participant for each of the following identities: American Indian/Black, American Indian/White, Armenian, Moroccan, and Puerto Rican.

There was one 10-year-old (3%), nine 11-year-olds (30%), fourteen 12-year-olds (47%), four 13-year-olds (13%), and two 14-year-olds (7%). Participants self-reported consuming school lunch an average of 3 days/week and school breakfast 2 days/week, and 50% reported being in schools with the Community Eligibility Provision, which provides lunch at no cost to all students (USDA Food and Nutrition Services, 2019), based on the question, “Does everyone in your school eat lunch for free)?” Only two participants reported there were no additional children living in the home with them, and the average number for the other 28 participants was two additional children in the household.

4.2.2 Photo-elicitation Process

Participants met with the researchers two times, and the first meetings and interviews were conducted by the first author and primary researcher. For the second meetings, the primary researcher conducted all but two meetings and interviews, and a trained researcher with experience interviewing early adolescents completed the other two interviews.

At the first meeting, participants self-reported information about their age, school, grade level, race/ethnicity, number of children in the household, and participation in free/reduced price school lunch and breakfast (Appendix C.1). They also completed the ProChildren questionnaire, a validated questionnaire that included several scales about personal, social, and environmental correlates of fruit and

vegetable intakes (De Bourdeaudhuij et al., 2004) (Appendix C.1). Efforts were made to allow the child to complete the questionnaire alone, but they were able to ask for clarification or have help from the researcher to read any difficult or confusing items. During the first meeting, a brief lesson (approximately 5 minutes) about how to be a “Researcher 101” was presented to each participant to teach them how to take research photos. The lesson was guided by a modified 4 A-approach, a learner-centered teaching approach that anchors individuals in their own experiences and then adds new information and concludes by giving them a chance to apply the new concepts. This lesson was meant to make the child more comfortable with tasks, provide clear guidelines, and create time for the child to ask questions pertaining to the project (Clark-Ibáñez, 2007; Norris, 2003). It was during this lesson the participants were also provided with a digital camera on mobile phones where calling and Internet had been disabled.

Simple instructions to take photos of anything happening around food and eating in daily life were provided during the first meeting. Efforts were made with each participant to make instructions very open so they could take photos of any aspect of food or nutrition they deemed important. This was paramount because a photo-elicitation approach was chosen to more directly see the world through the child’s eyes, decrease the necessity of interpretations made by researchers, and provide a more engaging experience for young participants. After all questions were asked and instructions were clear to the participant, they were provided with the primary researcher’s contact information and a handout with reminders of what to do the week they had the digital research camera (Figure 4.1). All participants had their

digital research cameras for at least one week to take photos so that weekday and weekend activities could be captured.

After one week, the participant met with the researchers a second time to discuss photos they had taken. This meeting took place in a private area without the child's parent/caregiver present to ensure the child could discuss his/her opinions about photos and topics more freely. Interviews lasted from 30-75 minutes depending on the participant, and all interviews were audio recorded. A semi-structured interview guide was used, and each participant was prompted to choose the photos most important to them in order to create a PowerPoint as the interview went on, with participants discussing approximately 3-6 photos during the interview (Appendix C.2). The interview was guided by the creation of the PowerPoint, and only photos included in the participants' PowerPoints were considered during data analysis. In the interview, member checks were used often, and attempts were made to have participants describe their routines by comparing and contrasting a chosen photo to other times, places, and contexts for each PowerPoint slide they created. Additionally, many open-ended probes were used to help participants expand on their photos with probes such as, "Can you give me an example of...", "Tell me more about...", or "Can you say more about how... works?"

At the conclusion of the second meeting, participants returned all camera equipment and completed a validated and brief Pubertal Development Scale questionnaire (Petersen et al., 1988; Robertson et al., 1992) (Appendix C.2). This questionnaire was used to inform each participant's perceived level of pubertal development using only a few questions, and it was intentionally placed at the

conclusion of all activities so as not to influence the child in any way during the research process (Petersen et al., 1988; Robertson et al., 1992). At the completion of the study each participant received \$15 for their participation.

4.2.3 Analysis

Data analysis used a constant comparative method with field notes, interview transcripts, and associated photos coded using an iterative process to identify key themes (Harry et al., 2005; Strauss and Corbin, 1998). After interviews were transcribed verbatim and checked for accuracy they were coded and analyzed in ATLAS.ti (version 8). Note that for this study, the PDS and ProChildren data that was collected were not considered in the analysis process, but this information will be used in future papers using this qualitative data set.

Preliminary coding occurred as a research team developed an initial codebook. Two interviews chosen for their variation in content were coded independently by the first and second authors (Green and Spivak) as well as the larger research team. After a peer debriefing, an initial codebook was developed and codes were guided by the lifecourse perspective constructs, Food Choice Model constructs, and topics that emerged from the data itself (Sobal and Bisogni, 2009; Wethington, 2005). The second phase of codebook development included the first and second authors coding five additional interviews independently with the codebook followed by a meeting to discuss discrepancies, clarify code definitions, and make modifications to the codebook to create a final version. After this process, all 30 interviews were coded using the final codebook. All interviews were coded by the first author (Green) and 50% of interviews were second coded by the second author (Spivak). Weekly

discussions as well as memos were created to help document potential themes and understand each participant's general food and eating routines based on the data provided in the interview.

After coding was completed for all interviews, the code for "routines" was the focus for further analysis. Routines was defined as any description or instance of a repeating food/drink episode or other food-related episode that was repeated across days, weeks, seasons, or lives of the participant and/or their family (Jastran et al., 2009). Analysis was ongoing and iterative to determine final constructs and themes, and multiple peer debriefings occurred with the researchers' larger research group, as well as multiple discussions among the primary author and the second author. Additionally, the first and second authors independently identified themes and then met to discuss concepts and interactions between themes based on the interview data. Finally, using lists about each participant's routine descriptions and schematics of participant data, a conceptual model was developed iteratively; this model represents the main themes present in the data for food and eating routines.

4.3 Results

The conceptual model for the food and eating routines described by participants (Figure 4.2) has three main constructs that will be expanded upon in the following sections: family, setting, and food or meal. There are also two spheres around the three main constructs to represent transitions and control as they relate to food and eating routines for early adolescents. Transitions represent changes in social roles or responsibilities (Wethington, 2005), and control represents instances where

participants described having the power to influence or decide on foods or food-related activities. All parts of the conceptual model interact and are dynamic for participants depending on the context of the food routine being described.

4.3.1 Family

Family members and the structure of families were described by early adolescents across all interviews as influencing their routines the most frequently including parents/caregivers, siblings, and other adults in the household. Other contributors to food routines included aspects of family processes such as the level of predictability for eating episodes throughout the week, cultural practices, and family resources.

Family Members

The involvement of parents, both mothers and fathers, in family food routines was discussed by all participants. Parents were the main individuals planning meals, making shopping decisions, and determining the level of involvement for the participants in family food episodes. Overall, participants seemed content with how their parents/caregivers were managing family food routines. For example, a 13-year-old male whose father usually decided on and cooked the meals, was asked how his father made choices. He responded, “Cause he knows what we like... we tell him what we like and don’t like.” In addition to influencing foods that were prepared, the level of motivation for parents/caregivers to maintain a routine and cook also varied in households. Some participants described how food is often fast food/take-out during the week “Because on weekdays she [mom] doesn’t really feel like cooking most of the times” (12-year-old-female). Others were like a participant whose mom controlled

their snack after school because “*She (mom) makes us cookies or she'll get us fruits or something, so that we can go home and eat something that's nice*” (11-year-old-female). Parents/caregivers also shaped food routines and food choices by negotiating and adapting foods for their children rather than forcing them to eat foods they did not enjoy. A 12-year-old-female discussed a photo of a new dinner with eggs she had tried the week she participated in the project:

Participant: So mom just looks up the recipes, she makes them, and then if I don't like it, then I don't have to eat it. I don't really like eggs, but it was good. I guess it was maybe because it was cooked a different way from how I'm usually used to eating.

Interviewer: Okay, so how does that go when you don't like eggs?

Participant: If I don't eat eggs, my mom just doesn't make me have them, or I usually have cereal or just something different or egg whites....

In this case as well as others, parents/caregivers and children appear to negotiate foods based on previous eating experiences at home. However, it was a process whereby individuals learned together, over time, to perform their current food routines.

Sibling influence was notable and varied in food routine descriptions, with all but two participants having other children in the household. Siblings influenced routines when their food choice values shaped the meals or foods provided by parents/caregivers for the entire family. Sometimes this was simply one sibling going shopping with a parent/caregiver and having control over snack foods they liked, but in other cases it was much more impactful. A 12-year-old-male participant, whose older brother had been trying to lose weight and eat healthy over the past two years,

used photos to point out how he was *“Eating pretty healthy usually ‘cause my mom makes really good, like healthy food, and she doesn’t make like the not good food.”*

The whole family also ate meals differently now, basing dinners on MyPlate regularly:

“Cause like the My Plate thing... we kind of like base off that, and like we just base it off that to see how much of what we need each meal. My mom and my brother and I.”

Siblings also frequently reported doing food-related tasks either together or in coordination with their siblings, such as a 12-year-old-female who described how “we” made our lunches for school together the night before and also made plates at breakfast, but *“It all depends on the morning... it all depends on if I did or if I feed the cattle yet and then at nights my sister has to do it.”*

Another way siblings shaped food routines was through the level of involvement they had in preparing and cooking meals for the family. In a few instances, participants described high levels of control over foods they prepared for themselves and their siblings. A 14-year-old-female described regularly making dinners for her family, something she has been doing since she was around 10 years old. When her 13-year-old brother was interviewed, he described his cooking role and routines in the family saying:

Participant: ‘Cause my sister loves to cook.... Like I can cook it's just I don't cook the way she does, I cook my way.... Like one time I wanted to have steak with jalapenos at home, so I chopped up the jalapenos, and her and my other sister they said 'oh I'm not eating that.' I said why? 'It is, oh 'cause I don't want to eat anything you make,” so I made the steak for me and my dad. He liked it, I did too, and they never got any.

Interviewer: Okay, so do you like cooking?

Participant: Yeah, like the only time I really cook something is like, if I get home from school and my mom is sleeping or taking a nap, so I make Ramen Noodles, or I'll make myself some eggs or something.

A 13-year-old-male, who was the oldest sibling at home, also had more food roles in his family's routines compared to most participants. Not only did he usually make foods such as macaroni and cheese or small snacks for his younger sister and brother during the weekdays, but when he turned 13 years old, he also started cooking for his siblings on most weekends, saying, "*Usually they [brother and sister] ask me what they want, and I make it.*" Additionally, he described having rules about how eating routines occurred at home, noting how his siblings should "*Only eat three meals a day.... I make sure I don't give them extra, and I wait 'til other times to eat food, like when its dinner time and stuff.*" Although this participant had more control over his siblings eating routines than others, it highlights how important it is to consider family members who are not adults when exploring food routines in households with early adolescents.

Other family members such as grandparents, aunts, and uncles also influenced food routines. In a few families, a non-parent relative was the main caregiver for a participant, and even more common was the situation of grandparents living very close to or even with the family. Other family members were important when considering food routines, because, along with parents, they frequently shared the responsibility of creating a routine for children. Most often this was described as a regular weekly meal at a relative's home. However, in a few cases, grandparents were impacting food and

routines throughout the week. One 12-year-old-female participant, whose food routines were very dependent on her immediate and extended family based on her photos, described it this way: *“It’s usually what I have at lunch at my grandparents’ house ‘cause um, me, my mom and my brother always go to my grandparents’ house for lunch on Saturdays,”* and her grandparents also watch her on Wednesdays where *“Before we have our [piano] lesson and he [Grandfather] reads us part of a book that we read once a week, and they make us a big snack, and we get fruits and veggies and we call these pita pizzas.”* In the case of sharing the same home with other relatives, some described certain foods being more prevalent at meals due to a grandparent’s food preference.

Family Processes

Family processes are how the family operates around food and associated routines and were described by all participants. The level of predictability in processes for food routines varied greatly across interviews. Most described a predictable routine during the weekdays, in large part due to school and parent/caregiver work schedules. A few participants had very predictable routines every day of the week that were well established for the entire family. However, most could describe a “typical” meal but schedules, family members, and locations of where these meals were eaten varied throughout the week. A common description of food routine structures in a week was the following: *“It was very normal, ‘cause for dinner my mom always makes, like she’ll make a vegetable, a meat, and then... make something different... except for Fridays. Fridays, we eat out [and] Saturdays, we buy, we eat out.”* (13-year-old-female).

Another factor influencing the predictability of food routines was whether early adolescents were splitting time between two households with separated or divorced parents. There were a handful of participants who described a major differences in routines depending on the household in which they were residing. Differences typically included frequency of family meals, parents/caregivers on diets in one home but not the other, and different food roles for the participant in each home. In one interview, a 12-year-old-male had recently transitioned from living primarily with his mom where *“We used to, at my Mom's house we just used to eat like those re-heatable chicken things, but I didn't eat those ‘cause I get really sick of them, so I [was] just eating cup of noodles every night.”* At his dad’s home he said, *“Like we started eating more meals, we started eating more healthily, if that's a word.... Like we'd tried to incorporate all the meals with like grains, dairy and vegetables, that kind of thing.”*

With almost a third of participants identified as other/multi-ethnic in this sample, with many being second generation immigrants, cultural influences were important to family routines. For some, the cultural practices of a parent/caregiver resulted in a regular special meal, such as a father from Costa Rica who made a special snack for his children every Monday with particular candies, or a mother from Ethiopia who made authentic dishes a few times a week for family dinners. Cultural practices also impacted available food for participants, such as with a 14-year-old-female, whose family leaves sugar or fruit for their gods daily, which can affect what she takes as a snack to school because her choices depend on what the family has left over after they leave an offering to their god: *“Like in the morning I try putting fruit in*

there [backpack] like a banana but it depends like if it's there or not because we put a prayer for my god. I put, we put something for them to eat... so like usually we give fruit or there's already like this little cube it's just pure sugar and we give them that or like raisins or something.” Finally, culture affected routines around regular foods and drinks consumed such as with a 12-year-old-male whose family emigrated from Morocco last year. He described his typical breakfasts as: *“Um, egg and bread and tea. Um, sometime different where my mom or my sisters make it with tea. There's always tea by the way. It's like a Moroccan thing. There's always tea.”*

Family resources were discussed in relation to family structure and food routines by some early adolescents. Although only a few participants directly discussed food assistance programs, there were subtle suggestions and conversations with a few participants' teachers that indicated family resources had some impact on food routines. For example, one 12-year-old-male meticulously took a picture of every item he received in the local foodbank's backpack program on Friday afternoons. The foods included items like granola bars, instant oatmeal, canned sausages, dry cereal, and boxed macaroni products to help supplement weekend foods for the family. He discussed how different members of his family ate different items, like the granola bars for his sister, and he discussed sharing his canned sausages:

Interviewer: Oh your little brother ate it. Did you eat any of it too or just give it to your little brother?

Participant: Gave it... 'Cause he need it more than me, 'cause he was out.

Interviewer: He was out of what?

Participant: Dinner

Interviewer: Oh there was no other food for him?

Participant: Nope.

No other participants discussed food insecurity as directly as this participant, but a few were aware of financial limitations on foods, with food routines changing depending on resources. Another 12-year-old-male discussed liking snacks such as applesauce, but said, *“I ask for it when we have food stamps and she [mom] gets it, but then like I didn't ask for it because I was having snacks at the community center, ‘cause like sometimes it depends either if we have food stamps, or like at the end of the week when she [mom] gets paid, she sometimes gets those things for us to snack on.”* This example also serves to highlight that some participants did not directly discuss family resources, but based on their photos, after-school programs were supplementing family resources during the week by frequently providing snacks and, in some situations, dinner for participants.

4.3.2 Settings

The location and time of food and eating episodes described by early adolescents influenced food routines in multiple ways. Locations such as home, school, community centers, and friend’s homes were frequently cited by participants. Time was also important when discussing time of week and time demands around food, and routines were often very different depending on the temporal setting.

Location

Most participants took many photos at home but locations within the home varied across interviews. Many reported that eating at the table with their family was normal for dinners most days, but photos also showed early adolescents eating in front

of a screen or in a location other than the kitchen or dining table. A few participants had pictures of breakfast, dinner, and snacks in their bedrooms, which they reported was a regular eating location. Other times the location varied based on family members and family activities, like with a 12-year-old-male's description of dinners at home: *"Oh, like sometimes we eat in the living room as a family and watch like movies as a family, and then when I go in my dad's room it's me and him just chilling and watching TV, and if I eat in my bedroom it's either I'm chilling with my friend and my brother, and eating while we play games and stuff."*

The second most cited location was school, and reports about this location revealed how early adolescents controlled their breakfast and lunch away from home, which often impacted their overall eating routines. Despite half the sample being eligible for universal free lunch, self-reported intakes and interviews revealed many participants were not eating these meals every day, and the ways they navigated their food choices at school were complex. While some participants didn't always like the meals served, they said they would just eat it anyway because it was available. Others constructed complex routines like this 11-year-old-male when deciding on lunch at school versus bringing lunch from home:

Participant: Because sometimes I know that it's gonna be like a horrible lunch... like last time I was eating meatloaf there, I found like a hard chunk in it and it tasted horrible.... I just know that it's gonna be a horrible lunch, but if I'm like still hungry, I go up there and see what it is, and I like take a lunch too.

Interviewer: Oh. How often are you taking both lunches?

Participant: Just like if I'm not full from my lunches then I'll take up there.

Other participants described just skipping breakfast or lunch completely for various reasons such as having to finish homework during mealtimes or because they did not like the foods being served. For example, a 10-year-old-female who rarely ate at school described her regular school eating routine in the following exchange:

Interviewer: How often would you say you eat breakfast at school?

Participant: I don't really eat it. I only eat it if there's something good.

Interviewer: Okay, so just every once in a while, yeah. How about lunch?

Participant: I don't usually eat it. I just get a cup of water and I just draw the whole period.

Interviewer: Is there any meal at school, at school lunch you ever eat?

Participant: If I'm hungry I'll eat like, there's like these little banana breads and I'll eat one of them.

Some participants also chose to go without food at school because they knew they could request foods after school from parents/caregivers or they would have better snacks available at after-school programs. A 12-year-old male described how he will sometimes eat lunch, *"If it's like chicken nuggets or French toast I'll eat that, but I don't eat anything else,"* and then if he doesn't eat school foods *"like today, I didn't feel like eating anything today, so I just went to get myself a chocolate milk, and then later on I just ask my parents for something to eat.... Like if my dad picks me up, I'll ask him for some Wendy's or for Burger King or something."*

After-school programs and friends' homes were described as locations for food routines outside of their own homes and school. Only a few participants had photos of foods consumed in locations other than home and school on a regular basis. In these instances, they described high levels of control over foods consumed compared to their peers. Such as an 11-year-old-female who goes to a skating rink every Saturday night and controls her own food purchases:

Participant: We'll chill, because at the rink they sell food and stuff. So, I'll like buy something and I'll eat it, and then I'll buy another thing, and then I'll eat that.

Interviewer: Describe a normal time when you're there and how you go about getting food please

Participant: I'll go and I'll get the pizza and I'll get the sprite. There's nachos and pizza and then there's candy and a lot of other things. There's a lot of different choices you can pick.

Interviewer: Okay and do you always choose the pizza?

Participant: Sometimes, because I'll take a bite out of the pizza and the cheese. It's just so thick, but it's like it's cheesy, but thick and it's gross. So, I'll eat it, but it's... I don't like... I'll eat it, because I like pizza.

Interviewer: Okay, and then, do you have to ask like your mom or an adult or are you deciding all by yourself?

Participant: I decide all by myself.

Commonly photos included foods at after-school programs, which was often a location that helped some early adolescents get enough food before they were able to go home for dinner. An 11-year-old-female who is a cheerleader for two programs during the school year described how *“I come here [community center] so that I can like eat and stuff and then, I come over to cheer. So it like fills me up with my energy. So that I can do all the stuff that my coach tells me to do.”* Foods at community and after-school centers included a wide range of foods in photos, from a piece of fruit or a dessert item to meals such as spaghetti. The role these foods played in routines varied greatly depending on the individual. Finally, friends’ homes were described in some breakfast and snacks photos, and some participants were going to a friend’s home every week for at least one night. A 10-year-old female’s description of weekends at a friend’s home illustrates a common experience for this sample: *“On weekends for me I just eat like all cereal, ‘cause I’m at my friend’s house and her mom is at work and her dad is in his room, so we just ask him to make, well not make, but ask him if we can have cereal.”*

Time

Time was discussed frequently during interviews to identify weekly routines in the temporal context of photos taken by participants, and most interviews discussed comparisons of photos depicting differences in food routines during weekdays and weekends were discussed. Participants described weekends as being different from weekday food routines in many ways, with scheduling and time constraints often cited as reasons for differences.

Friday evenings and weekends and were often seen as the time when participants and their parents/caregivers had more free time and less structure around food. An 11-year-old female viewed Friday night as her “*chill back day*” where she just ate a sandwich for dinner, because “*Like I lay down for a little bit. I take a nap, because almost every day of the week I'm doing something. It's like, whoa I gotta go here, no wait, I gotta go here.*” Breakfast was also consumed more regularly on weekends because some reported they did not have time on weekdays due to their busy schedules in the morning, with a 12-year-old male saying he liked eating cereal most days and “*Well I do care to eat breakfast, but like sometimes I don't [eat it] and I'm like, 'But mom, I don't have time, I can't....' It depends how fast I'm getting ready, if I have like my hair combed and I'm dressed by like 7:00 or like 6:50, then I will have breakfast.*” Weekends were also seen as a time where parents/caregivers and participants could cook more foods at home. A 13-year-old male described a dinner he helped make on a weekend saying it was different compared to a weekday dinner, “*Cause I'm never, I'm not going to take that long to make something... on the weekend I actually can take time, [not] like on the week days [when] I have school.*” Eating away from home and consuming dinner later Friday and Saturday were also commonly discussed, and for some participants food routines fluctuated more on weekends because participants and family members opted to sleep in late most weekend mornings.

Foods available and consumed by participants were also different depending on time of the week. One 12-year-old female described how she only had foods like chili and Indian food made by her mom on weekends compared to eating out or a

simple dinner during the weekdays. A 12-year-old male discussed how he would have a bagel most weekday mornings but “*On the weekends, we usually make pancakes a lot though. Yeah. It's pretty awesome....Weekend breakfasts are awesome!*” For those who always ate school breakfast and lunch during the weekdays, eating routines and foods were also often different during the weekend. An 11-year-old male who always ate at school described it this way: “*If there's not school, I usually just eat cereal with toast or toaster strudels or waffles.*” A 12-year-old female discussed how eating multiple apples a day was “*One of my habits*” on school days, but not on weekends where a normal snack was usually chips. Some photos of weekend food routines also highlighted increased control, with participants eating chips or other foods as snacks, and justifying their choice because it was the weekend, or a 12-year-old male who only made his own snack of a “*Bagel with meats in it*” on weekend afternoons when adults were sleeping.

4.3.3 Food or Meal

Foods or meals consumed and described by participants included breakfast, lunch, dinner, and various types of snacks. All participants typically used these traditional labels for their meals, but the foods included in their photos did not always coincide with traditional foods, traditional mealtimes, or proportions of what might be expected for a given meal.

Breakfast

For those who had time to eat breakfast, foods at home included cereal, toast, eggs, or a bagel in the morning for most participants. Early adolescents often chose and prepared this meal for themselves. A typical breakfast routine was described by a

13-year-old-female as the following: *“We're all like in our kitchen, and we're either packing lunches or like making breakfast or stuff like that, and then um, we just have a cupboard with like cereals and breakfast foods in it so I usually just look in there to see what I want that day.”*

Others described eating school breakfast which included different items daily, but photos typically included a fruit, dairy-based food, and grain product. However, many participants described only eating one item and discarding the rest due to time constraints or not liking the foods offered on certain days. In a few breakfast photos, participants also described trading breakfast foods with their friends, such as a 13-year-old male who took a photo of two pears, two yogurts, and two milks at school, because *“I had gotten my food and my friend doesn't eat breakfast, he only eats his lunch, so he let me have his breakfast and then he gets exactly what I get so I had everything that I get twice.... They have yogurt like once a week, so I have either yogurt, cereal, or I don't eat 'til lunch because like the muffins are disgusting.”*

Finally, breakfast was a meal where many described gaining more control in recent years as their food roles in the family were transitioning. This was most evident when a few participants went into great detail describing photos of how they had recently started making different types of eggs for breakfast. For example, an 11-year-old male's mom had shown him how to make eggs when he was around 10 years old, and reported that since he made them almost every day, even preparing omelets on the weekends if he was bored: *“I just grab a pan, and I put the sausages in there, make sure they're all not connecting, and then wait until like everything's done, and then crack my egg and then boom... 'cause the eggs cook fast.”*

Lunch

Lunches were most frequently described during the weekdays when participants were at school. Some appeared to be skipping lunch altogether, others were eating school lunch every day, and there were also some bringing lunches packed from home. For those eating lunches at school, participants often described main food items such as pizza, sandwiches, chicken nuggets, and hot dogs being regularly available. More than one main food option was typically available for students each day in public middle schools, and this was important because many participants had clear food preferences for some school foods. One 11-year-old-male took multiple photos of his friends' pizzas at lunch, even though he disliked pizza, because he wanted to make sure he showed us what most kids were eating at lunch. However, if pizza was offered, he chose other options: *“Well sometimes there's pizza, pizza and nuggets. So I'll usually eat nuggets and sometimes there's like pizza and pretzels, I would eat pretzels and sometimes there's pizza and chicken patties, I would eat chicken patties.”*

Interestingly, many lunch photos had fruits such as whole fruits like apples or fruit cocktail containers, but only a few lunch photos included vegetables. This was also the case for photos of packed lunches, where foods typically included leftovers from dinner, a grain and meat/protein item like a sandwich, fruit, and snack foods such as pretzels, chips, or fruit snacks. For packed lunches it was common for participants to have some degree of control over foods included in their lunch. In one household the participant made her own lunch but had to follow guidelines posted on the refrigerator by her mom, and others could choose snack options, but had to pack their

main food based on a parent's recommendation. Some participants had just recently started packing their own lunches as part of their weekday routines, but others described packing their lunches for many years as a very established routine. In most cases participants who were packing lunches regularly also described completing this activity the day before due to time constraints in the mornings, such as one 12-year-old female who had been making her own lunches since elementary school, and did so as soon as she got home: *"Just so I don't have to rush and do it in the morning. I can just get whatever I need to get done in the morning."*

Dinner

Foods and times for dinner varied and were often determined for participants and their siblings by a parent/caregiver's work schedule or recreational activities. Often meals prepared by parents/caregivers at home were somewhat healthier than photos of dinners outside the home, as home dinners often included a salad or a vegetable item. There were food rules for dinners in some homes, with participants reporting they were not allowed other dinner foods until they ate their vegetables, or their parents/caregivers required them to eat a certain amount of vegetables at each dinner. A 12-year-old female whose mother and father both prepared dinners most nights reported that most dinners included chicken or pork and rice and then *"That's my salad that I have to eat."* This dinner photo included only a miniscule amount of salad, including one lettuce leaf and a tomato slice, which the participant had served herself. For this participant as well as others eating at home, there were often foods they served themselves, but other dinner food servings were decided by the parents: *"Usually, my mom serves me the pork, the rice... and I usually only [have] one pork*

chop because they're sort of big and we don't usually make that many of them at a time.... And the peas, I serve myself because I like peas, and the pork, and the salad.”

Recognizing who is serving foods at dinner may be important when considering the dietary intakes of early adolescents. If early adolescents can serve themselves portions at dinner, amounts may include too little or too much of some foods compared to what parents/caregivers desire, and just saying they had a food item may not be enough to determine diet quantity and quality.

Dinners were also sometimes under the control of early adolescents, and while this was less common compared to other meals, it was still a part of some participants' regular routines. Dinners controlled by the participant often included simple foods that were alternatives to what a parent or caregiver in the home was serving, with sandwiches and ramen being two common alternative dinner foods. Participants also showed increased control when they did not want to wait for an adult to prepare a dinner, or when an adult's schedule made dinner too late for the participant. A 12-year-old female, who described her favorite dinner, highlighted how family schedules can increase control of food routines at dinner for some early adolescents:

Participant: This is like my favorite dinner that I'll eat. Like if there's meat in the refrigerator I'll heat it up in the microwave and I'll put it in a Doritos bag. I'll put it in a Doritos bag when I get home from cheer if I'm hungry, because my aunt, she's usually at my grandma's house.

Interviewer: Ok, when you took this picture how were you feeling about this food?

Participant: Well, I was, I was happy that we didn't have to wait like an hour like usual for dinner.

Snacks

Snacks were very common photos, with after-school and after-dinner snacks being reported by most. There was a large range in quality and quantity of these snack foods. After-school snacks were often decided by parents, grandparents, or another adult such as an after-school teacher, but some participants described being in control of their food routines after school because adults were not present. A 12-year-old female talked about a normal Monday saying, *“Um I usually get myself my own snack because no one's really home.... I usually like look in the fridge, in the cupboards, and I have a couple of pictures. I really like oranges. That's like my favorite fruit. So, I sometimes cut oranges up.”* After-school snacks were sometimes small like this example, but if participants had skipped lunch or it was simply their normal routine to have a larger snack after school, then foods would include items such as sandwiches, ramen, or cereal during the weekdays. Snacks during the weekends also included these items, since other meals were more variable, and participants could make these snack items themselves at home. Items like popcorn or chips, with varying portion sizes, were also common in photos of weekend snacks.

Some snack photos were of traditional portion sizes, but a few participants were eating snacks frequently or in greater amounts on weekends. A 12-year-old female described eating up to five sandwiches as snacks on Saturdays, while a 12-year-old male was consuming Dorito chip snack bags twice a day on some weekend days and described eating more chips after dinner:

Interviewer: Okay, so you had dinner and so how did you decide to do this 55 minutes later?

Participant: It sounded good at the time.

Interviewer: So do you have to ask anyone when you want things after dinner?

Participant: Nope.

Interviewer: Oh okay, so what made you eat this time?

Participant: I wanted chips.

Another common food routine for some families was to have an after-dinner snack together on most evenings. For a few this was shown as ice cream or a dessert item, and some also described items such as popcorn being a regular snack after dinner: *“Like sometimes after dinner, we’ll have popcorn as we watch something.... Well, sometimes we’ll eat like a few pretzels, ‘cause we’re watching something fun and it’s snack-ish”* (11-year-old female).

4.3.4 Summary

The preceding sections described each main concept of early adolescents’ food routines separately to provided adequate examples and descriptions. It is important to acknowledge that individual concepts did not exist in isolation, and all three of the major concepts were continually interacting for the participants, as shown in the conceptual model. For example, even if a participant described a meal at an after-school program, the food or meal was important, and the influences of family processes were also considered during this routine. Furthermore, the results showed that transitions and control were both subtle but important when considering food routines in this age group. Social transitions such as the transition from elementary

school to middle school and increased social roles at home for tasks such as cooking influenced routines. Control in each main concept was also described by many participants as impacting their food routines.

4.4 Discussion

This study sought to elicit, describe, and understand the food routines of early adolescents. The use of photo-elicitation interviews contributed to the conceptual understanding of food routines by elucidating many of the influences related to usual food behaviors and routines for this age group. Key findings from this study showed that the influence of family, settings, foods and meals were important considerations for food routines. These findings provide new insights to a small body of literature related to the food routines of early adolescents.

A major finding in this study was that parents/caregivers were very important to early adolescents' food routines. Parents/caregivers directly and more subtly appeared to be shaping food routines both at home and away from home for their children. Directly, parents often decided what foods were brought into the house, established cultural cooking and eating practices, and usually determined food routines based on their work schedules and the needs of the entire family. However, parents/caregivers also provided opportunities for their child to decide some aspects of food routines such as by letting them choose what was in their lunch based on foods parents made available, or by letting early adolescents serve themselves at dinner instead of deciding how much food their child was allowed to put on their plates. These are subtle but potentially important feeding practices as early adolescent

transition from childhood to adulthood, because they provide opportunities for the youth to have a sense of increased autonomy in a controlled setting. Research shows that adolescents are not passive during family meals; they can strategically position themselves during food episodes, negotiate with parents/caregiver, and strive to be more autonomous (Aronsson and Gottzén, 2011; Bassett et al., 2008; Videon and Manning, 2003). Our research also found that children were active participants in food routines along with their parents/caregiver. Even though adults generally determined most aspects of food routines, the food preferences of the child were often considered.

Siblings and other family members emerged as important influences on early adolescent eating behaviors and food routines. Only a few studies have examined the impact of sibling dynamics on eating behaviors, and most have focused primarily on parenting practices with siblings as they relate to childhood obesity (Farrow et al., 2009; Larsen et al., 2015; Payne et al., 2011). A few investigations have also found that birth order impacted how much autonomy parents/caregivers allow, with first born children often being granted more freedoms, and parents/caregivers feeling more responsibility to ensure younger children are taken care of compared to their older children (Campione-Barr et al., 2015; Mosli et al., 2015; Pearson et al., 2009; Pulley et al., 2014). Similar results were found in this study with older siblings often having more control over their food routines and taking increased roles in food provisioning for themselves and others. In some cases early adolescents were influencing the food routines of their younger siblings. The present research also found that members of the extended family were important, influencing weekly meals and cultural practices, as well as working with parents/caregivers to establish stable and predictable food

routines for early adolescents.

Most early adolescents appear to be eating a majority of their meals at home and school, which is supported by other research (Cullen and Chen, 2017); (Poti and Popkin, 2011). However, food routines outside the home that are described in this study suggest that early adolescents may not have healthy options to choose from, or they do not find healthy options appealing when they are eating away from home. Research has shown that multiple factors can influence food choice in adolescence, with food characteristics (e.g. taste), usual food choices, health beliefs, body image, and peer intake often influencing food decisions (Contento et al., 2006; Heidelberger and Smith, 2014; Share and Stewart-Knox, 2012; Watts et al., 2015a). Descriptions and photos in this study indicated that taste, convenience, appeal of a food at school, and time constraints were influencing early adolescents' food choice processes away from home. Furthermore, early adolescents often reported skipping meals and constructed food routines to avoid foods they found undesirable, which is important when considering the dietary intake of this age group in the United States. In the same vein, this study provides new insights about the role of after-school programs and other locations away from home as opportunities to increase the availability of healthy foods, since changing home and school food routines may not always be feasible, and early adolescents are being provided with meals frequently at these other locations.

Finally, the influence of foods on eating routines contributes to the literature because a majority of models of food choice research does not include foods themselves, with the exception of some food choice models, which do have food characteristics as a major factor in food selection (Randall and Sanjur, 1981). That

model includes characteristics of the individual, environment, and of the foods themselves, considering taste, cost, appearance, method of preparation, and food combinations (Randall and Sanjur, 1981). Our research also considered some of these food characteristics such as taste and method of preparation, but more research is needed to determine if other food considerations impact food choice among early adolescents. Foods and meals influenced early adolescents' routines in multiple ways, and the level of control they described depending on the food and the time of a meal during a week was especially important. The social transition of early adolescents was related to increases in meal preparation for some participants, and their food preparation roles increased especially for breakfast and snacks. This is potentially important as research suggests more cooking self-efficacy and experience during adolescence can promote healthier diets (Hartmann et al., 2013; Jarpe-Ratner et al., 2016; Lavelle et al., 2016; Woodruff and Kirby, 2013).

This study also highlighted an important consideration, where meals were often labeled in traditional ways by participants, but portions and the attributes of these meals did not fit traditional ideas. For example, snacks played an important role in routines for this sample, and snacking is known to increase during adolescence (Larson and Story, 2013; Piernas and Popkin, 2010; Sebastian et al., 2008). However, many of these snacks were quite large and would not be labeled as traditional snack items. Many snacks described also influenced how much was eaten at other mealtimes, making the content and amount of each eating episode important to consider when examining food routines.

Strengths and Limitations

A strength of this study was the use of a photo-elicitation approach paired with in-depth interviews that allowed young participants to show rather than be burdened with recalling their experiences around nutrition and food solely from memory (Clark-Ibañez, 2004; Harper, 2002; Lal et al., 2014). The approach was a major strength as it was engaging for participants and permitted frequent member checks, allowed the interviewer to explore various food episodes across time, and provided clear prompts and cues during interviews. In our formative work, early adolescents often told us what their parents said and thought rather than articulating their own views; using photos helped ground the interview in the child's experience. This decreased the need to make assumptions by researchers during analysis and provided visual data to complement participants' descriptions. Another strength of this study was the representation of male and female perspectives as well as the cultural diversity of the sample. This allows for more transferability of the findings and contributes to a growing body of research that recognizes the importance of culture and race/ethnicity in food routines and food choice in the United States (Caprio et al., 2008; Larson et al., 2015; Masters et al., 2014). Also, this research was guided by the Food Choice Process Model, which is a well-established constructivist framework for conceptualizing food choice (Furst et al., 1996; Sobal and Bisogni, 2009).

A limitation of the study was the small sample size and recruitment in a limited geographical area, which makes results less widely transferable. In addition, almost half of the sample was 12 years old, which may limit our ability to fully understand potential influences of age-related transitions related to food routines. Another

limitation is that, while all participants took photos for at least one week in order to provide opportunities for them to capture different food episodes and experiences, this length of time may not have been adequate to capture all aspects of their food and eating routines across months and seasons. Furthermore, during the interview some participants discussed being afraid to lose the digital camera provided, so they did not always take the camera with them when they went to school or attended activities away from home. Attempts were made to discuss aspects of routines not captured by photos, but due to limited recall of past food episodes and data collection being limited to a single interview, some aspects of food routines may not have been fully explored.

Potential Applications and Future studies

This research provides a foundation for future research and practice about adolescent food choice and food behaviors. The results presented here can assist researchers and practitioners in providing practical and relevant information to early adolescence and their families about nutrition. First, some of the reasons for how and why early adolescents are skipping meals is addressed, and this information can be used to inform the ongoing efforts to prevent obesity and disordered eating research and practice. Second, the importance of family is supported in the literature and further developed in this study. We highlighted the influence of both parents and many other types of family members, which can be applied in future research and practice to provide more relevant food and nutrition messages and guidance to the whole family. Third, application of this research to the role of food routines outside the home environment for early adolescence is important. Food routines away from home were often complex, contributed substantially to daily food intakes, and were frequently

under the adolescent's control. Thus, future intervention research and practice should consider all locations where early adolescents are consuming foods beyond the home environment when designing research for this age group.

The conceptual model presented in this paper identified several major influences on early adolescent food routines. However, this model only lays the initial foundation and more research with early adolescents is needed to understand each concept completely. Future research should focus on how additional characteristics of meals and foods influence food routines, as well as the role of family processes. This study also found subtle shifts in the adolescents' food roles and social transitions impacting food routines, and future research should continue to investigate the role of social and biological transitions on food choice and food routines. Finally, the role of perceived control over food routines was discussed by some participants, but more research is needed to understand how control impacts other aspects of food behaviors.

4.5 Conclusions

These results describe early adolescent food routines and provide information about how multiple sources of influence interact and are modified in the context of food choice. Early adolescents appear to have complex food routines, with structure often provided by multiple sources, while the adolescents are also controlling some aspects of their current food routines.

Figure 4.1

“Researcher 101” Things to Remember Document for Photo-Elicitation Project



THINGS TO REMEMBER

PHOTO RESEARCH PROJECT

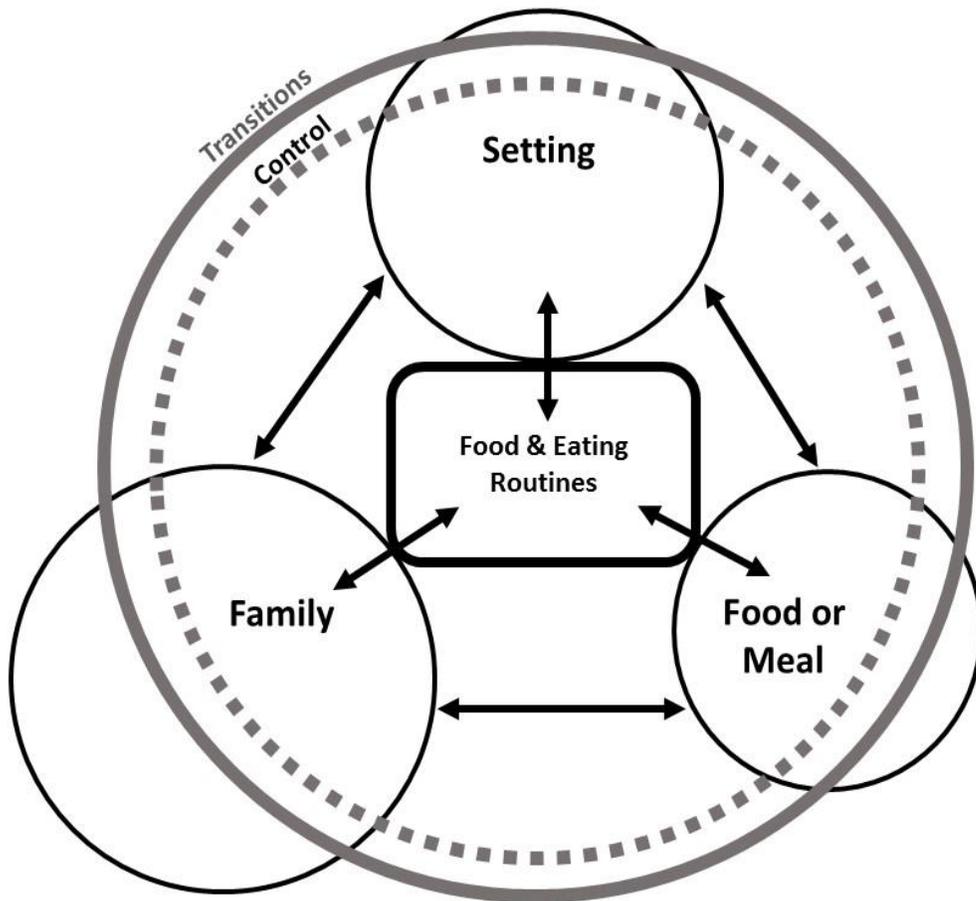
Take pictures of things in your daily life that have to do with eating and/or nutrition. This can be people, places, or things that you think are important when it comes to what you eat! This project does not cost you or your parents any money, and you will be given a camera on LOAN for this research!

-  This camera is your responsibility for the next week! It belongs to you so remember to keep it in a safe area and not let any of your friends or siblings use it. It is for YOU to do your research!
-  Next time we meet we will take some time to talk about the pictures you took! Remember that you can delete any photos you do not wish to share, and I will have some questions about nutrition and eating for you.
-  I will get the camera back from you next week when we meet and you have finished taking the pictures.
-  You can call or email me with any questions you have while you do your research (researcher's phone #)
-  If you need more time to take pictures you and/or your parent can contact me.
-  Finally, this is meant to be fun!! There are no “right” pictures or “wrong” pictures to take. You are the expert- I want to know what you think and feel about food, nutrition, and eating!

Contact: email and number provided here

Figure 4.2

A conceptual model for the food and eating routines of early adolescents



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CHAPTER 5

CONCLUSIONS

The overall goal of this research was to fill gaps in knowledge about early adolescents' food choice processes. Findings explain several important aspects of these processes, specifically how different individuals and contexts influence food choice during the transition from childhood to early adolescence. Looking at this specific transition period was important because many social transitions occur simultaneously with significant growth and developmental transitions in a relatively short time period (Das et al., 2017; Eccles, 1999; Smetana et al., 2006). The preceding chapters show how early adolescents navigate food choice and construct food choice processes as they undergo these multiple transitions in their lives. They are active participants, but how they engage in food choice and related activities is often unique and dependent on multiple factors such as their environments and influences from a variety of individuals in their everyday lives. This dissertation sheds light on these processes, contributes to theoretical and methodological approaches to studying them, and provides avenues for future research with early adolescents.

The specific aims of this dissertation were to (i) explore the emergence of agency within the context of early adolescent food choice and food activities, (ii) examine associations between NHANES Consumer Behavior variables of food choice values of adults in a household with adolescents, demographic information, and reported early adolescent dietary intakes, and (iii) describe food routines of early

adolescents. Each chapter reports research using different methodological approaches, but findings build upon and support one another.

Chapter 2 identified and explained how early adolescents engaged in personal, proxy, and collective agency for food activities such as cooking, grocery shopping, food consumption, and nutrition information seeking activities. These findings suggest that agency is an ongoing process for early adolescents where the structure created by parents/caregivers and food environments can have important implications on food choice behaviors and levels of perceived agency. A major finding in Chapter 2 was that parents/caregivers were central to early adolescents' descriptions of agency for all food-and-nutrition activities. This is supported by other research examining childhood and adolescent eating behaviors, with parents/caregivers determining home food availability and influencing eating occasions such as family meals throughout all stages of adolescence (Contento et al., 2006; Holsten et al., 2012; Jones, 2018; Utter et al., 2018). Parents/caregivers can also influence independent eating occasions for their adolescents, with some research, including that presented here, showing that even when parents/caregiver were not present, their expectations and food beliefs influenced independent food choices (Bassett et al., 2008; Higgs and Thomas, 2016; Larsen et al., 2015; Reicks et al., 2015). Chapter 2 contributes to current research on parenting practices by highlighting how early adolescents and their parents/caregivers created opportunities for food related agency in a coordinated and varied way around food and nutrition activities.

The findings from Chapter 2 informed the hypotheses for Chapter 3, which took a quantitative approach to better understand influences on early adolescents' food

choice processes, specifically adult influences and background factors. Nationally representative data of dyads of an adult and early adolescent in the same household were examined to determine the relationship of food choice values of the adult, sociodemographic characteristics, and the early adolescent's dietary intakes, resulting in some important findings. First, mean dietary intake of key food groups (fruit, vegetables, and dairy) were all lower and added sugar was much higher than current recommendations for early adolescents, and although adult food choice values were not frequently associated with dietary intake, other characteristics such as race/ethnicity were often associated with intake. This supports a continued need to focus nutrition interventions and research to understand how to improve dietary outcomes and further understand influences on this specific age group.

Second, the race/ethnicity of the adolescent was associated with the importance of different food choice values being important (i.e. nutrition, price, convenience) for an adult respondent in the same household, with the exception of the food choice value of taste, which was not significantly different among the racial/ethnic groups. Other research has indicated that race/ethnicity differences can impact eating practices and health, with adherence to dietary guidelines and rates of obesity being different depending on race/ethnicity (Crawford et al., 1995; Kirkpatrick et al., 2012; Masters et al., 2014; Xie et al., 2003). Research presented in Chapter 3 contributes a new and important perspective to health research related to race/ethnicity because it emphasizes that food choice values were also not the same across all groups. This is important when considering how to target nutrition messages and interventions to the public as a one-size-fits all approach may not be effective or appropriate.

The consistent finding that race/ethnicity was an important influence on families and food choice values of parents in Chapter 3 informed the sampling and recruitment phases of the research project presented in Chapter 4. A photo-elicitation approach was selected to describe food routines of early adolescents. Families and especially parents/caregivers were a major influence of food routines based on adolescents' photos and descriptions. These results and research by Bassett et al. (2008) suggest that the food choice process between parents and adolescents is actively co-constructed over time and is not necessarily described as stressful by most adolescents (Bassett et al., 2008). Results from Chapter 4 also found that family processes including cultural practices and family financial resources were important, further emphasizing the need to consider the whole family, resources, and background factors when examining early adolescents' food choice.

The concept of settings, both locations and temporal settings, also provides important insights about how early adolescents navigate food away from home and plan their food choices. Often descriptions of independent eating episodes involved a complicated process where considerations of foods or meals available, their schedule throughout the day or week, and other individuals all influenced how a participant decided what to eat on a given day or at a specific meal. Descriptions of why participants skipped meals, how they chose what or how much to eat, and considerations they had in different settings contribute needed context and details to research on early adolescents' food choice behaviors. This information is important because, although it is known that diet quality often decreases and snacking behaviors increase during adolescence, it helps answer when and where these detrimental

behaviors are occurring. Insights from participants can inform future research endeavors by providing information on where and when to target early adolescents in their daily lives.

Strengths

A main strength of this dissertation is the use of both qualitative and quantitative approaches to describe how early adolescents were making food choices and how they were influenced during the food choice process. A mixed-method approach allowed for some triangulation of findings across each research aim, and using different qualitative approaches was useful for answering questions about different constructs and research questions. The mixed methods approach employed the information from qualitative interviews and then used these data to inform and guide the quantitative and qualitative research that followed. These methods helped to illuminate how early adolescents were experiencing complex food choice processes; the qualitative methods further allowed for the inclusion of relevant and nuanced information about aspects of participants' lives beyond food that can impact food choice behaviors. Ongoing purposive sampling informed by research results and considerations for location (rural/urban), gender, and race/ethnicity also allowed for recruitment of participants that better informed the main research aims of this dissertation. Finally, the use of photo-elicitation was a methodological strength. This qualitative method is underutilized in nutrition research, and resources for how to create a practical, safe, and appropriate methodology for young participants to conduct photo-elicitation projects is lacking. This dissertation provides a clear lesson plan and appropriate guidance for working with children using participant-driven techniques.

Results presented in Chapter 4 show that this methodology is appropriate as well as engaging for future research with early adolescents.

In addition to methodological strengths, the use of well-established theories and concepts was a strength of this dissertation. Framing the main research aims around a combination of the lifecourse perspective and the Food Choice Process Model, which commonly are used for research with adults, proved to be appropriate, adaptable, and effective for studying early adolescent food choice. This research illustrated the utility of viewing key influences on early adolescents' food choice through the lens of these well-established perspectives and models. By approaching early adolescent food choice with clearly defined concepts, this dissertation was able to explore the extent to which youth at this age were influenced in different contexts more completely than traditional research approaches with early adolescents. Employing the Food Choice Process Model also allowed for clear research questions and hypotheses, and considerations to avoid making assumptions based on previous research were necessary to understand how influences and personal food systems were constructed for early adolescents rather than adults. To avoid assumptions, efforts were taken to analyze all interviews using a grounded approach, and definitions and concepts from early adolescent research were employed when exploring themes and concepts.

Limitations

The limitations of this dissertation should also be recognized. The study participants for both qualitative projects (Chapters 2 and 4) were relatively small and limited to early adolescents who were living in New York State. Sampling

considerations were made for gender, race/ethnicity, and locations (rural/urban) in New York State when possible, but not all characteristics could be considered in this research due to resource and time constraints. Therefore, results may differ if other geographical locations, cultures, or socioeconomic characteristics are considered in future sampling criteria with early adolescent populations. For the qualitative projects, it should also be noted that Chapter 2, which explored agency, needs further development beyond the results presented here. Although the concept of agency emerged from the data and is representative of the interviews conducted, methodological limitations, such as multiple interviewers and the interview guide being formative for many topics limited our findings. As a result, the depth and detail around all modes of agency is lacking for some areas and activities. It was not appropriate to assume or extrapolate additional results for the interview data and more direct and in-depth research is needed to fully understand the complexity of food-related agency with early adolescents.

For the quantitative project, Chapter 3, there were also a few key limitations. First, the NHANES data are cross sectional so no causal inferences can be made from the findings. Second, the reliance on 24-hour dietary recalls for some main outcomes in analyses presented in Chapter 3 may introduce limitations such as social desirability bias or unreliability due to individuals' inability to recall dietary intakes accurately. A final limitation of the quantitative results is that the depth of detail on respondent characteristics was limited in the data set. It cannot be assumed that the adult respondents were parents/caregivers of the early adolescent respondents, as the survey only asked for an adult in the household. Therefore, associations and inferences should

be viewed with caution.

Applications for Future Research & Practice

This dissertation illustrated the value of employing multiple research approaches and has methodological implications for future research and practice with early adolescents. Future research with early adolescents should consider using similar theoretical and methodological approaches presented in this dissertation as there are still many unanswered questions about food choice behaviors in youth.

While routines were explored in-depth, continuing to use the Food Choice Process Model will be important in guiding future research questions because of the many other aspects of early adolescents' personal food system processes that remain unknown. There are still many concepts in this model, such as the development and negotiation of food choice values and the development of food scripts, which deserve attention. These concepts should be studied in the future because understanding how various processes develop at the onset of adolescence has the potential to move research forward and provide opportunities for better designed nutrition interventions and more effective practice approaches. For example, a better understanding of how early adolescents negotiate food choice values may provide researchers and practitioners with new information for parenting interventions and tailored messaging for parents and their early adolescents.

Future research and practice should continue to address the role of transitions and agency in nutrition-focused work in early adolescence, because this life stage is so complex. Transitions were considered throughout this research, but due to the multifaceted nature of transitions, they deserve more attention and focus in nutrition

research and practice. Social worlds and food worlds are constantly evolving, and how early adolescents experience social, historical, biological, and psychological transitions simultaneously will impact every aspect of their daily lives. Thus, food choice, which is part of everyday life, should be understood for today's youth so that practitioners and researchers can provide effective and relevant nutrition interventions and information. Agency is also important for practitioners and researchers focused on early adolescence and nutritional issues because it is a concept that impacts daily life. This dissertation showed that early adolescents are still defining food agency for themselves and that multiple influences such as parents and structures can impact food choice. However, more dedicated research focused on how early adolescents move through and determine where they will exert agency related to food choice is needed for practitioners and researchers.

It will be important to promote an interdisciplinary approach in future research and practice by combining the Food Choice Process Model concepts with concepts from other disciplines such as human development and sociology to provide appropriate depth and guidance for future work with early adolescents. For example, incorporating concepts related to autonomy and personal identity from the human development literature, and including theories such as structuration from sociology can provide important and complementary information to understand early adolescent food choice in various contexts.

Final Thoughts

This dissertation explored and elaborated on food-related agency, influences on food choice behaviors, and the food routines of early adolescents. Findings and perspectives directly from early adolescents highlighted the nuanced and complex nature of food choice processes during this life stage. Results further confirmed that early adolescence is an especially important time, where individuals are in a state of flux between two developmental stages and are often confronted with new food choice opportunities. A better understanding of subtle transitions, behaviors, and influences can offer many opportunities for prevention and intervention efforts during this critical life stage.

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family income, and education on dietary intake among adolescents. *Preventive Medicine*, 36(1), 30–40.

How many other children live with you? _____

How old are they?

3 years or younger? _____

Pre-K or elementary school? _____

Middle school? _____

High school? _____

Does your school serve universal free school lunch (does everyone eat school lunch for free)?

___ Yes

___NO

How many days per week do you usually eat school lunch?

___Everyday

___4 days a week

___2 days a week

___1 day a week

___Less than once a week

A.2. Final Interview Guide

Interview questions for PHASE II – MIDDLE SCHOOL AGE STUDENT QUESTIONS

Phase II student interviews are expected to take around 20-30 minutes each. Start with free lists of fruits, vegetables, and drinks typically consumed. Open-ended questions regarding their perception of their parents' concerns, family meals, and school foods will follow.

First, we have a few questions about what kinds of foods you typically eat:

(Fruit) Please list the fruits you like. Which ones do you usually eat? What fruits do you have at home? Think about what you eat for breakfast, lunch, and dinner – are there any other fruits you eat? What about snacks?

(Vegetables) Now, please list the vegetables you typically eat. What vegetables do you like? Think about what you had for meals this week – are there any other vegetables that you have eaten? What vegetables do you have at home?

(Drinks) Finally, what drinks do you usually have? What do you drink with meals? What do you drink for snacks or between meals? What about after sports?

Now, we want to talk a little more about what your parents tell you about food and what you usually eat and drink with your family.

1. **(Talking to parents about healthy eating)** What do your parents tell you about the foods they want you to eat?
What are their concerns about the foods you eat?
What about your drinks?
What do they want you to eat or drink? Why?
2. **(Family meals)** What meals do you usually have with your family?
What kinds of foods do you eat?
Vegetables? Fruits? Drinks?
Do you all eat the same foods or different ones?
Do your parents eat the same foods? Why or why not?
Who cooks?
What do you like about these meals?
What do you wish was different?
3. **(School foods)** What do you think about the food at your school?

The fruits? The vegetables? The drinks?

Do you usually eat school lunch? Do your friends?

What do you like to eat?

What do you know about the changes to the school foods that have taken place over the past couple of years?

APPENDIX B

APPENDIX OF CHAPTER 3: NHANES CONSUMER BEHAVIOR FOLLOW-UP
CHILD MODULES 2009-2010: ASSOCIATIONS AMONG ADULTS' FOOD
CHOICES VALUES, SOCIODEMOGRAPHIC CHARACTERISTICS, AND
EARLY ADOLESCENTS' DIETS IN THE SAME HOUSEHOLD

Table B.1 Preparation and description of NHANES variables of interest

Table 1: Preparation and Description of variables of interest				
Variable Name	Original NHANES variable	Original Scale and/or Description	NEW Variable	Final Scale and/or justifications (*How variable was used in this project)
Child BMI	BMXBMI	BMXBMI = Body Mass Index (kg/m**2), which was obtained during the physical examination, and CDC growth charts and classifications were used to determine overweight and obesity in children.		
Child Weight	BMXWT	Weight= kg , All survey participants were eligible for the body measurement component. To collect weight measurements, participants stood on a floor scale, equipped with a digital read-out. Standing height was also measured using a wall mounted stadiometer that was connected to an automated data electronic database so data could be entered automatically		
Child Race/ Ethnicity	RIDRETH1	Derived from responses to the survey questions on race and Hispanic origin and based on self-report.		RIDRETH1= 1 =Mexican American 2=Other Hispanic 3= Non-Hispanic White 4=Non-Hispanic Black 5=Other Non-Hispanic
Child Age	RIDAGEYR	Age in Years at time of screening		Years= 1-15 years old
Child Gender	RIAGENDR	Gender= Female/male		1= Male 2=Female
Importance of Nutrition	CBQ665	Question: how about nutrition? When you buy food from a grocery store or supermarket how important is nutrition? Scale: very important (1), somewhat imp (2), not too important (3), not at all important (4), refused (7), don't know (9)	InCBQ665	RECODED: 1= Very Important 2= Somewhat Important, Not Too Imp, and Not at all Imp JUSTIFCIATION= Because over half of the pop responded with very important and because this will better capture only individuals likely to really

				value nutrition the variable was dichotomized.
Importance of Price	CBQ660	Question: When you buy food from a grocery store or supermarket how important is price? Scale: very important (1), somewhat imp (2), not too important (3), not at all important (4), never buy from a grocery store or supermarket (5)	InCBQ660	No missing, but (5)-refused was 4 respondents, and reclassified as Missing. RECODED: 1= Very Important 2= Somewhat Important, Not Too Imp, and Not at all Imp
Importance of Taste	CBQ670	Question: how about taste? When you buy food from a grocery store or supermarket how important is taste? Scale: very important (1), somewhat imp (2), not too important (3), not at all important (4), refused (7), don't know (9)	InCBQ670	6 respondents didn't know (9), RECODED: 1= Very Important 2= Somewhat Important, Not Too Imp, and Not at all Imp
Importance of food preparation easiness	CBQ675	Question: how about how easy the food is to prepare? When you buy food from a grocery store or supermarket how important is how easy the food is to prepare? Scale: very important (1), somewhat imp (2), not too important (3), not at all important (4), refused (7), don't know (9)	InCBQ675	RECODED: 1= Very Important 2= Somewhat Important, Not Too Imp, and Not at all Imp
Importance of how well the food keeps	CBQ680	Question: how about how well the food keeps after it's bought? When you buy food from a grocery store or supermarket how important is how well the food keeps after it's bought? Scale: very important (1), somewhat imp (2), not too important (3), not at all important (4), refused (7), don't know (9)	InCBQ680	RECODED: 1= Very Important 2= Somewhat Important, Not Too Imp, and Not at all Imp
Annual Family Income	INDFMIN2	Released as range of incomes for a family based on CPS definition of a family as "a group of two people or more (one of whom is the householder) related by birth, marriage, or adoption and residing together. (****If a respondent refused to answer the income question or did not know the total combined family income, a screener question to query if the family income was < \$20,000 or ≥ \$20,000 was used and income range was not determined. Note: total 2009-2010 sample: (7)Refused: 220, (99)Don't know: 215 (.)Missing: 72).	income	RECODED: 1= Under \$20k 2= \$20 - \$75k 3= \$75k and Over 4=Other
Respondent Education Level	CBD765	1=less than HS 2=HS diploma or GED 3=more than HS	InCBD765	RECODED: 1= less than HS or GED 2=More than HS JUSTIFICATION= common way to dichotomize this type of variable for analysis and to determine if there are difference if education exceed high school.
Respondent Age	CBD760	Age in Years at time of screening		Years= 17-77 years old and >/= 80 years old
Respondent Gender	CBD770	Gender= Female/male		1= Male 2=Female
Respondent main meal planner?	DBD930	Are you the person who does most of the planning or preparing of meals in your family? (1) Yes (2) No		No respondents refused or didn't know: 1= Yes 2=No

Respondent main food shopper?	DBD940	Are you the person who does most of the shopping for food in your family? (1) Yes (2) No	No respondents refused or didn't know: 1= Yes 2=No
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Table B.2 USDA Food Pattern Equivalent Database Information

(USDA. *Food Patterns Equivalents Database*. Beltsville, Maryland; 2013)

<u>Main Components</u>	<u>FPID/FPED Components</u>
Fruit	1 Total fruit
	2 Citrus, melons, and berries
	3 Other fruits
	4 Fruit juice
Vegetables	5 Total vegetables
	6 Dark green vegetables
	7 Total red and orange vegetables
	8 Tomatoes
	9 Other red and orange vegetables (excludes, tomatoes)
	10 Total starchy vegetables
	11 Potatoes (white potatoes)
	12 Other starchy vegetables (excludes white potatoes)
	13 Other vegetables
	14 Beans and peas computed as vegetables
Grains	15 Total grains
	16 Whole grains
	17 Refined grains
Protein Foods	18 Total protein foods
	19 Total meat, poultry, and seafood
	20 Meat (beef, veal, pork, lamb, game)
	21 Cured meat (frankfurters, sausage, corned beef and luncheon meat made from beef, pork, poultry)
	22 Organ meat (from beef, veal, pork, lamb, game, poultry)
	23 Poultry (chicken, turkey, other fowl)
	24 Seafood high in <i>n</i> -3 fatty acids
	25 Seafood low in <i>n</i> -3 fatty acids
	26 Eggs
	27 Soybean products (excludes calcium fortified soy milk and immature soybeans)
	28 Nuts and seeds
29 Beans and peas computed as protein foods	
Dairy	30 Total dairy (milk, yogurt, cheese, whey)
	31 Milk (includes calcium fortified soy milk)
	32 Yogurt
	33 Cheese
Oils	34 Oils
Solid Fats	35 Solid fats
Added Sugars	36 Added sugars
Alcoholic Drinks	37 Alcoholic drinks

. Units of Food Patterns Equivalents Database Components

Food Patterns Equivalents Database Main Components	Units of Measurement
Fruits	Cup equivalents
Vegetables	Cup equivalents
Grains	Ounce equivalents
Dairy	Cup equivalents
Protein Foods	Ounce equivalents
Added Sugars	Teaspoon equivalents
Oils	Gram equivalents
Solid Fats	Gram equivalents
Alcoholic Drinks	Number of drinks

APPENDIX C

APPENDIX OF CHAPTER 4: EARLY ADOLESCENTS DESCRIBE THEIR FOOD ROUTINES USING PHOTO-ELICITATION

C.1 First Meeting

C.1.1 Introduction Script

MINI INFO SESSION SCRIPT

(Adapted from Clark-Ibanez, 2007 and Norris, 2003)

What will you be doing? If you agree to participate, you will be asked to meet with me twice, including today, and to take some photos.

1. In this first interview, today, you will be asked some basic questions about your family, age, and eating habits. You will also be given a camera and told the type of photos we want you to take. This interview will take about 30-40 minutes.
2. Over the next week, we want you to take some photos showing what is important to you when you decide what to eat. We will use these photos in your second interview. I will tell you more about this later.
3. In the second interview, you will be asked to choose a few of the photos you took for us to talk about. You will be asked some questions about the photos you selected. You will be asked how the photos show what is going on related to food and nutrition in your life right now and in the past. This interview will take about 30-45 minutes.

Before we talk about how to take pictures as a researcher, can you describe your favorite dinner for me? (Probes: What is the dinner? What are the components? How is it prepared? What do you like about this dinner?)

Ok, so say you were to take a picture of your favorite meal, what are some things you may think about when you are getting ready to take the picture? (Probes: Anything you would want to include in the picture other than food? Anything you would not want to have in the picture?)

Great, so in addition to those things it is also important to think about a few other things when you are a researcher and go out into the world and take pictures:

- We are trusting you to use this digital camera responsibly. It has been disabled so that it CANNOT go on the internet and should be used ONLY for taking pictures for this project.
- Try to take photos that represent what is happening around food and nutrition in your daily life. Think about what you do in your daily life and document it in photos. We want to know YOUR experiences!
- That means, YOU get to decide what pictures to take! There are no right or wrong pictures. The purpose of this activity is to show us/me what is important for YOU. Examples of photos you may want to take are photos that tell stories about both easy and hard experiences when it comes to what you eat. Photos that show how you choose foods, what food you or your family prepare, challenges around food, and how what you eat is different compared to when you were younger. For example, you may want to take photos of things in your school, neighborhood, home, or somewhere with your friends, or you may want to take photos things that influence what you eat now that you are in middle school.
- Please do NOT take photos of people's faces for the study so that no one is identified.
- Since you have a digital camera you can take as many pictures of your food and nutrition experiences as you want, you can also delete any pictures you do not feel comfortable sharing before our next meeting.
- You have one week to complete the photo activity.

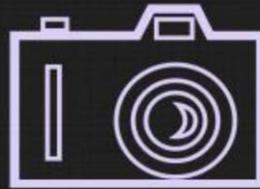
So based on what we talked about what picture has a potential issue and which one does not?



(Pictures from studies by Johnson et al, 2010 and Clark-Ibanez, 2004) (ANSWER: photo 1 because it has faces)

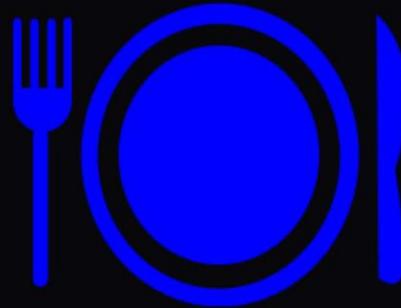
***To conclude, participant will be given an infographic that is discussed with them prior to giving the camera to the child.**

How to be a Photo Researcher 101



WHAT will
you be
doing???

If you agree to participate, you will be asked to meet with me twice, including today, and to take some photos.



Before we talk about how to take pictures as a researcher can you describe your favorite dinner for me and how it is prepared?

THINGS TO THINK ABOUT:



The camera has been disabled so that it **CANNOT** go on the internet.

Since you have a digital camera you can take as many pictures of your food and nutrition experiences as you want, you can also delete any pictures you do not feel comfortable sharing before our next meeting.

Please do **NOT** take photos of people's faces for the study so that no one is identified.

What will YOU be doing???

Try to take photos that represent what is occurring around food and nutrition in your daily life.

YOU get to decide what pictures to take about your current food experiences.

There are no right or wrong pictures. It is meant to show what is important for YOU.



WHAT picture has an issue???

1



2



C.1.3 Researcher 101 Reminders Document



THINGS TO REMEMBER

PHOTO RESEARCH PROJECT

Take pictures of things in your daily life that have to do with eating and/or nutrition. This can be people, places, or things that you think are important when it comes to what you eat! This project does not cost you or your parents any money, and you will be given a camera on LOAN for this research!



This camera is your responsibility for the next week! It belongs to you so remember to keep it in a safe area and not let any of your friends or siblings use it. It is for YOU to do your research!



Next time we meet we will take some time to talk about the pictures you took! Remember that you can delete any photos you do not wish to share, and I will have some questions about nutrition and eating for you.



I will get the camera back from you next week when we meet and you have finished taking the pictures.



You can call or email me with any questions you have while you do your research (researcher's phone #)



If you need more time to take pictures you and/or your parent can contact me.



Finally, this is meant to be fun!! There are no "right" pictures or "wrong" pictures to take. You are the expert- I want to know what you think and feel about food, nutrition, and eating!

Contact: email and number provided here

C.1.4 ProChildren Questionnaire

Please tell us about you. We want to be able to describe the group of people who were in this study. All of the information will be kept completely private. You may choose not to answer any questions that you don't want to answer.

SEX: _____ Female _____ Male

AGE: _____

GRADE: _____

SCHOOL: _____

WHAT IS YOUR RACE?

_____ White
_____ American Indian/Alaskan Native
_____ Asian
_____ Black or African American
_____ Hawaiian Native/Pacific Islander
_____ Other:

WHAT IS YOUR ETHNICITY?

_____ Hispanic/Latino _____ Non-Hispanic/Latino

HOW MANY OTHER KIDS LIVE WITH YOU? _____

HOW OLD ARE THEY?

3 Years or younger _____
Pre-K or elementary school _____
Middle School _____
High School _____

DOES YOUR SCHOOL SERVE UNIVERSAL FREE LUNCHESES (does everyone in your school eat lunch for free)? YES _____ NO _____

HOW MANY DAYS PER WEEK DO YOU USUALLY EAT SCHOOL LUNCH?

_____ Everyday
_____ 4 days a week
_____ 2 days a week
_____ 1 day a week
_____ Less than 1 day a week

HOW MANY DAYS PER WEEK DO YOU USUALLY EAT SCHOOL BREAKFAST?

_____ Everyday
_____ 4 days a week
_____ 2 days a week
_____ 1 day a week
_____ Less than 1 day a week

Please complete the following questionnaire! Please do not write your name on the questionnaire. The questionnaires are completely anonymous. You are free to skip any questions you do not feel comfortable answering, and if you have questions you

can ask the researcher at any time. When you have answered the questionnaire please put it in the envelope provided and return the closed envelope to the researcher talking with you today. If you don't want to answer the questionnaire, please return it unanswered in the envelope. **Thank you for your help!**

HOW TO COMPLETE the questionnaire: Most of the questions can be answered by checking just one box. In a few questions you may check more than one box. In some questions we ask you to write your own answer.

An example: Do you think that you eat much or a little cereal?

- A lot of cereal
- Some cereal
- Not much, not little
- Little cereal
- Very little cereal

SOME QUESTIONS ABOUT YOU:

D1. In what year were you born? _____

D2. What month is your birthday?

- | | |
|-----------------------------------|------------------------------------|
| <input type="checkbox"/> January | <input type="checkbox"/> July |
| <input type="checkbox"/> February | <input type="checkbox"/> August |
| <input type="checkbox"/> March | <input type="checkbox"/> September |
| <input type="checkbox"/> April | <input type="checkbox"/> October |
| <input type="checkbox"/> May | <input type="checkbox"/> November |
| <input type="checkbox"/> June | <input type="checkbox"/> December |

D3. Are you a girl or a boy?

- Girl
- Boy

D4. Are you born in the United State of America?

- Yes
- No

D5. In which country was your mother born? _____

D6. In which country was your father born? _____

D7. What language do you most often speak at home? _____

D8. Do you live with both your parents? (if you live in two places you can check two boxes)

- | | |
|---|--|
| <input type="checkbox"/> Only with my mother | <input type="checkbox"/> With my father and his partner |
| <input type="checkbox"/> Only with my father | <input type="checkbox"/> Both my mother and my father all the time |
| <input type="checkbox"/> With my mother and her partner | <input type="checkbox"/> Other adults? Write who: _____ |

D9. How many brothers and sisters do you have? _____ Brother(s) and/or
_____ Sister(s)

SOME QUESTIONS ABOUT WHAT YOU USUALLY EAT:

F1. How often do you usually eat fruit?

- Never
- Less than one day per week
- One day per week
- 2-4 days a week
- 5-6 days a week
- Every day, once a day
- Every day, twice a day
- Every day, more than twice a day

F2. How often do you usually eat green salads?

- Never
- Less than one day per week
- One day per week
- 2-4 days a week
- 5-6 days a week
- Every day, once a day
- Every day, twice a day
- Every day, more than twice a day

F4. How often do you usually eat potatoes?

- Never
- Less than one day per week
- One day per week
- 2-4 days a week
- 5-6 days a week
- Every day, once a day
- Every day, twice a day
- Every day, more than twice a day

F5. How often do you usually eat cooked vegetables?

- Never
- Less than one day per week
- One day per week
- 2-4 days a week
- 5-6 days a week
- Every day, once a day
- Every day, twice a day
- Every day, more than twice a day

F3. How often do you usually eat other raw vegetables?

- Never
- Less than one day per week
- One day per week
- 2-4 days a week
- 5-6 days a week
- Every day, once a day
- Every day, twice a day
- Every day, more than twice a day

F6. How often do you usually drink 100% fruit juice?

- Never
- Less than one day per week
- One day per week
- 2-4 days a week
- 5-6 days a week
- Every day, once a day
- Every day, twice a day
- Every day, more than twice a day

NOW BACK TO QUESTIONS ABOUT FRUIT (remember: only check one box for each question)

D12. Do you think that you eat much or a little fruit?

- Very much fruit
 Much fruit
 Not much, not little
 Little fruit
 Very little fruit

D13. Do you think that you eat more or less fruit than most boys and girls of your age?

- Much more
 Somewhat more
 The same
 Somewhat less
 Much less

D14. How much fruit do you think you should eat to have a healthy diet?

<input type="checkbox"/> No fruit	<input type="checkbox"/> 1-3 pieces per week	<input type="checkbox"/> 4-6 pieces per week	<input type="checkbox"/> 1 piece per day	<input type="checkbox"/> 2 pieces per day
<input type="checkbox"/> 3 pieces per day	<input type="checkbox"/> 4 pieces per day	<input type="checkbox"/> 5 pieces per day or more		

PLEASE LET US KNOW TO WHAT EXTENT YOU AGREE WITH THESE OPINIONS:

D15. To eat fruit every day makes me feel good

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree

D16. To eat fruit every day gives me more energy

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree

D17. I like to eat fruit every day

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree

D18. Fruit tastes good

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree

D19. My mother eats fruit every day

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree I don't know

D20. My father eats fruit every day

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree I don't know

D21. My best friends eat fruit every day

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree

D22. My mother encourages me to eat fruit every day

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree I don't know

D23. My father encourages me to eat fruit every day

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree I don't know

D24. It is difficult for me to eat fruit every day

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree

D25. If I decide to eat fruit every day, I can do it

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree

D26. I want to eat fruit every day

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree

D27. To eat fruit every day is a habit

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree
-

D28. Which of the following fruits do you like or dislike: (please check one box in every line)

	Like very much	Like a bit	Dislike a bit	Dislike very much	Have not tried
Apples					
Bananas					
Pears					
Oranges					
Tangerines					
Plums					
Peaches					
Melon					
Strawberries					
Grapes					
Cherries					
Kiwis					

SOME QUESTIONS ABOUT FRUIT AT HOME

(if you live in two places, please answer for the place you live most of the time)

D29. Do your parents demand that you eat fruit every day?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D32. If you tell at home what fruit you would like to eat, will it be bought?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D30. Are you allowed to eat as much fruit as you like at home?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D31. Are you allowed to drink as much fruit juice as you like at home?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D33. If you tell at home what fruit juice you would like to have, will it be bought?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D34. Are there usually different kinds of fruits available in your home?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D35. Is there usually fruit available at home that you like?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D36. Is there usually fruit juice available at home that you like?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D37. Does your mother or father usually cut up fruit for you in between meals?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

SOME QUESTIONS ABOUT FRUIT AT YOUR SCHOOL AND LEISURE TIME ACTIVITIES:

D38. Do you usually bring fruit with you to school?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D39. Can you get fruit at school either by buying it or getting it for free?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D40. Can you get fruit at your friends' house, when you spend the afternoon there?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D41. Can you get fruit at the place where you have your leisure time activity (e.g. club, sports place), either by buying it or getting it for free?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D42. PLEASE LET US KNOW TO WHAT EXTENT YOU AGREE WITH THESE OPINIONS:
(please check ONE box in every line)

	I fully agree	I Agree Somewhat	Neither Agree nor Disagree	I Disagree Somewhat	I fully disagree
a) I do not eat fruit because it takes too much time to eat					
b) I do not eat fruit because the breaks are not long enough for eating					
c) I do not eat fruit at school because my classmates do not do it					
d) I do not eat fruit because most fruit does not look fresh					

e) I do not eat fruit because I am still hungry after having eaten it					
f) I do not eat fruit because I want to eat something else (e.g. sweets)					
g) I do not eat fruit because my fingers get greasy when I eat it					
h) I do not eat fruit because I am allergic to some of it					
i) I do not eat fruit because it gets squeezed in the school bag					



NOW SOME QUESTIONS ABOUT VEGETABLES:

D43. Do you think you eat many or few vegetables?

- Very many vegetables
 Many vegetables
 Not many, not few
 Few vegetables
 Very few vegetables

D44. Do you think that you eat more or less fruit than most boys and girls of your age?

- Much more
 Somewhat more
 The same
 Somewhat less
 Much less

D45. How many vegetables do you think you should eat to have a healthy diet?

<input type="checkbox"/> No vegetables	<input type="checkbox"/> 1-3 portions per week	<input type="checkbox"/> 4-6 portions per week	<input type="checkbox"/> 1 portion every day	<input type="checkbox"/> 2 portions every day
<input type="checkbox"/> 3 portions every day	<input type="checkbox"/> 4 portions every day	<input type="checkbox"/> 5 or more portions every day		

PLEASE LET US KNOW TO WHAT EXTENT YOU AGREE WITH THESE OPINIONS:
(please check ONE box in every line)

D46. To eat vegetables every day makes me feel good

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree

D47. To eat vegetables every day gives me more energy

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree

D48. I like to eat vegetables every day

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree

D49. Vegetables taste good

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree

D50. My mother eats vegetables every day

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree I don't know

D51. My father eats vegetables every day

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree I don't know

D52. My best friends eat vegetables every day

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree

D53. My mother encourages me to eat vegetables every day

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree I don't know

D54. My father encourages me to eat vegetables every day

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree I don't know

D55. I often eat vegetables together with my family

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree

D56. It is difficult for me to eat vegetables every day

- I fully agree I agree somewhat Neither agree nor disagree I disagree somewhat I fully disagree

D57. If I decide to eat vegetables every day, I can do it

- I fully agree
 I agree somewhat
 Neither agree nor disagree
 I disagree somewhat
 I fully disagree

D58. I want to eat vegetables every day

- I fully agree
 I agree somewhat
 Neither agree nor disagree
 I disagree somewhat
 I fully disagree

D59. To eat vegetables every day is a habit for me

- I fully agree
 I agree somewhat
 Neither agree nor disagree
 I disagree somewhat
 I fully disagree

D60. Which of the following vegetables do you like or dislike: (please check one box in every line)

	Like very much	Like a bit	Dislike a bit	Dislike very much	Have not tried
Tomatoes					
Cucumber					
Salad					
Cabbage					
Spinach					
Leak					

Green beans					
Onion					
Carrots					
Broccoli					
Cauliflower					
Green peas					

SOME QUESTIONS ABOUT VEGGIES AT HOME:

(if you live in two places, please answer for the place you live most of the time)

D61. Do your parents demand that you eat vegetables every day?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D62. Are you allowed to eat as many vegetables as you like at home?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D64. Are there usually different kinds of vegetables available in your home?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D65. Are there usually vegetables available at home that you like?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D63. If you tell at home what vegetables you would like to eat, will they be bought?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D66. Does your mother or father usually cut up vegetables for you in between meals?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

SOME QUESTIONS ABOUT FRUIT AT YOUR SCHOOL AND LEISURE TIME ACTIVITIES:

D67. Do you usually bring vegetables with you to school?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D68. Can you get vegetables at school either by buying it or getting it for free?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D69. Can you get vegetables at your friends' house, when you spend the afternoon there?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D70. Can you get vegetables at the place where you have your leisure time activity (e.g. club, sports place), either by buying it or getting it for free?

- Yes, always
- Yes, most days
- Sometimes
- Seldom
- Never

D71. PLEASE LET US KNOW TO WHAT EXTENT YOU AGREE WITH THESE OPINIONS:

(please check ONE box in every line)

	I fully Agree	I Agree Somewhat	Neither Agree nor Disagree	I Disagree Somewhat	I fully Disagree
a) I do not eat vegetables because it takes too much time to eat					
b) I do not eat vegetables because the breaks are not long enough for eating					
c) I do not eat vegetables at school because my classmates do not eat them					
d) I do not eat vegetables because most vegetables do not look fresh					
e) I do not eat vegetables because I am still hungry after having eaten them					
f) I do not eat vegetables because I want to eat something else (e.g. sweets)					
g) I do not eat vegetables because my fingers get greasy when I eat them					
h) I do not eat vegetables because I am allergic to some of them					
i) I do not eat vegetables because they get squeezed in the school bag					

THANK YOU FOR YOUR HELP!

Please put the answered questionnaire in the envelope, close it and give it to the researchers talking with you.

C.2 Second Meeting

C.2.1 Final Photo-elicitation Interview Guide

Tell me more about _____/ Please explain what you said about _____/ What do you mean by _____/ Can you give me an example of _____/ Say more about how _____ worked/ You mentioned _____ how did you feel about it? / Help me understand _____

Let's turn to the photos you took! Which one do you think is the most interesting?

So tell me what you see in this photo.

- Tell me all about what's happening in this photo.
- Where was this photo taken?
- What happened before you took this photo?
- What happened after you took this photo?
- What do you like about this photo? What do you dislike about this photo?
- Who else was with you when you took this photo? Who was not there?
- How were you involved with "----"?
- What are some reasons this photo matters to you? / Tell me what makes this photo important to you.
- **Feelings:** When you took this picture how were you feeling about this food? When you took this picture, how were you feeling about eating, in general?

How much could you change the way food and eating happened in this photo?

- F/u: How would you like to change things?

Who decided what was for that meal? Who decided when that meal would be eaten?

- Who decided who would eat together?

What were the reasons you did _____?

In what ways is this different to when you were younger? In what ways is it similar?

When did the way you eat begin to change?

- When did this change start?
- What made it change?
- Help me understand what else was going on in your life?

- Tell me about other reasons you had for the change in eating?
- Tell me about what happened after you made __change.

How does this picture compare to what you USUALLY eat on a weekday?

What about on a weekend? (Describe what you eat on most weekends)

What was going through your mind when you were choosing what to eat in this photo?

- How did you decide to eat this? (if photo of a meal or food)
- Who prepared this (food/meal)?
- How does this (food/meal) compare to what else you have eaten today?

If a photo of a specific activity i.e. cooking, shopping, food prep):

- What was going on while you took this photo?
- How is this photo different from what you usually do in terms of -----?
- How is this photo the same as what you usually do in terms of -----?
- What other things do you [cook/help with/prepare]?
- Who else was involved in this? How does [person] involve you with [activity]?
- When did you start doing this?
- How has [activity] changed for you over the years?
 - Tell me about added responsibilities you have been given with [activity] over the years?

Help me understand how you feel about your control over choosing the foods you eat.

- Do you feel like you make choices when it comes to food? Why would you say that?
- (F/U: On a scale of 1 to 5 with 1 being you have no control and 5 being you have a lot of control what would you give yourself?)
- When do you decide what to eat? How do you do this? How do you think this will change as you get older?

What did you want to take a photo of but didn't? (What photo did you want to take but could not? (note depending on the participant sometimes this comes up in the beginning of the interview and not at the end depending on chatting/conversations prior to the start of the recording.)

THANK YOU FOR PARTICIPATING IN THIS INTERVIEW!

C.2.2 Puberty Development Scale (PDS)

GIRLS PDS

We would like to ask you some questions about physical development.

1. Would you say that your growth in height has not yet begun to spurt, has barely started, is definitely underway, or does growth seem completed? (if asked, spurt = more growth than usual)

1	2	3	4
No	Yes (Barely)	Yes (Definitely)	Development Completed

2. And how about the growth of body hair? Would you say that your body hair has not yet started growing, has barely started growing, or does growth seem completed? (if asked, body hair = underarm or pubic hair)

1	2	3	4
No	Yes (Barely)	Yes (Definitely)	Development Completed

3. Have you noticed any skin changes, especially pimples?

1	2	3
No	Yes (Barely)	Yes (Definitely)

4. Have your breasts begun to grow?

1	2	3	4
No	Yes (Barely)	Yes (Definitely)	Development Completed

5. Have you begun to menstruate (get your period)?

1	2	3	4
No	Yes (Barely)	Yes (Definitely)	Development Completed

a. IF YES:

1. What was the date of your first period: _____
Month/Year

2. If you don't know the date, how old were you? _____
Age

6. How tall are you? _____
Feet Inches

7. How much do you weigh? _____ pounds
8. Do you think your development is earlier or later than most other boys/girls your age?
1. Much Earlier
 2. Somewhat Earlier
 3. About the Same
 4. Somewhat Later
 5. Much Later
-

BOYS PDS

We would like to ask you some questions about physical development.

1. Would you say that your growth in height has not yet begun to spurt, has barely started, is definitely underway, or does growth seem completed? (if asked, spurt = more growth than usual)

1	2	3	4
No	Yes (Barely)	Yes (Definitely)	Development Completed

2. And how about the growth of body hair? Would you say that your body hair has not yet started growing, has barely started growing, or does growth seem completed? (if asked, body hair = underarm or pubic hair)

1	2	3	4
No	Yes (Barely)	Yes (Definitely)	Development Completed

3. Have you noticed any skin changes, especially pimples?

1	2	3
No	Yes (Barely)	Yes (Definitely)

4. Have you noticed a deepening of your voice?

1	2	3	4
No	Yes	Yes	Development

(Barely)

(Definitely)

Completed

5. Have you begun to grow hair on your face?

1

No

2

Yes
(Barely)

3

Yes
(Definitely)

4

Development
Completed

6. How tall are you? _____
Feet Inches

7. How much do you weigh? _____ pounds

8. Do you think your development is earlier or later than most other boys/girls your age?

1. Much Earlier
2. Somewhat Earlier
3. About the Same
4. Somewhat Later
5. Much Later

C.2.3. Participant Photos from Photo-Elicitation Interviews

Breakfast



Breakfast



Breakfast



Breakfast



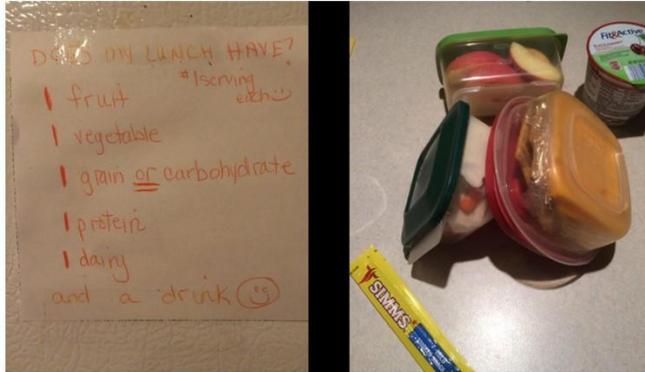
Breakfast



Lunch



Lunch



Lunch



Lunch



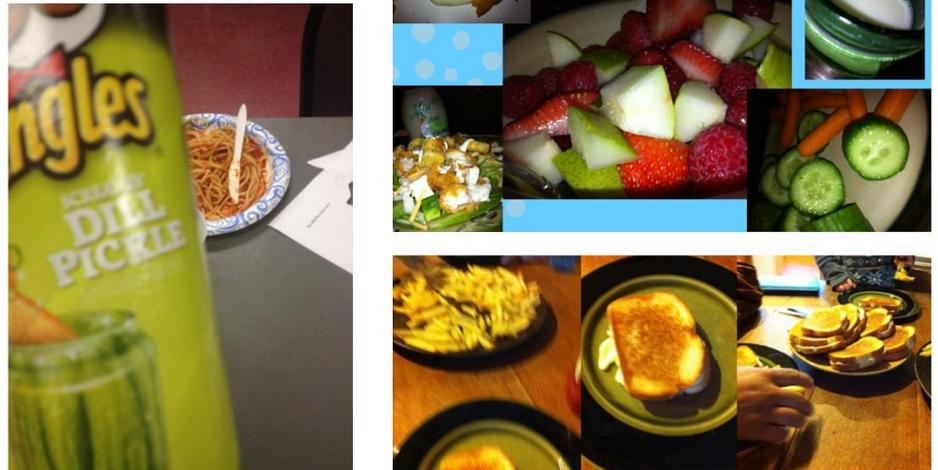
Lunch



Dinner



Dinner



Dinner



Dinner



Dinner



Dinner



Dinner



Dinner



Dinner



Snack



Snack



Snack



Snack



Snack



Snack



Snack

