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Literature suggests that in certain populations, such as Hispanic families, children may have strong influence on dietary behaviors for the entire family. Additionally, a family environment where parents are more often compliant to their child's requests for less nutritious foods may be related to increased obesity prevalence rates (Flegal, Ogden, & Carroll, 2004). The purposes of this project were to examine child influence on dietary behaviors in low-income families, assess how child influence may differ between Hispanic and non-Hispanic families, and investigate the association between child influence and child overweight and obesity. A cross-sectional community-based design was utilized. Data collection methods included surveys, at-home interviews, and grocery store observations. It was first established that the majority of parents found their early adolescent child to have a substantial influence on family dietary and physical activity behaviors. Investigating this idea more in depth, it was found that children tended to request of their mothers to purchase or provide foods that were lower in nutritional content, but mothers tended to be more compliant when these requests involved foods with higher nutritional content. The number of child food requests was important as a statistically significant positive association between child food requests and maternal compliance was found. Maternal compliance, however, was found to have a significant association with child BMI. Although statistically significant differences between Hispanic and non-Hispanic participants were not identified, areas worthy of further

research were identified. These results can be used in future development of nutrition interventions targeted to low-income families.

CHILD INFLUENCE ON DIETARY BEHAVIORS IN
LOW-INCOME FAMILIES

by

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To my husband and family: I could not have achieved this without your love and support.

APPROVAL PAGE

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CHAPTER I

INTRODUCTION

Obesity

According to the 2009-2012 NHANES data, approximately 35.7% of adults and 17% of children and adolescents in the United States are classified as obese (Ogden et al., 2012). Obesity in adults is defined as having a body mass index (BMI) greater than 30 kg/m². Children are considered overweight when their BMI-for-age is between the 85th and 94th percentile on the growth chart and classified as obese with a BMI-for-age \geq 95th percentile (CDC, 2010). Obesity and overweight in childhood tends to persist into adulthood and is associated with a number of chronic diseases, such as type 2 diabetes, cardiovascular disease, sleep apnea, and psychological disorders (Fontaine et al., 2003; Guo, Wu, Chumlea, & Roche, 2002; Lyznicki et al., 2001; Ogden et al., 2006; Olshansky et al., 2005). Disparities in overweight and obesity prevalence rates can be seen in both adults and children, such that minority populations and individuals living in low-income households tend to have higher prevalence rates (DHHS, 2012). Childhood obesity rates are disparately higher in the Hispanic population compared to non-Hispanic population (Small et al., 2009). Prevalence of obesity in Hispanic children in 2009 was 17.9%, compared to 12% for non-Hispanic white children (CDC, 2010). One study reported that

3 year old Hispanic children were nearly twice as likely as non-Hispanic white and black children to be overweight even when controlling for children's and mothers' characteristics, mothers' health status and health behaviors, and children's opportunities for exercise in the models (Kimbrow, Brooks-Gunn, & McLanahan, 2007). There are a variety of hypothesized reasons for this higher overweight and obesity prevalence among Hispanic populations. One cause may be differing cultural beliefs related to health. Early studies examining this belief suggested that Mexican mothers perceive overweight as a healthy state for their preschool children (Sherman et al., 1995). Contrary to this notion, recent literature has not found that Hispanic mothers identify being overweight or obese as a healthy state for their child. Rather, the mothers were unsure how to tell if their child was overweight (Small et al., 2009). Additional possible causes for higher childhood obesity rates among the Hispanic population have been attributed to unequal access to resources, unequal wages, and higher levels of acculturation (Centrella-Nigro, 2009; Small et al., 2009).

Hispanic Immigrant Population

The term Hispanic refers to descendants from over 25 various Spanish-speaking countries (Centrella-Negro, 2009). For the purposes of this paper, the terms Hispanic and Latino will be used interchangeably depending on the language of the reference article. The Hispanic ethnic group is one of the fastest growing ethnic groups in the United States, increasing by 43.3% from 2000 to 2010 (US Census, 2011). Guilford County, NC,

was made up of approximately 7.1% (34,826) Hispanic individuals in 2010. Of those Hispanic individuals, 61% have origins from Mexico (US Census, 2011).

Although there are numerous countries that make up the Hispanic ethnicity, there are some commonalities between groups that are specific to the Hispanic culture. Familism is a term used to describe a strong sense of family (both nuclear and extended). This value is often associated with Hispanic culture and has been shown to be significantly higher in Hispanic families than non-Hispanic white families (Sabogal et al., 1987). This can be illustrated by the fact that, in Hispanic culture, extended families tend to play a big role in raising children (Centrella-Negro, 2009). Familism is also evident as Latino culture places an emphasis on family interdependence, in which the needs of the family go before those of the individual (Fuligni, Tseng, & Lam, 1999).

When focusing on decreasing the rates of obesity in low-income Hispanic families, it is important to keep these cultural variances in mind as well as other factors that affect the nutritional status of Hispanic families. Acculturation and food insecurity are two important factors related the nutritional intake of Hispanic families living in the United States (Newhouser, Thompson, & Coronado, 2004).

Acculturation and Language Brokering

The process of adapting cultural values, norms and behaviors in response to contact with another culture is referred to as acculturation (Dave et al., 2009). Acculturation to the United States has been found to be a risk factor for obesity-related eating behaviors in adolescent and adult immigrants (Barcenas et al., 2007; Gordon et al.,

2003; Himmelgreen et al., 2004; Liu et al., 2012; Unger et al., 2004). Higher levels of acculturation can be equated to adopting the fast-paced American lifestyle, which often includes meals purchased outside the home, families eating on-the-go and convenience foods holding a high priority. Acculturation status is measured in a variety of ways. In a number of studies language spoken at home is used to determine level of acculturation, which is probably an oversimplification (Dave et al., 2010).

Immigrant parents often learn about their new country's culture through their children, who tend to acculturate quicker than adults due to their exposure to the media and other social outlets, such as school (Acoach & Webb, 2004; Suárez-Orozco & Suárez-Orozco, 2001). A language broker is a child in an immigrant family who translates, interprets and mediates information for their parents or other adults (Acoach & Webb, 2004). Language brokering is common among immigrant populations. A study conducted by Tse (1995) found that all of the 35 Latino (United States and foreign born) high school students that were interviewed reported experience with language brokering. The age at which they began brokering ranged from 5- 18 years old.

Language brokers help to make decisions for the whole family by navigating American culture and participating in necessary family tasks. Various settings in which language brokering occurs have been reported, such as schools, stores, hospitals, banks, restaurants, and government offices (Tse, 1995). Adolescents seem better able to handle the demands of language brokering compared to children (Weisskirch, 2005). This could be due to the fact that adolescents may better understand adult situations and they may

have had more time to acculturate than children. This is because language brokering involves more than translation. Brokers also have to be able to interpret meaning in a culturally appropriate manner for both parties, which can allow language brokers more influence in mediating the communication between parties (Hall, 2004).

Food Insecurity

Food insecurity is defined as “a household-level economic and social condition of limited or uncertain access to adequate food” (United States Department of Agriculture Economic Research Service, 2013). Approximately 22% of all Hispanics in the United States live at or below the poverty line (US Census Bureau, 2011). Households with incomes less than 100% of the federal poverty level have a food insecurity prevalence rate of 42.2%, which is greater than those households with higher incomes (1.7- 26.3%; DHHS, 2008). Specifically, 26.9% of Hispanics report experiencing food insecurity compared to the overall national average of 14.4% (Nord et al., 2010).

Although rates of overweight and obesity are high for all Americans, Hispanic immigrants living in the United States have disproportionately higher rates of obesity compared to non-Hispanic Americans. Factors that may contribute to this include the adoption of American lifestyles and living in low-income, and possibly food insecure households. However, these unique aspects of Hispanic American culture and experiences, such as acculturation, language brokering, and strong sense of family, could also be used as a means of promoting healthy behaviors in families.

CHAPTER II

REVIEW OF THE LITERATURE

Acculturation Effects on Diet

Acculturation has been associated with multiple negative effects on the diets of Hispanic immigrants. As immigrants live in the United States, they tend to develop Americanized lifestyles, including diet and physical activity patterns. Traditional diets consisting of vegetables, meats, and whole grains tend to shift to diets higher in processed, high-fat and fast foods (Unger et al., 2004). Mexicans living in Mexico have been found to have less energy dense diets, with lower energy from saturated fats and sugar compared to Mexican American immigrants who were born in Mexico, Mexican Americans who were born in America, and non-Hispanic Americans. This may be due to the fact that consumption of desserts, salty snacks, pizza and French fries has been found to be higher in Mexican American female adults, adolescents, and children compared their Mexican counterparts (Batis, 2011). This indicates that diets change greatly upon living in the United States. In most studies examining diet and acculturation, a significant difference can be seen only when looking at the differences between Mexicans in Mexico and American Mexicans (born in Mexico or the United States) or non-Mexicans in the United States, which suggests that the diets of Mexican Americans are similar to that of

non-Mexican Americans (Batis, 2011). Although the previous study focused on Mexicans, which only encompasses one group of Hispanics, the same results have been found in the Hispanic population as a whole. As Hispanic immigrants become more acculturated, their diets shift from traditional diets to more Americanized diets, along with increased rates of negative health outcomes, such as diabetes diagnoses, compared to less acculturated Hispanic immigrants (Ghaddar et al., 2010).

In addition to focusing on the diet as a whole, acculturation has been studied regarding Hispanic immigrant fruit and vegetable intake. Less acculturated Hispanic immigrants have been found to have higher fruit and vegetable intakes (Ghaddar et al., 2010). An association has been demonstrated between children in Spanish-speaking families, which are assumed to be less acculturated, and higher availability and accessibility of fruits and vegetables in the home compared to children in more acculturated families (Dave et al., 2010). These findings suggest that as Hispanic immigrants become more acculturated; they tend to consume fewer fruits and vegetables, which could be related to overweight and obesity. Low intakes of fruits and vegetables have been associated with overweight and obesity (Hill & Trowbridge, 1998).

Many Hispanic immigrants have stories of themselves, friends, or family members gaining a significant amount of weight within weeks of living in the United States. Reasons that Hispanic women have provided for this phenomenon include less cooking taking place in the United States because of work demands, and excess

availability of snacks and fast foods expected by their children and families to fit in with American society (Small et al., 2009).

Television viewing has been identified as an important source of nutrition information by some Hispanics and has been associated with many nutrition related behaviors, such as fast food consumption, lower fruit and vegetable intake and higher intakes of high fat, high sodium snacks (Perez-Escamilla et al., 2001). Additionally, television viewing seems to be a contributing factor to diet acculturation of immigrant children and adolescents. Children of Mexican descent in the United States were found to watch significantly more television than Mexican children in Mexico (Rosas, 2010). The average child in the United States spends approximately 6 hours a day using media, including television, and watches about 40,000 television advertisements per year (Kunkel, 2001; Roberts, Foehr, & Rideout, 2005). Children from lower socioeconomic families tend to watch more television than children from higher socioeconomic families (Story & French, 2004). The amount of television watched has been positively correlated with the number of food or beverage requests made by school-aged children (Chamberlain, Wang, & Robinson, 2006). Additionally, one study found that 55% of Latino preschool children made a request of foods or beverages they had seen on television in the previous two weeks (Borzekowski & Poussaint, 1998). Particularly in a Mexican-American sample, parental fulfillment of child requests for foods advertised on television has been associated with a higher number of snacks and overall fat intake consumed per day for children (Ayala et al., 2007). These results indicate that the food

and beverages viewed on television may have an impact on the foods consumed by the family.

Unfortunately, the foods and beverages on television seem to have a negative effect on the nutritional status of Hispanic immigrants. In one study examining the commercial content of two popular Spanish channels, of which school aged children are exposed, found that a high percentage of the commercials were advertising foods or beverages. Additionally, the foods and beverages advertised tended to be less nutritious choices (Centrella-Negro, 2009). Another study found that food advertisements made up about 11% of all non-program spots on Hispanic television channels (Abbatangelo-Gray, Byrd-Bredbenner, & Austin, 2008). They also found that fast food advertisements and advertisements making health claims were significantly more frequent on the Hispanic television channels than the mainstream channels (Abbatangelo-Gray, Bryd-Bredbenner, & Austin, 2008). This high frequency of fast food advertisements may be a factor in the increased fast food intake found in more acculturated Hispanic immigrants.

Not all acculturation effects on the diet have been found to be negative, however. The ratio of adult women drinking high-fat milk to adult women drinking low-fat milk was found to be lower in Mexicans born or living in the United States compared to Mexicans living in Mexico (Batis, 2011). Mexicans living in the United States also demonstrated higher intakes of low-fat meat and fish and high-fiber breads than Mexicans in Mexico (Batis, 2011). This would indicate lower intake of saturated fat and increased fiber intake, which are seen as positive diet changes. In addition to

acculturation, cost may also be an attributing cause of changes in the diet after coming to the US. With the large increase in Hispanics to the US, many of their traditional foods can be found at a reasonable price in specialty stores. However, the low cost of many high fat, high sugar processed foods seems to lead to an increased consumption of these foods (Colby, Morrison & Haldeman, 2010). In low-income Hispanic immigrant households, these lower cost foods may be purchased instead of other more nutritious foods to ensure that family members receive enough to eat.

Food Insecurity in Hispanic Immigrant Families

Acculturation has also been associated with food security status for Hispanic immigrants, so that less acculturated (Spanish-speaking) households are more likely to experience food insecurity than more acculturated (English-speaking) households (Nord et al., 2010). The association between acculturation and household food insecurity may be partly due to low socioeconomic status. Less acculturated families tend to live in low-income neighborhoods where grocery stores may not be as abundant and fast food establishments are prevalent (Unger et al., 2004).

Adult overweight and obesity has been associated with household food insecurity. However, this positive association has not been demonstrated with children living in food insecure households in the United States (Matheson et al., 2002). In a predominately low-income Hispanic sample, children of the same age, living in food secure households were found to have a significantly higher BMI than their food insecure counterparts.

Additionally, mean food consumption was found to be significantly lower in children

from food insecure households (Matheson et al., 2002). Neither of the groups was found to be underweight, however. The children from the food insecure households were considered a healthy weight, on average, as opposed to children from low-income food secure households where the children were considered overweight on average.

Other dietary changes have been noted between food secure and food insecure households. Food insecurity has also been associated with lower variety of fruits and vegetables available in the home (Dave et al., 2010). Additionally, in-home energy and meat consumption has been shown to significantly decline just prior to payday in food insecure households, but not in food secure households (Matheson et al., 2002). This finding is typical of food insecure households, but what is interesting is that non-Hispanic respondents report significantly more strategies for obtaining food when they did not have enough money for food (Nord et al., 2010). This may mean that Hispanic families living in food insecure households are more likely to go without food when they cannot afford it. Additionally, this would indicate that parents would be less likely to be able to comply with dietary requests made by their children.

Improving Family Dietary Behaviors

Family approach. Childhood overweight and obesity is influenced by a variety of factors, including individual, family, community, and environmental. The family environment can be used to encourage healthy lifestyles or promote obesity-related behaviors. Dietary and physical activity behaviors, such as high consumption of fast food and sugar sweetened beverages and sedentary lifestyle increase the risk of overweight

and obesity. A study by McArthur et al. (2004) found that the majority of Hispanic families participated in sedentary activities most often, and had a variety of high fat and high sugar foods, which are not typically found in the traditional Hispanic diet, almost always available in the household. This would indicate a household environment that may increase the risk of overweight and obesity for family members.

The number of parents in the household and parenting styles can also contribute to obesity risks. Single parents tend to exert less control on their children due to the demands of parenting alone (Dornbusch et al., 1985; Weiss, 1979). Children of authoritarian parents, who use control strategies with food, tend to eat less healthy, whereas children with parents who monitor and reinforce healthy eating behaviors tend to eat healthier (Elder et al., 2010). A previous obesity intervention targeting school- aged children and their parents has shown success in reducing dietary fat intake, increasing fruit and vegetable intake and reducing blood sugar levels in a predominately Hispanic population (Valdez et al., 1996). The participation of Hispanic parents indicated that they were interested in being involved in weight change efforts. Bourdreau et al. (2013) also found that Latino parents of an obese child were willing to participate in and work with health coaches as part of a family-centered intervention within the primary care setting.

The family approach to combating childhood overweight and obesity relies on providing an environment that fosters healthy dietary behaviors and a de-emphasis on the child being responsible for his/her weight status (Golan & Weizman, 2001). Interventions

with participation from the whole family tend to be more effective than targeting children alone (Golan, Weizman, & Fainaru, 1999).

A recent pilot study focused on grocery shopping habits of low-income Latino families as a potential strategy for encouraging these families to purchase healthier foods (Cortes et al., 2013). The families were provided with 3-5 individualized nutrition education sessions at their home and one session at the grocery store. Grocery store receipts were collected at baseline and completion of nutrition education in order to assess nutritional value of food purchases. Researchers found a significant decrease in total number of calories purchased and number of calories per dollar spent between time points, which would suggest that education on food shopping practices could be an effective way to promote healthy dietary behaviors for the entire family.

Children as change agents. Within the family approach, children may be able to function as agents of change for dietary behaviors for the whole family. The influence that children have on the foods purchased at the store, and the foods prepared or provided for meal and snacks in and outside of the home have an effect on the dietary intake of the entire family. This idea may be especially pertinent to certain ethnic groups, such as Hispanics, where children tend to have more influence on decisions that affect the entire family (Johnson, Sharkey & Dean, 2011). It has been shown that dietary intakes of low-income Hispanic mothers and children are highly correlated (Perez-Escamilla et al., 2001). Further evidence suggests that children have influence over family purchasing

decisions, but the level of influence varies by product being purchased, decision stage, child, parent, and family characteristics (Flurry & Burns, 2002).

Donkin et al. (1993) conducted a survey in the United Kingdom to examine children's food purchase requests to parents. They found that 7-11 year old children tended to request foods that they were able to consume on their own, such as breakfast cereals, snack foods (yogurt, sweets and fruit) and drinks. Additionally, 39% of the foods requested were items that had been advertised on television within 6 months prior to the survey and the healthy eating profile of the child significantly improved with less television viewed, increased household income, and increased number of times the family ate meals together per week.

It is estimated that children aged 8-14 years old annually spend and influence the spending of approximately \$1.2 trillion dollars (Lindstrom, 2004). Studies have focused on adolescents' (12-16 years old) influence on family decision, but little research had been done examining the influence of children in the analytic stage of development (8-11 years old; Roedder-John, 1999). Children in the analytic stage are able to make independent decisions and employ influential tactics in an attempt to gain desired outcomes, which makes this age group worthy of further research (McNeal, 1992).

A 10 year longitudinal study was conducted to assess the bidirectional nature between children and parents in family dietary decisions. Diet, exercise, and smoking cessation information was circulated in the form of print materials, television programs and public service announcements, newspapers and radio messages. At the 2 cross-

sectional points in time, children's dietary behaviors served as a significant predictor of parent's dietary behaviors, (Rimal & Flora, 1998). It is suggested from these results that health campaigns that focus on children as potential sources of family influence instead of just an audience, may enhance their effects.

Immigrant children, especially those who act as a language broker, have a unique role in the family and function as a way to manage cultural barriers between Hispanic families and health/nutrition educators (Palmeri et al., 1998). When children acculturate more quickly than their parents, it can lead to a role reversal in the family in which parents depend on their children to help them navigate the American culture (Unger et al., 2004). Even children in families without this role reversal have been shown to have persuasive power in familial consumer decisions (Jeffrey, McLellarn, & Fox, 1982). Additionally, child requests have been found to be important influences of family spending (Borzekowski & Poussaint, 1998). This would suggest then that when children are in a position of even greater influence, they may have more control over family purchasing decisions. This influence, however, may also be dependent on the extent with which children's requests are complied.

Maternal compliance. Compliance is defined as a change in behavior in response to an implicit or explicit request of others. Due to the reciprocal nature of influence, it is important to address both parties involved: children and parents. Mothers are more often the recipients of influence attempts and the purchasing agents in families compared to fathers (Cowan & Avants, 1988; Cowan et al., 1984; Flurry & Burns, 2002). Maternal

compliance to children's dietary requests will be utilized as a way to measure successful child influence attempts. There is little research focused directly on maternal compliance to children's food requests and its relation to family dietary behaviors, but there have been some studies regarding level of dietary restriction and relation to obesity.

It has been suggested that a family environment with little restraint on food intake is related to increased obesity prevalence rates (Flegal et al., 2004). Additionally, parenting styles that are low in control/demanding, such as indulgent, permissive, or uninvolved, have been associated with higher risks of overweight or obesity in children with various ethnic backgrounds (Wake et al., 2007; Tovar et al., 2012). Low demanding/high responsive feeding styles used by parents have also been found to be associated with higher child intake of low nutrient density and lower intake of fruits and vegetables in low-income ethnically diverse families (Hennessy et al., 2012; Tovar et al., 2012). A study looking specifically at low-income Mexican American families found that 65% of mothers were classified as indulgent or uninvolved in their parenting styles at baseline and those mothers were significantly more likely to have an overweight child 3 years later (Olvera & Power, 2010). The authors attributed this association to a variety of factors. Indulgent mothers may allow their children too many food choices and this parenting style may not provide children with enough guidance on how to self-regulate eating behaviors. Other possible causes for this association could be that indulgent mothers may be more likely to cater to children's unhealthy food requests and they may provide less healthy food items. This would indicate that parents who are more compliant

with their child's food requests (outside the home, inside the home, and at the store) could be contributing to their child's weight gain, depending on the types of foods that are purchased, prepared, or provided.

From the relevant research, it can be established that acculturation, household food security status, and the family environment can greatly affect the nutritional and weight status of low-income Hispanic immigrants. The effects of acculturation on diet have been found to have many negative implications, such as increased consumption of highly processed and fast foods. However, a few positive diet changes due to acculturation have been noted, such as increased consumption of high fiber bread and decreased consumption of whole fat milk. Also, food insecurity in the Hispanic population has been associated with lower levels of acculturation, obesity in adults, and decreased intake of fruits, vegetables, meat, and overall energy intake in children. The family environment can also contribute to overweight and obesity. The high availability of high fat foods combined with sedentary family activities could increase the risk of obesity. Additionally, parents who are authoritarian or indulgent in regards to food intake can increase the risk of their child becoming overweight or obese. All of these characteristics as well as familism and the presence of language brokers may help to explain the rapid rise in obesity among Hispanic population.

Theoretical Framework

The theoretical basis for this study is rooted in social power theory. Social power theory has been utilized in examining family purchasing decisions and has been applied

to children aged 8-11 years old (Flurry & Burns, 2005). Social power can be defined as the ability of one individual or group to influence the thoughts or actions of another individual or group (Flurry & Burns, 2005). Social power can be both active and passive, although it has been documented that children tend to exert more active forms of power, such as asking, pleading, bargaining, persisting, and more (Flurry & Burns, 2005). As children age, they tend to exert more passive forms of power because parents learn their likes and dislikes and may make purchasing decisions based on those (Roedder-John, 1999). Decision history may also aid in children feeling as if they have more influence on purchases (Flurry & Burns, 2005). For example, if children have had success with recent requests, they may be more confident in their influential abilities.

Additionally, there are several different types of power: expert, reward, referent, legitimate, and coercive. Children tend to use expert, reward, and referent power techniques in order to positively influence purchasing decisions. It was found that children did not think they had legitimate power in decision making, such that they did not feel that they had the right to be involved in the decision making (Flurry & Burns, 2005). However, it would seem plausible that children who act as language brokers may exert legitimate power based on their prior involvement in family decisions.

CHAPTER III
PERCEIVED CHILD INFLUENCE ON FAMILY DIETARY AND
PHYSICAL ACTIVITY BEHAVIORS

Introduction

Obesity currently affects approximately 34% of adults in the United States (CDC, 2011). Obesity is associated with a number of chronic health conditions such as high blood pressure, high blood cholesterol levels, diabetes, heart disease, and musculoskeletal and joint problems. The primary cause of obesity is an increased consumption of energy dense foods accompanied with a sedentary lifestyle. Prevalence rates of obesity show great disparities among ethnicities and household income levels. Minority groups, such as Hispanics, have higher prevalence rates of obesity than whites (CDC, 2011).

Many dietary and physical activity behaviors are learned in the family environment. It has been suggested that an environment with little restraint on food intake and lack of physical activity may be partly to blame for the increasing rates of overweight and obesity among Hispanic children (Flegal et al., 2004). Additionally, individuals living in households with incomes less than 130% federal poverty level are also at an increased risk of becoming obese. Explanations as to why these disparities exist include low level of acculturation of family members, limited access to resources, limited

family income, and cultural and language barriers (Centrella-Nigro, 2009; Small et al., 2009).

New immigrants to the United States have low obesity prevalence rates initially. However, it has been shown that as immigrants live longer in the United States, prevalence rates of overweight and obesity increase, as well as chronic diseases, such as diabetes and cardiovascular disease (Barcenas et al., 2007; Flynn et al, 2006; Gordon et al., 2003; Himmelgreen et al., 2004; Unger et al., 2004;). Children and adolescents in newly immigrated households tend to assimilate quicker than their parents, which causes them to be more vulnerable to obesity promoting environments. The American culture adopted by children and adolescents, such as eating fast food, and pizza and engaging in sedentary activities like watching television and playing video games is likely to influence family behaviors (Unger et al, 2004). This is especially true in families where parents depend on their children to navigate US culture and children have more influence in family decision-making, which tends to be the case for Hispanic immigrant families (Dale et al, 2001). Additionally, the Hispanic population tends to exhibit a strong sense of familism, which has been shown to be significantly higher in Hispanic families than non-Hispanic whites (Sabogal et al., 1987). This trait may also support children having more influence on family decisions.

A lack of cultural understanding often forms a barrier for health professionals to effectively communicate nutrition education with Hispanic families. A possible solution to overcoming the cultural divide is targeting interventions toward older children in

immigrant households. Because children usually learn the language and American customs quicker than their parents and their input is meaningful in the family setting (Acoach & Webb, 2004), it is possible that children could influence healthy dietary and physical activity behaviors for the entire family.

The purpose of this study was to determine the amount of influence parents perceive their adolescent children to have on family dietary and physical activity behaviors. The researchers examined whether Hispanic parents perceived their children to have greater influence over family dietary and physical activity behaviors than other ethnic groups. This preliminary research will provide the basis for an obesity intervention study targeted to low-income Hispanic families in North Carolina.

Methods

Subjects were recruited from a pediatric clinic for low-income families in central North Carolina from April 2011 to August 2011 on various days of the week at various times of day. Individuals were recruited in the clinic waiting room by research assistants. Potential participants were screened for eligibility, which consisted of being a parent or caretaker of at least one 10-14 year old child and speaking English or Spanish. Eligible participants provided informed consent if they wished to take part in the survey. The survey and informed consent documents were available to participants in English or Spanish, based on the participants' preference. Documents were translated into Spanish by a bilingual research assistant. All research assistants were trained to use the same script and protocol when interacting with participants and all protocols were approved by

the IRB at the University of North Carolina at Greensboro. Additionally, interviewers were trained to be aware of any problems with participant understanding.

The survey contained a total of 9 items, which was prior tested for content and face validity, or the extent to which it measured the intended concept. Because of the simplicity of the survey (only 9 questions) and previous work with this population, the brief instrument was not validated with participants prior to use. There were 5 items measuring the parent's or caretaker's perception of how much influence their early adolescent child had on their family's dietary and physical activity behaviors on a Likert scale of 1-5 (1 "None at all"; 2 "A little"; 3 "Some"; 4 "Quite a bit"; 5 "A lot"). These items included perceived influence on foods purchased in the grocery store, foods served for family dinner, activities the family does on the weekends, the types of physical activity the family does and the amount of television watched by the family. The survey also contained 2 items relating to future situations: "If your 10-14 year old child wanted your family to eat more fruits and vegetables, how likely would your family consider doing that?" and "If your 10-14 year old child made suggestions on ways your family could get more exercise, how likely would your family consider them?" Possible answers for these items were 1 "Not at all", 2 "A little likely", 3 "Somewhat likely", 4 "Quite likely", or 5 "Very likely." Additionally, 2 survey items asked how likely the participant would be to attend a family nutrition class or family physical activity class offered at the clinic. These items used the same scale of likeliness and were included for use in program

planning at the clinic. Demographic information was not included except for self-reported ethnicity. Participants were only given the opportunity to complete the survey once.

Descriptive and non-parametric statistical analyses (Mann-Whitney U test) were conducted using SPSS 19.0, due to the Likert type items on the survey. Statistical significance was noted at $p \leq .05$.

Results

Although socioeconomic status was not assessed on the survey, in order to receive services at the clinic all participants had household incomes below 200% of the federal poverty level. Of the 135 surveys analyzed, 72 (53%) identified themselves as Hispanic/Latino, 41 (30%) identified as African American, 3 (2%) identified as Asian, 9 (7%) identified as Caucasian/White, and 10 (7%) identified as other. Surveys with greater than 2 items left unanswered were not included in the analysis. Occasionally a participant would be called back for their office visit during the survey and the survey had to be stopped.

The majority of parents or caretakers perceived that their adolescent child(ren) to have influence on their family's nutrition and physical activity behaviors. The number of participants that perceived their child to have "Quite a bit/likely" or "A lot/Very likely" of influence on specific nutrition and physical activity family behaviors are depicted in Table 1. There were no significant differences in the distribution of survey responses when comparing Hispanic respondents to non-Hispanic respondents, except in the likelihood to attend health and nutrition classes ($p = .037$). Hispanic participants reported

being more likely to attend family health and nutrition classes than non-Hispanic participants. Participants, regardless of ethnicity, often stated that their participation in family nutrition or fitness classes would depend on the time and day of the week the classes were offered.

Table 1. Participants who Reported Their 10-14 year old Child to Have a Strong Influence on Family Dietary and Physical Activity Behaviors.

Survey Item	Number of Participants (Percentage)
Supermarket Foods (<i>n</i> = 135)	78 (57.8%)
Family Dinner (<i>n</i> = 134)	72 (53.8%)
Family Weekends (<i>n</i> = 132)	79 (59.9%)
Family Exercise (<i>n</i> = 133)	59 (44.4%)
Family TV (<i>n</i> = 130)	58 (44.6%)
Future Fruit and Vegetable Intake (<i>n</i> = 135)	113 (83.7%)
Future Family Exercise (<i>n</i> = 135)	90 (66.7%)
Likely to Participate in Family Nutrition Classes (<i>n</i> = 135)	71 (52.6%)
Likely to Participate in Family Fitness Classes (<i>n</i> = 134)	73 (54.4%)

Note: These numbers/percentages represent participants who answered “Quite a bit/quite likely” or “A lot/very likely” to the corresponding survey item.

Discussion

The purpose of this study was to examine the level of parental perception of their adolescent child(ren)’s influence on family dietary and physical activity behaviors. The results of this preliminary study show that parents, regardless of ethnicity, perceive their adolescent child(ren) to have a substantial level of influence on family dietary and

physical activity behaviors. The majority of parents perceived their child(ren) to have “Quite a bit” or “A lot” of influence on family dietary behaviors, such as foods purchased at the supermarket, foods prepared or consumed for dinner, family weekend activities, family exercise activities, likelihood to consume fruits and vegetables, and likelihood to increase physical activity. Despite the high percentage of parents who stated they were likely to consume more fruits and vegetables and increase physical activity if their child(ren) suggested it, fewer parents indicated that they would be likely to participate in family nutrition education or physical activity classes.

These results are consistent with previous studies examining child influence on consumer decision-making. There is evidence that children may influence parental decision-making regarding routine family purchases (Rimal & Flora, 1998). Particularly, De Bourdeauhuji and Van Oost (1998) found that children were an important influence on family food decisions. This influence may be passive (child not overtly asking for something) or active (child requesting certain foods or activities). A small grocery shopping study found that one of the reasons African American mothers chose certain grain products was due to their child’s preferences, which would be a passive form of influence (Chase, Reicks, Smith, Henry, & Reimer, 2003). Another grocery store study found that adults yield to their child’s food requests about 50% of time, which would be illustrate an active form of influence (O’Dougherty, Story, & Stang, 2006).

Previous research has shown that parents and siblings provide substantial influence on physical activity behaviors of children (Anderssen & Wold, 1992; Sabiston

& Crocker, 2008; Welk et al., 2003). This is attributed to modeling physical activity behaviors and encouragement. However, the results from this study indicate that children themselves may also influence the physical activity behaviors of the family by choosing physically active activities for the family to participate in, but to a lesser extent than family dietary behaviors.

The hypothesis that Hispanic participants would perceive their child(ren) to exert more influence than non-Hispanic parents was not supported by the results of this study. This is one of few studies that has examined child influence in Hispanic family decision-making, which may be an important factor. Talpade, Talpade, and Prabhu (1997) discussed the importance of addressing adolescent influence on family purchasing decisions in Hispanic families due to their growing population in the United States.

A limitation of this study is that only perceived child influence was assessed and therefore, actual level of influence may vary. Survey responses were dependent upon the participant's interpretation of the term influence and their level of awareness.

Additionally, level of acculturation was not assessed in this study. Acculturation level may vary greatly even between clients of the same clinic and can affect how involved children are in family decisions. Children from families in which the parents are less acculturated may have more or less influence on family decisions compared to children from more acculturated families.

Despite the limitations of this study, it provides a foundation for additional research examining the level of child influence on family dietary and physical activity

behaviors. The results suggest that using children to advocate for changes in family dietary and physical activity behaviors might be an effective approach for improving the health of families. Changes in children's behavior are significantly influenced by family behavior and environment so that efforts to affect healthy lifestyle change needs to involve the family (Steinbeck, 2001). This is reflected in several nutrition education weight management intervention models (Crockett, Mullis, & Perry, 1988; Gillespie, 1981; Golan & Weizman, 2001) that emphasize changes in children's dietary behavior is largely influenced by the behavior of their parents. While some investigators (Golan, Fainaru, & Weizman, 1998; Golan et al., 1998; Graves, Meyers, & Clark, 1998) suggest child weight management interventions should be parent- rather than child-centered, others conclude that including the whole family is a more desirable approach (Nader et al., 1992). In the Hispanic community, the family is the most important social unit, which is fitting to the family approach of adopting healthy eating and physical activity behaviors.

Implications for Research and Practice

Regardless of ethnicity, it was found that parents of early adolescent children perceive their children to have influence on family nutrition and physical activity behaviors. This may be a possible approach to overcoming cultural barriers between health professionals and immigrant and minority families. Additional research is needed to further examine how this influence affects the health of the family and how this influence may be used to improve dietary and physical activity behaviors in families,

especially in low-income immigrant households. The information gained can be used to develop interventions targeted to those populations with higher obesity prevalence rates, such as low-income Hispanic families.

CHAPTER IV

MATERNAL COMPLIANCE TO CHILD FOOD REQUESTS

Introduction

Obese children have an increased risk of developing chronic conditions, such as high blood pressure, high cholesterol, insulin resistance, musculoskeletal problems, and breathing problems, which are not only dangerous, but costly to treat. According to the Centers for Disease Control and Prevention (CDC), the costs associated with childhood obesity are approximately \$3 billion annually (CDC, 2010). The most recognized causes of obesity include high consumption of fast food, refined grain products, added sugars and high fat foods, low fruit and vegetable intake, and increased sedentary behaviors (Hill & Trowbridge, 1998). It is expected that if a high percentage of children's dietary intake is made up of fruits, vegetables, and whole grains that they will be less likely to become overweight or obese, compared to children who consume a high percentage of their dietary intake from foods with added sugars and solid fats. One factor related to the types of foods consumed by children is the family environment. A family environment with little restraint on food intake has been suggested to be related to increased obesity prevalence rates (Flegal et al., 2004). This means that parents who are more compliant with their child's food requests could be contributing to their child's weight gain, depending on the types of foods that are purchased, prepared, or provided.

Obesity currently affects 17% of children in the United States, but prevalence rates have great disparities between racial groups and income levels (CDC, 2010). Minority and immigrant children have higher obesity rates compared to non-minority children. There are a variety of hypothesized reasons for this disparity such as differing cultural contexts about health, unequal access to resources, unequal wages, and low levels of acculturation (Centrella-Nigro, 2009; Small et al., 2009). Despite the higher prevalence rates, a review of obesity research identified a lack of obesity intervention programs targeted to immigrant and minority adults and children (Flynn et al., 2006).

A large body of research has focused on the various approaches to combating childhood obesity. These approaches include various targets, such as children alone, parents alone, or family-based, and occur in a variety of settings, such as clinics, schools, child care, or homes. Family-based approaches have been shown to be more effective than targeting children alone in the general population (American Dietetic Association, 2006; Golan, Weizman, & Fainaru, 1999). There also is research suggesting that children are able to function as agents of change for certain parental behaviors, such as food purchasing behaviors (Rimal & Flora, 1998). This idea may be especially pertinent to certain ethnic groups, such as Hispanics, where children tend to have more influence on decisions that affect the entire family (Johnson, Sharkey & Dean, 2011). Donkin et al. (1993) conducted a survey in the United Kingdom to examine children's food purchase requests to parents. They found that 7-11 year old children tended to request easily

consumable foods, such as breakfast cereals, snack foods (yogurt, sweets and fruit) and drinks.

It has been suggested that immigrant mothers may be more compliant to their child's food requests due to their transitional circumstance. They may have had to refuse child requests while living in an underserved country; whereas living in the United States, where inexpensive food is abundant, mothers may have the ability to be more compliant to food requests. Additionally, with the stress and difficulties faced during the acculturation process, it may be easier for immigrant mothers to be compliant with food requests than to argue about why the child cannot have those foods (Tovar et al., 2012).

Immigrant children tend to acculturate quicker than their parents. This means that immigrant parents often depend on their children to navigate American language and culture, which positions the child in the middle of many family decisions Dale et al, 2001). Children who interpret, translate, and mediate information for their parents are referred to as language brokers (Love & Buriel, 2009). It is plausible that the experience of acculturation and language brokering may cause children to have a strong influence on family decision-making, including food decisions.

Additionally, Hispanic families also tend to have a strong sense of family interdependence and interconnectedness, known as familism (Sabogal et al., 1987). This strong sense of family, in which the good of the family is given greater priority than the good of the individual, might also be reason for children to have influence on family decisions (Fuligni, Tseng, & Lam, 1999).

The purpose of this exploratory study was to examine the influence that children have on dietary behaviors that may affect the health of the entire family in the hopes of providing the foundation for a nutrition intervention utilizing children as agents of change for the family. The specific aims were 1) to describe, by food group, the child food requests (from outside the home, inside the home, and at the grocery store) most often fulfilled by mothers, 2) to examine the association among child food requests, maternal compliance to their child's food requests and child body mass index (BMI) percentile, and 3) to test the moderating effects of ethnicity on the association among child food requests, maternal compliance to food requests, and child BMI percentile. It was hypothesized that children would more often make requests for less nutritious foods than requests for more nutritious foods and that mothers would more often comply with child's more nutritious food requests than with the child's less nutritious food requests. Less nutritious foods would consist of foods with a relatively low content of healthful nutrients compared to the content of less healthful nutrients, such as saturated fat, and sodium. The opposite would be true for more nutritious foods. Additionally, a positive relationship was hypothesized among child food requests, maternal compliance to their child's food requests and child BMI percentile, and that this relationship would be stronger for Hispanic participants compared to non-Hispanic participants.

Theoretical Framework

The theoretical basis for this study is rooted in social power theory. Social power theory has been utilized in examining family purchasing decisions and has been applied

to children aged 8-11 years old (Flurry & Burns, 2005). Social power can be defined as the ability of one individual or group to influence the thoughts or actions of another individual or group (Flurry & Burns, 2005). Social power can be both active and passive, although it has been documented that children tend to exert more active forms of power, such as asking, pleading, bargaining, persisting, and more (Flurry & Burns, 2005). As children age, they tend to exert more passive forms of power because parents learn their likes and dislikes and may make purchasing decisions based on those (Roedder-John, 1999). Decision history may also aid in children feeling as if they have more influence on purchases (Flurry & Burns, 2005). For example, if children have had success with recent requests, they may be more confident in their influential abilities.

Methods

Sampling procedures and characteristics. A community-based cross-sectional design with quota and snowball sampling techniques was utilized in order to achieve an approximate 50% Hispanic and 50% non-Hispanic sample. All study protocols were approved by the UNCG Institutional Review Board. Participants were recruited through various clinics and agencies serving primarily low-income, and immigrant and minority families. A variety of recruitment techniques were utilized based on the agency's preference, such as talking to patients in the waiting rooms of clinics, speaking to potential participants at classes offered by the agency, posting and handing out recruitment fliers (made available in both English and Spanish), and contacting potential

participants over the telephone. Recruitment was conducted on a rolling basis from May 2012 to May 2013.

Screening of potential participants was done during the recruitment process. Participants consisted of a mother or other primary female caregiver of at least one 7-12 year old child and said child. This particular age group was chosen because older children may exhibit more influence on family behaviors than younger children. Participants also had to be fluent in either English or Spanish. In households where there was more than one 7-12 year old child, the researcher chose which child would participate in the study based on convenience. If participants met the eligibility requirements, they were invited to participate in the study. If interested, an appointment to conduct an interview would be made.

Data collection. Structured interviews took place at the participant's home. Interviews were conducted by trained research assistants or community interpreters and 2 researchers/interpreters went on each interview. Interview questions and procedures were content validated by 3 experts in the field and pilot tested with 3 members of the target population. Prior to beginning the interview, informed consent, parental consent and child assent was provided by both mother and child. Interviews lasted between 30-90 minutes, were audio recorded, and conducted in English or Spanish depending on the participant's preference. The interview questions focused on family dietary behaviors on the most recent weekday, most recent weekend day, and at the grocery store, and included eating behaviors outside the home, inside the home, and at the grocery store. Participants also

were asked how typical the days in question were with regard to meals and snacks so that only days that were at least somewhat typical were used. Additionally, demographic and socioeconomic information was collected, along with questions to assess household food security, parenting style, parental stress level, acculturation level (only for mothers and children who identified as Hispanic), and language brokering (only for children who were identified as Hispanic). The interview questionnaire and protocol, along with screening protocol, can be found in Appendix A.

Additionally, while at the participant's home, heights and weights for the mother and child were measured by the researcher, as described later on. Research assistants and community interpreters were trained on how to conduct the interview and measure height and weight according to the protocols. Participants received a \$10 gift card to Wal-mart and a child activity booklet upon completion of the interview.

Child food requests. A child food request was defined as any food that a child verbally asked their mother or other primary female caregiver to prepare, provide, or purchase. To assess child food requests, mothers were asked about the foods their child requested on the most recent weekday, most recent weekend day, and most recent grocery store trip. This included foods requested from outside the home (i.e. restaurant or convenient store), inside the home, and at the grocery store. The number of foods requested for each time period and setting was recorded. Food requests were categorized into food groups based on the Nutrient Data System for Research (NDSR) software version 2011 developed by the Nutrition Coordinating Center, University of Minneapolis,

MN, with the exception of the addition of a combination food group. Because the NDSR software ultimately measures food group servings and not food requests, it made more sense to count a food request made up of multiple food groups as 1 food request rather than multiple food requests. For example, the NDSR software categorizes a turkey sandwich as 1 Meat serving, and 2 Grain servings, but for the purposes of this study, it was categorized as 1 Combination food request.

Maternal compliance. Maternal compliance was defined as a mother or other primary female caregiver fulfilling a food request made by their child by purchasing, providing, or preparing the requested food item. To assess maternal compliance to their child's food requests, mothers were asked if they prepared, provided, or purchased each food requested by their child throughout the various time periods and settings. The number of food requests with which mothers complied was recorded and a percentage of complied food requests was generated.

Child BMI Percentile. Height was recorded to the nearest tenth of a centimeter using a portable stadiometer (Charder HM200P Portstad) and weight was recorded to the nearest tenth of a kilogram using a calibrated scale (Tanita BWB800). Shoes and heavy clothing were removed prior to height and weight measurements. The average of the 2 height measurements and the average of the 2 weight measurements were used to calculate BMI for mothers and children ($BMI = kg/m^2$). Mothers with a $BMI < 18.5$ were classified as underweight, a BMI of 18.5- 24.9 were classified as normal weight, a BMI

of 25.0-29.9 were classified as overweight, and a BMI ≥ 30.0 were classified as obese. Each child's BMI was plotted on the CDC's BMI-for-Age growth charts for 2-20 year old boys and girls. Children were classified as underweight if their BMI-for-Age was $< 5^{\text{th}}$ percentile, normal weight if it was between the 5^{th} - 84.9^{th} percentile, overweight if it was between the 85^{th} - 94.9^{th} percentile, and obese if it was $\geq 95^{\text{th}}$ percentile.

Control and additional descriptive variables. Monthly household income, number of parents in the home, parenting style, and parental stress were collected as control variables. Monthly household income level was recorded as a categorical variable using the following groupings: \$0-500, \$501-1000, \$1001-1500, \$1501-2000, \$2001-2500, and $> \$2500$. Number of parents or primary caretakers in the home was classified as 1, 2, or ≥ 3 . Parenting style was determined based on the Primary Caregivers Practices Report (PCPR). This 32- item scale categorizes parents into authoritative, authoritarian, or permissive parenting styles. Authoritative items have demonstrated a Cronbach's alpha of .91, authoritarian items have demonstrated a Cronbach's alpha of .86 and permissive items have demonstrated a Cronbach's alpha of .75 in a Caucasian majority group of preschool and school-aged parents (Robinson et al., 1995). Maternal stress was assessed using the 18-item Parental Stress Scale (Cronbach's alpha of .83; Berry & Jones, 1995). Each item has a 5-point response scale and the total score is obtained from adding all item responses (some items are reversed scored). Maternal stress level was recorded as a continuous variable with possible scores ranging from 18- 90. Lower maternal stress

corresponds to a lower score. The midpoint score of 54 was used to indicate high levels of stress compared to low levels of stress.

Additional descriptive variables collected included food security status, acculturation level (of Hispanic mothers and children), and language brokering experience (of Hispanic children). The Six-Item Household Food Security Scale (SIFSS) was included in the questionnaire in order to assess household food insecurity status. This scale was designed to identify households that have experienced food insecurity within the previous 12 months. The SIFSS was developed by the National Center for Health Statistics and has been found to be effective in identifying food insecurity at the household level (Cronbach's alpha = .75-.83; Blumberg, Bialostosky, Hamilton, & Briefel, 1999). An affirmative response to 5-6 of the survey items indicates very low food security and affirmation to 2-4 survey items indicates low food security, which will both be categorized as food insecure. Affirmation to 0-1 survey items indicates high or marginal food security, which will be categorized as food secure (Blumberg, Bialostosky, Hamilton, & Briefel, 1999).

Level of acculturation of the mother was assessed using the Short Acculturation Scale for Hispanics, which has shown to be reliable and valid in a Hispanic population (Cronbach's alpha of .92, $r > .70$; Marin et al., 1987). The child's level of acculturation was assessed using the Short Acculturation Scale for Hispanics (Youth Version; Barona & Miller, 1994). This scale has also been shown to be reliable in school-aged Hispanic children (Cronbach's alpha of .92; Barona & Miller, 1994). Composite scores for both

acculturation scales ranged from 12-60, with a score of 12 indicating the lowest level of acculturation and a score of 60 indicating the highest level of acculturation. Language brokering, which is defined as the translating and interpreting of information between parties, was assessed using a modified version of the Language Brokering Scale (Cronbach's alpha of .74; Love & Buriel, 2009). This scale was answered by the child directly and included the places where the child brokers, the people for which the child acts as a broker, and the age when brokering first began.

Data Analysis

Specific Aim 1. Descriptive statistics (i.e. frequencies, percentages) were utilized to describe the types of food requests made by children and maternal compliance to those food requests, by food group and setting. Additionally, independent t-tests were conducted to identify significant differences in maternal compliance rates between Hispanics and non-Hispanics by food groups and by setting.

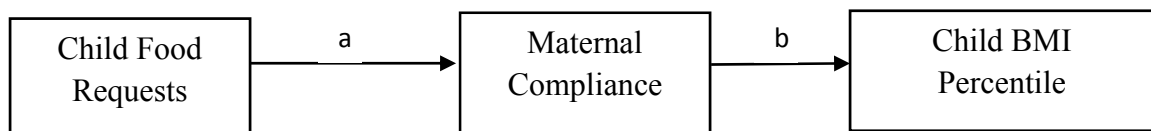
Specific Aim 2. The direct association among the number of child food requests, the frequency of maternal compliance, and child BMI percentile was first established using path analysis. In preliminary analyses, a number of different recursive models (i.e. unidirectional) were tested: 1) a latent model with child food requests (independent variable) and maternal compliance (dependent variable) as latent variables, or observed variables, in which each setting was kept as a separate manifest, or unobserved, variable; 2) three separate path models in which each setting was used to create manifest variable paths from child food requests to maternal compliance to child BMI percentile; and 3) a

model where information from all settings was combined to form a manifest variable of child food requests and a manifest variable of maternal compliance. The latter, which no longer contains latent variables, was the only configuration in which an adequate model fit was obtained. This path model is depicted in Figure 1. The model fit adequacy was evaluated using the chi-square goodness-of-fit statistic (χ^2), Root Mean Square Error of Approximation (RMSEA), and Comparative Fit Index (CFI). A good model fit was indicated by a statistically non-significant χ^2 (as the χ^2 indicates the amount of difference between the expected and observed covariance matrices), $RMSEA < 0.05$, and $CFI > 0.95$ (Hu & Bentler, 1999).

IBM SPSS Amos 19.0 statistical software was used for path analysis, utilizing maximum likelihood method of estimation. This technique also estimates all pathways in the model simultaneously. Composite summary scores for child food requests and maternal compliance were compiled by adding all child food requests measures and maternal compliance measures, respectively, in order to create a single manifest variable for each construct. The need to aggregate the data across various settings instead of keeping each setting separate was due to an inability to establish an adequate model fit when latent variables were estimated. Correlations between all variables in the model and potential control variables were estimated. No statistically significant relationships were detected between model and control variables so control variables were not included in the final model. The correlation tables are included in Appendix B.

Specific Aim 3. Descriptive statistics were conducted to characterize the participant sample in terms of ethnicity. To test for group differences between Hispanic and non-Hispanic participants, path analysis also was utilized. The model was estimated with moderator subgroups (Hispanics and Non-Hispanics) using a fully constrained model. The critical ratios for differences between parameters within the AMOS output was utilized to identify statistically significant differences in the pathways between (a) child food requests and maternal compliance, and (b) maternal compliance and child overweight/obesity between Hispanic and non-Hispanic mother-child dyads (Buehler, Benson, & Gerard, 2006). A critical ratio $> |1.96|$ was used to indicate a statistically significant difference between groups for that particular pathway, at $p = .05$.

Figure 1. Path Analysis Model Predicting Child BMI Percentile



Results

A total of 115 interviews were conducted between May 2012 and May 2013 and analyzed. Demographic and socioeconomic characteristics of the total sample are provided in Table 2. Significant differences were not seen between Hispanic and non-Hispanic participants for these measures. Data on acculturation and language brokering among the Hispanic participants is provided in Table 3. Three mothers were pregnant at the time of the interview so instead of measuring their weight, a participant reported pre-

pregnancy weight was used. Of the total 115 mothers, 51 (44.3%) mothers reported their child requesting at least 1 food item to be purchased or provided from outside of the home (when the mother and child were already at the food establishment), 60 (52.2%) mothers reported that their child requested at least 1 food item to be prepared in the home on the most recent weekday or weekend day, and 106 (92.2%) mothers reported their child requesting at least 1 food item to be purchased during their most recent grocery shopping trip. Mothers reported compliance rates were 91.0% for child food requests from outside the home, 78.5% for child food requests from inside the home, and 74.0% for child food requests made while grocery shopping.

Table 2. Demographic and Socioeconomic Characteristics of Total Sample

	Percent of Participants (N = 115)
<i>Ethnicity</i>	
Hispanic/Latino	56.5%
African American/Black	34.8%
Caucasian/White	7.0%
Other	1.8%
<i>Mother's Education Level: High School Diploma or Less</i>	73.9%
<i>Monthly Household Income: ≤\$1500</i>	70.4%
<i>Participation in SNAP</i>	60.9%

<i>Food Insecure</i>	43.5%
<i>Overweight or Obese</i>	
Mothers	82.6%
Children	47.8%
<i>Sex of Child: Female</i>	53.9%
<i>Parenting Style: Authoritative</i>	95.7%
<i>Parental Stress: <54</i>	99.1%

Table 3. Acculturation and Language Brokering Among Hispanic Participants

	Child (n = 64)	Mother (n = 64)	P-value
First Generation Immigrant (Percentage)	N/A	97%	
Acculturation Level [Mean (SD)]	33.7 (5.2)	17.7 (4.4)	<.001
Language Brokering Experience: Yes [Number (Percentage)]	59 (92.2%)	N/A	

Note: P-value corresponds to paired samples t-test.

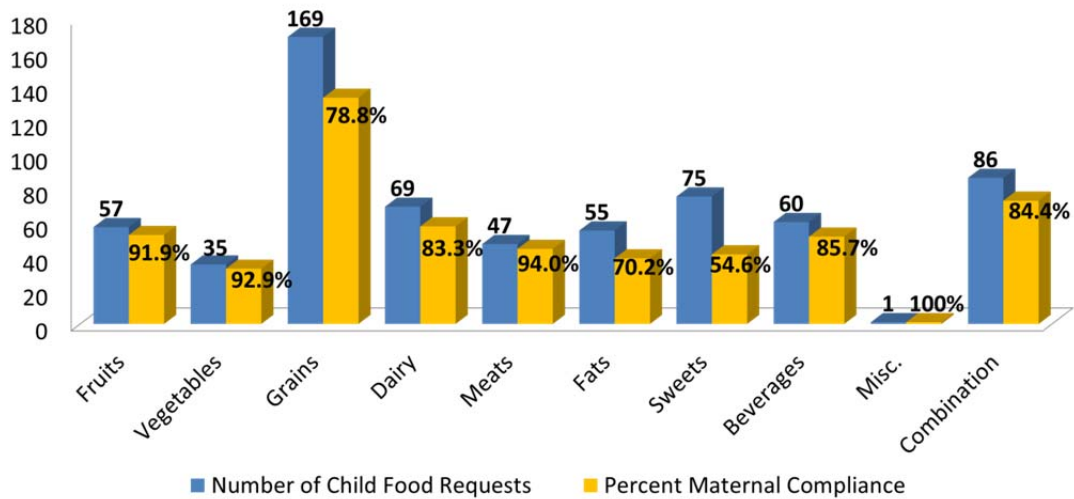
The total number of child food requests on the most recent weekday, weekend day, and grocery store trip by food group are depicted in Figure 2. The Grains group was the most commonly requested and usually consisted of food requests for cookies, sugary cereals, and pastries. The Combination food group was requested next most frequently representing food requests, such as *Lunchables*, pizza, macaroni and cheese, and *Hot Pockets*®. The next most requested food group was Sweets, which consisted mostly of

candy and gummy fruit snacks. The next food group was Dairy and the items most requested in this group were yogurt, ice cream, and drinkable yogurts/smoothies. Beverages were the next most requested food group. Items in this group consisted of only non-100% fruit or vegetable juice and non-dairy beverages and children commonly were requesting juice drinks, sodas, lemonades, and *Kool-Aid* drinks. The Fats groups was the next requested food group and consisted almost exclusively of requests for potato chips and *Takis* (mini rolled corn tortilla chips), which was also the most requested single food item overall. Fruits were requested next often, with apples, oranges, bananas and grapes being the most popular in that group. The Meat, Fish, and Protein Alternative group was requested next often and usual requests within this food group consisted of chicken nuggets, bacon, and hot dogs. The least requested food group, besides the Miscellaneous group was the Vegetable group. The most common foods requested within the vegetable group were French fries, and mashed potatoes. The Miscellaneous food group contained a very limited number of foods and only 1 request for gravy was categorized into that food group.

The reported maternal compliance rates to child food requests on the most recent weekday, weekend day, and grocery store trip by food group are also depicted in Figure 2. With the exception of the Miscellaneous food group, average maternal compliance rates by food group ranged from 54.6% to 94.0%. The order of highest compliance rate to lowest compliance rate by food group was: 1) Meat, Fish and Alternative Protein, 2)

Vegetables, 3) Fruits, 4) Beverages, 5) Combination, 6) Dairy, 7) Grains, 8) Fats, and 9) Sweets.

Figure 2. Total Child Food Requests and Maternal Compliance by Food Group on Most Recent Weekday, Weekend day and Grocery Store Trip



Note: 65.6% of food requests in the Grains group consisted of cookies, pastries, or sugar sweetened cereals. Other requests in the Grains group were for pancakes, *Goldfish*® crackers, pasta/noodles, and rice. 45.7% of food requested in the Vegetable group consisted of french fries.

When examining the association among child food requests, maternal compliance and child BMI percentile, all food requests were utilized, regardless of nutritional content. The model shown in Figure 1 fit the data well ($\chi^2 = 0.504$; $d = 1$; $p = .478$; RMSEA = .000; CFI = 1.00). Path analysis of the relationship between child food requests and maternal compliance to those requests demonstrated a statistically significant small to medium relationship between child food requests and maternal

compliance ($\beta = .225$; $p < 0.05$). However, a statistically significant relationship between maternal compliance and child overweight/obesity was not found ($\beta = .047$, $p = 0.623$).

The pathway from child food requests to maternal compliance was statistically significant with a small to medium effect size for Hispanic dyads ($\beta = .267$, $p < 0.05$), but not for Non-Hispanic dyads ($\beta = .190$, $p = 0.180$). However, the critical ratio for this pathway indicated that the relationship between child food requests and maternal compliance was not statistically different between groups (C.R. = 0.807, $d = 1$). Additional comparison of compliance rates between Hispanic and non-Hispanic participants by food group and by setting are listed in Tables 3 and 4, respectively. None of the differences in compliance rates between Hispanic and Non-Hispanic participants by food groups or by setting were found to be statistically significant utilizing independent t-tests.

Table 4. Comparison of Hispanic and Non-Hispanic Average Maternal Compliance Rates by Food Group

	Fruits	Vegetables	Grains	Dairy	Meats	Fats	Sweets	Beverages	Misc.	Combination
Hispanic (n = 65)	90.0%	93.8%	83.9%	78.7%	96.0%	68.2%	53.2%	87.2%	0.0%	86.0%
Non-Hispanic (n = 50)	94.4%	91.7%	71.4%	94.1%	91.2%	73.7%	56.1%	82.3%	100.0%	81.5%

Table 5. Comparison of Hispanic and Non-Hispanic Average Maternal Compliance Rates by Setting

	Hispanic (n = 65)	Non-Hispanic (n = 50)
Average outside food request compliance:	94.3%	88.8%
Average inside food request compliance:	85.0%	70.6%
Average grocery store compliance:	72.0%	74.5%
Average overall compliance:	83.7%	78.0%

Statistical power analysis. Post hoc power analyses were conducted to estimate 1) power to detect a small to medium effect size ($\beta = .22$) utilizing bivariate linear regression with one group and 2) power to detect a small difference of slope (0.133) between two groups (Hispanics = 65, Non-Hispanics = 50) utilizing bivariate linear regression (Faul et al., 2009). Both analyses were conducted using 2-tailed tests with an alpha level of 0.05. The analysis using one group estimated power of 0.67. The analysis using two groups estimated power of 0.05.

Discussion

The overall purpose of this study was to examine the influence that children have on dietary behaviors that may affect the health of the entire family. The hypothesis that children would more often make food requests for less nutrient dense foods compared to more nutrient dense foods was generally supported. The most requested food groups were the Grains group, the Combination group, and the Sweets group. Although it is possible for the Grains and Combination food groups to contain highly nutritious foods, the foods

that children were requesting within those food groups consisted mostly of highly processed, high sugar, high fat, convenience, and/or low nutrient density food items. These results are consistent with Donkin et al. (1993) who found that children often requested foods they could consume on their own.

Additionally, the hypothesis that mothers would comply more often with more nutrient dense foods compared to less nutrient dense foods was also generally supported. The food groups with the highest maternal compliance rates were the Meats, Fish and Protein Alternatives, Fruit, and Vegetable groups. Generally, most of the foods requested in these groups provide important nutrients, even though some may be of higher fat and/or processing. However, it is also important to note that even though these food requests were complied with most often, they were some of the least requested food groups by children.

The setting in which the foods were requested also seem to make a difference in the reported compliance rate. It is interesting that the highest compliance rate by setting was for foods from outside the home. These requests were made when the family was already at the food establishment and it would make sense that mothers would comply with these requests so that money was not wasted on purchasing foods that the child did not want or would not eat. Another explanation for this high compliance rate could be due to the fact that those food requests were usually just for that child to consume and not the rest of the family. Atkin (1978) also found that children tended to have more influence on family purchases when they were the primary consumer of that product.

Food requests made for foods inside the home tended to be items that would become part of the entire family's or numerous family members' meal or snack.

The association among child food requests, maternal compliance, and child BMI percentile was partially supported by the results. There was a significant positive association between child food requests and maternal compliance for the total sample, meaning that as the number of child food requests increased, the percentage of maternal compliance also increased. However, there was not a statistically significant association between maternal compliance to child food requests and child BMI percentile. These results demonstrate that children have power in family food decisions, particularly in decisions around the types of foods purchased, prepared, or provided on a daily basis. Although, the lack of a significant association between maternal compliance and child BMI percentile may also be due to a lack of variance within child BMI percentiles. This sample consisted mostly of low-income, low education level mothers and both of these factors have been associated with child overweight/obesity (Rose & Bodor, 2006). This study did not have any children classified as underweight and almost half were identified as overweight or obese. Another possible reason for the lack of a significant association between maternal compliance and child BMI percentiles is the fact that the mothers may have already been buying low nutrient dense foods without influence of the child, which is suggested by the high percentage of overweight and obese mothers in this sample.

Statistically significant differences between Hispanic and non-Hispanic participants were not found between maternal compliance rates by food groups or setting, or the relationship between child food requests, maternal compliance, and child BMI percentile. It is worth noting however, there were some differences. The positive relationship between child food requests and maternal compliance was found to be statistically significant for the Hispanic mothers, but not for the non-Hispanic mothers. This slight difference could be due to some of the unique characteristics and experiences of Hispanic immigrant families, such as strong sense of family, acculturation and language brokering. Additionally, Hispanic mothers reported higher rates of compliance to food requests in the Grains group compared to non-Hispanic mothers, but reported much lower rates of compliance for food requests in the Dairy group than non-Hispanic mothers. These differences by food groups may be due to cultural variations and food preferences. Hispanic mothers frequently reported their family members consuming sweet breads, tortillas and ready-to-eat cereal. This is consistent with Sharma et al.'s (2012) finding that 3 foods on the list of top five major food sources of 'energy' for Latinos living in the United States were grain based (rice, bread, and pasta). Hispanic mothers also reported higher compliance rates for food requests from outside and inside the home compared to non-Hispanic mothers, but compliance rates at the grocery store were fairly similar between groups.

Although the study sheds light on child food influence in family dietary behaviors, it is not without limitations. First, a convenience sample was utilized, which

could yield selection bias. Secondly, this study was not adequately powered to detect small differences between groups. It is possible that there are differences between Hispanic and non-Hispanic participants that would be evident with a larger sample size. Thirdly, data were dependent on mothers' recall and report, sometimes from up to 4 days prior, which may not always be accurate. Also, the great majority of the Hispanic participants were first generation. These results may differ from Hispanic participants who were born in the United States. Additionally, it was not specifically asked whether the foods requested by the child were consumed solely by that child or the entire family. However, mothers usually noted if one or more family members were eating something different than the rest of the family at meal times. Lastly, interviews with mothers were not always private from the children, which could have caused some bias, particularly for questions about parenting style and stress. Many of the homes where interviews were conducted did not offer another area for the child to go. Interviewers tried to remedy this by having mothers answer with numerical responses instead of actual responses on the PSDQ and Parental Stress Scale. It was, however, sometimes helpful having the child nearby when asking the mother to recall meals and snacks from previous days.

Conclusions and Implications

This study aimed to demonstrate that children have a substantial impact on the foods consumed by the entire family by requesting certain food items to be purchased, provided, or prepared by their mothers in a low-income population. Unfortunately, children are most often requesting highly processed, high fat, and/or high sugar foods that

may have little nutritional value and mothers, on average, are complying with these food requests at least half the time. However, maternal compliance does not seem to be associated with child BMI percentile in this sample, but could warrant further research using a sample with greater income and education level variety.

Having a strong influence on foods purchased, provided, or prepared may allow children to function as agents of change for family dietary behaviors, especially in Hispanic families. This approach draws on the strong sense of family interdependence and strong motivation to support the family often seen in Hispanic households (Love & Buriel, 2007). Although, not significant, there were subtle differences that emerged between Hispanic and non-Hispanic participants which deserve further evaluation. These results show that these children have power over food decisions. The results from this study will be used to develop an intervention program focused on promoting healthy dietary behaviors in Hispanic families in an attempt to reduce the disparity in obesity and chronic disease prevalence rates.

CHAPTER V
UTILIZATION OF GROCERY STORE OBSERVATIONS AS A METHOD
TO ASSESS MOTHER-CHILD FOOD SHOPPING BEHAVIORS

Introduction

There is much research examining family eating behaviors, however, in the nutrition field, a large amount of that research utilizes family member report. It has been reported that self-report of energy consumption is often underreported (Neuhouser et al., 2008). It may be beneficial to examine measures of actual behavior, such as observation. The field of marketing has long utilized grocery store observations as a way of examining consumer behaviors and recognized the power of child influence on parent purchasing decision. Children have been shown to have persuasive power in familial consumer decisions, primarily through child requests for items to be purchased (Borzekowski & Poussaint, 1998; Jeffrey, McLellarn, & Fox, 1982). Compared to fathers, mothers are more often the recipients of influence attempts and the purchasing agents in families (Cowan & Avants, 1988; Cowan et al., 1984; Flurry & Burns, 2002). Due to the reciprocal nature of influence, it is important to address both parties involved: children and mothers.

Grocery store observation has been used to examine food purchasing decisions. O'Dougherty, Story, and Stang (2006) utilized grocery store observations to collect information on food purchases by families with children 8 years old or younger. They found that children initiated food requests in approximately 50% of the parent-child interactions observed, and parents collectively complied with their child's food requests almost half of the time. Another study utilizing grocery store observation methodology examined the relationship of affective states on the role that children play with influencing their parents on store purchases (Nadeau & Badley, 2012). It was found that children's affective state had an effect on the influence strategy used by the child, which then had an effect on the food purchasing decision by the parent. For example, children who were observed to have a more pleasant affective state were more likely to use a positive interaction strategy (i.e. asks nicely) to persuade their parent to purchase a particular food item, which tended to be more effective than negative interaction strategies (i.e. cries or pouts). Limitations to these study methodologies, however, are that subjects were not followed throughout the entire grocery store, and subjects were unaware of their participation and were never contacted by the researchers. While this approach allows for less participant bias, it lacks attainment of accurate demographic information about the participants or information about their entire grocery shopping experience.

In order to account for some of these types of limitations, a retail focused study utilized grocery store observations with the addition of subsequent brief interviews. They

found that the observation data related to children's influence was broader than the information gained from the parent-report interview alone (Ebster, Wagner & Neumueller, 2009). Additionally, they found that some of the dyads observed, which were thought to be a parent with their child turned out to actually be a child with some other adult. The use of the subsequent interview allowed for the researchers to separate these dyads from the true parent-child dyads.

The objective of this study was to examine the utilization of grocery store observations, for assessing types of child food requests based on food groups and the frequency of maternal compliance to these requests in a low-income, ethnically diverse population. The grocery store observation technique utilized in the current study differs from previous studies in that 1) the participants were aware of their participation, but masked to the specific purpose of the study, 2) participants were recruited prior to the observation to ensure eligibility criteria, and 3) participants were observed from entering the store until leaving the store.

Methods

Screening and Recruitment. All study protocols were approved by the UNCG IRB and all research assistants were trained using the same protocols. Potential participants were recruited through various clinics and agencies serving primarily low-income, and immigrant and minority families in Guilford County, North Carolina. A variety of recruitment techniques were utilized based on the agency's preference, such as talking to patients in the waiting rooms of clinics, speaking to potential participants at

classes offered by the agency, posting and handing out recruitment fliers (made available in both English and Spanish), and contacting potential participants over the telephone.

Participant screening was done during the recruitment process. In order to be eligible for the study, participants had to be a mother or other primary female caregiver of at least one 7-12 year old child and be fluent in English or Spanish. The 7-12 year old child also participated in the study. In households where there was more than one 7-12 year old child, the researcher chose which child participated in the study based on convenience. This particular age group was used because this was a component of a larger study examining child food requests of 7-12 year olds. If participants met the eligibility requirements, they were invited to participate in the study. If interested, an appointment to conduct the grocery store observation was made at a time and location that was reflective of the participants' normal grocery shopping habits.

Data collection. Mother-child dyads met a research assistant at a store of the participant's choosing at an agreed upon time. If the mother had additional children, they were also allowed to come on the shopping trip, but only information from the target child was recorded. A community interpreter was used if the participants spoke Spanish. Before food shopping began, informed consent, parental consent, and child assent forms were signed, which were available in English or Spanish. To avoid potential behavior change participants were provided a broader purpose of the study on informed consent forms, which was to examine family dietary behaviors rather than to examine maternal compliance to child food requests.

Once the forms were signed, participants were instructed to go about their shopping and act as if the research assistant was not there. The research assistant played the role of a non-participatory observer and was instructed to stay close enough to the participants in order to hear conversation, but far enough away so as not to disrupt their shopping. Research assistants recorded each time a child verbally asked for a food or beverage item to be purchased or put a food item into the cart without being prompted by their mother, being as specific as possible including brand name. Requests for non-food or non-beverage items were not recorded. Also recorded was ethnicity (Hispanic or non-Hispanic). Research assistants followed participants for the duration of the grocery shopping trip through the end of the check-out process and indicated whether each food item the child had requested was indeed purchased or not purchased. After completing check-out, participants were provided their incentives, which consisted of a 21-piece kitchen utensil kit and child activity booklet. The protocol for conducting the grocery store observations is available in Appendix A.

Data analysis. Child food requests were categorized into food groups based on the Nutrient Data System for Research (NDSR) software version 2011 developed by the Nutrition Coordinating Center, University of Minneapolis, MN, with the exception of the addition of a combination food group. Descriptive analyses (i.e. frequencies, percentages) were conducted to describe the types of food requests made by children and maternal compliance to those food requests, by food group.

Results

A total of 16 grocery store observations were conducted from May 2012 to July 2013. Approximately half of the observations consisted of mother, target child and at least one other child. Six (37.5 %) participants identified as Hispanic and 10 (62.5 %) identified as non-Hispanic. On average per grocery store trip, children requested their mothers to purchase approximately 8 food items (range: 3-19 food requests) and overall mothers complied with approximately 53% of child food requests (range per observation: 0-100% compliance). The number of child food requests and average rate of maternal compliance by food group is depicted in Table 5. The majority of requested food items consisted of highly processed, high sugar and/or high fat foods, such as sugary cereals, cookies, pastries, potato/corn chips, ice cream, candy/gummies, soda/juice drinks, *Lunchables*, pizza, and cups of noodles.

Participants' grocery carts commonly contained a high percentage of convenience-type foods and/or foods that children could easily make on their own, such as frozen microwavable meals or pizzas, *Hamburger Helper*[®], cups of noodles, hot dogs, cereal and bread. Many food items represented store brands. Food labels were seldom read by either mother or child, but price comparison of food items was commonly done. A number of mothers gave their child(ren) tasks while shopping or would ask them to choose between certain food items (those were not counted as a child request, as they were not initiated by the child).

Wal-Mart was the most frequently visited store, with other stores consisted of Food Lion and Save-a-Lot. Many mothers shopped for their meats (both fresh and frozen) before going through the rest of the store. The majority of mothers utilized SNAP benefits to pay for at least part of their groceries. Most grocery store observations lasted between 30-90 minutes and the majority of participants had previously taken part in the at-home interview, which was described earlier. Comparison between the results obtained from the grocery store observations and the maternal interviews, as well a comparison table between Hispanic and non-Hispanic maternal compliance rates by food group is available in Appendix B.

Table 6. Number of Child Food Requests and Average Maternal Compliance to Those Requests at the Grocery Store by Food Group

	Fruits	Vegetables	Grains	Dairy	Meats	Fats	Sweets	Beverages	Misc.	Combination
Child Food Requests (n)	15	2	33	18	9	10	20	10	0	20
Average Maternal Compliance (%)	93.7	50.0	69.8	57.5	28.6	50.0	51.8	58.3	–	34.7

Mothers, for the most part, seemed undisturbed throughout the grocery observation process and went about their shopping ignoring the research assistant. Children also generally seemed unbothered by the research assistant, but sometimes attempted to engage the researcher in conversation. Although, mothers did not seem preoccupied with the researcher’s presence, some other shoppers in the store would occasionally stare or look confused about what was going on.

Discussion

This study aimed to examine the utilization of grocery store observations to assess child food requests and maternal compliance to those requests by food group in a low-income, ethnically diverse population. Even with a researcher following the participants throughout the grocery store trip, children did not seem shy about asking for foods and did not seem to be asking for foods based on gaining the attention of the researcher. Additionally, mothers also seemed to conduct normal shopping habits even though they knew they were being watched. This study found the average maternal compliance rate to their child's food requests at the grocery store to be 53%. This is consistent with O'Dougherty, Story, and Stang (2006) who also reported observing an approximate 50% parental compliance to child food requests at the grocery store.

Beyond child food requests and maternal compliance, other aspects of food shopping behavior were identified that were not discussed in the interview, such as mother providing the child with tasks during grocery shopping, lack of nutrition food label reading, cost comparing of food items, and shopping for meat products at the beginning of the shopping trip. Ebster, Wagner, and Neumueller (2009) also found that grocery store observations yielded more comprehensive results than the parent-report interview with the same participants. These behaviors could serve as possible future teaching points for this population.

Another benefit to this observation technique is that researchers were able to hear reasons that the mother gave as to why a particular food item requested would not be

purchased, if the mother provided that information to the child. The price of the food item, having the particular food item already at home, or the novelty of the food item to the child tended to be included in the rationales mothers used for not purchasing the requested food items. Similar parental refusal responses have also been documented by O'Dougherty, Story, and Stang (2006), in which parents, when explanation was provided, tended to tell children that a particular food item was not needed or the child would not want it.

Another unique aspect of this grocery store observation technique is that participants were recruited prior to the observation. By recruiting participants prior to meeting at the grocery store, researchers were able to be sure that participants fit into the eligibility requirements and could then focus on certain groups of the population. Previous grocery store observations, in which participants were not aware of being observed or were approached after being observed, demographic information was estimated (Nadeau & Badley, 2012; O'Dougherty, Story & Stang, 2006; Pettersson, Olsson, & Fjellström, 2004). In addition to being able to gain demographic information beforehand, researchers could also gain further insights into the grocery shopping habits of certain groups, such as the grocery store where they choose to shop, the method of transportation getting participants to and from the grocery store, the time of day they choose to go grocery shopping, and the time of the month they choose go shopping.

Additionally, this technique allowed researchers to follow participants all the way through the check-out, and examine which foods were actually purchased (Ebster, Wagner, & Neumueller, 2009). It was not uncommon for the mother to decide against certain food items during the check-out process and not actually purchase these items although they were previously in the cart. Sometimes this was due to the child putting items into the cart without the mother's knowledge and sometimes it was due to limited money or SNAP benefits for the entire cart of groceries.

The limited number of store trips made by the participants on a monthly basis and the somewhat limited food budget also seemed to be beneficial to the observations. The participants did not frequent the grocery store often, which meant they needed to get the foods that their family was going to need for the month and they were not able to change their food purchases drastically based on social desirability. It may not be worth the risk buying new or more expensive foods because if those foods did not last until the next grocery store trip or budget allotment, their family may go hungry.

This study is not without limitations and challenges. One limitation of the study is the small sample size. It is also important to note that this sample consisted of low-income participants and may not be generalizable to other income levels. Scheduling of the observations was the biggest challenge. Many potential participants in this low-income population did not have their own vehicle and thus, relied on public transportation or other individuals for transportation to and from the store. This made it

difficult to schedule an exact time to meet at the store and the timing often changed if the transportation was running early or late. Additionally, most participants had only 1-2 days per month available to go to food shopping, which was usually on or around the day their SNAP benefits arrived. If a research assistant was not available on that day, the observation had to wait until the next month. Rescheduling was also difficult, as participants' phone numbers often changed or participants would lose interest in the study.

In addition to the limitations stated earlier, grocery store observation methodology has other limitations as well. First, nonverbal communication may be an important component in child influence, but is difficult to report using observation techniques. Second, the nature of a grocery shopping trip can be very dynamic (Ebster, Wagner & Neumueller, 2009). Other influences, such as previous shopping trips, the timing of the food requests, the behavior of the child earlier in the day, and other factors may change the influence and compliance relationship between mother and child.

Conclusions and Implications

Children requested an average of 8 food items per shopping trip, with mothers complying with those requests approximately 53% of the time. The foods requested by children tended to consist of highly processed and/or low nutrient dense foods. Based on the findings from this observational study, it seems as if children exert substantial influence on foods purchased at the grocery store. It may be possible to utilize this child

influence in future nutrition interventions focused on promoting the health of the entire family.

Grocery store observations, in which subjects are aware of their participation, but are blinded to the true objective of the study, can serve as an effective method for assessing mother-child food purchasing interactions in a low-income ethnically diverse population. In addition to the specific food purchasing behaviors recorded, this grocery store observation technique allowed for a wide range of other grocery shopping behaviors and mother-child interactions to be documented. This suggests that this methodology could be used to examine additional consumer behavior focused research questions.

CHAPTER VI

EPILOGUE

From this project, which has included a variety of data collection techniques and sources, it has been shown that children have a good deal of influence on foods purchased, prepared, or provided by the mother. The degree to which this influence affects the dietary behaviors of the entire family warrants further research. It would seem that utilizing child as agents of dietary change for families could be an effective area of focus for future family-based nutrition interventions, particularly in Hispanic families, where mothers may be more compliant with their children's food requests than non-Hispanic mothers. Although significant differences between Hispanics and non-Hispanics were not found, there were interesting discrepancies in which further examination may be necessary.

The results of this project demonstrate that children possess social power in family food decisions. The next step in continuing to examine this concept would be to conduct focus groups with the Hispanic population I intend to work with, as the participants in this sample may be unique in terms of acculturation level, generations living in the US, income, and education levels compared to the Hispanic population in other parts of the country. Then, a tailored nutrition intervention utilizing the social power of children can be developed.

The idea of utilizing children as agents of change for family dietary and physical activity behaviors was first introduced to me by Dr. Kenneth Gruber and Dr. Lauren Haldeman. Their formation of this concept led to the child influence study described in Chapter III, in which they developed the survey tool utilized and secured funding for the project. I was brought into the study at the point of data collection and analysis.

Throughout this project I have gained valuable insights into the dietary behaviors and lifestyles of Hispanic immigrants. It became very obvious to me the importance of an effective community interpreter/interviewer. The research team included a number of bilingual members able to conduct Spanish speaking interviews, but those who were not as connected with the target Hispanic population were not as successful in recruiting participants. Additionally, the participants were comfortable enough with the community interviewer to provide honest answers and also recommend others to participate. The community interviewer also spent time to explain things about the culture and food habits, which was helpful.

Even with a great community interviewer on the team, there were a number of difficulties encountered during this project. While at the time these setbacks were upsetting and frustrating, looking back now at the situations that arose I can appreciate those challenges as learning opportunities. No matter how well planned, obstacles and challenges are bound to arise while conducting research. I now feel better able to plan for and manage issues that may arise in with future projects.

Developing and maintaining an effective working relationship with our community partners was not always easy and even extremely frustrating at times. There were major organizational changes made within one community partner in particular, which caused the entire project to be delayed by approximately 6 months. To try to remedy this, additional community partners were added. However, working with multiple organizations meant having to comply with multiple sets of rules and guidelines, which sometimes made the process more cumbersome. Sometimes it did not seem as if a partnership had been developed with the various community agencies, as much as a one-way association in which I continued to accommodate the wishes of the organization while getting very little in exchange. However, this has taught me to be more effective in my communication and realistic with expectations.

Working with this population also brought certain challenges. Very often potential participants would show interest in participating and provide their contact information, but later they would be unreachable over the telephone, forget about an appointment made with us, or not answer the door when we arrived to the interview. Contacting participants over the telephone was not always fruitful due to frequent number changes, or running out of minutes. Of all the contact information received from individuals who showed interest in completing the interview or observation, only about one third of those contacts ended with an actual interview or observation.

Although it was eye opening to see the homes of the participants, if I were to do this project over again, I would try to work out a different setting for the interview. There

was a lot of time wasted driving to the participants' homes only for them to not answer the door or not be home, despite having been given a confirmation phone call beforehand. It would put fewer burdens on the participants if they were able to be interviewed while they were already waiting somewhere, such as the WIC office. Clients often waited for 2 hours in the waiting room and that may be a great time to interview them if a private space was able to be utilized.

Another change I would make in the future is the recruitment techniques used. The recruitment flyers were not helpful; only 2 individuals called the number on the flyer and 1 person e-mailed. Also, recruitment in the waiting rooms of the clinics did not seem to be the most effective technique. Many hours were spent in the clinics by members of the research team and it was not uncommon to return from the clinic without any potential contacts.

This project was very labor intensive and took a great deal of man power, which provoked added challenges, but taught me a lot about how to manage students. Although, it was great to have the extra help, it was often difficult managing everyone's schedules, making sure that everyone had been trained by myself, IRB, and the community organizations, and that everyone was conducting interviews and observations the same way. Additionally, all research assistants had varying, and sometimes very limited, hours of availability and various commitment levels to the project. It was frustrating when an interview or observation had to be rescheduled or cancelled because not enough researchers could attend. Students who were getting paid to work on the project or were

taking research credit hours to work on the project tended to be more invested in doing the work.

Most of the difficulties encountered in this project are part of the nature of community-based research and although difficult at times, it is still the area of research I see myself continuing to conduct. The part I enjoyed the most was working with the Hispanic population. It was fascinating to see how their culture and beliefs actually influenced their day-to-day lives and how interested the mothers were in learning about healthy eating. In the future, I would like to continue to work with this population to help improve their overall health. I think that this population would benefit greatly from a comprehensive intervention that was tailored to their particular cultural beliefs and lifestyle habits. Based on the fact that many mothers stated they bought the same food items every time they went food shopping, a grocery store tour is something I would like to incorporate into that intervention.

I am also very interested in continuing to explore consumer behavior and food expenditure. There were a few questions included in the interview that asked why mothers prepared certain foods for various meals or snacks and why they purchased the foods they did at the grocery store. Because that was not the main purpose of this study, those questions were not probed for more detail, but I think it would be interesting to examine further the reasons that mothers provide for choosing the foods they do. I feel if we can learn why mothers (or anyone else for that matter) choose certain food, we can suggest better options in order to improve overall health.

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APPENDIX A
PROTOCOLS AND INTERVIEW QUESTIONS

Screening Protocol

Eligibility criteria includes mother or primary female caregiver of at least one 7-12 year old child, and speaking/understanding English. Potential participants will be screened during recruitment to make sure they fit the inclusion criteria. If participants are willing record participant's name and phone number, and possibly schedule an interview at that time.

Screening Script

My name is and I am a student at the University of North Carolina at Greensboro. I am conducting a research study assessing family eating behaviors. I am asking for your participation because you have a child that is a patient at Guilford Child Health. You will be asked to answer questions about your family's eating habits which will take approximately 60 minutes. As a part of the study we will come to your home and ask you and your 7-12 year old child questions about your eating. Also, we will ask you if we can follow you to a grocery store to observe your shopping habits. You will receive a gift card for your participation in this study. If you have any questions please feel free to contact the Principal Investigator, Dr. Lauren Haldeman at 336-256-0311 or lahaldem@uncg.edu.

1. Would you be interested in participating in a study through UNCG that is examining family dietary behaviors?

If no, thank the participant for their time and end conversation.

If yes, "I am going to ask you a few questions to see if you are eligible to participate."

2. Are you a mother or primary caregiver of a 7-12 year old child?

If no, "Thank you for your time, but we are only looking at families with at least one 7-12 year old child at this time."

If yes, provide individual with flyer and instruct to contact the phone number on flyer, or record individual's name and phone number and possibly schedule interview at that time.

Interview Protocol

Look for scheduled interview date and time in the study calendar in black filing cabinet. Bring 2 copies of the informed consent forms, 2 copies of the assent forms, copy of the interview script, something to write with, digital recorder, portable stadiometer, scale, activity booklet, gift card, and UNCG ID. On the interview script write the participants' (mother and child) first names and address. If there is more than one 7-12 year old child, randomly choose one to participate. Researchers are not to go to a participant's home by themselves- 2 researchers need to go to each interview.

Discuss and sign informed consent and assent forms prior to beginning the interview.Only interview children of Hispanic ethnicity as identified in screening. If possible, one researcher will interview mother while the other researcher interviews the child (in a separate open area). If not possible, mother will be interviewed first and then child, separately. After completion of the interview, thank the participants for their time and provide mother with gift card and child with activity booklet.

Interview Script (for mother)

I am going to be asking you a few questions about your dietary behaviors and family interactions.

A. First, I am going to ask you a couple general questions about your household.

1. How many parents or caregivers are present in the household?

___1 ___2 ___>2

2. What is your monthly household income?

___ \$0-500 ___\$501-1000 ___\$1001-1500 ___\$1501-2000 ___\$2001-2500
___≥\$2501

3. Do you or your child(ren) participate in: (may provide definition listed below if needed)

SNAP WIC School breakfast program School lunch program

SNAP: formerly food stamps; money on EBT card to use on food each month

WIC: supplemental food program for women, infants and children

School breakfast program: child(ren) receive free or reduced price breakfast at school

School lunch program: child(ren) receive free or reduced price lunch at school

4. What was the highest level of education you achieved?

Less than high school

High school diploma

Some college

Technical or vocational school graduate

College graduate

Post graduate

5. What is your 7-12 year old child's name? (if more than one, record all)

6. Which of these best describes you and your 7-12 year old child?

Caucasian/White African American/Black Hispanic/Latino Asian
 Other

7. 6- Item Household Food Security Scale

Interviewer INSTRUCTIONS: Select the appropriate fill from parenthetical choices depending on the number of persons and number of adults in the household.

I'm going to read you several statements that people have made about their food situation. For these statements, please tell me whether the statement was often true, sometimes true, or never true for (you/your household) in the last 12 months—that is, since last (name of current month).

HH3. The first statement is, “The food that (I/we) bought just didn’t last, and (I/we) didn’t have money to get more.” Was that often, sometimes, or never true for (you/your household) in the last 12 months?

- Often true
- Sometimes true
- Never true
- DK or Refused

HH4. “(I/we) couldn’t afford to eat balanced meals.” Was that often, sometimes, or never true for (you/your household) in the last 12 months?

- Often true
- Sometimes true
- Never true
- DK or Refused

AD1. In the last 12 months, since last (name of current month), did (you/you or other adults in your household) ever cut the size of your meals or skip meals because there wasn't enough money for food?

- Yes
- No (Skip AD1a)
- DK (Skip AD1a)

AD1a. [IF YES ABOVE, ASK] How often did this happen—almost every month, some months but not every month, or in only 1 or 2 months?

- Almost every month
- Some months but not every month
- Only 1 or 2 months
- DK

AD2. In the last 12 months, did you ever eat less than you felt you should because there wasn't enough money for food?

- Yes
- No
- DK

AD3. In the last 12 months, were you ever hungry but didn't eat because there wasn't enough money for food?

- Yes
- No
- DK

**If participants answer affirmatively to at least 2 questions indicates food insecurity. Indicate number of affirmative responses here: _____

B. Next, I am going to ask you about foods eaten outside of your home.

1. Thinking about the last weekday (provide day and date), how many meals and/or snacks were purchased or eaten outside of the home?

If none, continue to 1a, then skip to question 5.

If yes, ask questions 1a- 4d, then skip to question 7.

1a. How typical was this day in terms of meals and snacks?

____ Not at all typical ____ A little bit typical ____ Somewhat typical
____ Pretty typical ____ Very typical

**If this day was not at all or a little bit typical, ask participant about the weekday before. Go back as far as needed to get a typical weekday because we want information on a typical day.

2. From where were the meals and/or snacks ordered or eaten?

3. Did (insert name of reference child) ask to go to (name of food establishment visited)?

4a. How did you decide on what foods to order for those meals and/or snacks outside of the home?

4b. Did (insert name of reference child) ask for any foods or beverages to be ordered?

If no, skip to section C.

If yes, continue to 4c.

4c. Which foods did (insert name of reference child) ask for? (use table below)

4d. Which of these foods were order?

Food Item Requested	Food Item Ordered	
	Yes	No
<i>Example: soda</i>		X

5. Did (insert name of reference child) ask to go outside the home for any meals or snacks that day?

If no, skip to question 7.

6. Where did (insert name of reference child) ask to go eat?

7. Thinking about the last weekend day (provide day and date), how many meals or snacks were purchased or eaten outside of the home?

If no, continue to 7a, then skip to question 11.

If yes, ask questions 7a- 10d, then skip to section C.

7a. How typical was this day in terms of meals and snacks?

___ Not at all typical ___ A little bit typical ___ Somewhat typical
___ Pretty typical ___ Very typical

**If this day was not at all or a little bit typical, ask participant about the weekday before. Go back as far as needed to get a typical weekday because we want information on a typical day.

8. From where were the foods ordered or eaten by the family members?

9. Did (insert name of reference child) ask to go to (name of food establishment visited)?

10a. How did you decide on purchasing those meals and/or snacks outside of the home?

10b. Did (insert name of reference child) ask for any foods or beverages to be ordered?

If no, skip to section C.

If yes, continue to 10c.

10c. Which foods did (insert name of reference child) ask for? (use table below)

10d. Which of these foods were order?

Food Item Requested	Food Item Ordered	
	Yes	No
<i>Example: soda</i>		X

11. Did (insert name of reference child) ask to go outside the home for any meals or snacks that day?

If no, skip to section C.

If yes, continue to question 12.

12. Where did (insert name of reference child) ask to go eat?

C. Now I am going to ask you about meals and snacks prepared at home.

1. Thinking about the last weekday (provide day and date), how many meals and/or snacks did you prepare in your home?

If none, continue to question 1a, then skip to question 7.

1a. How typical was this day in terms of meals and snacks?

Not at all typical
 A little bit typical
 Somewhat typical
 Pretty typical
 Very typical

**If this day was not at all or a little bit typical, ask participant about the weekday before. Go back as far as needed to get a typical weekday because we want information on a typical day.

2. Which snacks and meals did you prepare at home?

3. What did you prepare for (insert name of meal)?

***Ask this question for each meal prepared at home.

4. How did you decide on what to make for (insert name of meal)?

***Ask this question for each meal prepared at home.

5. Did (insert name of reference child) ask for certain foods to be prepared at (insert name of meal)?

If no, skip to question 7.

***Ask this question for each meal prepared at home.

6a. What foods did (insert name of reference child) ask you to prepare for (name of meal that child requested foods for)? (use table below)

6b. For each food item that the child requested, ask whether or not it was prepared (use table below).

***Ask this question for each meal prepared at home.

Food Item Requested	Food Item Prepared	
	Yes	No
<i>Example: soda</i>		X

7. Thinking about the last weekend day (provide day and date), how many meals and/or snacks did you prepare in your home?

If none, continue to question 7a, then skip to section D.

If any, continue to question 8-11.

7a. How typical was this day in terms of meals and snacks?

Not at all typical
 A little bit typical
 Somewhat typical
 Pretty typical
 Very typical

**If this day was not at all or a little bit typical, ask participant about the weekday before. Go back as far as needed to get a typical weekday because we want information on a typical day.

8. Which snacks/meals did you prepare at home?

9. What did you prepare for (insert name of meal)?

***Ask this question for each meal prepared at home.

10. How did you decide on what to make for (insert name of meal)?

***Ask this question for each meal prepared at home.

11. Did (insert name of reference child) ask for certain foods to be prepared at (insert name of meal)?

If no, skip to section D.

If yes, continue to question 12.

***Ask this question for each meal prepared at home.

12a. What foods did (insert name of reference child) ask you to prepare for (name of meal that child requested foods for)? (use table below)

12b. **For each food item that the child requested, ask whether or not it was prepared.

***Ask this question for each meal prepared at home.

Food Item Requested	Food Item Purchased	
	Yes	No
<i>Example: soda</i>		X

D. Now I am going to ask you about shopping for food at the store.

1. Where do you usually shop for food? (if more than 1, indicate primary store with a 1)

- _____ Grocery store (Food Lion, Lowe's Foods, Harris Teeter)
- _____ Specialty foods market (Earth Fare, Tienda Y Tortilleria Morris)
- _____ Convenient store or gas station
- _____ Retail store (Walmart, Target)
- _____ Membership warehouse (Sam's, Costco)

2. How often do you shop for food?

- _____ < Once a month
- _____ Once a month
- _____ Twice a month
- _____ Weekly
- _____ > Once a week

3. On which day or days of the week do you usually shop for food? (indicate all days reported)

- _____ Monday
- _____ Tuesday
- _____ Wednesday
- _____ Thursday
- _____ Friday
- _____ Saturday
- _____ Sunday
- _____ No particular day

4. What time of day do you usual shop for food?

- _____ Morning (3am- 12pm)
- _____ Afternoon (12pm-5pm)
- _____ Evening (5pm- 9pm)
- _____ Night (9pm-3am)

5. How often does (insert name of reference child) go with you to shop for food?

_____ Less than half of food shopping trips

_____ About half of food shopping trips

_____ More than half of food shopping trips

6. How often do you use a shopping list when shopping for food?

_____ Less than half of food shopping trips

_____ About half of food shopping trips

_____ More than half of food shopping trips

7. Thinking about the last time you went food shopping, was (insert name of reference child) with you?

If no, ask participant to think about the last time the child was with her while food shopping, ask question 7a. If never, skip to maternal questionnaire.

If yes, continue to question 7a.

7a. How typical was this shopping trip?

_____ Not at all typical _____ A little bit typical _____ Somewhat typical

_____ Pretty typical _____ Very typical

**If this day was not at all or a little bit typical, ask participant about the weekday before. Go back as far as needed to get a typical weekday because we want information on a typical day.

8. How did you decide which foods to purchase?

9. Did (insert name of reference child) ask you to purchase any foods?

If no, skip to maternal questionnaire

If yes, continue to question 10.

10. What food or beverage items did (insert name of reference child) ask for?

-Use table below

10a. For each food or beverage, ask if that item was purchased (use table below). Fill in as many rows as food items listed by the mother- the entire table does NOT need to be filled in.

Food Item Requested	Food Item Purchased	
	Yes	No
<i>Example: soda</i>		X

Mother Questionnaire

1. I am going to ask you a few questions about your culture while living in America. ****Hispanic mothers ONLY****

Short Acculturation Scale for Hispanics

Circle the generation that best applies to you. Please circle only one.

1st generation= You were born in Mexico or other country.

2nd generation= You were born in USA; either parent was born in Mexico or other country

3rd generation= You were born in USA, both parents born in USA and all grandparents born in Mexico or other country.

4th generation= You and your parents born in the USA and at least one grandparent born in Mexico or other country with remainder born in the USA.

5th generation= You and your parents born in the USA and all grandparents born in the USA.

1. In general, what language(s) do you read and speak?

(1) Only Spanish	(2) More Spanish than English	(3) Both Equally	(4) More English than Spanish	(5) Only English
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2. What was the language(s) you used as a child?

(1) Only Spanish	(2) More Spanish than English	(3) Both Equally	(4) More English than Spanish	(5) Only English
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3. What language(s) do you usually speak at home?

(1) Only Spanish	(2) More Spanish than English	(3) Both Equally	(4) More English than Spanish	(5) Only English
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4. In which language(s) do you usually think?

(1) Only Spanish	(2) More Spanish than English	(3) Both Equally	(4) More English than Spanish	(5) Only English
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5. What language(s) do you usually speak with your friends?

(1) Only Spanish	(2) More Spanish than English	(3) Both Equally	(4) More English than Spanish	(5) Only English
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6. In what language(s) are the TV programs you usually watch?

(1) Only Spanish	(2) More Spanish than English	(3) Both Equally	(4) More English than Spanish	(5) Only English
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7. In what language(s) are the radio programs you usually listen to?

(1) Only Spanish	(2) More Spanish than English	(3) Both Equally	(4) More English than Spanish	(5) Only English
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8. In general, what language(s) are the movies, TV, and radio programs you *prefer* to watch and listen to?

(1) Only Spanish	(2) More Spanish than English	(3) Both Equally	(4) More English than Spanish	(5) Only English
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9. Your close friends are:

(1) All Latinos/Hispanics	(2) More Latinos than Americans	(3) About Half and Half	(4) More Americans than Latinos	(5) All Americans
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10. You prefer to go to social gatherings/parties at which the people are:

(1) All Latinos/Hispanics	(2) More Latinos than Americans	(3) About Half and Half	(4) More Americans than Latinos	(5) All Americans
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11. The persons you visit or who visit you are:

(1) All Latinos/Hispanics	(2) More Latinos than Americans	(3) About Half and Half	(4) More Americans than Latinos	(5) All Americans
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12. If you could choose your children's friends, you would want them to be:

(1) All Latinos/Hispanics	(2) More Latinos than Americans	(3) About Half and Half	(4) More Americans than Latinos	(5) All Americans
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2. Now, I am going to ask you some questions about parenting.

Parenting Styles and Dimensions Questionnaire

The following statements relate to behaviors that parents may exhibit when interacting with their children. The questions are designed to measure how often you exhibit certain behaviors toward your child(ren).

I exhibit this behavior:

- 1 = Never
- 2 = Once in a while
- 3 = About half of the time
- 4 = Very often
- 5 = Always

- _____ 1. I encourage our child to talk about the child's troubles.
- _____ 2. I find it difficult to discipline my child.
- _____ 3. I give praise when my child is good.
- _____ 4. I spank when my child is disobedient.
- _____ 5. I punish by taking privileges away from my child with little or any explanations.
- _____ 6. I spoil my child.
- _____ 7. I give comfort and understanding when my child is upset.
- _____ 8. I yell or shout when my child misbehaves.

- _____ 9. I scold or criticize to make my child improve.
- _____ 10. I grab my child when being disobedient.
- _____ 11. I state punishments to my child and do not actually do them.
- _____ 12. I am responsive to my child's feelings or needs.
- _____ 13. I allow my child to give input into family rules.
- _____ 14. I give my child reasons why rules should be obeyed.
- _____ 15. I punish by putting my child somewhere alone with little if any explanations.
- _____ 16. I help my child to understand the impact of behavior by encouraging my child to talk about the consequences of own actions.
- _____ 17. I take my child's desires into account before asking the child to do something.
- _____ 18. I explode in anger toward my child.
- _____ 19. I threaten my child with punishment more often than actually giving it.
- _____ 20. I use physical punishment as a way of disciplining my child.
- _____ 21. I give in to my child when the child causes a commotion about something.
- _____ 22. I slap my child when the child misbehaves.
- _____ 23. I have warm and intimate times together with my child.
- _____ 24. I encourage my child to freely express him/herself even when disagreeing with parents.
- _____ 25. I scold and criticize when my child's behavior doesn't meet my expectations.
- _____ 26. I show respect for my child's opinions by encouraging my child to express them.
- _____ 27. I explain to my child how I feel about the child's good and bad behavior.
- _____ 28. I use threats as punishment with little or no justification.
- _____ 29. I take into account my child's preferences in making plans for the family.
- _____ 30. When my child asks why he or she has to conform, I state: because I said so, or I am your parent and I want you to.
- _____ 31. I explain the consequences of the child's behavior.
- _____ 32. I emphasize the reasons for rules.

3. Our last set of questions is related to your level of stress.

Parental Stress Scale

The following statements describe feelings and perceptions about the experience of being a parent. Think of each of the items in terms of how your relationship with your child or children typically is. Please indicate the degree to which you agree or disagree with the following items by placing the appropriate number in the space provided.

1 = Strongly disagree, 2 = Disagree, 3 = Undecided, 4 = Agree, 5 = Strongly agree

- ___ 1. I am happy in my role as a parent.
- ___ 2. There is little or nothing I wouldn't do for my child(ren) if it was necessary.
- ___ 3. Caring for my child(ren) sometimes takes more time and energy than I have to give.
- ___ 4. I sometimes worry whether I am doing enough for my child(ren).
- ___ 5. I feel close to my child(ren).
- ___ 6. I enjoy spending time with my child(ren).
- ___ 7. My child(ren) is an important source of affection for me.
- ___ 8. Having child(ren) gives me a more certain and optimistic view for the future.
- ___ 9. The major source of stress in my life is my child(ren).
- ___ 10. Having child(ren) leaves little time and flexibility in my life.
- ___ 11. Having child(ren) has been a financial burden.
- ___ 12. It is difficult to balance different responsibilities because of my child(ren).
- ___ 13. The behavior of my child(ren) is often embarrassing or stressful to me.
- ___ 14. If I had it to do over again, I might decide not to have child(ren).
- ___ 15. I feel overwhelmed by the responsibility of being a parent.

____ 16. Having child(ren) has meant having too few choices and too little control over my life.

____ 17. I am satisfied as a parent.

____ 18. I find my child(ren) enjoyable.

4. I am now going to measure your height and weight. ****Measure each twice- to nearest tenth****

Mother:

_____ Height (cm)_____

_____ Weight (kg)_____

Child:

_____ Height (cm)_____

_____ Weight (kg)_____

Would you be willing to allow a researcher to accompany your and (insert name of reference child) during a grocery shopping trip?

If so, please provide a telephone number and best time of day to be contacted.

Thank you for your participation.

Child Questionnaire

1. Short Acculturation Scale for Hispanics (Youth Version)

1. What language(s) do you read and speak?

(1) Only Spanish	(2) More Spanish than English	(3) Both Equally	(4) More English than Spanish	(5) Only English
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2. What language(s) do your parents speak to you in?

(1) Only Spanish	(2) More Spanish than English	(3) Both Equally	(4) More English than Spanish	(5) Only English
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3. What language(s) do you usually speak at home?

(1) Only Spanish	(2) More Spanish than English	(3) Both Equally	(4) More English than Spanish	(5) Only English
------------------	-------------------------------	------------------	-------------------------------	------------------

4. In what language(s) do you usually think?

(1) Only Spanish	(2) More Spanish than English	(3) Both Equally	(4) More English than Spanish	(5) Only English
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5. What language(s) do you usually speak with your friends?

(1) Only Spanish	(2) More Spanish than English	(3) Both Equally	(4) More English than Spanish	(5) Only English
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6. In what language(s) are the TV programs you usually watch?

(1) Only Spanish	(2) More Spanish than English	(3) Both Equally	(4) More English than Spanish	(5) Only English
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7. In what language(s) are the radio programs you usually listen to?

(1) Only Spanish	(2) More Spanish than English	(3) Both Equally	(4) More English than Spanish	(5) Only English
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8. In what language(s) are the movies, TV, and radio programs you *prefer* to watch or listen to?

(1) Only Spanish	(2) More Spanish than English	(3) Both Equally	(4) More English than Spanish	(5) Only English
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9. In what language(s) do your parents speak with their parents?

(1) Only Spanish	(2) More Spanish than English	(3) Both Equally	(4) More English than Spanish	(5) Only English
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10. Your close friends are:

(1) All Latinos/Hispanics	(2) More Latinos than Americans	(3) About Half and Half	(4) More Americans than Latinos	(5) All Americans
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11. You prefer going to parties at which the people are:

(1) All Latinos/Hispanics	(2) More Latinos than Americans	(3) About Half and Half	(4) More Americans than Latinos	(5) All Americans
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12. The persons you visit or who visit you are:

(1) All Latinos/Hispanics	(2) More Latinos than Americans	(3) About Half and Half	(4) More Americans than Latinos	(5) All Americans
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2. I am going to ask you about your experience with language brokering. If you have interpreted or translated between two people who would not otherwise be able to communicate, you have brokered. Here are a few examples of brokering: 1) translating a notice brought home from school for your parents who don't know English well, 2) interpreting what your friends or parents say to a clerk at the grocery store, bank, post office or government office, or 3) writing letters or notes for someone who is unable to or

uncomfortable with using English. We want to find out if you have ever been a language broker, and if so, when and under what circumstances. Please answer the questions below honestly and thoroughly.

Language Brokering Scale (Modified)

1) Year in school: _____ Date of Birth: _____ Sex: M F

2) Place of Birth:

3) If born outside of this country, age of arrival to the U.S.:

4) Number of brothers and their ages:

5) Number of sisters and their ages:

6) Language(s) your mother knows:

7) Have you ever brokered (circle one)? Yes No Not sure

8) At what age did you begin brokering?:

9) Are you still brokering? yes no

10) If no, how many years ago did you stop? _____
Why?

11) Who have you brokered for (check as many as applicable)?

___ parents ___ brothers/sisters ___ friends ___ other relatives

___ neighbors ___ teachers ___ school officials

other: _____

12) Where have you brokered (check as many as applicable)?

____ home ____ school ____ store ____ bank ____ post office

____ government offices other:

*****End of questionnaire*****

Thank you very much for your participation.

Observation Protocol

Mother will be contacted via the telephone or at interview to set up the observation location, date and time. All scheduled observations will be recorded on a calendar kept in the locked file cabinet in order to avoid over scheduling participants. Additionally, this information will be written on the top of an observation protocol sheet, in addition to the participant's first name. These sheets will be kept in the locked file cabinet in the research lab at UNCG. Prior to the observation, the observer will obtain this sheet from the lab and bring it with to the store to record observations. Also bring a cooking utensil kit, something to write with, and 2 copies of the consent and assent forms to the store with the observer.

1. Meet mother-child dyad at store of their choosing. The observer will meet the participants outside the entrance to the store (if more than one entrance, this will be decided on beforehand and recorded on the observation protocol sheet). The observer is not to provide transportation to the store.
2. Kindly greet participants. Discuss and sign consent and assent forms (script listed above). Remind participants to try to carry out a typical shopping trip and pretend that you are not there. Also, remind participants that you will be following them throughout the store, without talking to the participants, to observe their shopping behaviors and making notes regarding those behaviors.
3. Follow participants throughout the store- you should not be guiding the participants through the store; you should be behind them. Stay close enough to the participants so that you are able to hear interactions between mother and child, but not too close as to get in the way of the participants' shopping. Keep a neutral

disposition throughout the observation as not to influence participant purchasing. Your role is to be a non-participatory observer- do not provide verbal or nonverbal feedback to the behaviors witnessed until checkout is completed.

4. Record each time the child requests the purchase of a food or beverage item (use table below).

Example: *Let's get some of these. (child holds up bag of Lay's Barbeque Potato Chips)*

5. Record the food/beverage item being requested being as specific as possible (brand names if available). Use table below

6. Record whether or not the food/beverage item was purchased. Use table below.

7. Thank participant for their involvement. Provide cooking utensil kit to participant.

8. Leave store. The observer is not allowed to provide participants with transportation after the observation. Return completed observation protocol sheet to locked filing cabinet in research lab at UNCG.

APPENDIX B

TABLES

Table 7. Spearman's rho Correlations of Model Variables and Possible Control Variables

		Child Food Requests	Maternal Compliance	Number of Caregivers	Monthly Income	Household Food Insecurity	Parenting Style	Mother Education Level	Child BMI Percentile
Child Food Requests	Correlation Coefficient	1.00							
	Sig.								
	N	115							
Maternal Compliance	Correlation Coefficient	.171	1.00						
	Sig.	.075							
	N	110	110						
Number of Caregivers	Correlation Coefficient	.045	.077	1.00					
	Sig.	.634	.426						
	N	115	110	115					
Monthly Income	Correlation Coefficient	.003	-.140	.293**	1.00				
	Sig.	.978	.146	.001					
	N	115	110	115	115				
Household Food Insecurity	Correlation Coefficient	-.090	.026	-.104	-.220*	1.00			
	Sig.	.339	.787	.269	.018				
	N	115	110	115	115	115			
Parenting Style	Correlation Coefficient	-.127	-.120	.033	.093	-.083	1.00		
	Sig.	.183	.218	.734	.333	.385			
	N	111	107	111	111	111	111		
Mother Education Level	Correlation Coefficient	-.051	.030	-.208*	-.056	.084	-.097	1.00	
	Sig.	.589	.754	.025	.550	.371	.311		
	N	115	110	115	115	115	111	115	
Child BMI Percentile	Correlation Coefficient	-.032	.072	-.034	-.018	-.006	.123	-.177	1.00
	Sig.	.735	.452	.719	.847	.946	.198	.058	
	N	115	110	115	115	115	111	115	115

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 8. Pearson Correlations of Model Variables and Possible Control Variables

		Child Food Requests	Maternal Compliance	Parental Stress	Child BMI Percentile
Child Food Requests	Pearson Correlation	1.00			
	Sig.				
	N	115			
Maternal Compliance	Pearson Correlation	.219*	1.00		
	Sig.	.022			
	N	110	110		
Parental Stress	Pearson Correlation	.024	.063	1.00	
	Sig.	.797	.516		
	N	113	108	113	
Child BMI Percentile	Pearson Correlation	-.054	.059	-.152	1.00
	Sig.	.566	.541	.108	
	N	115	110	113	115

* Correlation is significant at the 0.05 level (2-tailed).

Table 9. Comparison of Observation and Interview Data: Number of Child Food Requests at the Grocery Store and Average Maternal Compliance to Those Requests by Food Group

		Fruits	Vegetables	Grains	Dairy	Meats	Fats	Sweets	Beverages	Misc.	Combination
Observation (n = 16)	Child Food Requests (n)	15	2	33	18	9	10	20	10	0	20
	Average Maternal Compliance (%)	93.7	50.0	69.8	57.5	28.6	50.0	51.8	58.3	-	34.7
Interview (n = 115)	Child Food Requests (n)	40	9	112	49	14	48	62	28	0	22
	Average Maternal Compliance (%)	91.4	100	76.2	84.1	100	76.7	50.0	73.1	-	66.7

Table 10. Comparison of Hispanic and Non-Hispanic Maternal Compliance Rates to Child Food Requests by Food Group

		Fruits	Vegetables	Grains	Dairy	Meats	Fats	Sweets	Beverages	Misc.	Combination
Hispanic (n = 6)	Average Maternal Compliance (%)	87.7	-	89.2	91.5	0	87.5	80.0	100	-	37.5
Non- Hispanic (n = 10)	Average Maternal Compliance (%)	100	50.0	46.7	38.1	40.0	20.0	28.3	16.5	-	33.3