

## ABSTRACT

Title of Thesis: FEDERAL NUTRITION ASSISTANCE AT FARMERS' MARKETS: EVALUATING SELF-EFFICACY AND THE HOME NUTRITION ENVIRONMENT

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SNAP and WIC help alleviate food insecurity among low-income families; however, some still struggle with fruit and vegetable accessibility. Farmers' markets present the opportunity to purchase fresher foods than other food retailers; therefore, we chose this environment to conduct our research. A survey of 70 WIC/SNAP shoppers at three D.C. metropolitan area farmers' markets assessed the correlation between parental self-efficacy and the home nutrition environment (composed of family health behavior, perceived barriers, and fruit and vegetable offerings in the home) and found a significant relationship. Interviews were used to evaluate market accessibility, SNAP/WIC benefit redemption, and the feasibility of accepting these benefits. Both market participants and coordinators mentioned the greater variety and superior quality of farmers' market produce but also suggested several improvements. Findings suggest that SNAP incentive programs may increase fruit and vegetable purchases. Programs targeting consumer self-efficacy may also produce positive outcomes.

FEDERAL NUTRITION ASSISTANCE AT FARMERS' MARKETS: EVALUATING  
SELF-EFFICACY AND THE HOME NUTRITION ENVIRONMENT

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## LIST OF ABBREVIATIONS

CVV: Cash Value Voucher  
EBT: Electronic Benefit Transfer  
FMNP: Farmers' Market Nutrition Program  
FNS: Food and Nutrition Service  
HIP: Healthy Incentive Pilot  
SNAP: Supplemental Nutrition Assistance Program  
TFVs: Targeted Fruit and Vegetables  
TPB: Theory of Planned Behavior  
WIC: Special Supplemental Nutrition Program for Women, Infants and Children

## CHAPTER 1: INTRODUCTION

Today, over 44 million people, including 12 million children, live in food insecure households in the United States [United States Department of Agriculture (USDA), 2012b]. As defined by the USDA, food insecurity is “limited or uncertain availability of healthy and safe food or hav[ing] uncertain ability to acquire food in normal ways” (Martinez et al., 2010). Households with one or more children under age six are twice as likely to suffer from food insecurity as those without, and children are present in 80% of households participating in public food nutrition assistance programs (Yu, Lombe, & Nebbitt, 2010). Informing the heads of the households about how to access healthy foods in their communities and widening the options for where nutrition assistance money can be spent may help combat this problem. If parents or guardians know about other places or ways to use their benefits, it could help to alleviate food insecurity and to provide healthy food for the children in these homes.

Additionally, many food insecure households are located in food deserts, which are areas of limited access to or availability of healthful foods (Martinez et al., 2010). According to a literature review of 31 food desert studies, food deserts are usually characterized by “residential segregation, poverty and neighborhood deprivation” (Walker, Keane, & Burke, 2010, p. 1). Again, increased options for food purchasing would help to alleviate this problem. Oftentimes, these areas of limited healthy food availability have higher rates of nutrition-related disease and health problems (Walker et al., 2010). While these situations negatively impact the entire family, they can be especially devastating to children in very low food security households whose food availability and nutrition primarily relies on what their parents are able to provide

(Coleman-Jensen, Nord, Andrews, & Carlson, 2012). If households have both the funds to buy healthy foods and places where healthy foods are easily available, some of these negative outcomes can be avoided.

The federal government has instituted two major programs designed to relieve the burden of food insecurity. The Supplemental Nutrition Assistance Program (SNAP), formerly known as the Food Stamp Program, is the largest of these federal nutrition programs. It served on average 44.7 million people in a month in the 2011 fiscal year (USDA, 2012b). Households with a monthly income that is at or below the federal poverty level are eligible to participate and may redeem their SNAP benefits in most grocery stores. SNAP allows qualified individuals to purchase almost any food item at participating retailers (Wasserman et al., 2010). The Special Supplemental Nutrition Program for Women, Infants and Children (WIC) is a similar program designed for pregnant and post-partum women with infants or children under the age of five. WIC participants have more restrictions and limitations than SNAP recipients regarding what foods they may purchase with their benefits. While SNAP participants may use their benefits to purchase any food products intended for at-home consumption, WIC participants must purchase from a group of specific foods that have been pre-selected for their nutritional value to mothers and young children (USDA, 2010a).

A major concern regarding SNAP is that recipients will buy less expensive and less healthful foods in order to get the most out of their money. Often, despite their best efforts and intentions, parents buy less healthful alternatives such as calorie dense but less nutritious items; in one study of low-income mothers, vegetables made up the smallest portion of the household food budget (Wiig & Smith, 2009). This is in part because,

unlike WIC, SNAP does not specify food restrictions for its participants. More importantly, it is the consequence of a lack of variety and quality in healthful foods at stores and outlets that accept SNAP benefits. Often, participating corner stores, convenience marts, and local grocery stores in low-income neighborhoods do not carry fruits and vegetables (Morland, Wing, Diez Roux, & Poole, 2002). Supermarkets that normally carry fresh produce are typically absent or otherwise difficult to access because of transportation or other reasons, in low-income areas (Guy & David 2004). SNAP recipients living in these neighborhoods – often living in food deserts – are therefore at a loss.

One way to address the difficulty in procuring fresh fruits and vegetables is to allow SNAP redemption at farmers' markets. In addition to being a source of fresh produce, the markets benefit both local farmers and shoppers and foster community interaction. Though SNAP benefits are not accepted at many farmers' markets, redemption has become more common in recent years. WIC, on the other hand, has had a successful presence in farmers' markets for several years. In 1992, WIC started providing participants with additional coupons for eligible foods in farms, farmers' markets, and roadside stands (Martinez et al., 2010). Additionally, in 2002, Congress established the Women, Infants, and Children Farmers' Market Nutrition Program (FMNP) to "provide fresh, nutritious, unprepared, locally grown fruits and vegetables through farmers' markets to WIC participants" (USDA, 2012e, n.p.). Eligible WIC participants are issued special coupons to be used at markets, or at state-approved roadside stands, in addition to standard WIC coupons. During 2010, over 3,600 farmers' markets were authorized to accept FMNP coupons, which generated over \$15.7 million in revenue for farmers

(USDA, 2011a). Recently, similar efforts have been made on a smaller scale to implement comparable programs at farmers' markets for SNAP redemption (USDA, 2011c).

With all of this in mind, we questioned the impact of micro versus macro level issues of food access. WIC and SNAP exist and serve many people, but are not effective since many recipients still eat a poor diet. The shopping options in low-income areas and in food deserts are often inadequate, and short of changing the products sold at a corner store or building a new supermarket, these conditions will not change. Certainly, there needs to be a change in infrastructure and the larger food systems that allow for – perhaps even create – food insecurity and diet-health concerns among low income communities. But this change comes slowly. If these large issues on the macro scale cannot easily be changed, then perhaps a factor on the micro scale – an individual level factor – is significant and can be changed more easily. This led us to the idea of parental self-efficacy surrounding providing healthy food for a family and how it may be related to the home nutrition environment. What would best help people living in food insecure households or food deserts better address their problems of food access, security, and related health outcomes? How much influence does a SNAP or WIC recipient's self-efficacy have on his or her home, the foods they purchase, and the foods they feed their family? What factors influence their self-efficacy?<sup>1</sup> Additionally, we wished to conduct this research within a farmers' market because we see farmers' markets as a viable alternative to more traditional shopping locations. They offer an abundance of fruits and

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<sup>1</sup> Our research used the definition of perceived self-efficacy (an individual's confidence in his or her ability to perform a behavior) as defined by Bandura (1977, 1982), which was identified as being interchangeable with perceived behavioral control and has been shown to strongly influence behavior (Ajzen, 1991).

vegetables, can be introduced more easily than a brand new supermarket structure, and offer a community space.

Team Food Deserts, a group of eleven undergraduates in the University of Maryland's Gemstone Program, has worked to address these questions and expand the body of research concerning both SNAP and WIC redemption programs at farmers' markets. By surveying SNAP and WIC participants shopping at three Washington, DC metropolitan area farmers' markets, we examined the relationship between parental self-efficacy and various elements of the home nutrition environment. The multi-phase, mixed-methods research project data included a cross-sectional survey and in-depth interviews with market coordinators and survey participants ( $n = 70$ ). In addition to the surveys, during the summer and fall of 2011, we worked with our faculty mentor and a team of graduate students to administer a monthly nutrition education program, "Food Smart, Fresh Start," to survey participants. Participants who were retained throughout the entire program (the duration of the farmers' market season) completed a second survey. However, due to low-retention, we were not able to analyze the post-test surveys. Alternatively, we conducted in-depth interviews with retained participants ( $n = 4$ ). The interviews served as supplemental information on a handful of individuals and their specific experiences in the farmers' markets.

If farmers' markets might serve as a way to aid SNAP and WIC recipients in purchasing more healthful foods, our survey sought to examine these recipients and shoppers in terms of their own preferences and needs. Specifically, we looked at parental self-efficacy and the home nutrition environment in SNAP and WIC shoppers at farmers' markets. We hypothesized that parental self-efficacy would be a significant predictor of

the quality of the home nutrition environment and that higher reported self-efficacy would have a positive correlation with elements of a healthy home nutrition environment.

This paper provides a literature review, as well as an explanation of our methodology, data analysis, results, and a discussion of the applications of our research. A glossary of terms specific to our project and the tools we used to collect our data are included in the appendices.

## CHAPTER 2: LITERATURE REVIEW

The terms listed in the glossary (found in Appendix F) may be helpful in reading our review of previous literature.

### **Food Insecurity**

Studies have shown that adults who live in food insecure households often make changes to their dietary habits (Seligman, Laraia & Kushel, 2010; Kendall, Olson, & Frongillo, 1996; Olson, 1999; Tarasuk & Beaton, 1999; Bickel, Nord, Price, Hamilton, & Cook, 2000; Monsivais & Drewnowski, 2007; Drewnowski &, 2005) and that these types of changes have been linked to poor health (Seligman et al., 2010; Vozoris & Tarasuk, 2003; Klesges et al., 2001; Chilton & Rose, 2009; Walker et al., 2010). Because a component of food insecurity is uncertainty about being able to acquire nutritious and safe foods by normal means (Martinez et al., 2010), people living in food insecure households often adjust their eating behaviors by changing the amount of money they allocate to food, which can result in less food consumed and different types of food consumed (Seligman et al., 2010; Kendall, et al., 1996; Olson, 1999; Tarasuk & Beaton, 1999; Bickel et al., 2000; Monsivais & Drewnowski, 2007; Drewnowski & Darmon, 2005). Instead of eating more healthful foods that can be expensive, food insecure adults often turn to cheaper energy dense foods that are high in unhealthy fats and sugars (Seligman et al., 2010; Monsivais & Drewnowski, 2007; Drewnowski & Darmon, 2005; Drewnowski, 2010; Pickett, Kelly, Brunner, Lobstein, & Wilkinson, 2005). The introduction of increased amounts of these unhealthful foods, along with the decrease in more healthful foods such, as fruits and vegetables, dairy, and foods containing adequate

amounts of needed micronutrients, has been linked to the onset of chronic diseases (Seligman et al., 2010; Vozoris & Tarasuk, 2003; Klesges, et al., 2001). The relationship between food insecurity and health does not end with physical issues, but has also been shown to extend to mental health. Food insecurity has been associated with anxiety and depression in adolescents and adults (Chilton & Rose, 2009; Siefert, Heflin, Corcoran, & Williams, 2001; Zaslow et al., 2009). It is clear that the consequences of food insecurity are not seen only at the table, but also in the physical and mental well-being of people living in these conditions.

Studies have found that children are especially vulnerable to food insecurity because they are still developing (Rose-Jacobs et al., 2008; Shonkoff & Phillips, 2000). Nutritious food is required for the normal development and growth of young children in the first three years of life and cognitive and physical problems can arise in response to even minimal nutritional deficits (Rose-Jacobs et al., 2008). After controlling for environmental, family, and health factors, it was found that severe child hunger is associated with higher rates of chronic illness (Weinreb et al., 2002). In another study, researchers found that after controlling for sociodemographic factors, maternal health, and family habits, food insecurity was associated with behavior problems in preschool-aged children (Whitaker, Phillips, & Orzol, 2006). In a study of children less than 36 months old, a positive association was identified between food insecurity and developmental risk, including motor, language, behavioral, social, and emotional development (Rose-Jacobs et al., 2008).

Not only is food insecurity associated with poorer mental and physical health in children, but the prevalence of food insecurity among households with young children is

alarming as well. In the entire United States in 2010, 9.8% of all households with children experienced food insecurity. This equates to 3.9 million homes that were unable to provide their children with adequate meals (Coleman-Jensen et al., 2012). It is estimated that of all of the families participating in public food assistance programs, 80% of them are families with children (Yu et al., 2010; Gorman, Horton, & Houser, 2006).

Supplemental nutrition programs aim to relieve food insecurity by reducing the financial burden associated with purchasing adequate amounts of healthful foods (Seligman et al., 2010; Whitaker et al., 2006). Studies have found that participation in these programs has positive effects on families and children. For example, Rose-Jacobs and colleagues (2008) found that participation in WIC and SNAP had several beneficial outcomes for families and children, including signs of positive growth and health and improvements in reading and math. Other research is ongoing in order to find areas in which supplemental nutrition programs can focus and improve in order to further their impact in eliminating the problem.

### **Poverty and Nutrition**

Many SNAP and WIC participants experience poverty, which can affect their health. Studies have demonstrated that a relationship exists between diet-related diseases, such as obesity and diabetes, and income inequality in countries with a hierarchical class structure, such as the United States (Pickett et al., 2005). Pickett and colleagues (2005) found positive correlations between the levels of income inequality in a nation and the prevalence of obesity in that country. Relationships have also been reported between income inequality and higher body mass index measurements in women in the United States (Pickett et al., 2005). The researchers posit that psychological stress from living at

the bottom tier of a hierarchical society may be to blame for the correlation between poor health and poverty (Pickett et al., 2005). Class-based differences in education also contribute to the prevalence of diet-related illnesses (Molarius, Seidell, Sans, Tuomilehto, & Kuulasmaa, 2000). In this study of 26 countries shows that lower levels of education correlate with higher rates of obesity. This study also demonstrated that obesity is more common among both lower-educated women and men in these countries (Molarius et al., 2000). These findings suggest cause for concern that conditions of both income and educational inequality may produce poor health outcomes not just for the poor, but also for the entire population.

The inequalities influence the dietary choices of the impoverished that, in turn, affect their health outcomes. These choices involve the quality of food eaten, the types of foods eaten, and the intake of specific nutrients, which influence the healthfulness of an individual's diet and, as a result, the occurrence of obesity and diet-related illnesses. An important cause of obesity, specifically, is the over-consumption of low-cost energy-dense foods (Wilde, McNamara, & Ranney, 1999; Rose, Habicht, & Devaney, 1998; Devaney & Moffitt, 1991). Lower quality diets consist of higher energy and high calorie foods, and a lack of high nutrient foods, like fruits and vegetables (Drewnowski, Darmon, & Briand, 2004; Drewnowski & Darmon, 2005).

Low quality foods generally cost less (Drewnowski et al., 2004; Drewnowski & Darmon, 2005) and food purchases are influenced by income (Pickett et al., 2005). People in low-income households, on average, consume smaller quantities of fruits and vegetables than members of more affluent households (Krebs-Smith, Cook, Subar, Cleveland, & Friday, 1995; Stewart, Blisard, & Jolliffe, 2003), and people receiving

SNAP benefits have statistically significantly higher intakes of meats, added sugars, and total fats (Wilde et al., 1999). In terms of energy costs, fats, grains, sugar, beans, and potatoes have been shown to possess significantly lower energy costs per calorie than lean meat, fish, lettuce, or fresh fruit (Drewnowski et al., 2004; Drewnowski & Darmon, 2005). On a per calorie basis, Drewnowski (2010) showed that grains, sugars, and fats were cheaper than fruits and vegetables. When considering nutrient value, foods that contain protein, calcium, iron, potassium, magnesium, and vitamin C cost more than foods high in fats, carbohydrates, and sugars (Maillot, Darmon, Darmon, Lafay, & Drewnowski, 2007). Studies have also shown that consumption of added sugars is highest in lower income and minority groups (Drewnowski, 2004; Thompson et al., 2005). As a consequence, families with less money may consume less healthful food in an effort to spend less. In fact, in the low-income population of the United States, 23% of people meet the recommendations for fruit consumption, while 42% meet the recommendations for vegetable consumption (Rose & Richards, 2004).

These differences in fruit and vegetable consumption may be because the high costs of fruits and vegetables act as an obstacle to the consumption of these more nutritious foods (Shankar & Klassen, 2001). Poverty, financial constraints, and trends in food prices could influence the levels of consumption of fresh produce by the poor and near poor (Drewnowski, 2010; Drewnowski, 2004; Thompson et al., 2005; Drewnowski & Barratt-Fornell, 2004; Darmon & Drewnowski, 2008). Higher quality diets, indicated by higher consumption of fruits and vegetables, have been linked to higher incomes (Drewnowski, 2007; Beydoun & Wang, 2008).

In addition to issues of cost, low-income households may have difficulty accessing grocery stores. Studies have also found that the distribution of supermarkets is not even among neighborhoods of varying incomes (Bollen, Vernez-Moudon, Kinney, & Drewnowski, 2010; Truhaft & Karpyn, 2010; Karpyn et al., 2010; Andreyeva, Blumenthal, Schwartz, Long, & Brownell, 2008). One study found that the 23.5 million people who live in low-income areas do not have a supermarket within a mile of their homes, indicating that 28% of low-income residents who live in areas with limited or no supermarket access (Karpyn et al., 2010).

Access to fruits and vegetables can often be limited by the absence of a supermarket in a neighborhood, because it is more difficult to find fruits and vegetables if there is no supermarket (Bollen et al., 2010; Truhaft & Karpyn, 2010; Karpyn et al., 2010; Papavasiliou et al., 2007; Andreyeva et al., 2008). In fact, studies have shown that the presence of a supermarket in a neighborhood is related to whether the people of that neighborhood meet their fruit and vegetable recommendations (Morland, Wing, & Roux, 2002; Wrigley, Warm, & Margetts, 2003, Karpyn et al., 2010). Morland and colleagues (2002) found that African Americans living in census tracts that contained one or more supermarkets were more likely to meet these requirements. Wrigley and colleagues (2003) found that the introduction of a supermarket to a neighborhood that had previously been classified as a food desert was associated with an increase in total fruit and vegetable consumption in the area.

Andreyeva and colleagues (2008) conducted a study that compared fruit and vegetable access in two neighborhoods of varying income levels in New Haven, Connecticut. Their results show that even with supermarkets in both neighborhoods, there

were still disparities in the availability of healthful foods between the neighborhoods. Stores in the lower-income neighborhood stocked fewer healthful varieties of foods, had poorer quality produce, and had fewer unprocessed goods. Thus, while access to grocery stores is important, differences in quality exist in neighborhoods with different income levels.

### **Supplemental Nutrition Assistance Program (SNAP)**

Since its inception, SNAP has been welcomed by low-income families across the nation and has received considerable support from local communities and the government (Fitzgerald & Holcombe, 2012). SNAP serves these low-income families by providing them with additional resources to purchase food. Although the program has undergone numerous changes since it began in 1961, the SNAP program was most recently updated in the 2008 farm bill. The 2008 Farm Bill adjusted the eligibility criteria of SNAP participants, standardized the distribution of benefits, allotted resources for the continuation of SNAP and other health-related programs, among other changes (USDA, 2013a). Through the Farm Bill, an additional \$7.8 billion were given to the program to make these improvements (Rosenbaum, 2008). In total, SNAP was allocated \$189 billion over five years, or 67% of the budget, for mandatory programs (Johnson & Monke, 2012).

More recently, the Agriculture Reform, Food, and Jobs Act of 2012 extended SNAP through fiscal year 2017 with further modifications to participant eligibility, store eligibility, and policy (Stabenow, 2012). Under this new bill, \$772 billion are allocated to SNAP, or 78% of the budget for mandatory programs (Johnson & Monke, 2012). The American Recovery and Reinvestment Act of 2009, an economic stimulus package, added \$20 million in SNAP benefits (Department of Commerce, 2010). While the federal

government pays for SNAP benefits, administrative rates are covered by individual states. States are also responsible for paying for SNAP if they choose to extend eligibility to people outside of the federal government's aforementioned eligibility criteria (Zedlewski & Mon, 2009).

To be eligible to receive SNAP benefits, participants must meet certain criteria that reflect their economic status and that of their household. A household, according to the USDA, is a group of people "who lives together and purchases and prepares meals together" (USDA, 2013b). Eligibility certification lasts between six and 12 months, but no limit exists on how long a household may participate in SNAP. Participation in some federal programs, like Temporary Assistance for Needy Families, guarantees eligibility for SNAP (FitzGerald & Holcombe, 2012). Although households with elderly members are exempt from certain requirements, generally, households may have no more than \$2,000 in countable resources. Household gross income must fall below 130% of the poverty line. However, these requirements vary depending on the size and composition of the household. Exceptions for the income requirement are made for child support payments, caring for dependents, disability, medical costs, and housing costs (USDA, 2013b). In fiscal year 2010, 85% of households receiving SNAP benefits earned an income that was less than the poverty guideline. Sixty percent of households' incomes came from government sources, like social security (FitzGerald & Holcombe, 2012).

An increasing number of low-income families are turning to SNAP to acquire needed food. From 2007 to 2011, rates of SNAP eligibility and of those claiming SNAP benefits have increased (Fitzgerald & Holcombe, 2012). According to the Congressional Budget Office, as unemployment rises, so do rates of SNAP participation. Even after the

economy recovers, rates of SNAP participation do not always decrease to the rates prior to the downturn, indicating a continued reliance on SNAP even after recovery (Fitzgerald & Holcombe, 2012). Increasingly, SNAP is a necessary source of support for many households: in 2010, 20% of households recorded no income at all, as compared to 10% of households in 1990 (FitzGerald & Holcombe, 2012). 65% of families enrolled in SNAP are single-parent households. The financial assistance provided by SNAP allows participants to spend their money on other essential resources and helps reduce rates of deep poverty. SNAP benefits cut the share of working families with children in deep poverty from 20% to 4% in 2007, and substantial increases were observed in the share of families with young children living at or above the official poverty level when SNAP benefits were added to cash income (Zedlewski & Mon, 2009). Furthermore, participation in SNAP increases food security, particularly in households that previously had very low food security (Nord & Golla, 2009). These results suggest a positive direction for federal nutritional aid.

Though SNAP has generally been associated with positive outcomes, some connection exists between participating in SNAP and poorer health outcomes, but results are inconsistent. For instance, one study found that participation in government nutrition assistance programs was associated with a higher body mass index (BMI) (Webb, Schiff, Currivan, & Villamor, 2008). Another study found that receiving less than \$150 in SNAP benefits was associated with higher adult BMI for women, but those women who received greater than \$150 in benefits had comparatively lower BMIs (Jilcott, Wall-Bassett, Burke, & Moore, 2011). Because the latter category of women had more money, they had more choice in what they could purchase. With fewer resources to expend on

healthful foods like fruits and vegetables, families may turn to less expensive, calorie-laden alternatives. However, Simmons and colleagues (2012) found that BMI did not differ between SNAP and non-SNAP participating children.

Additionally, a recent study by Vartanian and Houser (2012) demonstrated that neighborhood conditions play a role in health outcomes for children participating in SNAP. So, it is possible that environment has a more significant impact than previously explored. Rather than encourage household members to make healthy choices, SNAP may simply allow families to purchase the same foods that their non-SNAP neighbors buy.

### **Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)**

WIC, like SNAP, is a federal program designed to benefit low-income households. WIC began in 1974 and has seen increasing participation since its founding (Devaney, 2007). In Maryland, participation from fiscal year 2007 to fiscal year 2012 increased from 123,868 participants to 146,272 participants (USDA, 2013f). Unlike SNAP, WIC serves only pregnant, breastfeeding, and postpartum women, as well as infants and children under five. WIC also differs from SNAP in that WIC participants may only use their benefits to purchase certain foods. These foods, chosen for their nutritional value, include milk, eggs, cheese, fruits and vegetables, cereals, formula, baby food, some types of fish, soy products, and beans, among others (Baltimore City Health Department, 2012). WIC provides additional assistance, including nutrition education and referrals for health and social services.

Further, WIC-receiving households must meet both an income and nutrition risk requirement. Participants must have an income between 100% and 185% of the federal

poverty guidelines, percentages that are adjusted yearly. However, as with SNAP, some participants are eligible through their participation in other programs, such as TANF or Medicaid. Individuals may participate in both SNAP and WIC simultaneously given that they independently meet the requirements for both. To meet the nutrition risk requirement, participants must see a medical professional and then be found to have a nutrition- or medically-related condition, such as anemia or an unhealthful diet (USDA, 2012d).

Several case studies regarding WIC redemptions suggest that there is a strong correlation between economic supplements for food purchases to low-income families and outcomes for improved health behavior. For instance, pregnant women participating in WIC were more likely than nonparticipants to breastfeed, have a longer gestational age, and have higher birth weights for their children (Richards, Merrill, Baksh, & McGarry, 2011). Participation in WIC was also correlated with an improved diet that included lower fat intake, increased fruit and vegetable consumption, increased iron density, and fewer added sugars (Colman et al., 2012). While the relationship between caloric intake and WIC participation is unclear, WIC participation was associated with a diet consisting of a variety of foods (Colman et al., 2012). Another study examined the effects of additional financial support to WIC participants to reduce barriers to accessing fresh fruits and vegetables. The study was designed to assess whether WIC participants would use the supplemental support and, if so, how that support would affect which foods were purchased (Herman, Harrison, & Jenks, 2006). Study results indicated a high redemption rate by these users, allowing researchers to conclude that low-income women used almost

all of the vouchers and purchased a wide variety of fruits and vegetables over the course of the study (Herman et al., 2006).

### **Electronic Benefit Transfer (EBT) System**

To redeem SNAP and WIC benefits, participants may use an Electronic Benefit Transfer (EBT) system. The EBT system is similar to a debit card, and it allows participants to make purchases more easily than earlier paper systems. The EBT system may be implemented using the same machine that a retailer would use for credit or debit card transactions. To accept EBT benefits, a retailer must apply and be approved by the government. To be eligible, the store must sell several types of foods falling under four categories: dairy; bread, grains, and cereal; fruits and vegetables; and meat, fish, and poultry. The store may also be eligible if more than half of sales come from the sale of one or more of these categories (Community Resources Information, Inc., 2012). From fiscal year 2006 to 2010, the number of retailers accepting EBT cards rose from 162,015 to 216,738. In fiscal year 2010, Maryland had 3,178 retailers whose customers redeemed \$915,613,632 of SNAP benefits (USDA, 2011).

Because of the success of the EBT system in traditional venues, farmers' markets are making the transition to the EBT system, allowing the redemption of SNAP and WIC benefits. For example, the number of farmers' markets accepting SNAP benefits in Minnesota has increased from one location in 2006 to 24 locations in 2012. This increase, along with the expansion of the state's "Market Bucks" program, which matches \$5 for participant EBT purchases, is based on 2011 data that indicates an increase in participant-market interaction (BlueCross BlueShield, 2012). According to a study from BlueCross BlueShield of Minnesota, more than 2,300 individual customers used EBT benefits at the

16 participating markets in 2011, up 215% from 2010. Moreover, 97% of SNAP customers reported they would continue to patronize markets in the future and 88% reported increased fruit and vegetable consumption because of the opportunity to use EBT (BlueCross BlueShield, 2012). Furthermore, the government continues to encourage farmers' markets to accept EBT benefits. In fiscal year 2010, 1,611 farmers' markets accepted EBT benefits, and the government hopes to see this number continue to increase (USDA, 2011). The Food and Nutrition Service of the USDA aims to "authorize an additional 200 markets farmers or farmers' markets each year" to accept the EBT system (USDA, 2011).

To implement the EBT system, farmers' markets must obtain a license. However, if multiple vendors participate in the market, each vendor is required to have their own license to operate their EBT machine. To avoid this issue, many markets use a scrip system, in which the buyer is given a token or paper scrip, and pays at a central terminal upon the completion of their shopping (Wasserman et al., 2010). Federal benefit redemption has become increasingly common. For instance, redemption at farmers' markets has increased from \$2 million to \$4 million from 2008 to 2009. Accepting EBT benefits is lucrative, as the EBT system enables farmers' markets to access a population that would otherwise be unavailable (Wasserman et al., 2010).

Despite the benefits of the EBT system, problems exist regarding EBT implementation at farmers' markets. Researchers conducted a pilot study of Point of Service (POS)-terminals for EBT redemption at the Clark Park farmers' market in West Philadelphia, which accounts for almost a fourth of all SNAP redemption in the state of Pennsylvania (Buttenheim, Havassy, Fang, Glyn, & Karpyn, 2012). They concluded that,

while there was almost a 40% increase in monthly SNAP sales at the market, a majority of vendors indicated that the sales did not make up for the implementation and operational costs of the machines. Therefore, state or federal subsidies for equipment costs and maintenance are crucial if the EBT system is to stay in place (Buttenheim et al., 2012). SNAP currently provides some financial support for supermarkets and small-scale SNAP retailers but not for those without landline access, given the practicalities of installing the EBT system. In order for EBT implementation to be fiscally beneficial and thereby feasible, government subsidies would be required. Buttenheim and colleagues (2012) also concluded that after withdrawal of the terminals and thus the revocation of the EBT system, market sales for SNAP customers declined. This suggests that the intervention was successful but that significant changes and options for funding should be considered (Buttenheim et al, 2012). The Farmers' Market Promotion Program has responded to these financial needs by offering \$10 million in grants to expand and otherwise improve farmers' markets and other community food and agriculture programs (USDA, 2012a).

### **Associated Programs: Farmers' Market Nutrition Program, and Double Dollar Program, and Cash Value Vouchers**

In addition to making the EBT system more accessible, the government has instituted the Farmers' Market Nutrition Program (USDA, 2012e) to improve WIC participants' access to fresh produce. Created in 1992, the FMNP operates in 36 states, including Maryland, and reached 1.9 million WIC participants in fiscal year 2011 (USDA, 2012e). Participants receive coupons valued between \$10 and \$30 to spend at farmers' markets and other venues that offer fresh, local produce. Because WIC offers nutrition

education, FMNP participants also receive information about the foods they purchase, including how to cook them. These coupons, funded entirely by the federal government, are lucrative for farmers' markets and other recipients, contributing \$16.4 million in revenue in fiscal year 2011 (USDA, 2012e).

Additionally, markets have started to incentivize SNAP and WIC spending in farmers' markets through initiatives such as "Double Dollar" programs, in which community organizations match the SNAP dollars shoppers spend. Crossroads Farmers' Market in Takoma Park, Maryland, was one of the first in the nation to implement such a system. Recently, the Inova Health System in Virginia began matching up to \$10 for SNAP benefits spent at the city market and has initiated a Double Dollar program at three other sites in the state (Borden, 2012). The FMNP and Double Dollar program are examples of a positive trend for increasing healthy food access and fostering a strong relationship in communities between SNAP and WIC participants, farmers, and market coordinators.

Similarly, the Cash Value Voucher (CVV) program, implemented through WIC, gives participants checks that may be used specifically for purchasing fruits and vegetables at WIC-authorized stores and markets. Like the Farmers' Market Nutrition Program, which generated approximately \$20 million in revenue for farmers in 2008, the CVV checks enable both a new source of fresh produce for WIC recipients and a new source of income for farmers. Farmers could earn between \$50 and \$60 million if only a tenth of all vouchers were used in farmers' markets (Briggs, Fisher, Lott, Miller, & Tessman, 2010). However, Briggs and colleagues (2010) also analyzed state implementation of the CVV system, with a specific focus on opportunities and barriers of

the program, noting that the largest concerns and roadblocks to successful implementation were operational costs such as training and acquisition of the necessary equipment.

### **Program Successes**

Previous studies have been done with SNAP and WIC recipients to increase food access and improve nutrition. Andreyeva, Long, and Brownell (2009) studied the effectiveness of an increased subsidy for fruits and vegetables to WIC participants. Participants who were given the additional subsidy were found to have increased their consumption of fruits and vegetables and sustained this increase for six months following the program's end (Andreyeva et al., 2009). This study suggests that, given additional funds, lower income families will change their diets to incorporate more fruits and vegetables and that finances are an important barrier to overcome in achieving a healthful diet.

In 2006, Herman and colleagues conducted a similar study using fruit and vegetable vouchers to increase produce consumption among low-income women and children. Throughout the course of the study, vouchers for fruit and vegetable purchase were provided to low-income women participating in WIC. The intent of the study was to determine whether providing financial support for the purchase of fresh fruits and vegetables would change low-income consumer spending patterns. The study concluded that once the financial burden of purchasing fresh fruits and vegetables was decreased low-income women purchased a wide variety of fresh produce (Herman et al., 2006). This study again demonstrates that finances are one of the main barriers to produce purchase among low-income families.

Using vouchers to promote produce purchase has also been tested among low-income senior populations. The Seniors Farmers' Market Nutrition Program (SFMNP) provides low-income seniors with vouchers that can be redeemed at local farmers' markets. The Clemson University Food Stamp Nutrition Education Program conducted a study to determine if the SFMNP participants reported increased produce consumption after receiving the vouchers. The majority of participants reported that they intended to eat more fruits and vegetables throughout the year due to the availability of the vouchers, and almost all participants used the vouchers (Kunkel, Luccia, & Moore, 2003). Farmers also responded positively to the program and were willing to participate in the project beyond the scope of the study (Kunkel et al, 2003).

The benefits to markets that choose to accept federal nutrition benefits were analyzed in a study conducted by Young and colleagues (2011). The study concluded that increasing low-income communities' access to farmers' markets as a source of fresh produce not only helps communities but also is profitable for markets. The study concluded that authorizing the use of WIC benefits at farmer's markets would improve food access in underserved communities, leading to a healthier population and greater sustainability for farmers' markets (Young, Karpyn, Nicky, Wich, & Glyn, 2011). These studies provided the background necessary to predict that when barriers to fresh fruits and vegetables are eliminated, people tend to include more of these foods in their diets.

### **Theoretical Background**

Using the Theory of Planned Behavior (TPB), we expected to find a relationship between parental self-efficacy and the home nutrition environment. According to this theory, an individual's attitudes, subjective norms, and perceived behavioral control

contribute to that individual's behavioral intentions (Ajzen, 1991). Attitude is defined as an individual's evaluation of his or her performance of a specific behavior. In a more concrete sense this means whether a person considers a specific behavior to be good or bad. Subjective norms refer to perceptions of social pressure from important others regarding the individual's behavior. The individual predicts how those close to him or her will evaluate his or her specific behavior. Perceived behavioral control (PBC) refers to an individual's assessment of his or her ability to perform an action. This involves determining the feasibility of performing an action or behavior (Paschal, 2001). Ajzen (1991) emphasizes the importance of perceived behavioral control and asserts that a person's resources and opportunities must, to some extent, determine the likelihood of his or her behavioral achievement. In general individuals are more likely to participate in behaviors that they believe are achievable (Bandura, 1997).

We predicted that parents with lower self-efficacy would have poorer home nutrition environments. Using TPB, we theorized that parents with low self-efficacy would also have low perceived behavioral control. Drawing from this theory, it is likely that parents with low self-efficacy will likely have more perceived barriers to healthy eating and food access, leaving them less empowered and less likely to improve or change family health behavior and fruit and vegetable consumption in the home. A study conducted by Sheeran and colleagues (2001) attempted to determine whether the TPB could be used to predict health screening attendance at two points over a thirteen-month period. The overarching goal of this project was to determine whether using the TPB model reliably predicted health behaviors. They concluded that both behavioral intentions and perceived

behavioral control were adequate predictors of whether an individual would attend a health screening (Sheeran, Norman, & Conner, 2001).

### **Self-Efficacy**

A major component of the TPB is the construct of PBC as outlined originally by Ajzen (1991). Traditionally, PBC has been discussed in conjunction with self-efficacy, albeit viewed as entirely separate. Due to their similarity, there has been confusion as to which is the more appropriate measure or indicator of an individual's intent and behavior. However, Ajzen (2006) clarifies this confusion and proposes that self-efficacy is one of two components that make up the overarching construct of PBC - the other being controllability, as defined later.

Self-efficacy is defined in our study as "belief in one's capabilities to organize and execute the courses of action required to produce given of attainments," based on Bandura's (1998, p. 3) definition. In comparison, Azjen (2006) defines controllability as "the extent to which performance is up to the actor" (p. 680). Thus, while self-efficacy focuses more on one's capability in performing a behavior, controllability focuses more on how much of the behavior's outcome can be controlled by the individual. For example, an individual may have high self-efficacy in preparing fruits and vegetables, but may also have a low sense of controllability if they feel that they are not equipped to do so (e.g. they cannot access a supermarket to purchase produce). Practical considerations point to self-efficacy as an easier predictor of behavior to control for than the overarching PBC construct, due to the greater room for PBC to be influenced by external factors influencing controllability.

Self-efficacy may be influenced by locus of control, either an external or internal locus of control. Individuals with high internal locus of control believe that attainment of a specific outcome is within their control, and their action determines the outcome (Abusabha & Achterberg, 1997). High external locus of control is characterized by the belief that they have little or no control over the situation. Studies of the locus of control construct have yielded inconclusive results, with some findings indicating a positive relationship between internality and health behavior and other findings indicating no relationship. Locus of control is domain specific, meaning that it depends on the context of the situation, while self-efficacy is task-specific, meaning it relates to a particular behavior (Abusabha & Achterberg, 1997).

Selection of self-efficacy as a predictor of behavior is also supported by a large number of studies. For example, a study conducted by Dzewaltowski and colleagues (1990) found that self-efficacy had a more direct impact on participation in physical activity than did PBC. Following the logic proposed by Ajzen that outlines self-efficacy as being contained within PBC - one of the three components of the TPB - we used the TPB as a theoretical framework for our research. We identified self-efficacy as the best gauge of a parent's attitude and behavior towards the home nutrition environment and therefore used it as our independent variable.

Several studies have examined the role of parental self-efficacy in health and nutrition-related areas. In particular, the link between parental self-efficacy and child nutrition has been investigated. Shriver and colleagues (2010) examined self-efficacy among Hispanic Head Start parents of urban elementary school children. Through their findings, they suggested that nutrition education for low-income Hispanic parents should

include components focused on increasing self-efficacy and minimizing perceived barriers. In addition to parental self-efficacy, they also found that the personal health and lifestyles of the parents directly affected their child's health and nutrition. Moreover, the study proposed that more efforts are required to enable parents to set positive and healthful examples for their children, while also maintaining their own personal health (Shriver, Hildebrand, & Austin, 2010).

Research has also attempted to examine explanations of the role of self-efficacy in improving behavior intention and likelihood of performance, which could result in subsequent improvement of the home nutrition environment. Conner and colleagues (2001) found that attitudes, PBC, and perceived past behavior predicted intentions to improve health among study participants. Their results also indicated increased parental self-efficacy, which decreased perceived barriers to fruit and vegetable access, increased fruit and vegetable consumption in the home, and empowered parents to change negative family health behavior. Higher self-efficacy should result in an increase of behavioral intention and an increase in the likelihood of a parent performing the desired behavior -- improving the home nutrition environment.

Some studies examine the role of parental self-efficacy in performing health behaviors. Adedze and colleagues (2011) address the misconceptions parents have regarding child obesity. Adedze and colleagues suggest targeting maternal education to bolster self-efficacy, after they found that while mothers participating in WIC are generally knowledgeable about the causes, risk factors and consequences of childhood obesity, several misconceptions persist among them. These include the beliefs among low-income and minority (primarily African-American) mothers that children might be

“born big” and that obesity cannot be affected by lifestyle and nutritional intervention. Adedze and colleagues therefore suggest that maternal education and resultant increased self-efficacy are necessary to combat these misinformed perceptions (Adedze, Chapman-Novakofski, Witz, Orr, & Donovan, 2011).

A 2010 study by Campbell and colleagues suggests that a mother's self-efficacy is strongly associated with the health outcomes of her children, especially during the first few years of life. A mother's higher reported self-efficacy in promoting healthy eating was associated with greater consumption of vegetables in their children. These researchers also found that as children age, their parents' self-efficacy may decline. Subsequently, the children are more likely to exhibit obesity promoting behaviors, such as sedentary behavior and less fruit and vegetable consumption in lieu of high-calorie foods. Campbell and colleagues (2010) suggests that interventions that support the development of healthy lifestyle behavior are most effective when they target parental self-efficacy. By exercising parental control over activities, such as time spent in front of the television and snack choices, parents can positively influence their child's health behaviors.

In a prior study, Cullen and colleagues (2000) sampled 109 parents of fourth through sixth grade students and found that parental self-efficacy surrounding the planning of meals and encouragement of fruit and vegetable intake is directly related to their children's fruit and vegetable consumption. Campbell and colleagues (2010) specifically highlight the relationship they found between maternal self-efficacy and children's choices regarding diet and physical activity (2010). These studies by Cullen and colleagues (2000) and Campbell and colleagues (2010) find that higher parental self-

efficacy promotes healthier eating habits, specifically higher fruit and vegetable consumption in the children. Moreover, Campbell and colleagues' (2010) findings regarding the association between maternal self-efficacy and child fruit consumption are consistent with those of Cullen and colleagues (2000).

A study by Young and colleagues (2004) that examined the effect of parental behavior on middle school students' fruit and vegetable consumption found that perceived parent support, self-efficacy, and perceived fruit and vegetable availability were all significant predictors of fruit and vegetable consumption in the middle school students sampled. Young and colleagues proposed that the relationship between perceived parent support of the child and fruit and vegetable consumption was mediated by self-efficacy. Overall, Young and colleagues concluded that parents appear to influence students' fruits and vegetable consumption. They also suggest that, in addition to concentrating on parental behaviors, educators focus on improving the self-efficacy of students in an effort to give the students and their families the confidence and skills they need to live a healthier lifestyle.

Although self-efficacy is regarded as an important facilitator of personal health behavior, as Campbell and colleagues (2010) note, the literature linking parental self-efficacy to child nutrition and obesity protective behavior is limited. Campbell and colleagues' findings, along with Young's (2004), provide more insight into understanding the role parental self-efficacy plays in promoting healthy eating habits in children. Both studies suggest that parental support and promotion of healthy eating will require more than simple translation of knowledge between parent and child, but rather

support in strengthening and maintaining a parent's self-efficacy in regards to feeding their children.

Thus, building upon Campbell's (2010) findings along with the literature described previously, we assigned parental self-efficacy as the independent variable in our methodology. We look to further this area of research by addressing the link between parental self-efficacy and the home nutrition environment, which we define through three components – perceived barriers, family health behavior, and fruit and vegetable offerings in the home. Specifically, our research addresses this link in the context of SNAP and WIC parents shopping at farmers' markets.

## CHAPTER 3: QUANTITATIVE METHODS AND RESULTS

Our research sought to answer the question: What is the effect of parental self-efficacy on the home nutrition environment? We hypothesized that higher parental self-efficacy predicts higher quality of the home nutrition environment. Our study was approved under expedited review by the University of Maryland Institutional Review Board. Our study consists of a cross-sectional analysis of parental self-efficacy and the home nutrition environment, and qualitative in-depth interviews with participants and with market coordinators. The first section of this chapter discusses market identification and selection. The next section discusses the cross-sectional surveys that were completed by research participants. The following section describes the interviews done with research participants who returned to the market for nutrition education. In the final section, we describe the interviews with market coordinators and the resulting qualitative data. After a discussion of our methods, we briefly review the nutrition education program, Food Smart Fresh Start.

### **Identifying and Selecting Markets**

Our mentor, Dr. Stephanie Grutzmacher, secured a partnership with two local organizations that address food and food access issues: the Maryland Department of Agriculture and the Prince George's County Extension. During the winter and early spring of 2011, these groups identified several possible farmers' markets for participation in our research. After contacting several of these markets, some decided they would prefer not to be involved in the project and withdrew their interest. After eliminating markets that were unwilling to let us conduct on-site research and ones that we

anticipated would not attract our target population, we were left with three locations. To maintain the privacy of our survey participants, our locations will be referred to as Market 1, Market 2, and Market 3. Markets 1 and 2 are both located in Prince George's County in Maryland, and neither market had an EBT machine during the market season. Market 3 is located in Northeast Washington, DC, and had an EBT machine during the market season. All the markets accepted WIC vouchers. While we had initially planned on surveying only SNAP recipients, we expanded our pool of survey participants to include both SNAP and WIC recipients. This was because Markets 1 and 2 were unable to accept SNAP benefits.

Leading up to the market season in June, our partner organizations conducted community outreach in the areas surrounding the markets to inform SNAP and WIC participants of the upcoming nutrition education program and research. All markets were in operation from June to November of 2011, allowing us to make one market visit a month throughout the full market season. In the course of our research, we discovered that each market had a unique atmosphere and organizational structure, and each served a different population.

### **Quantitative Methods**

To qualify for our cross-sectional survey, participants had to receive either WIC or SNAP benefits, and had to be parents or primary caregivers living with their children. At least one of their children had to be between four and ten years old. Also, neither the participants nor anyone in the household could have any serious food allergies or dietary health conditions, such as diabetes. Finally, only one member of each household could

take the survey, as our unit of analysis was one family or household. For questions that involved children, respondents who had more than one child were asked to select a “reference child” on whom they based their answers. This “reference child” was the oldest child in the household between the ages of four and ten.

## **Procedures**

At each market visit, we set up a table with posters advertising the survey and nutrition education program. Posters also advertised the five-dollar incentive for participating in the cross-sectional survey. We administered our survey to a total of 70 shoppers across the three markets. This was a convenience sample. This total was composed of one participant from Market 1, 37 participants from Market 2, and 32 participants from Market 3. Most of these participants did not return for further nutrition education program sessions.<sup>2</sup>

After obtaining written informed consent from the participants, we administered the surveys individually. For low-literacy survey respondents, a team member administered the survey orally and then wrote the participants’ answers. Additionally, we hired several student translators to translate our materials into Spanish, and we had translators on-site for all of our initial participant recruitment days in June. At Market 2, where there were a number of Spanish-speaking participants, a translator accompanied the team on all return visits.

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<sup>2</sup> Initially, we planned a two-part survey, with the cross-sectional survey being the initial survey, and a second survey in November measuring any changes in our variables. Since we had such low retention, this part of our project was dropped. The participants who we did retain throughout the summer were interviewed and later completed the second survey for an incentive of 20 dollars. The results of the second survey were not analyzed on the grounds that the small sample size rendered them statistically insignificant.

During one day of recruitment at Market 1, we recruited one participant. While this market accepted WIC benefits, it did not accept SNAP benefits at the time of our data collection. Several other shoppers at the market approached us and expressed interest in the program, but they did not meet our survey criteria. Most notably, many of these shoppers were interested in our nutrition education program and survey but were not WIC or SNAP recipients. This market was a larger market with a wide variety of fruit and vegetable offerings in addition to other food items.

We recruited participants at Market 2 for multiple days in June. Like Market 1, this market also did not accept SNAP benefits, but did accept WIC benefits. Thirty-seven survey participants were recruited, of whom 19 were Spanish speakers and 18 were English speakers. This market was also a larger market with a wide variety of fruit and vegetable offerings in addition to other prepared food items.

We recruited participants at Market 3, the only market to accept both WIC and SNAP benefits, throughout several days in June. Thirty-two survey participants were recruited. This was the smallest market, with only one vendor who offered fruits and vegetables, and was the only one of our three markets to accept SNAP benefits.

## **Measures**

Our measures for quantitative data collection were parental self-efficacy, perceived barriers, family health behavior, and fruit and vegetable offerings in the home. We created the cross-sectional survey by combining two existing public health and nutrition questionnaires: the Parent Self-Efficacy Questionnaire, the Parent/Family Barriers Questionnaire, and the Family Nutrition and Physical Activity Screening Tool

(FNPA Screening Tool). In addition to these instruments, we created our own fruit and vegetable checklist modeled after the Fruit and Vegetable Food Frequency Questionnaire (FVFFQ). These different instruments helped to measure our dependent variable (parental self-efficacy) and our three independent variables: perceived barriers, fruit and vegetable offerings in the home, and family health behavior. For demographic purposes, we included questions regarding the respondent's age, sex, race, and household composition, as well as original questions about their shopping habits and market experience (see Appendix A).

#### *Parental Self-Efficacy*

Parental self-efficacy was measured through questions 1-14 on page six of the cross-sectional survey, which includes questions from the Parent Self-Efficacy Questionnaire (Cullen et al., 2000). This section of the survey asks questions about whether the respondent parent felt that their family would eat fruits or vegetables, and whether they felt confident or comfortable planning meals or grocery shopping lists. The survey also asks questions about whether the respondent felt confident or comfortable including vegetables and fruit in their meals regularly, and whether they felt sure that they could serve new vegetables regularly or provide health snacks (fruits and vegetables, low fat food) to their children (Cullen et al., 2000).

This portion of the survey was intended to provide insight on a parent's perceived self-efficacy surrounding their ability to provide fruits and vegetables to their family. Parental self-efficacy items report high internal consistency ( $\alpha = 0.92$ ). Parental self-efficacy was measured on a Likert scale from "1" to "5," where "1" meant "very sure I cannot" and "5" meant "very sure I can" in relation to whether or not the respondent felt

they could carry out the behavior. Certain questions were used as controls to account for various biases. Questions were recoded so that a “1” indicated a response that was not efficacious and “5” indicated a response that was efficacious. A final composite score of “1” indicates lower parental self-efficacy perceptions, while a score of “5” indicates higher self-efficacy perceptions.

#### *Family Health Behavior*

Family Health Behavior was measured through questions 17a-s of the survey. This section of the survey contains questions from the FNPA Screening Tool, which was created and used by the American Dietetic Association Foundation to measure family health behavior (Welk & Ihmels, 2012). The FNPA Screening Tool has shown high construct validity and reliability in screening family obesogenic environments and behavior (Ihmels, Welk, Eisenmann, Nusser, & Myers, 2009). This section of the cross-sectional survey asked questions about the family’s use of prepackaged versus fresh foods; what type of beverages the reference child drinks (soda versus milk); how the parent monitors the reference child’s eating habits; whether sweets are used as rewards for good behavior; the family’s tendency to eat meals together; the family’s tendency to eat meals in front of the television; general television habits; and physical activity of the parent, reference child, and family overall.

Taken together, these questions were intended to give a picture of the general nutrition environment in the home, from eating habits to physical activity. Family health behavior items report high internal consistency ( $\alpha = 0.74$ ). Family Health Behavior was measured on a Likert scale from “1” to “5,” where a “1” indicated “never” and a “5” indicated “always” in relation to how frequently a respondent felt they exhibited a

particular behavior in the home. Certain questions were used as controls to account for various biases. Questions were recoded so that a “1” indicated a response that exhibited an unhealthy family behavior and “5” indicated a healthy family behavior. A final composite score of “1” indicates poorer family health behavior, while a score of “5” indicates healthier family health behavior by the respondent.

#### *Perceived Barriers*

Perceived barriers were measured through questions 1-15 on page five of the cross-sectional survey, which included questions from the Parent/Family Barriers Questionnaire (Cullen et al., 2000). Respondents were asked whether they felt that fruit and vegetables were appealing in grocery stores, whether the cost of fruit and vegetables was too high, and if fresh fruits and vegetables spoil too quickly. They were also asked if the family wastes food when fruits and vegetables are served, if no one in their home or family currently eats fruits and vegetables, and if the family members dislike recipes or meals that include fruits and vegetables.

Taken together, these questions were intended to provide insight on the strength and impact of the barriers that keep an individual from providing fruits and vegetables to his or her family. Perceived barrier items had high internal consistency ( $\alpha = 0.67$ ). Perceived Barriers were measured on a Likert scale from “1” to “5,” where a value of “1” indicated “disagree a lot” and a value of “5” indicated “agree a lot” in relation to how much the respondent felt they agreed that the stated barrier was an obstacle. Certain questions were used as controls to account for various biases. Questions were recoded so that a “1” indicated a response that exhibited a strong barrier and “5” indicated a weak barrier to providing fruits and vegetables in the home. A final composite score of “1”

indicates perceptions of stronger barriers while “5” indicates weaker barriers to providing fresh fruits and vegetables in the home.

### *Fruit and Vegetable Offerings in the Home*

Fruit and vegetable offerings in the home were measured with the Fruit and Vegetable Checklist portion of our survey, which was modeled after the FVFFQ. This part of the cross-sectional survey listed 34 fruits and vegetables, with three write-in slots for unlisted fruits and three write-in slots for unlisted vegetables. The 34 fruits and vegetables listed included some unhealthy choices, such as fried potatoes, in order to differentiate between healthy and unhealthy variations of the same food. Such unhealthy items were excluded from the respondent’s final score. The checklist asked if the food item was currently in the participant’s home, if the participant liked the food, if the participant’s reference child liked the food, and where the food was purchased.

Altogether, the checklist was intended to provide insight on the fruit and vegetable offerings in the home, as well as child and respondent preferences and shopping habits. The Fruit and Vegetable Checklist portion of our survey has high internal consistency ( $\alpha = 0.88$ ). Fruit and Vegetable Offerings in the Home were measured on a range from “0” to “28,” where “0” indicated the presence of zero fruits or vegetables and “28” indicated the presence of all of the eligible listed survey items in the home. Each “have” was coded as a “1”, and responses were then summed into a composite score. “Venues” were not included because they could not be given a numerical value. Similarly, parent and child preferences on fruits and vegetables were excluded from the composite score due to their inability to accurately reflect fruit and

vegetable offerings in the home. Examples of foods found on the fruit and vegetable checklist can be found at the end of our survey instrument (see Appendix A).

Missing values were estimated using mean replacement. In the mean replacement method, the values of all the questions were summed to give a total variable score where a lower score indicated unhealthier food behavior or lower parental efficacy perceptions. A final variable score was determined by dividing the composite score by the number of questions/items on the survey connected to that variable. The final score provided an average score for each subject that was still representative, but smaller and easier to work with for analysis.

After having collected all of our data, our team divided the data into quantitative and qualitative portions. The quantitative data, consisting of primary cross-sectional survey responses, was coded and analyzed using SPSS software. We will first present our quantitative results and discussion, followed by the qualitative results and discussion.

### **Quantitative Results**

We first analyzed the demographic characteristics of respondents for a more detailed idea of the constituents of the different areas we studied and of the people who used federal nutrition assistance programs at those farmers’ markets (Table 1).

Table 1  
*Demographic Characteristics of Survey Respondents*

	Males (n = 11)			Females (n = 59)		
	Mean	Standard Deviation	Range	Mean	Standard Deviation	Range
Age	43.90	10.19	32-56	36.25	11.21	18-62
Race/Ethnicity	n	%		n	%	
Black or African American	7	64		34	58	

Hispanic or Latino	3	27	19	32
White	1	9	3	5
Asian or Pacific Islander	0		1	2
American Indian or Alaskan Native	0		0	
Other/Multiracial	0		2	3

Of the 70 respondents, 11 (15.71%) were men and 59 (84.29%) were women (Figure 1). The age of respondents ranged from 18 to 62 years (Figure 2). The mean age was 37.24 (SD = 11.05), and the median age was 34. The age range varied widely because not all survey participants were the parents of the reference child. Some participants were siblings or grandparents who were one of the primary caregivers of the reference child. Two (2.86%) respondents were multiracial, four (5.71%) were Caucasian, one (1.43%) was Asian/Pacific Islander, 22 (31.43%) were Hispanic or Latino, and 41 (58.57%) were African American (Figure 3).

Figure 1. Sex distribution.

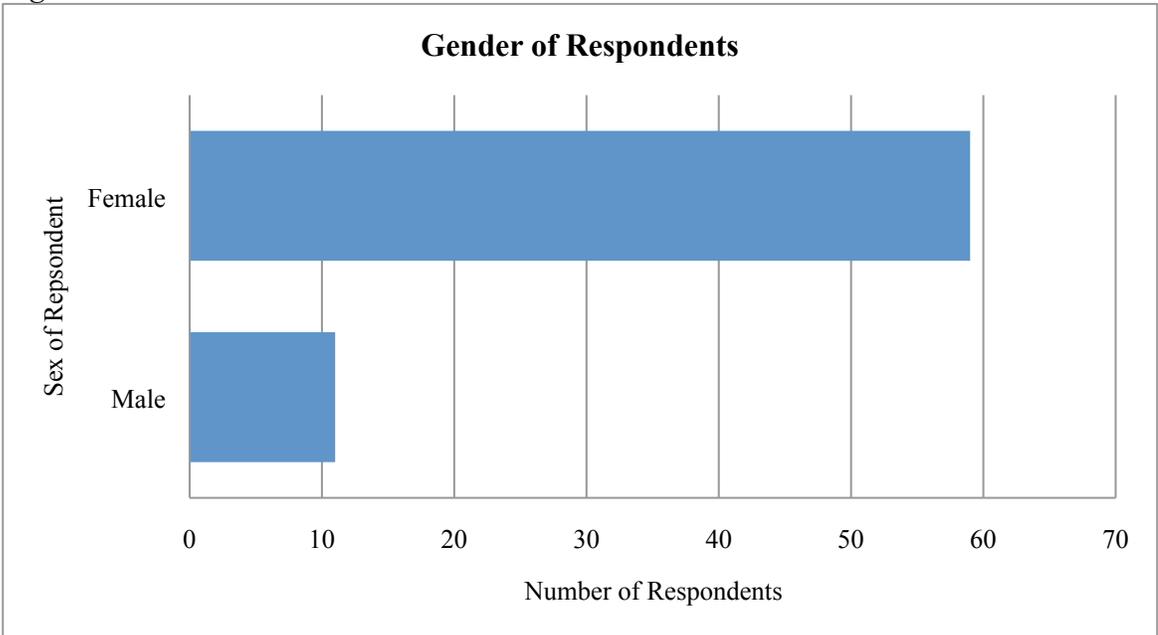


Figure 2. Age distribution.

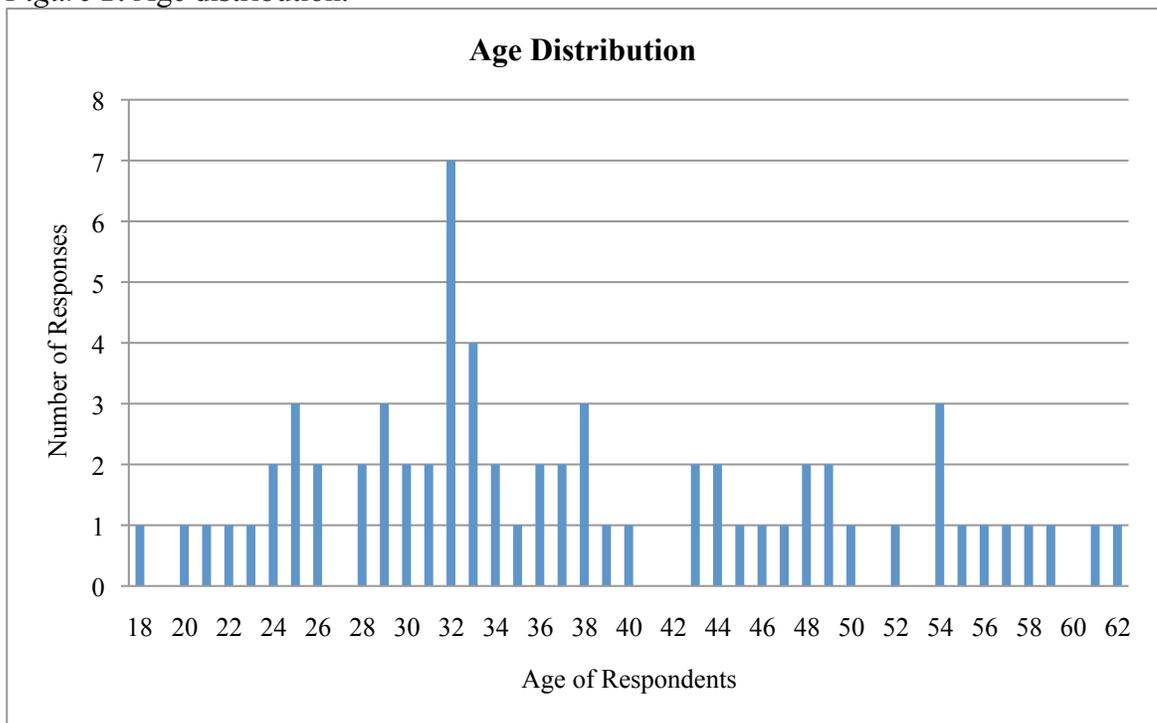
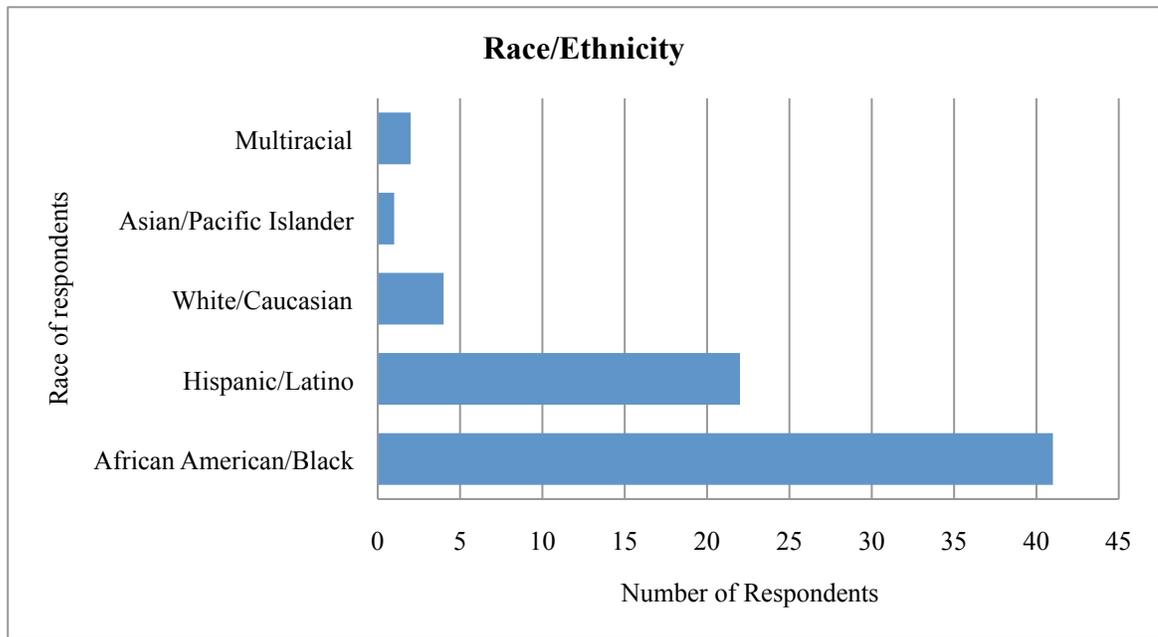


Figure 3. Race/ethnicity.



We also compiled demographic information for the reference children (Table 2). While the original age range for reference children was four to 10 years of age, allowances were made in order to obtain more participants in our convenience sample. Of the 70 reference children, 36 (51.43%) were male and 34 (48.57%) were female (Figure 4). The ages for the reference child ranged from one to 17 years old (Figure 5). The mean was six years old (SD = 3.26) and the median age was 5.

Table 2  
*Ages of Reference Children*

Age	Males			Females		
	Mean	Standard Deviation	Range	Mean	Standard Deviation	Range
	6.81	3.26	1-17	5.44	2.65	2-11

Figure 4. Sex distribution of reference children

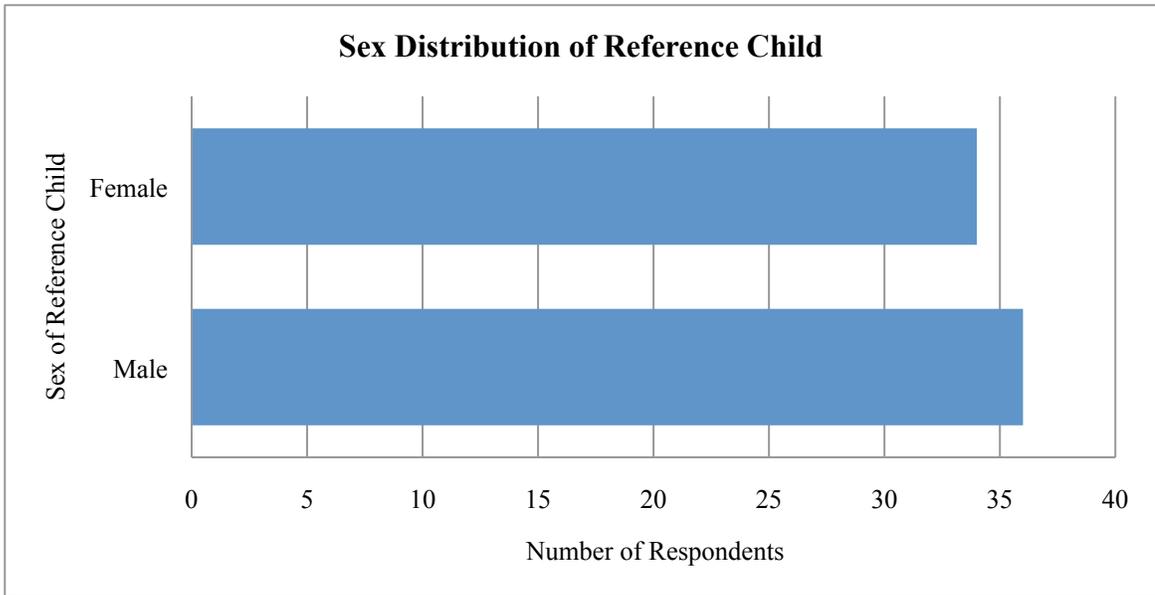
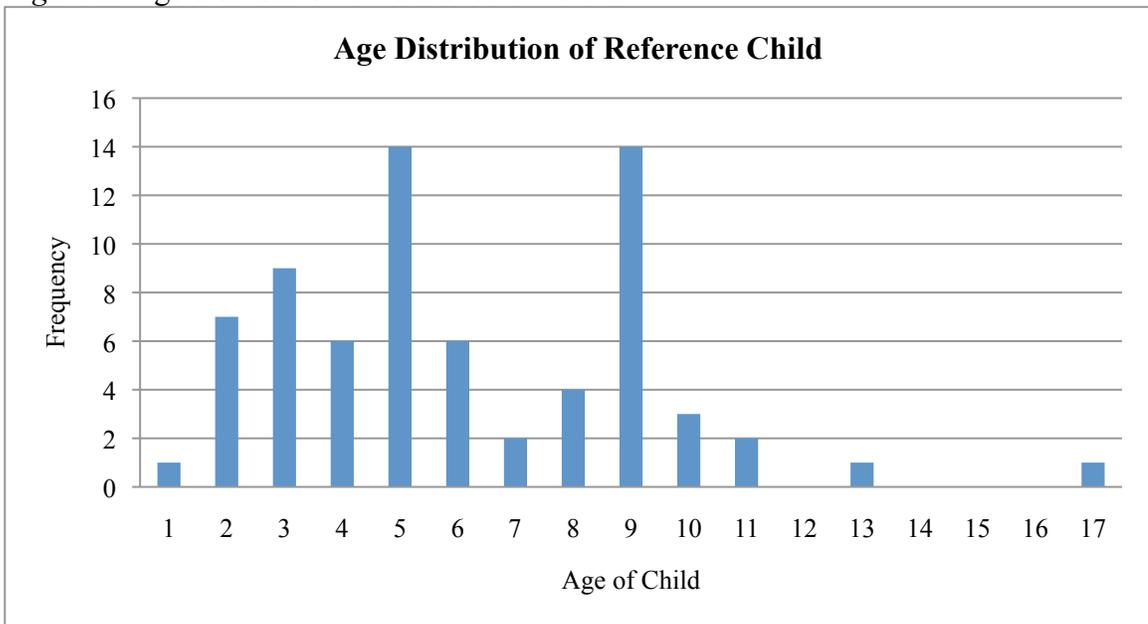


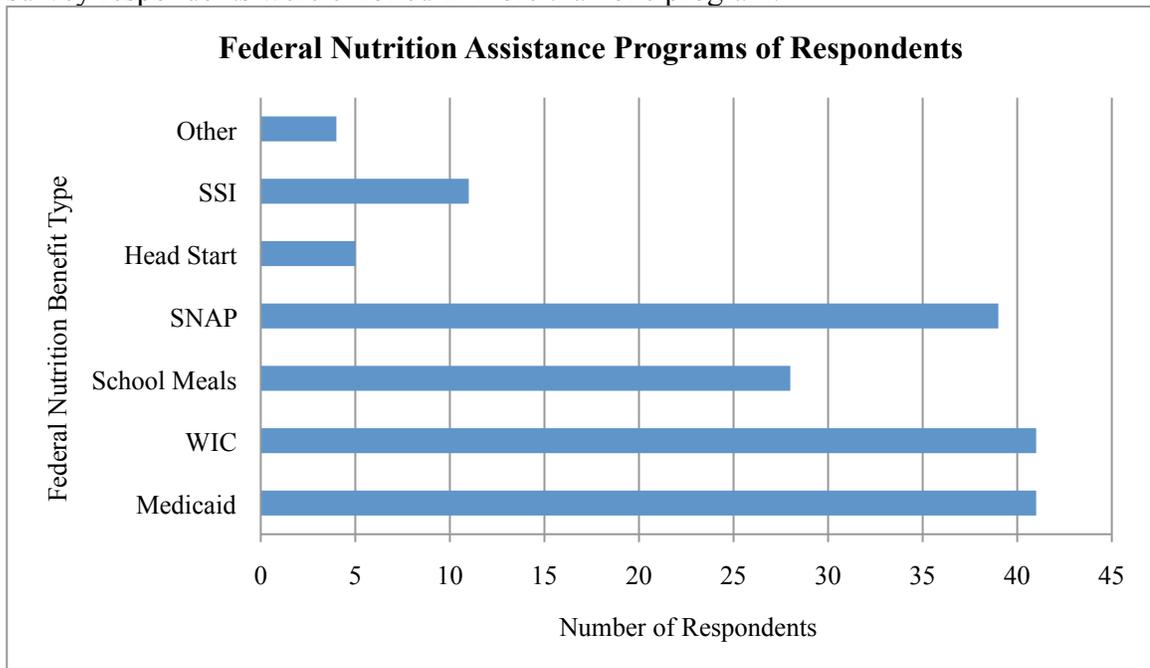
Figure 5. Age distribution of reference children.



All survey participants were enrolled in various federal nutrition assistance programs. By understanding which federal nutrition assistance programs are used by participants, policy decisions can be made to improve the effectiveness of those programs. Responses can also be compared to see if the federal nutrition benefit program(s) the

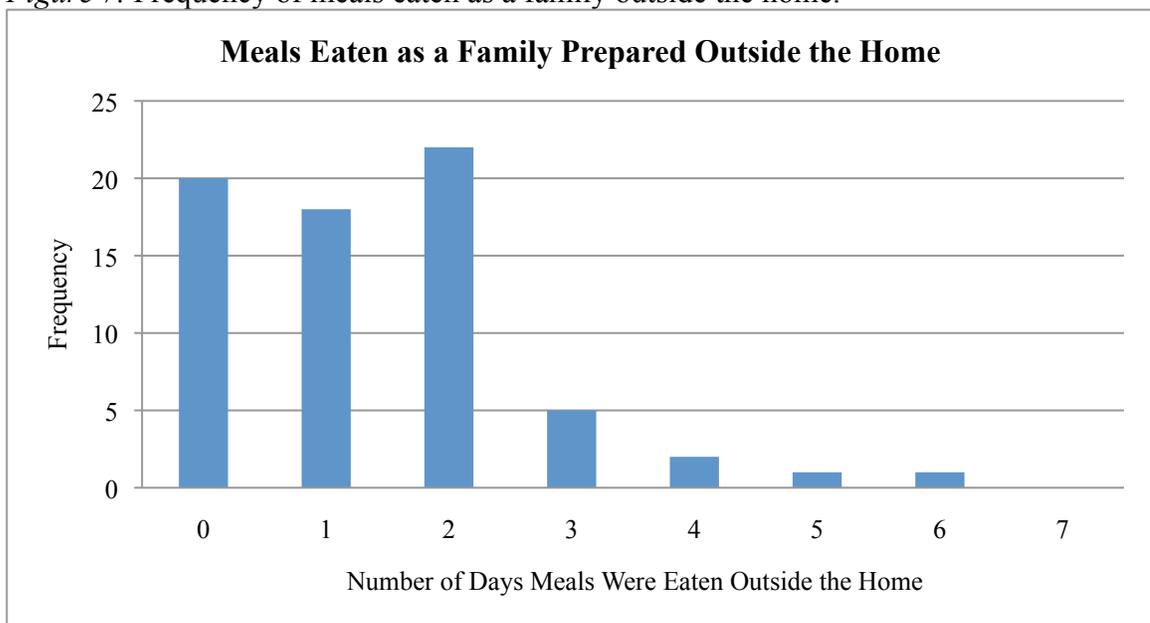
participant is using has any impact on their self-efficacy and/or home nutrition environment.

*Figure 6.* Distribution of federal nutrition assistance programs used by participants. Most survey respondents were enrolled in more than one program.



An important aspect of the home nutrition environment is the family health behavior. Participants ate a mean of 1.39 meals outside the home (SD = 1.27) and a median of one meal outside the home (Figure 7).

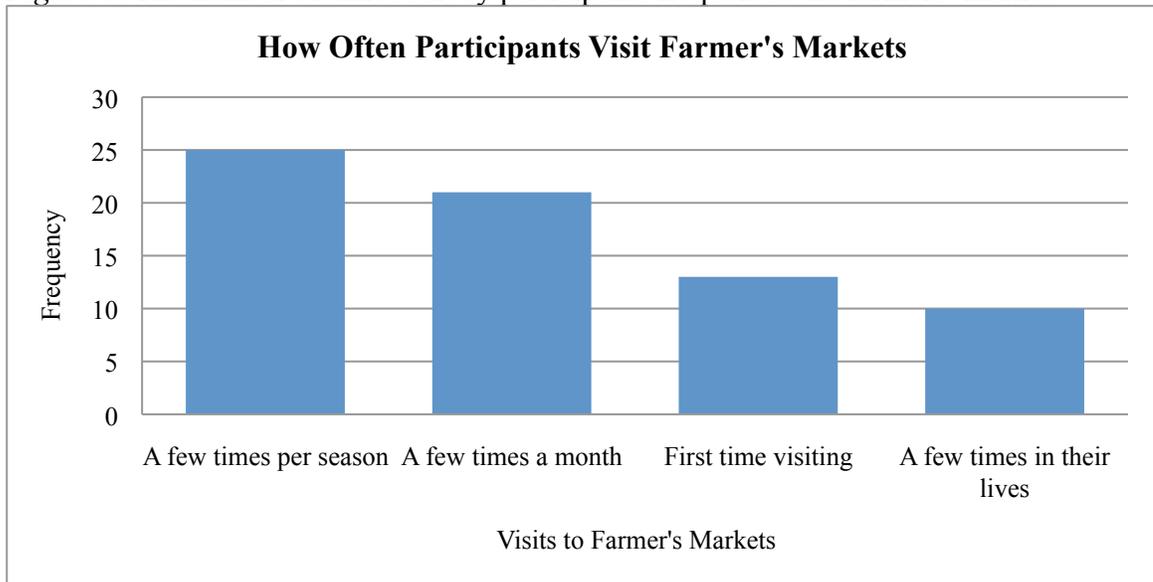
Figure 7. Frequency of meals eaten as a family outside the home.



The number of times participants visit the farmers' market was important to our study because we were specifically interested in the presence of SNAP and WIC recipients at farmers' markets. When asked how often the participants visit farmers' markets, 25 (36%) participants responded that they visit a few times per season, 21 (30%)

visit a few times a month, 13 (19%) were visiting for the first time when they took the survey, and 10 (14%) had visited a few times in their lives (Figure 8).

Figure 8. The number of times survey participants frequented the farmers' market



After analyzing survey participant demographics, as well as responses to individual survey questions, we analyzed our four variables. For each variable, a composite mean score based on self-reported values was calculated (Table 3). Pearson's product-moment correlations, though they do not show causation, were completed to

provide a more detailed idea of how each of the dependent variables is related to parental self-efficacy (Table 4). Next, regressions were run to address our main research question: what is the effect of parental self-efficacy on the home nutrition environment (Table 5)?

Table 3  
*Descriptives of Variables*

Variable	Mean	SD	N
Parental Self-Efficacy	4.16	.68	70
Family Health Behavior	3.77	.42	70
Perceived Barriers	3.79	.53	70
FV Checklist	15.65	5.16	70

Table 4  
*Correlations Among Variables*

		FV Offerings	Family Health Behavior	Parental Self-Efficacy	Perceived Barriers
FV Offerings	Pearson Correlation	1	.346**	.314**	.382**
	Sig. (2-tailed)		.003	.008	.001
	N	70	70	70	70
Family Health Behavior	Pearson Correlation	.346**	1	.638**	.293**
	Sig. (2-tailed)	.003		.000	.014
	N	70	70	70	70
Parental Self-Efficacy	Pearson Correlation	.314**	.638**	1	.319**
	Sig. (2-tailed)	.008	.000		.007
	N	70	70	70	70
Perceived Barriers	Pearson Correlation	.382**	.293**	.319**	1
	Sig. (2-tailed)	.001	.014	.007	
	N	70	70	70	70

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

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

Table 5  
*Regression Results for Variables*

Variable	Family Health Behavior	Perceived Barriers	FV Offerings
Constant	2.126 (0.243)	2.738 (0.383)	7.610 (3.774)
Self-efficacy	0.394** (0.058)	0.252* (0.091)	1.934* (0.896)
R-squared	0.407	0.101	0.064
Adjusted R-squared	0.398	0.088	0.050
Number of observations	70		

Standard errors are reported in parenthesis

\*\* . Correlation is significant at the .001 level

\* . Correlation is significant at the .05 level

Parental self-efficacy had a mean score of 4.16 out of five (SD = 0.68), indicating a high level of perceived parental self-efficacy among survey participants.

Family health behavior had a mean score of 3.77 out of five (SD = 0.42), indicating the belief that participants maintained acceptable family behaviors in the home. The Pearson's product-moment correlation indicated that parental self-efficacy and family health behavior were positively and strongly correlated,  $r(68) = 0.634, p < 0.001$ , where 68 indicates degrees of freedom =  $n-2$ . The regression test showed that parental self-efficacy was a significant predictor of family health behavior,  $F(1, 68) = 46.58, p < 0.001$  (Table 6).

Table 6  
*Regression<sup>b</sup> between Parental Self-Efficacy and Family Health Behavior*

Model	df	F	Sig.
1 Regression	1	46.58	.000 <sup>a</sup>
Residual	68		
Total	69		

a. Predictors: (Constant), Parental Self-Efficacy

b. Dependent Variable: Family Health Behavior

Perceived barriers had a mean score of 3.79 out of five (SD = 0.53), indicating that while there might have been some barriers to providing fresh produce in the home, participants believed they were surmountable. The Pearson's product-moment correlation indicated that parental self-efficacy and perceived barriers were positively correlated,  $r(68) = 0.32, p < 0.05$ . The regression test showed that parental self-efficacy was a significant predictor of perceived barriers,  $F(1, 68) = 7.68, p = 0.007$  (Table 7).

Table 7  
*Regression<sup>b</sup> between Parental Self-Efficacy and Perceived Barriers*

Model		df	F	Sig.
1	Regression	1	7.68	.007 <sup>a</sup>
	Residual	68		
	Total	69		

a. Predictors: (Constant), Parental Self-Efficacy

b. Dependent Variable: Perceived Barriers

Lastly, fruit and vegetable offerings in the home had a mean score of 15.65 out of a possible 28 (SD = 5.16), indicating an average amount of fruits and vegetables in the home. The Pearson's product-moment correlation indicated that parental self-efficacy and fruit and vegetables in the home were positively correlated,  $r(68) = 0.31, p < 0.05$ . The regression test showed that parental self-efficacy was also a significant predictor of the fruit and vegetable offerings in the home,  $F(1, 68) = 7.46, p = 0.008$  (Table 8).

Table 8  
*Regression<sup>b</sup> between Parental Self-Efficacy and FV Offerings*

Model		df	F	Sig.
1	Regression	1	7.46	.008 <sup>a</sup>

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Residual	68
Total	69

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a. Predictors: (Constant), Parental Self-Efficacy

b. Dependent Variable: FV Offerings

## CHAPTER 4: QUALITATIVE METHODS AND RESULTS

### **Writing Interview Questions**

In preparation for our interviews with survey participants and market coordinators, we created two sets of interview questions. The participant questions (see Appendix B) were mainly reflective and centered around the interviewee's impressions of the farmers' market (general atmosphere, price, etc), comparative questions between the market and other locations where the participant shops, motivations for shopping at either place, how difficult or easy it was to get to the farmers' market, and about their experience in the nutrition education program.

Graduate students at the University of Maryland School of Public Health conducted the nutrition education portion of our project (see Appendix E). The nutrition education program was comprised of five separate sessions which each lasted approximately 15 minutes. A random number generator was used to select which participants received which style of the nutrition lessons. Some individuals met with graduate students receiving one-on-one lessons, while others were provided with the educational materials but no additional instruction. The study was designed in this way to measure whether the one-on-one instruction or the educational materials themselves were more successful at instructing the participants. Given the small number of participants who returned for education sessions we did not have enough data to make any statistically significant conclusions about which mode of instruction was the most effective.

Market coordinators are the individuals who facilitate the overall functioning of the market. This includes procuring the market space, organizing the vendors, advertising

the market and various other tasks. The questions that we presented to the market coordinators (see Appendix C) addressed what the coordinators wanted to provide to the community through their market, their goals for their market, and any opinions they had regarding acceptance of EBT/WIC benefits at their market. Most questions were open ended to encourage in depth responses. We also prepared probing questions that we included in the dialogue to attain more detail if the responses were brief.

### **Sampling**

Our participant interviewees came from the original sample of survey participants. As outlined in more detail in the Quantitative Methods section, this sample was comprised of SNAP and or WIC recipients who were the primary caregiver of a child. At the start of our research we informed the cross-sectional survey respondents that if they attended the nutrition education program and took the survey a second time at the end of the market season, they would be eligible for additional monetary compensation. Of the original 70 cross-sectional survey participants, only four completed the entire nutrition education program. Because of the low retention rate, we decided to conduct interviews with the remaining participants in addition to administering the second cross-sectional survey. With the interviews we hoped to understand in greater detail the participants' opinions of the markets, as well as their views on the nutrition education program. The four interviewees completed a second survey - nearly identical to the original cross-sectional survey, but with several reflective questions, however their responses were not used in our data analysis.

We also interviewed two coordinators from Market 1, one coordinator from Market 2, and one coordinator from Market 3. It is important to note that the coordinator from Market 3 was also a participant in our cross-sectional survey who was retained through the market season and completed a second survey and an interview. This sets her interview apart from the others, as her perspective contains both that of a purchaser and supplier. Her point of view reflects the food and shopping needs of a parent receiving SNAP and or WIC as well as the business aspect of a coordinator trying to target low-income shoppers to their market.

### **Data Collection**

Participant interviews were conducted at the farmers' markets on the last day of market visits. Participants were given advanced notice on the penultimate market visit that we would like to interview them. Market coordinator interviews followed the same general procedure, except three of the four interviews were conducted over the phone, and only one was conducted at the market. The coordinator interview conducted at the market was with the individual who was both a survey participant and a market coordinator, at Market 3.

The interviews were each conducted by one member of our team, and the participants were given as much time as they wished to respond. We used our questions less as a strict script and more as a guideline, in order to get at the issues the participants found most important and most wanted to discuss. At the end of our planned questions, we asked each interviewee if she/he had any more thoughts or ideas they wanted to share.

All interviews were recorded so that our data and data analyses would be as precise as possible. Generally, interviews lasted 10 to 20 minutes.

### **Data Analyses**

The first step of our data analysis process was interview transcription. Because we had recorded the interviews we were able to use ExpressScribe (NCH Software, 2012) to transcribe the interviews. The second phase of analysis involved four team members coding and categorizing the themes that were most prevalent in our interviews. We used grounded theory as our method of analysis (Corbin and Strauss, 1990). Grounded theory is a research method that begins with data collection in the effort to establish prevalent concepts or ideas, which emerge from the data. Four members of the team individually coded each interview in ATLAS.ti 6 (ATLAS.ti, 2011). We went into this initial phase of coding with no predetermined codes to allow each member to decide on his/her own what the emergent themes or important topics were in each interview. After this first round of coding, the four-person team compared the lists of codes that each member had made. From these comparisons we made a final list of concepts and sub-concepts that became our master code list (see Appendix D). We found many similarities in our individual code lists, and consolidating them consisted of streamlining terminology, deciding which ideas could be made more specific and which more broad, and splitting codes up between market coordinator-relevant codes and participant-relevant codes. An example of one of our concepts was “accessibility of market” and some of the sub-concepts were “accessibility of market-cost of goods at market,” “accessibility of market-schedule of market,” and “accessibility of market-transportation issues.” In the second

round of coding, each of the four team members took an alternate interview from the one which they coded in the first round. We then re-coded the interviews using the codes we had chosen to include in the master code list. The findings reported on in the next section are based on this second round of coding only.

## **Qualitative Results**

In this section, we examine participant and market coordinators' responses in interviews administered during and after our data collection.

### **Participant Views**

Four female participants were interviewed. Their mean age was 41.5 years, and these participants had an average of five children each. Participants in their interviews touched upon a variety of themes including: Transportation to the market, market affordability and access, food offerings, comparisons between the markets and other venues, social aspects of the market, market critiques, family eating habits, and the nutrition education program effects and tools.

Participants often touched on the theme of accessibility of the farmers' markets. Participants reported being able to walk, take the bus, or drive themselves to the farmers' markets. One noted that transportation problems were not significant as she only visited the market once a week. Within our small sample of four participants, the general agreement was that accessing the farmers' market was not difficult, and participants felt it was worth their time and effort to travel to the market. One participant, a 37-year-old mother of five enrolled in multiple assistance programs, even stated, "I'd drive 50

minutes to come here.” However, of note is that only participants who were already able to attend the market were interviewed.

Participants had mixed feelings about the theme of affordability and cost of goods at the market, with some saying the market was cheaper than other locations: (“yeah it was a whole lot cheaper”), others stating that it was “just kind of a little bit expensive,” and others that it was the same price. Two participants, including one who also worked as a market coordinator, explained that they would prefer if the market was open more frequently, or even daily.

Participants had generally positive thoughts regarding the theme of market food offerings. While one participant did mention the lack of meat options at the farmers’ market, another, a 36-year-old mother of two participating in WIC, mentioned that she “love[d] the fruits and vegetables here.” Farmers’ market food was said to be “literally fresh versus having to sit on the shelf,” “more fresh; it’s fresh! As simple as that” and that one could “taste the difference from the vegetables from the farmers’ market and from the other stores.” This general theme of “quality is really better here” at the farmers’ market was frequently repeated in our interviews.

Participants spoke extensively on the theme of comparisons between their farmers’ market and other venues such as local supermarkets. One participant explained that she chose her farmers’ market because it was within walking distance. However, she noted that she does travel by car to other farmers’ markets. Another participant stated that certain items such as tomatoes would be “expensive” at other venues and would not “taste good like here from the market.” She also notes that these tomatoes would “not be as fresh” and would taste “different” compared to those from her farmers’ market.

However, “coupon sales” were listed as an example of a benefit of shopping at other stores over the farmers’ market. Another participant, a 49-year-old mother of four participating in SNAP for several years, explained that “the people, and the festivals, and then the samples” were what she liked best about the market, especially as market food samples were free. She elaborates that she could not get “certain things... from the regular store” and that she “knew [she] had better quality” at the farmers’ market. This participant did note that she had to visit other stores to obtain meat, as her farmers’ market did not sell any.

Another participant, a 44-year-old mother of nine who also serves as a market coordinator, touched on the theme of the social/“people” aspect of the farmers’ market, explaining that the market was “a social time ... to visit with my neighbors and just have a nice little chat with them. It's a good way to get the community even better” and that she “would shop at [the] farmers’ market if [she] had a choice.” This participant also explained that she “can't always find the freshest fruits and vegetables that [she's] looking for” at other stores and that she becomes “frustrated” with them. She however does note that other stores have, “more varieties than what we would.” The farmers’ markets and the education program were seen as tying into the community and providing a needed service. One participant explained that, as her community had “a lot of Chinese takeout that are in easy access, as well as convenience stores,” an education program was “very important.”

The theme of market critiques was seen when participants had aspects of the farmers’ markets in which they would like to see change. As noted, participants wished the markets would open more frequently. One participant wanted to see meat sold at the

market. One wished that “there were more farmers here ... so they can have a run on the prices with what they can charge”, meaning that she believed more farmers would possibly lower prices at her market. One also expressed that some of the participant education materials were not quite appropriate for her children’s developmental stage. Another suggestion was to “make it bigger – more fruit, more vegetables” and to have the market indoors.

Participants reported in the theme of family eating habits that children played a large role in determining these habits. Mealtime and food shopping involved the children and were related to their food preferences and health conditions. Said one participant, “When I’m grocery shopping, it’s hard to try something new, if it’s gonna be expensive, and especially if I know it’s gonna be tricky to buy and give to the kids and they’re not gonna eat it.”

It was found in nutrition education program theme that it had impacted both parents’ and children’s habits. One participant reported that her child was now more receptive to eating vegetables after the education program and that she was “planning the meals and planning the grocery lists ahead of time” after the education program. She also noted that her children paid attention to the program materials provided in “trying to plan different ideas for snacks and things like that.” Another reported that both she and her children were trying new fruits and recipes now and that she participated in the program to know what was healthy for her children. The participant also working as a market coordinator explained that she became “more conscious about buying [fruits and vegetables] more often” from the program and learned to experiment more with fruit by making smoothies at home.

Overall, our participants reported using the tools acquired from the education program. One mentioned she used what the program taught her “every time” she came to the market. Another reported that, with regards to her self-efficacy in “planning the meals and planning the grocery lists ahead of time,” she thought it took “a lot of work, but it’s something that needs to be done” and that “it’s going much better than it was.” She also reported “making sure that [she] had at least a couple of vegetables set up, cut up, so that [the children] could at least open up the refrigerator and grab something.” General thoughts about the education program included that “it was very important for this community” and that “I’ve learned a lot of helpful, useful ideas for my kids.” One participant reported that it “made [her] more aware with what’s going on with food, and organic stuff, and what’s a different way to eat it or get it,” while another reported that the recipes were “delicious.”

Participants largely had positive thoughts towards the farmers’ markets across the many themes. Generally, participants believed the farmers' markets were accessible, provided needed community services, and offered high quality food, especially in contrast with other shopping locations. They also indicated that the education program impacted their eating habits and those of their families, that its tools were useful, and that their children played a significant role in determining their family's eating habits. Participants did, however, have mixed feelings about the affordability of market goods. Further, some desired changes in the markets’ schedules (open on more days or for longer hours), as well as a desire for greater variety of food and vendors available at the market.

### **Market Coordinator Views**

Interviews with the market coordinators yielded insight into the market end of the research and the market-patron relationship. Coordinators provided feedback on WIC and SNAP redemption at their markets and general comments regarding their operations. Market coordinators discussed a variety of themes including: market food offerings, market logistics, SNAP and WIC benefit acceptance, goals for the community, plans for the market, comparisons between markets and other venues, and marketing strategies.

Market coordinators had their unique views regarding the farmers' market where they worked. They often expressed positivity and pride on the theme of their specific markets' offerings, with statements such as, "[their market having] a pretty good reputation for having a nice, rounded selection" in regards to fruits and vegetables and, "the things that I do purchase, they are quality number one, very good."

They also touched on the theme of their many market logistics. All coordinators brought up seasonal success and sales. The frequent fluctuations in profit between seasons and even days of the week were noted; for example one market decreased from about \$4,000 in average total sales during their peak month, to about \$1,500 in November, typically the end of the season. Several mentioned the drive for profits and increased sales. One market coordinator who also served as a farmer and a market vendor explained how, "the credit card purchases were a lot higher per average in transaction than our cash transactions were." However, he also explained that, in order to avoid the fees associated with credit card transactions, his market sought out and found a company that would not "penalize us for turning [the credit card machines] off. So, come the first of May, we can have them reinstated and start paying the fees." Also mentioned was the disagreement over profits between market coordinators and their supervisors, with one coordinator

explaining “My boss felt that [the market] wasn't making enough money, even though we were making money. It wasn't the amount of money he would like.” Another market coordinator mentioned his market’s schedule coinciding with that of a local college campus, and his wish to thus attract students with increased marketing, including advertising in the student newspaper. The importance of location visibility and parking for the markets was also noted. The low-income demographic of the neighborhood was cited by two different market coordinators as a principle reason for the market’s existence. One market coordinator who also served as the only vendor for her market emphasized the need for SNAP acceptance, saying, “It was a must. I think because the area is such a low-income area, in order for us to be successful and be able to teach them about different things, we would have needed to accept the food stamps.” Another market coordinator who helped run his market and managed vendors mentioned, “If we don’t take SNAP benefits ... it isn’t as broad a flock of the population.”

Market coordinators had a variety of thoughts on the theme of SNAP and WIC acceptance. Market coordinators of the markets that did not accept SNAP benefits at the time said that acceptance “couldn’t hurt” and that they “wish that we had an EBT machine out there for us ... try to get [SNAP users] coming out to our market, and you know, jump on the opportunity like that.” Another coordinator explained that he didn’t know how much the machines cost, but said, “I know it can’t be that expensive. I know we would be very interested, and plus it would maybe draw some different customers to our market.” Lack of sufficient staff and volunteers was identified as one reason why SNAP benefits were not accepted at one market. One coordinator did state that he “[didn’t] know if it would affect our sales” if he implemented SNAP benefit acceptance.

He elaborated that, in the past, customers with vouchers “spend them right away or they put it in their pocket and go somewhere else, or they waited until the last minute.... So I don't know if an EBT machine would necessarily help.” In general, SNAP benefits were regarded by coordinators as being “more difficult to administer” than WIC coupons.

Market coordinators also had different views regarding WIC acceptance at their markets. The positive aspects of WIC acceptance were noted: “they are vouchers, and the farmers don't mind taking the vouchers in;” or how, on days that a WIC booth was open at a market, “those days, our numbers really picked up” as “people could go right to where we were selling, and use their coupons right there and make their purchases and go home.”

However, coordinators did voice certain frustrations with the WIC program as well. One market coordinator mentioned how WIC recipients “didn't seem to come back the next week” after using their vouchers, “and that bothered me a little bit. And it was like, they're only there because of the coupons.” The coordinator said, “I know they have cash money, and they didn't use cash money too much, very little. And if they exceeded the price of the coupon, they just put it back.” WIC sales were also reported as “way down” and “declining quite a bit” in comparison to the previous summer.

Of primary concern and attention to the coordinators was the implementation of the EBT system into their markets, illustrated in the SNAP and WIC benefit acceptance theme. One market coordinator emphasized the need for an increase in customers to make an EBT machine advantageous. In his eyes, his market's SNAP acceptance would have to be “marketed appropriately, to reach to people that have [SNAP benefits] ... without that, an EBT machine is just an EBT machine. You gotta have the whole movement with it.”

He additionally noted the need for better “marketing” and “promoting” of his current acceptance of WIC vouchers, explaining that “the people who have those WIC vouchers do not know that we accept them there, or they go to other places. It's been hard to try to get these people.”

Market coordinators had a wide range of answers regarding the theme of goals for the community. Goals included convenience for customers, an “excellent quality” of food that “you can’t find [in] the store,” showing people how to eat healthy and “support[ing] us and our farm,” giving “access to local foods to the widest number of people possible,” and providing a “great social gathering for me and for the community.”

Market coordinators envisioned future plans both big and small for their market in the theme of plans for the market. Multiple market coordinators stated that they were attempting to bring in more farmers and vendors next year. One market coordinator mentioned looking for other grants and possibly beginning a nonprofit organization to financially support the market. Another offered that he would like, “to get a little entertainment out there, maybe someone to sell coffee... maybe barbecue or baked goods.”

The theme of comparisons between markets and other venues was frequently drawn throughout the interviews by market coordinators. One market coordinator emphasized the freshness of his produce being “ten hours off the vine,” whereas “what you see in the stores is at least a week old.” Another comparison concerned the relationship between markets and local farmers/vendors: “[other] markets in Prince George’s County do not even have *one* farmer from Prince George's County there. They have them from Pennsylvania, and Delaware, and St. Mary’s County, and Charles County

– at markets that are established in Prince George’s County.” One market coordinator brought up the overlap between neighboring markets as a contributing factor to competition, stating, “You have four markets right there, within three days of operation, and they're only about five to six miles apart. So I’m sure they, we, all compete against each other.”

To solve this problem, market coordinators have turned to a wide variety of different marketing strategies, addressed in the marketing strategies theme. As one market coordinator stated, “I think word of mouth is the best marketing out there.” However, another coordinator mentioned using social marketing tools such as Facebook and Twitter, and another also mentioned his market’s Facebook page and website. Traditional marketing techniques, such as posted signs, ads in newspapers, newsletters, flyers, and postcards were also frequently discussed.

Overall, coordinators addressed similar aspects of their markets and voiced similar successes, concerns and suggestions regarding SNAP and WIC redemption specifically. Coordinators were generally proud of their markets, both from an operational standpoint and in terms of their offerings and community relationship. Although each market is different in respect to demographics, size, access and location, coordinators’ responses were fairly consistent concerning the necessity for SNAP and WIC acceptance as a healthy step for both patrons and the market, but simultaneously voiced logistical concerns regarding the EBT system implementation and the cost-benefit analysis.

In general, all coordinators stressed increased marketing in the future to ensure more sales and to broaden the patron base, and each identified specific changes or visions

tailored to their respective markets. Coordinators thus seemed interested not only in their profits and popularity of their markets but also in serving as purveyors to increase food access to a low-income demographic that may not already frequent their sites. The commentary from market coordinators also point towards more collaboration between different (and especially neighboring) markets and the WIC and SNAP programs.

## CHAPTER 5: DISCUSSION

Consistent with previously discussed research, our findings suggest that parental self-efficacy has a significant effect on the home nutrition environment. Our results indicate statistical significance for self-efficacy's relationship with each of the three home nutrition environment components: perceived barriers, family health behavior, and fruit and vegetable offerings in the home.

### **Parental Self-Efficacy and Perceived Barriers**

There was a significant relationship between parental self-efficacy and perceived barriers, where some variance in outcomes of perceived barriers was attributable to variance in parental self-efficacy. A recent study evaluated the application of Transtheoretical Model (TTM)—which consists of perceived benefits and barriers to behavior change and parental self-efficacy—to SNAP-Ed, SNAP's current nutrition education program (Wyker, Jordan, & Quigley, 2012). The researchers found a significant association between perceived barriers and parental self-efficacy and fruit and vegetable consumption behaviors. These findings are consistent with our findings of a significant relationship between parental self-efficacy and perceived barriers.

Moreover, perceived barriers and parental self-efficacy have been identified as mediators in the relationship between the availability of fruit in the home and fruit intake (Wind et al., 2010). Wind and colleagues defined parental self-efficacy as the self-efficacy of parents to eating fruits, while barriers were measured as preventions from eating fruit. Since other research has also reported a relationship between these variables,

we again highlight how important it is to target SNAP-Ed towards overcoming barriers to being able to serve fruits and vegetables (i.e. negative beliefs and attitudes about fruit and vegetable cost, spoilage, and visual appeal). Our findings are important because they inform SNAP-Ed educators which areas in their curricula may be most influential on behavior change. An increase in parental self-efficacy and the ability to overcome perceived barriers may promote positive change in perceptions of fruit and vegetable access and nutrition. Thus, improved SNAP-Ed should have a greater focus on increasing self-efficacy amongst parents and removing or attenuating barriers in order to improve fruit and vegetable consumption (Wyker et al., 2012).

### **Parental Self-Efficacy and Family Health Behavior**

The relationship between parental self-efficacy and family health behavior also demonstrated significance, with almost half of the variance in family health behavior outcomes attributable to variance in parental self-efficacy. Thus, higher scores of parental self-efficacy are strongly predictive of positive family health behavior. Family health behavior items were focused on how often families ate meals individually and together; how often they ate meals inside or outside of the home; how often they consumed fast food, soda, pre-packed foods, fruits, and vegetables; and how often they exercised, both, individually and as family. The relationship of parental self-efficacy and family health behavior found in our study is consistent with data from previous research. Past studies have shown that motivational and educational interventions improve the home nutrition environment and dietary behaviors in parents and children (Tabak et al., 2012). Physical

and social factors, such as familial customs, influence eating behaviors of family members (Tabak et al., 2012).

Tabak and colleagues (2012) conducted a motivational intervention aimed at parents and found that self-efficacy in intervention participants increased from baseline scores. This motivational intervention took place over a period of four months. Participants received four monthly newsletters tailored from their baseline survey responses and two phone calls from dietitians trained in motivational interviewing techniques. Participants were motivated around one of the following as selected by the participants: vegetable availability, picky eating, modeling, and family meals. In conjunction with an increase in self-efficacy, participants also exhibited positive changes in their physical and social characteristics in relation to the home nutrition environment (Tabak et al., 2012). Children most often model themselves after their parents in developing their eating behavior, so if parents exhibit healthy eating practices, children will be more likely to follow their example (Tabak et al., 2012).

,Our study results, similar to those of previous studies, illustrate the importance of the parental self-efficacy and family health behavior relationship and suggest that a consistent effort to increase parental self-efficacy can be predictive of improved eating habits, positive changes in physical and social factors in the home, and therefore improved family health behavior. Higher parental self-efficacy may foster a healthier, more communal and consistent eating environment at home.

### **Parental Self-Efficacy and Fruit and Vegetable Offerings in the Home**

Our research yielded a significant relationship between parental self-efficacy and fruit and vegetable offerings in the home where some of the variance in fruit and

vegetable offerings is attributable to variance in parental self-efficacy. The fruit and vegetable portion of our survey listed many fruits and vegetables and asked parents which of those fruits and vegetables were present in their homes at the time of the survey. Due to this format, our results specify that parental self-efficacy is responsible for variance in the variety, not necessarily the amount, of fruits and vegetables in the home.

Our findings are similar to multiple studies. Cullen and colleagues (2003) found a relationship between parental self-efficacy (and making fruits and vegetables available to school children). Duncan (2012) found that parental self-efficacy for managing a child's diet was associated with higher variety of vegetables available in the home. Thus, self-efficacy for managing a child's diet influences fruit and vegetable purchases and the variety of fruits and vegetables that would be in the home. If parents feel confident that they have an influence over what their child will eat, they may be more likely to buy a variety of foods as opposed to only the foods that they usually prepare for their children.

Lohse and Cunningham-Sabo (2012) found that parental self-efficacy for serving fruits and vegetables to children and fruit and vegetable in-home availability are both influenced by parent eating competency. Eating-competent parents are described as parents who eat a variety of food, experiment more with foods, eat foods because they are healthy, and pay attention to eating. Eating-competent parents tended to agree that they could buy, prepare, and include vegetables in meals that their children would eat (Lohse & Cunningham-Sabo, 2012). Therefore, the level of eating-competency of a parent could contribute to the self-efficacy of that parent; this in turn could contribute to the variety of fruits and vegetables in the home. Or, the eating-competency of the parent could contribute to both self-efficacy and the variety of fruits and vegetables in the home. Our

research was not comprehensive enough to specify between these two possibilities.

Eating-competency is similar to our study's self-efficacy measures, and thus our findings support the growing body of research indicating self-efficacy is positively correlated with fruit and vegetable offerings in the home.

Another study exploring whether food insecurity was associated with parenting practices and parental self-efficacy related to fruit and vegetable consumption found that parental self-efficacy for making fruits and vegetables available in the home decreased among food insecure parents (Hilmers et al., 2012). Therefore, the relationship between self-efficacy and fruit and vegetable offerings in the home may include this variable and a number of others that were not specifically examined in our study. For instance, children's taste preferences, large household sizes, age of head of household, parent employment status, race and ethnicity, and levels of education have all been shown to influence vegetable variety in the home (Stewart & Harris, 2005; Jago, Baranowski, & Baranowski, 2007). Perceived barriers to fruit and vegetable consumption, like cost and selection, may also influence the variety of fruits and vegetables in the home, suggesting that the outcome variables in this study have a more complex relationship with self-efficacy than what was examined (Hatzenbuehler, Gillespie, & O'Neil, 2011).

### **Limitations**

Self-efficacy has been shown to be a strong predictor of health behavior, in some cases accounting for more than 50% of variability in behaviors (Abusabha & Achterberg, 1997). Although our study did not find such high predictability, we found significant relationships between self-efficacy and the three dependent variables. However, there are

many factors that we did not examine that could play a crucial role in explaining the relationship between self-efficacy and the home nutrition environment. Without conducting further research, we cannot make any definitive claims as to what these factors are. Our study also used a relatively small sample size ( $n=70$ ), and further, was a convenience sample, which likely contributed to our results having weaker relationships than other studies.

We looked specifically at the influence parental self-efficacy had on the three dependent variables we operationalized to define the home nutrition environment, but did not consider other bidirectional or cyclic relationships. This can be seen in the relationship between parental self-efficacy and family health behavior. Our study measured how much influence differences in parental self-efficacy had when examining differences in family health behavior. This, however, ignores the idea that the family's health behavior could reversely have an effect on the parental self-efficacy. If a family often eats pre-packaged meals in front of the television as opposed to eating home cooked meals at the table, a parent may feel that they do not have the ability to prepare healthful meals for their families, simply because they do not do it often. In this case, the parental self-efficacy could decrease because of the family's behaviors, as opposed to the idea that the quality of the family's health behavior is decreasing due to a decline in the parental self-efficacy.

This bidirectional relationship also leads to the idea that the relationship between self-efficacy and the three dependent variables is cyclic, causing parental self-efficacy and family health behavior to constantly influence one another for better or for worse. A parent that does not have high self-efficacy may feel incapable of cooking certain fruits

and vegetables and therefore will not buy them. Then, the fact that they do not have a variety or adequate assortment of fruits and vegetables in the home may cause their self-efficacy to decline even further. The parent's low self-efficacy may continue to manifest itself in the parent's limited purchases at the grocery store or farmers' market. Thus, repeated performance of the specific behavior — in this case purchasing fresh produce and preparing healthy meals in the home — is the best way to increase self-efficacy, as the cycle allows the parent to build confidence.

Some other limitations to our research include possible self-report bias and low participant retention over time. Additionally, participants may have over or under estimated their answers due to social desirability. If the responses did not accurately reflect reality, then scores we measured may have been different from the actual situation in that home

Unfortunately, due to inclement weather and transient residents, attrition over the course of the education program (which was conducted by partnering graduate students) was too high to allow us to analyze pre- and post- survey data. Participant criteria also limited the generalizability of our data. Our results can only be applied to parents with children between the ages of four and ten (even though our actual data range was from one to 17 due to specific family exceptions), with no serious food allergies or dietary health conditions. In addition, since the sample was from the Washington, D.C., metropolitan area, these results cannot be generalized to the entire United States as this is a specific geographic location.

One of the most significant limitations of our research was that our sample size (n=70) was too small for generalizations. The sample was a convenience sample, as

participants were recruited based on their presence at the markets when we were attending, and their willingness to participate. A truly random sample and not a convenience sample would improve the validity of our survey. Recruiting at places other than the market itself would allow us to obtain a more representative sample of SNAP and WIC participants, especially reaching out to those who are unfamiliar with or do not frequent farmers' markets.

There were also sources of systematic error with our survey instrument. When translating the survey from English to Spanish, some questions were accidentally omitted. Since those questions were not asked, the participants taking the Spanish surveys may have had slightly different scores in comparison to the English-speaking participants. To correct for this we did not include those questions in the statistical calculation for any of our survey participants. In addition, we did not measure fruit and vegetable consumption, only the fruits and vegetables that were available in the home. This measurement may not have been an accurate representation of health behavior since all members of the family may not eat the fruits and vegetables in their homes. Furthermore, the scale for the fruits and vegetables only measured variety, not quantity. When a participant marked that they had apples, we only know that they had apples in the home; we do not know if they had just one or if they had enough for each member of the family to have one every day (or if they ate them at all, as previously mentioned).

Upon reviewing our results, we realized that certain questions within our survey instrument were poorly worded or incompatible with the given answer choices. This may have resulted in flawed data, as confusion amongst participants may have resulted in less confident or omitted responses. For instance, questions 8 and 9 (See Appendix D)

address family health behaviors inside and outside the home, and ask the participant about number of meals eaten together or outside the home. However, the answer choices provided list days (0-7), which is confusing because days do not necessarily correlate with the number of total meals in the past week. Several other questions in the survey, especially in the self-efficacy section, could be reworded for clarity. Improving or modifying these questions for future surveys would allow for better understanding of family health behaviors and more accurate results.

Furthermore, cultural differences may have also had an effect on the dependent variables. Our list of fruits and vegetables was not exhaustive, so fruits and vegetables common in other cultures may not have been represented on the survey. We assumed that the fruits and vegetables on the checklist were common foods. However, some of the participants may not have heard of the food, which was evident as some people asked about certain foods while completing the survey.

Finally, the family health behavior questions do not account for any single member of the family whose eating behaviors deviate from the rest of the household. We cannot account for environmental conditions that may confound the variables. For example, the fruits and vegetables available to the child may not be limited to the ones in the house since the child can eat school lunches or eat at friends' or relatives' houses. The participant may also not be the primary person feeding the child, which may be another confounding variable. Children in daycare may be fed most of their snacks there, and these foods were not included in the survey results.

### **Program and Policy Implications**

Our qualitative data reveal several policy and program changes that can be made to improve redemption of SNAP and WIC benefits at farmers' markets. Our quantitative data reveal policy and program changes that can be made with regards to nutrition education and improving parental self-efficacy for SNAP and WIC participants. As discussed previously in the literature review, the best example of redemption of federal nutrition assistance programs at farmers' markets is FMNP, with over \$16.4 million in revenue generated for farmers authorized to accept FMNP coupons during fiscal year 2011 (USDA, 2012e). The federal government has acknowledged the success of FMNP and has made efforts to implement a comparable program within SNAP (United States Government Accountability Office [GAO], 2006). Because WIC already has an established farmers' market program, this section mainly focuses on policy and program implications for SNAP.

#### *An Incentive Plan for SNAP*

One method for creating a SNAP program comparable to FMNP would be to add rewards for buying healthful goods like fruits and vegetables, from some or all types of retailers. Programs that directly or indirectly discount the costs of fruits and vegetables for SNAP participants who redeem their benefits at farmers' markets have been shown to increase fruit and vegetable purchases and consumption (Shenkin & Jacobson, 2010; Lin, Yen, Dong, & Smallwood, 2010; GAO, 2006). The USDA recently piloted a SNAP incentive program, the Healthy Incentive Pilot (HIP), which explored financial incentives to increase the fruit and vegetable consumption of SNAP participations (USDA, 2009). However, HIP incentives were not specific to farmers' markets, and could be acquired at any participating vendors and retailers. HIP participants earned a 30-cent incentive for

every SNAP dollar spent on targeted fruits and vegetables (TFVs). The incentive was then immediately credited to the SNAP account and was eligible for use on any SNAP-eligible food or beverage (USDA, 2009).

Though HIP results are not yet available, the pilot demonstrates the viability of implementation of an incentive program for SNAP. Furthermore, HIP acts as an example of combining restrictive and incentivized methods, combining the selectiveness of WIC (the list of TFVs) while also encouraging the purchase of fruits and vegetables through refund rewards (USDA, 2009). A program following this model could avoid the controversy associated with prohibiting SNAP funds from being used to purchase any of the nonessential and less nutritious foods that are currently SNAP-eligible (Shenkin & Jacobson, 2010). Allowing SNAP participants to use accrued incentive funds to purchase customary SNAP-eligible foods and beverages would help offset any funds depleted to purchase TFVs. Therefore, SNAP participants would retain the ability to purchase their customary food items.

Participants in our study commented on cost discount approaches like these. One participant touched on the importance of the visibility of the cost reduction strategy used to make fruits and vegetables more affordable. Literature suggests subsidizing fruits and vegetables to make selling goods at farmers' markets more profitable for farmers, meanwhile lowering fruit and vegetable prices for SNAP and WIC users, increases the number of purchases (Lin, Yen, Dong, & Smallwood, 2010). Dong (2010) states that coupons, a more visible and tangible cost reduction strategy, affect consumers in two ways: price-discount and informational advertising, and coupons may be more effective at increasing fruit and vegetable purchases than pure price-discount methods like

subsidies. This coincides with a participant's statement that coupon deals at more traditional food-shopping venues made purchasing fruits and vegetables seem less expensive. When other participants were asked about price, they commented that fruits and vegetables from farmers' markets were either more expensive than other venues or were priced the same. And though they all agreed that the quality and taste was better at farmers' markets, none mentioned the price being better. An incentive program visible to SNAP shoppers (such as HIP) may thus change not only prices, but also perceptions of prices, and increase fruit and vegetable purchases at farmers' markets.

For an incentive program to facilitate the addition of incentive funds into a SNAP shopper's account, program and policy makers must consider any necessary adjustments to the EBT system. Outside of the difficulties already associated with EBT redemption at retailers, especially at farmers' markets (discussed below), a new receipt system would need to be developed (USDA, 2009). It would need to discern and calculate two distinct purchase totals: HIP foods and all other SNAP-eligible foods. Receipts would need to display the purchase amount, the corresponding incentive funds, and the account balance (USDA, 2009). With electronic cash registers, this may not be an issue; but if the POS device is not integrated into a retailer's cash register checkout system, they must manually identify and tally eligible items and input that total into the POS device, while also calculating the appropriate incentives (USDA, 2009). Retailers would be required to train staff on SNAP-approved foods and beverages and TFVs for the incentive program to ensure that SNAP participants receive due incentive funds. Program policy would need to address these logistical concerns, as well as identify a source of funding for any necessary adjustments.

### *A Farmers' Market Program for SNAP*

A farmers' market program within SNAP, unlike an incentive program, would only apply to farmers' markets (and most roadside stands if modeled after FMNP). Its mission would also be similar to FMNP: to provide locally grown fruits and vegetables to SNAP participants via farmers' markets and roadside stands (USDA, 2012e). This program, however, would need to address common issues with SNAP redemption at farmers' markets, the first of which is operational costs.

Generally, vendors at farmers' markets using POS terminals for EBT redemption indicate increased sales. However, increased sales do not always cover the operational costs associated with EBT redemption (Buttenheim et al., 2012; Young et al., 2011). Qualitative data from market coordinators in our study suggest that POS fees, in addition to the initial investment of an EBT machine, are too much for markets to cover. One coordinator mentioned that, depending on the duration of the market (seasonal versus year-round), additional POS fees can be charged for the activation and deactivation of the POS terminals, which literature confirms (Young et al., 2011). Although the scrip system, comparable to CVVs in WIC, may be used at farmers' markets, issues with the denomination of the paper, token, or scrip, as well as logistics, may influence shopper satisfaction and behavior (Gleason & Pooler, 2011). Gleason and Pooler (2011) found that even in states where WIC participants were permitted to exceed the value of their CVVs, lack of knowledge on the part of retailer staff repeatedly caused CVV users to put food items back. Using scrips, tokens, or paper methods for a SNAP farmers' market program also increases the potential for fraud and creates the need for upgraded

monitoring systems (GOA, 2006). Policymakers would need to decide which method of redemption to use.

Using the current EBT system would have fewer administrative costs and not require market staff to redeem coupons, scrips, or tokens to local assistance offices for compensation (GOA, 2006). However, market coordinators interviewed in our study cited a lack of trained staff and volunteers to operate POS terminals as a barrier to accepting SNAP at their markets. A farmers' market program would need to include or direct farmers' market coordinators to training programs and also make it affordable for market volunteers and staff to attend (Young et al., 2011). This would require adding provisions in program funds for subsidies and grants that are accessible to farmers' market coordinators.

Coordinators interviewed in our study also discussed how FMNP shoppers put food items back when they exceeded the value of their CVVs. There is an underlying assumption in this recurring theme that needs to be addressed. It may be beneficial to integrate education about SNAP and WIC and their participants into EBT redemption training. Coordinators may have negative perceptions of WIC/SNAP participants due to their misconceptions about the programs, and addressing these misperceptions may influence market accessibility and atmosphere in a positive way.

Some market coordinators in our study felt that redemption of SNAP and WIC benefits would not be beneficial, regardless of the redemption method and completion of the corresponding training, without increased marketing and promotion. This would need to include outreach from a community-based partner that informs SNAP/WIC recipients of the existence and location of farmers' markets (Young et al., 2011). The Farmers

Market Promotion Program (FMPP), a part of USDA Agricultural Marketing Service, provides non-matching grants for marketing and promoting to agricultural cooperatives, producer networks and associations, local and Tribal governments, nonprofit corporations, public benefit corporations, economic development corporations, and regional farmers' market authorities (USDA, 2012a). Compiling a database of these types of organizations to which market coordinators could refer may facilitate communication and partnership between these two groups. Having a tax write-off or other incentives for private organizations to aid in marketing for farmers' markets may also improve the willingness of such organizations to partner with markets. Together these parties could apply for funds.

Even with the funds for EBT equipment and training, markets cannot make a profit if patronage is low. One market coordinator in our study commented on the lack of regular WIC customers. Thirty-six percent of our 70 participants only returned a few times per market season. Although incentive programs have been shown to increase patronage, more needs to be done to incentivize regular patronage of farmers' markets (Shenkin & Jacobson, 2010; Lin, Yen, Dong, & Smallwood, 2010; GAO, 2006). Instead of rewarding SNAP participants based on purchase amounts, they could be rewarded on the number of days throughout a specific time period on which they are recorded purchasing fruit and vegetable items from the same farmers' market location. This would be relatively easy to track if that market were using EBT. Also providing grants for states or individual markets to advertise and employ a shuttle service to the market and back to designated sites throughout areas heavily populated by SNAP/WIC recipients might help eliminate market accessibility issues. Programs that provide incentives for coming

weekly, and not just on the weeks associated with the receipt of SNAP and WIC benefits, may also prove effective at improving SNAP and WIC redemption at farmers' markets.

Young and colleagues (2011) discussed the importance of the physical environment of the market (the location, visibility, parking, distance to public transportation and other areas that target audiences frequent) to patronage and benefit redemption at markets. One participant in our study mentioned the market atmosphere, commenting on how the market really brought the neighborhood together. Market coordinators and community partners should try to create a welcoming space for their target audiences. Young and colleagues (2011) considered having amenities for certain populations like the elderly and young children, and proper safety measures to be important. Creating market environments that are family-friendly community spaces may also increase sustained patronage.

#### *SNAP Nutrition Education Program*

Once an incentive or farmers' market program comparable to FMNP is established for SNAP, a nutrition education component should be considered. Nutrition education is a required component for FMNP. The education highlights the relationship of proper nutrition to the overall concept of good health and nutrition, including the importance of fresh fruit and vegetable consumption (WIC Farmers' Market Nutrition Program, 2012). The Food and Nutrition Service (FNS) encourages FMNP to coordinate nutrition education programs with WIC or other state agencies, as long as these programs reflect the goals of FMNP nutrition education (WIC Farmers' Market Nutrition Program, 2012).

Currently, SNAP has a nutrition education program called SNAP-Ed, but it is not mandatory for SNAP participants (USDA, 2012c). For funding, states must submit a SNAP-Ed plan to FNS to be approved to request grant funds for SNAP-Ed projects. The grants do not now require state contribution or matching; they are the only way to acquire federal funds. Whether a SNAP incentive program or farmers' market program was developed, to acquire federal funds requires the submission of a SNAP-Ed plan to FNS.

If states cannot secure federal funds for FMNP, FNS suggests working with cooperative Extension Programs, non-profit community organizations, local food groups and chefs, other farmers to farmers' markets, and for-profit organizations (USDA, 2012e). Since states can currently coordinate their SNAP-Ed projects with privately or publicly funded nutrition improvement or health promotion programs, this too is an option. For SNAP-Ed it is encouraged that states focus on using nutrition education programs administered by other FNS nutrition assistance programs and initiatives, such as WIC, to reduce costs (USDA, 2012c). The cost of administering mandatory nutrition education for SNAP would force states to find outside funding or generate funds internally. If federal, non-federal, and state funds were insufficient, the nutrition education program would be compromised. Instead of mandating nutrition education for SNAP, FNS could include a provision in its current Guidance to allow states the ability to create incentives for SNAP participants involved in SNAP-Ed activities, similar to those in HIP for TFVs. Because incentives for buying fruits and vegetables increase the amount of fruits and vegetables purchased, incentives for participation of SNAP users in nutrition education may increase SNAP-Ed's participation.

SNAP-Ed's goal is to improve the likelihood that SNAP-eligible persons will make healthy food choices within a limited budget and choose physically active lifestyles; its focus is on healthy eating habits and obesity prevention (USDA, 2012c). SNAP-Ed's guiding principles encourage including educational activities that "facilitate voluntary adoption of food and physical activity choices and other nutrition-related behaviors conducive to the health and well-being of SNAP participants" and that "[target] first, women, and then children in households participating in SNAP" (USDA, 2012c, p.12-13). Food choices, nutrition-related behaviors, and physical activity are related to fruit and vegetable offerings in the home, perceived barriers, and family health behavior,—the components of our dependent variable. Because we found the strongest relationship between self-efficacy and family health behavior, incorporating activities and curricula aimed at increasing self-efficacy into SNAP-Ed may improve food choices, nutrition-related behaviors, and physical activity--components of family health behavior.

Incorporating this type of SNAP-Ed into a SNAP incentive program or farmers' market program could positively influence the relationship between self-efficacy and fruit and vegetable offerings in the home. Incentives for specific fruits and vegetables could influence the offerings (variety) of those specific fruits and vegetables in the home. Furthermore, incorporating a fruit or vegetable of the week or of the month with a slightly higher incentive value could influence which types of fruits and vegetables SNAP participants are willing to bring into their homes. This could not only increase fruit and vegetable offerings in the home, but also influence perceived barriers. The relationship between price, purchase, and consumption suggests that incentives, as perceived benefits, may override perceived barriers such as price and spoilage, that may

influence decisions on where to purchase fruits and vegetables and which fruits and vegetables to purchase (Shenkin & Jacobson, 2010; Lin, Yen, Dong, & Smallwood, 2010; [GAO], 2006).

In addition to the curriculum, the location of this education may also impact its effectiveness (USDA, 2012c). The location should be wherever is most accessible to the target population: at the farmers' market, at the local WIC or social services office, community centers, medical facilities, etc. FNS even suggests using established sites that SNAP users may frequent, like job readiness and other training sites, SNAP/TANF offices, public housing sites, and other required training programs (USDA, 2012c). By using already frequented and established sites, states can cut administrative costs and pool resources (i.e. like staff, volunteers, and space).

#### *More Complementary Eligibility Criteria and Collaborative Efforts*

Another way to lower administrative costs may be creating automatic eligibility between WIC, SNAP, and TANF, or at least certain components of each program. A more collaborative safety net among these programs may capture more people who may otherwise fall through the cracks. Currently, they are completely separate programs, though TANF and SNAP are both usually located at the local social services. Consolidating these three programs to, for instance, create a SNAP-Ed program that also fulfills some WIC and/or TANF education or training requirements would make it more convenient for participants and less expensive for each program to provide the education or training. Because nutrition education or other training programs within each assistance program have different goals, either the goals need to be changed or a program that

fulfills the goals of all three programs must to be created. This would be the next step for program and policy makers.

All in all, to create a program for SNAP that is comparable to FMNP would require either creating an incentive program for SNAP participants to redeem their benefits to buy fruits and vegetables or creating a separate program within SNAP specifically for farmers' market redemption. Regardless of which one is created, the issues that arise with EBT and scrip implementation; marketing, promotion, and accessibility; and market environment and patronage must be addressed. Increasing SNAP-Ed participation without making the education mandatory would also be difficult. To fulfill the current goals and principles of SNAP-Ed, a change in structure and in curriculum, including incentivizing participation and incorporating lessons that target self-efficacy may also emerge. Redesigning SNAP-Ed or creating a new nutrition education program that can be a combined effort between WIC, TANF, and SNAP would also become an area of discussion. But with the success of FMNP, steps must be taken to create a similar program within SNAP to increase fruit and vegetable purchases at farmers' markets and fruit and vegetable consumption among SNAP users.

### **Directions of Future Research and Extensions**

Though self-efficacy was shown to significantly account for variance in the home nutrition environment in this study, the cross-sectional survey study design limited the depth of the data collected. Future researchers may want to use a longitudinal study design, and have a nutrition education intervention targeting self-efficacy as part of their study. Tracking participants over a longer period of time will allow researchers to better observe the relationship between self-efficacy and the home nutrition environment and its

long-term effects. The nutrition education component will help researchers determine if a change in self-efficacy results in a change in the home nutrition environment, and whether this correlation is positive or negative. A follow-up survey after participation in nutrition education assessing the home nutrition environment and self-efficacy is one possible method.

Regardless of study design, more effort should be put into marketing, recruiting, and retaining WIC and SNAP participants for farmers' market program research. Larger incentives dispersed throughout a program may be required to address attrition. Different methods for encouraging market and program attendance may need to be implemented to find the best solution.

A market analysis component examining how much revenue SNAP and WIC participants contribute to markets may help encourage increased subsidies and incentive programs by demonstrating economic feasibility. Future researchers could implement EBT machines and WIC CVV redemption at farmers' markets. They could then track sales data by program participation and by market and compare the corresponding past sales data. Examining the profitability of accepting SNAP and WIC CVVs in farmers' markets is another area of research that has not been explored in depth. Although accepting SNAP benefits would increase farmers' revenue, many farmers' markets have not acquired EBT machines. Since two of the farmers' markets in our study did not have EBT machines, we were unable to conduct a market analysis on the revenue attributable to SNAP benefits. However, future studies could analyze how much of the market revenue would be from SNAP and how profitable accepting SNAP benefits would be, taking into account EBT cost and implementation.

Future research examining self-efficacy and the home nutrition environment in WIC and SNAP participants should examine differences in culture, market location (urban, suburban, or rural), and other potential moderating or mediating variables. Since this study has shown that variance in self-efficacy contributes to variance in the home nutrition environment, the next step is to further examine the strength and direction of the correlational relationship between self-efficacy and the components of the home nutrition environment. As mentioned earlier, the three components of the dependent variable within this study may influence each other in a more complex way than the unidirectional path that we examined, parental self-efficacy's influence on each component of the home nutrition environment. Another research area that could be addressed is the navigability of the market and how shoppers felt about their experience at the market. Based on the qualitative interview results, participants felt they were able to navigate the market well and that there were no social barriers in shopping there. A main concern cited by one of the market coordinators was that WIC shoppers would not come back, and would only use their WIC CVVs at the farmers' market, but very little of their own money. Future studies can investigate the social barriers felt by SNAP/WIC recipients shopping at farmers' markets, which consist of higher income shoppers, and how they influence these behaviors. Although the participants that we interviewed said that they liked visiting the markets, it would be useful to ask those that did not find the atmosphere as inviting to elaborate on how to make the farmers' markets more welcoming. In the qualitative portion of our study, some of the shoppers spoke about how their farmers' market did not sell meat, which they would have liked to see. They also would have liked to see more variety of fruits and vegetables. In future studies, researchers can examine how the

variety of food sold at farmers' markets influences how attractive the market is to shoppers.

Further research could also look at increasing farmers' market programs in federal assistance programs as a way of alleviating food insecurity, by examining whether increasing the home nutrition environment significantly increases food security in low-income areas. Since food insecurity has been linked to decreased fruit and vegetable consumption, increasing food security should lead to increased fruit and vegetable consumption.

In future studies, questionnaires could include more questions about food consumption rather than the presence of the food in the home. Instead of the fruits and vegetables checklist, food consumption would be a more accurate measure of the family's nutrition as it measures what foods are being eaten. A scale used with adults called the Food Behavior Checklist (FBC) has high validity and reliability in measuring fruit and vegetable consumption, milk consumption, fat and cholesterol consumption, exercising healthful dietary behaviors, and food insecurity (Branscum, Sharma, Kaye, & Succop, 2010). In using this measure, the home nutrition environment would more accurately represent how many fruits and vegetables were consumed rather than how many were present in the home. Incorporating consumption as a variable would add a more concrete dimension to the analysis of fruit and vegetable intake.

In addition, another aspect to investigate would be food consumption inside and outside of the home. 28 out of the 70 respondents' children were enrolled in the School Breakfast Program and National School Lunch Program, which suggests that these children were eating meals that were not accounted for in the fruit and vegetable checklist.

The FBC accounts for all meals, including meals outside the home, by not specifying where the food was eaten. Though our study concentrated on the home nutrition environment, future studies can delve into family nutrition both inside and outside the home.

A future research direction would be to evaluate how farmers' markets can change the neighborhood's status as a food desert, a phenomenon that occurred in a food desert in Canada (Larsen & Gililand, 2009). Three years after the farmers' market was introduced, the availability of healthy food increased (Larsen & Gililand, 2009). In addition, the overall food costs for households decreased (Larsen & Gililand, 2009). Although the farmers' markets where we recruited participants were not recently opened farmers' markets, it would be interesting to track how effective the farmers' markets are in changing food desert status over time. The farmers' markets in our study had been established for a relatively long time; future researchers could monitor the accessibility of healthy food in another neighborhood that has plans for a farmers' market in the near future. Healthy food availability could be measured before and after the market opens, to track a change over time.

Future research could also focus on how nutrition education programs may improve parental self-efficacy and the home nutrition environment. Past researchers have conducted nutrition education programs measuring self-efficacy; adding a pre- and post-test to assess the home nutrition environment components would help to determine how a nutrition education program targeting self-efficacy may influence the home nutrition environment (Shriver et al., 2010; Adedze et al., 2011).

Past studies have mainly concentrated on maternal self-efficacy, and we think that it would be interesting to conduct research on both maternal and paternal self-efficacy, and how both parents' self-efficacy align to influence the home nutrition environment (Adedze et al., 2011). Self-efficacy of both parents may be different, so both of their individual self-efficacies likely influence the home nutrition environment. If the parents both provide food for their children, it would be advantageous to measure parental self-efficacy in both caregivers for a more complete look at the relationship joining parental self-efficacy and the home nutrition environment. A comparison between single-parent and two-parent homes would also be relevant.

## CHAPTER 6: CONCLUSION

Over 44 million people, including 12 million children, live in food insecure households in the United States (USDA, 2012b). Many of these food insecure households are located in food deserts (Martinez et al., 2010). These areas of limited healthy food availability often have higher rates of nutrition-related health problems that can be especially devastating to children, whose food availability and nutrition depend on what their parents are able to provide (Coleman-Jensen et al., 2012; Walker et al., 2010). The government has instituted WIC and SNAP to relieve the burden of food insecurity. Although SNAP and WIC benefits are not accepted at many markets, redemption at farmers' markets has become more common (Martinez et al., 2010). In 2002, Congress established FMNP (USDA, 2012e). This program has been largely successful, and the federal government is working toward easing EBT implementation for SNAP in farmers' markets (USDA, 2012e).

Our study has added to the body of research concerning SNAP and WIC redemption programs at farmers' markets. Data were collected at three Washington, D.C. metropolitan area farmers' markets from a cross-sectional survey of participants and in-depth interviews with market coordinators and participants. Qualitative data suggests that there is difficulty implementing the EBT system at farmers' market, but that market coordinators share favorable opinions of accepting SNAP and/or WIC benefits at their markets.

Our study has also added to the body of research concerning the relationship between self-efficacy and the home nutrition environment in SNAP and WIC participants shopping at farmers' markets. Self-efficacy was found to be a significant predictor of the

quality of the home nutrition environment. Self-efficacy significantly accounted for variance in family health behavior, perceived barriers to fruit and vegetable consumption, and fruit and vegetable offerings in the homes of SNAP and WIC shoppers at farmers' markets. Furthermore, qualitative data from the four participants who were interviewed suggests that the nutrition education program provided them with useful information, materials, and skills that influenced fruit and vegetable purchases, variety, and consumption.

This suggests that nutrition education programs targeted toward increasing self-efficacy can improve the home nutrition environment for WIC and SNAP participants who redeem their benefits at farmers' markets. More research is needed to support the positive relationship between self-efficacy and the home nutrition environment and to support suggested policy changes to WIC and SNAP. This research would promote increased redemption of benefits at farmers' markets and the creation of nutrition education programs targeted toward improving self-efficacy. This could be the first step in improving the home nutrition environment of SNAP and WIC participants.

## APPENDICES

**APPENDIX A: SURVEY**

LOCATION: \_\_\_\_\_ DATE: \_\_\_\_\_ CODE: \_\_\_\_\_ FOLDER/FILE: \_\_\_\_\_



**Instructions:** Please answer the following questions. Fill in the circle next to the answer that best describes you. There are no right or wrong answers. If you are not sure about a question or it does not apply to you, let us know.

**1. Who lives in your house?**

Name (First Name and Last Initial)	Sex	Age	Relationship to You (Self, Mother, Father, etc)
Me:			Self


**2. How do you identify? (Fill in circle for all that apply)**

- Black or African American
- White
- Asian/Pacific Islander
- American Indian / Alaska Native
- Hispanic or Latino
- Other (Please specify: \_\_\_\_\_)

**3. Do you or anyone in your house have any of the following conditions? (Fill in circles for all that apply. Write WHO has this condition next to it.)**

- Diabetes \_\_\_\_\_
- High blood pressure \_\_\_\_\_
- Heart disease \_\_\_\_\_
- Obesity or overweight \_\_\_\_\_
- Cancer \_\_\_\_\_
- Other serious condition: \_\_\_\_\_
- No, no one in the household has any of these
- Don't know / Not sure

**4. Which of the following programs do you or your children participate in? (Fill in all that apply).**

- Food Stamps (SNAP)
- Medicaid (Medical Assistance)
- School Breakfast / School Lunch
- WIC
- SSI
- Head Start
- Other: \_\_\_\_\_

5. How long have you been using food stamps? \_\_\_\_\_ years and \_\_\_\_\_ months

6. What is your household's total monthly income before taxes? (Guess, if you need to) \$ \_\_\_\_\_

7. How much do you typically spend on groceries per month? \$ \_\_\_\_\_

8. During the past 7 days, how many meals did all or most of your family sit down and eat together at home?

- |                              |                              |                              |
|------------------------------|------------------------------|------------------------------|
| <input type="radio"/> 0 days | <input type="radio"/> 3 days | <input type="radio"/> 6 days |
| <input type="radio"/> 1 day  | <input type="radio"/> 4 days | <input type="radio"/> 7 days |
| <input type="radio"/> 2 days | <input type="radio"/> 5 days |                              |

9. During a typical week, how many meals does all or most of your family sit down and eat together at home?

- |                              |                              |                              |
|------------------------------|------------------------------|------------------------------|
| <input type="radio"/> 0 days | <input type="radio"/> 3 days | <input type="radio"/> 6 days |
| <input type="radio"/> 1 day  | <input type="radio"/> 4 days | <input type="radio"/> 7 days |
| <input type="radio"/> 2 days | <input type="radio"/> 5 days |                              |

10. During the last 7 days, how often did your family eat meals prepared outside of your home (like, eating out, take out, or delivery)?

- |                              |                              |                              |
|------------------------------|------------------------------|------------------------------|
| <input type="radio"/> 0 days | <input type="radio"/> 3 days | <input type="radio"/> 6 days |
| <input type="radio"/> 1 day  | <input type="radio"/> 4 days | <input type="radio"/> 7 days |
| <input type="radio"/> 2 days | <input type="radio"/> 5 days |                              |

11. Where do you usually buy groceries?

- Local supermarket (Giant, Safeway, Shoppers, etc)

- Corner Store / Convenience Store
- Warehouse / Wholesale Store (Costco, Sam's Club, BJ's, Price Club)
- Farmers' Market
- Other: \_\_\_\_\_

**12. How do you usually get there?**

- Public Transportation (Bus, Metro)
- Walking
- Personal car
- Ride from friend or family
- Other: \_\_\_\_\_

**13. How often do you go to a farmers' market?**

- Never, today is my first day coming to a farmers' market
- A few times in my life
- A few times per season
- A few times per month

**14. How did you get to the market today?**

- Public Transportation (Bus, Metro)
- Walking

- Personal car
- Ride from friend or family
- Other: \_\_\_\_\_

**15. How did you hear that you can use your Food Stamp or WIC benefits at this market?**

- I have shopped here before
- Website: \_\_\_\_\_
- Food Stamp/DSS worker
- Advertisement/Flyers located: \_\_\_\_\_
- Child's School: \_\_\_\_\_
- Friends or Family
- Other: \_\_\_\_\_

**16. How likely are you to shop at the farmer's market in the future?**

- Very likely                       Somewhat likely                       Not likely                       Not sure

*Choose the oldest child in your house who is between the ages of 4 and 10. For the rest of the questions, please answer with this child in mind.*

**Child's Age:** \_\_\_\_\_

**Child's Sex:**

- Male
- Female

**17. Now think about this child and your family as a whole. How often do you do each of the following?**

<b>a. My child eats breakfast.</b>	Always	Often	Sometimes	Rarely	Never
<b>b. We eat together as a family.</b>	Always	Often	Sometimes	Rarely	Never
<b>c. We eat fast food.</b>	Always	Often	Sometimes	Rarely	Never
<b>d. We eat while watching TV.</b>	Always	Often	Sometimes	Rarely	Never
<b>e. We eat prepackaged foods.</b>	Always	Often	Sometimes	Rarely	Never
<b>f. We eat fruits with our meals.</b>	Always	Often	Sometimes	Rarely	Never
<b>g. We eat vegetables with our meals.</b>	Always	Often	Sometimes	Rarely	Never
<b>h. We eat fruits as snacks.</b>	Always	Often	Sometimes	Rarely	Never
<b>i. We eat vegetables as snacks.</b>	Always	Often	Sometimes	Rarely	Never
<b>j. We eat freshly prepared meals.</b>	Always	Often	Sometimes	Rarely	Never
<b>k. My child drinks soda or other sweetened drinks.</b>	Always	Often	Sometimes	Rarely	Never
<b>l. My child drinks low fat or fat free milk.</b>	Always	Often	Sometimes	Rarely	Never
<b>m. I monitor my child's snack food eating.</b>	Always	Often	Sometimes	Rarely	Never

<b>n. I use snack or deserts foods as rewards for good behavior with my child.</b>	Always	Often	Sometimes	Rarely	Never
<b>o. My child watches TV or plays on the computer more than 4 hours each day.</b>	Always	Often	Sometimes	Rarely	Never
<b>p. We play games outside, ride bikes, or take walks together.</b>	Always	Often	Sometimes	Rarely	Never
<b>q. I am physically active.</b>	Always	Often	Sometimes	Rarely	Never
<b>r. My child is physically active in his/her free time.</b>	Always	Often	Sometimes	Rarely	Never
<b>s. We have a daily routine for bedtime.</b>	Always	Often	Sometimes	Rarely	Never

*Instructions: Please select only ONE choice from the choices for each statement that describes you the best.*

<b>1. Some fresh fruit and vegetables do not look appealing in stores.</b>	Disagree a lot	Disagree a little	Not sure/ Don't know	Agree a little	Agree a lot
<b>2. Fresh fruit and vegetables spoil too quickly.</b>	Disagree a lot	Disagree a little	Not sure/ Don't know	Agree a little	Agree a lot
<b>3. Fresh fruit and vegetables cost too much.</b>	Disagree a lot	Disagree a little	Not sure/ Don't know	Agree a little	Agree a lot
<b>4. Canned vegetables are not as healthy as fresh or frozen vegetables.</b>	Disagree a lot	Disagree a little	Not sure/ Don't know	Agree a little	Agree a lot
<b>5. Canned vegetables do not taste as good as fresh or frozen vegetables.</b>	Disagree a lot	Disagree a little	Not sure/ Don't know	Agree a little	Agree a lot
<b>6. Frozen vegetables are not right for my family.</b>	Disagree a lot	Disagree a little	Not sure/ Don't know	Agree a little	Agree a lot

<b>7. My family wastes too much food when I serve fruit and vegetables.</b>	Disagree a lot	Disagree a little	Not sure/ Don't know	Agree a little	Agree a lot
<b>8. Nothing I seem to do gets my kids to eat more vegetables.</b>	Disagree a lot	Disagree a little	Not sure/ Don't know	Agree a little	Agree a lot
<b>9. If I added more vegetables to my usual dishes, no one in my family would eat them.</b>	Disagree a lot	Disagree a little	Not sure/ Don't know	Agree a little	Agree a lot
<b>10. Nothing I seem to do gets my kids to eat more fruit.</b>	Disagree a lot	Disagree a little	Not sure/ Don't know	Agree a little	Agree a lot
<b>11. No one eats vegetables in my home.</b>	Disagree a lot	Disagree a little	Not sure/ Don't know	Agree a little	Agree a lot
<b>12. No one eats fruit in my home.</b>	Disagree a lot	Disagree a little	Not sure/ Don't know	Agree a little	Agree a lot
<b>13. I don't have time to fix vegetable dishes.</b>	Disagree a lot	Disagree a little	Not sure/ Don't know	Agree a little	Agree a lot
<b>14. If I were to serve fruit for deserts, no one in my family would eat them.</b>	Disagree a lot	Disagree a little	Not sure/ Don't know	Agree a little	Agree a lot
<b>15. None of the dishes my family likes include fruits and vegetables.</b>	Disagree a lot	Disagree a little	Not sure/ Don't know	Agree a little	Agree a lot

**16. Overall, how would you rate your child's current health?**

- Excellent
  Very good
  Good
  Fair
  Poor

**17. In the last 30 days, on how many days was your child's physical health not good? \_\_\_\_\_**

18. In the last 30 days, on how many days was your child's mental health not good? \_\_\_\_\_

**How sure are you that you can ...**

<b>1. Regularly plan menus for the family that contain 1 serving of fruit at every dinner?</b>	Very sure I cannot	I think I cannot	Not sure	I think I can	Very sure I can
<b>2. Regularly plan menus for the family that contain 1 serving of vegetable at every dinner?</b>	Very sure I cannot	I think I cannot	Not sure	I think I can	Very sure I can
<b>3. Regularly have fruit at each dinner?</b>	Very sure I cannot	I think I cannot	Not sure	I think I can	Very sure I can
<b>4. Regularly insist that your child try at least 1 bite of a new fruit?</b>	Very sure I cannot	I think I cannot	Not sure	I think I can	Very sure I can
<b>5. Regularly insist that your child try at least 1 bite of a new vegetable?</b>	Very sure I cannot	I think I cannot	Not sure	I think I can	Very sure I can
<b>6. Regularly serve 2 vegetables at dinner?</b>	Very sure I cannot	I think I cannot	Not sure	I think I can	Very sure I can
<b>7. Regularly encourage your child to eat fruit?</b>	Very sure I cannot	I think I cannot	Not sure	I think I can	Very sure I can
<b>8. Regularly encourage your child to eat veggies?</b>	Very sure I cannot	I think I cannot	Not sure	I think I can	Very sure I can
<b>9. Regularly use a grocery list for shopping trips?</b>	Very sure I cannot	I think I cannot	Not sure	I think I can	Very sure I can
<b>10. Regularly cut up vegetables and have them available in your fridge for your child?</b>	Very sure I cannot	I think I cannot	Not sure	I think I can	Very sure I can

<b>11. Regularly have cut-up fruit available for your child's snack?</b>	Very sure I cannot	I think I cannot	Not sure	I think I can	Very sure I can
<b>12. Regularly serve a new vegetable once a week?</b>	Very sure I cannot	I think I cannot	Not sure	I think I can	Very sure I can
<b>13. Regularly have a low-fat dip available that your child can eat with vegetables?</b>	Very sure I cannot	I think I cannot	Not sure	I think I can	Very sure I can
<b>14. Regularly encourage your child to eat low-fat foods?</b>	Very sure I cannot	I think I cannot	Not sure	I think I can	Very sure I can

**15. Overall, how would you rate your current health?**

- Excellent
  Very good
  Good
  Fair
  Poor

**16. In the last 30 days, on how many days was your physical health not good? \_\_\_\_\_**

**17. In the last 30 days, on how many days was your mental health not good? \_\_\_\_\_**

### FRUIT AND VEGETABLE CHECKLIST

**Instructions:** This is a checklist of common fruits and vegetables. Please circle YES or NO for each question.

Cucumbers	Yes	No	Yes	No	Yes	No	
Eggplant	Yes	No	Yes	No	Yes	No	
Fried potatoes (french fries, tater tots)	Yes	No	Yes	No	Yes	No	
Grapes	Yes	No	Yes	No	Yes	No	
Green beans	Yes	No	Yes	No	Yes	No	
Green peas	Yes	No	Yes	No	Yes	No	
Kiwi	Yes	No	Yes	No	Yes	No	
Lettuce or green salad	Yes	No	Yes	No	Yes	No	
Mashed, baked or boiled potatoes	Yes	No	Yes	No	Yes	No	
Onions	Yes	No	Yes	No	Yes	No	
Oranges	Yes	No	Yes	No	Yes	No	
Peaches	Yes	No	Yes	No	Yes	No	
Plums	Yes	No	Yes	No	Yes	No	
Potato salad	Yes	No	Yes	No	Yes	No	
Radishes	Yes	No	Yes	No	Yes	No	
Spinach	Yes	No	Yes	No	Yes	No	
Squash	Yes	No	Yes	No	Yes	No	
Sweet potatoes	Yes	No	Yes	No	Yes	No	

<b>Tomatoes</b>	Yes	No	Yes	No	Yes	No	
<b>Turnip, collar or other greens</b>	Yes	No	Yes	No	Yes	No	
<b>Zucchini</b>	Yes	No	Yes	No	Yes	No	
<b>Other fruit: _____</b>	Yes	No	Yes	No	Yes	No	
<b>Other fruit: _____</b>	Yes	No	Yes	No	Yes	No	
<b>Other fruit: _____</b>	Yes	No	Yes	No	Yes	No	
<b>Other vegetables: _____</b>	Yes	No	Yes	No	Yes	No	
<b>Other vegetables: _____</b>	Yes	No	Yes	No	Yes	No	
<b>Other vegetables: _____</b>	Yes	No	Yes	No	Yes	No	

## **APPENDIX B: PARTICIPANT IN-DEPTH INTERVIEW QUESTIONS**

### **SNAP SHOPPERS**

1. How does shopping at the market compare to your usual food shopping?
2. What motivated you to come to the market?
3. What impression did you have of the market?
4. How has your experience with the EBT system been here at the market compared to other stores?
5. How do you like the market atmosphere?
  - a. Probe: Were the coordinators and farmers welcoming, helpful, etc?
6. Would you be willing to return to the market?
  - a. Probe: Why or why not?
7. What did you feel about the prices at the market?
8. How did hear about the market?
9. What motivated you to come?
10. Did you have any difficulty finding transportation to the market?
11. How would you improve the market?
12. How is the nutrition education program going?
  - a. Probe: Are you enjoying it? Are you gaining any information that you did not already know?

## **APPENDIX C: MARKET COORDINATOR INTERVIEW QUESTIONS**

1. What are your goals for the market?
  - a. Do you hope to incorporate more vendors?
  - b. Are you happy with the fruit and vegetable selection?
2. How much do you know about EBT machines?
3. What barriers do you see to implementing an EBT machine at this market?
  - a. Do you not have an EBT machine because:
    1. Cost of purchasing the machine
    2. Cost of running the machine
    3. Staff to run the machine
    4. Not interested in having the machine
    5. Other
4. How do you think adding the EBT machines would affect market sales?
5. Is the availability of fresh fruits and vegetables to low income families an important issue for you?  
For your community?
6. How do you advertise your market?
  - a. Do you advertise your market to low income families in your area?

## **APPENDIX D: *QUALITATIVE DATA ANALYSIS MASTER CODE LIST***

### Accessibility of Market

- Accessibility of market - Cost of goods at market
- Accessibility of market - Schedule of market
- Accessibility of market - Transportation was an issue
- Accessibility of market - Transportation was not an issue

### Participant's family's eating habits

### Results of Education Program

- Results of education program - Change in children's habits
- Results of education program - Tools used from education program
- Results of education program - Change in children's habits
- Results of education program - Change in parent's habits
- Results of education program - Change in shopping habits

### Thoughts about education program

### Comparisons between market and other places participant shops

- Comparisons between market and other places participant shops- Cost of goods
- Comparisons between market and other places participant shops- Selection of goods
- Comparisons between market and other places participant shops- Freshness of goods

### Other

## **Codes for Market Coordinator Interviews**

### Advertising

- Advertising- EBT/ SNAP acceptance
- Advertising- WIC
- Advertising - Methods
  - Advertising Methods- social networking marketing use
  - Advertising - Methods - traditional marketing use
  - Advertising - Methods - word of mouth

### Barriers

- Barriers- Meeting demand
- Barriers - Financial barriers

### Community

- Community - Eating habits

### Doesn't accept SNAP

- Doesn't accept SNAP - Hopes to attract new customers
- Doesn't accept SNAP - Hopes to in future

### Market logistics

- Market logistics- Operations

- Market logistics- Peak time
- Market logistics- College town
- Market logistics- Credit cards at the market
- Market logistics- Location
- Market logistics- sales
- Market logistics - sales from coupons
- Market logistics - schedule

Market coordinator's view of market

- Market coordinator's view of market- Food offerings
  - Market coordinator's view of market- Food offerings- Locality
  - Market coordinator's view of market- Food offerings- Quality
  - Market coordinator's view of market- Food offerings- Seasonality
- Market coordinator's view of market- Future plans
- Market coordinator's view of market- Views on their market compared to grocery stores
- Market coordinator's view of market- Views on their market compared to other markets
- Market coordinator's view of market- What market coordinator wants to provide to community

Nutrition assistance

- Nutrition assistance - Accepting benefits helps market
- Nutrition assistance - SNAP
  - Nutrition assistance - SNAP - Cost
  - Nutrition assistance - SNAP - Implementation
- Nutrition assistance - WIC
  - Nutrition assistance - WIC- Coupons
  - Nutrition assistance - WIC- Coupons- Compared to cash
  - Nutrition assistance - WIC- Sales

Why they accept SNAP/EBT

- Why they accept SNAP/EBT - Demographic of neighborhood
- Why they accept SNAP/EBT - Helping low income families

Other

## APPENDIX E: SURVEY RECRUITMENT POSTER



### What you'll do:

- 1 Take a short survey today
- 2 Come to four educational visits at the market
- 3 Take another short survey in November

### What you'll get:

- 4 short, monthly visits that will help you feed your children more fruits and vegetables!
- Fun recipes, books, and other items for you and your children!
- \$5 cash for completing today's survey and \$20 cash for completing the November survey.

### To qualify, you must:

- 1 Have at least one child between the ages of 4-10
- 2 Participate in WIC or Food Stamps (SNAP)
- 3 Live with a family without severe food allergies or dietary restrictions



## **APPENDIX F: GLOSSARY**

**Attitude toward the behavior:** refers to the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question.

**Electronic Benefit Transfer (EBT) Card:** A plastic card that, in combination with a PIN (personal identification number), allows SNAP and other public assistance clients access to benefits issued by the State (USDA 2010).

**Electronic Benefit Transfer (EBT) System:** An electronic payments system that uses point of service technology (wired or wireless devices that process transactions through the use of EBT, debit, or credit cards to initiate electronic debits and credits of customer and retailer accounts) and electronic funds transfers for the delivery and control of food and public assistance benefits (USDA 2010).

**Family health behavior:** the diet and nutrition patterns (breakfast patterns, family eating, food choices, beverage choices, food restriction and rewards systems), television habits (television usage and screen time), and activity (family physical activity, child physical activity, and family route) of a household.

**Home nutrition environment:** the perceived barriers to fruit and vegetables, fruit and vegetable consumption in the home, and family health behavior

**Perceived barriers:** see perceived behavioral control

**Perceived behavioral control:** refers to the perceived ease or difficulty of performing the behavior and it is assumed to reflect past experience as well as anticipated impediments and obstacles.

**Perceived self-efficacy:** refers to the belief about what one can do under different sets of conditions with whatever skills one possesses

**Subjective norms:** refers to the perceived social pressure to perform or not to perform the behavior.

**Supplemental Nutrition Assistance Program (SNAP):** A Federal program operated in accordance with the Food and Nutrition Act of 2008 (7 USC 2011-2036), formerly known as the Food Stamp Program created by The Food Stamp Act of 1964, which was created to help low-income households obtain a healthier diet (USDA 2010).

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