USING STATED AND REVEALED PREFERENCES TO ASSESS THE IMPACT OF COMMUNITY-BASED AGRICULTURAL EDUCATION SUMMER CAMPS ON YOUTH FOOD PREFERENCES

by

JOANNA BROWN

(Under the Direction of Gregory Colson and Nicholas Magnan)

ABSTRACT

This study utilized stated and revealed food preferences to investigate the impact of summer garden camps on food knowledge and preference in school-aged children from Atlanta, GA. Seventy-one children from two garden camps in Atlanta participated in a survey and food choice experiment pre- and post-camp participation. Results indicate that after participating in the garden camps children significantly improved their knowledge of healthy foods and expressed a greater stated preference for certain fruits and vegetables that were targeted by the camps. Families with lower-incomes achieved greater improvement in food knowledge and revealed preferences for fresh fruit and vegetables. Children from Black, Biracial and Hispanic racial and ethnic groups hold the lowest income levels within the sample. Thus the camps greater rate of positive impact on lower-income children extends to these families. The results indicate summer camps offer promise in achieving better diet and health standards for children.

INDEX WORDS: Educational Gardens, Stated and Revealed Preference, Childhood Obesity

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In the book of Proverbs, chapter 3:5-8 it says 5 “Trust in the LORD with all your heart, and do not lean on your own understanding. 6) In all your ways acknowledge him, and he will make straight your paths…8) It will be healing to your flesh and refreshment to your bones.” I can testify to this truth and rejoice over its saving power through Christ!

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Throughout my program at UGA I received the invaluable love and support of my East Point Church family. Thank each of you for your prayers and remembering to point me to Christ! Finally to my dear family – your patience, generosity, and loving-kindness to me is beyond what my feeble words can express. I will let my words be few and say I thank and love you dearly. As Grandma Brown used to say, “God is not stingy with his goodness and grace” and each of you are a constant reminder of this timeless truth.

TABLE OF CONTENTS

LIST OF TABLES

Page

LIST OF FIGURES

Page

CHAPTER 1: INTRODUCTION

1.1 Childhood Obesity in the United States and Georgia

Childhood obesity is a major problem in the United States. Since 1980 obesity rates for children and adolescents have almost tripled nationally; as of 2012, approximately 17% (12.5 million) of children and adolescents aged 2-19 are obese (Centers for Disease Control and Prevention [CDC], 2014). Children and adolescents who are obese are likely to be obese adults and are therefore more at risk for adult health problems such as heart disease, type 2 diabetes, and several types of cancer (CDC, 2014). Public health officials call it an epidemic and the problem is acutely observed in the South. In 2012 Georgia ranked second in the nation for childhood obesity with 21% of all its children in the obese category and 37% in the overweight or obese category (University of Georgia Obesity Initiative, 2012). Overweight is defined as having excess body weight for a particular height from fat, muscle, bone, water, or a combination of these factors. Obesity is defined as having excess body fat (CDC, 2014). It is also defined in terms of body mass index (BMI) where overweight children are in the 85^{th} to less than 95^{th} percentile for their age and obese children are equal to or greater than the 95^{th} percentile for their age (CDC, 2014).

The childhood obesity crisis is the result of many factors. In broad terms poor diet and physical inactivity are the two major reasons for the rise in childhood obesity. Specifically, a deficient amount of dietary fibers from fruits and vegetables coupled with high consumption of refined grains and added sugar and the general lack of physical activity are the major culprits behind obesity and related disorders to the child population (Davis et al., 2011). In 2009 Georgia

had only 52% of middle school and 43% of high school students meet the CDC requirements for recommended physical activity (Georgia Department of Public Health [DPH], 2010). The rate worsens with respect to diet. Only 17% of high school students consumed the recommended 5 or more servings of fruits and vegetables daily (GA DPH, 2010). According to CDC's 2013 State Indicator Report on Fruits and Vegetables, which provides national and state-level information on how many fruits and vegetables people are eating, Georgia adolescents are below the US national average. 43% of Georgia adolescents report consuming fruits and vegetables less than one time daily compared to a 36% national average. Also, Georgia adolescents have a median intake (times per day) of 1.0 fruit and 1.0 vegetable. The national average for fruits is also 1.0 while the average for vegetables is slightly higher at 1.3(CDC, 2013). Childhood obesity directly affects health care costs and indirectly creates loss in future labor productivity from obesity related disease, disability and death (GA DPH, 2010). In 2010 Obesity-related hospitalizations of children in Georgia were estimated to cost $2.4 billion a year in direct and indirect costs (GA DPH, 2010).

In the U.S. there are significant racial disparities within the childhood obesity epidemic. In 2011-2012, obesity prevalence was higher among Hispanics with 22.4% and non-Hispanic black youth with 20.2% than non-Hispanic white youth with 14.1% (CDC, 2014). Similar to the national statistics, there are disparities in obesity prevalence between children and adolescents in different racial and ethnic groups in Georgia. In 2011, 31% of all Georgia high school students were overweight or obese. Within that percentage 35% of black high school students compared to 28% of white high school students were either overweight or obese in 2011 (GA DPH, 2012). Given the prevalence of childhood obesity in Georgia, the persisting racial differences and the rising costs attributed to related diseases and disorders, there is a compelling interest to

understand how children's eating and physical activity habits are shaped by environmental factors such as family, school, community and economic factors like prices.

There is a robust response occurring in Georgia, where a wide range of initiatives have been launched trying to curb the childhood obesity rate. Most recently, in 2012, the University of Georgia launched their campus-wide Obesity Initiative to help the state address the epidemic. Their focus is on obesity-related instruction, research and public service that will develop obesity prevention and treatment programs (UGA Obesity Initiative, 2012). In 2010, at the state level, Governor Nathan Deal initiated Georgia SHAPE, a campaign against childhood obesity with a focus on health-related fitness (Georgia Shape, 2010). Prior to this, Georgia based non-profits like Georgia Organics and Community Health Works began partnering with the federally established Farm-to-School programs to combat childhood obesity (Georgia Organics, 2013). While all of these campaigns have their unique approach, there is a coherent theme. All of these campaigns employ a multifaceted method to encourage a healthy food environment. This response has been espoused nationally by the CDC and at the state and local level in Georgia (CDC, 2013 and GA DPH, 2010). The environment and policies that influence health behavior in children can be broken into two broad categories, the school and the community. The work being done in each area is considered in turn.

1.2 Environments, Policies and Practices in Childhood Obesity Prevention

At the national level the CDC fact sheet on prevention of childhood obesity affirms that the dietary and physical activity behaviors of children and adolescents are influenced by many sectors of society. The multiple levels of influence that determine long term health behavior include the individual child, parents, peers, instructors, and the community-at-large (CDC, 2013). The K-12 school-system, at its best, can involve most if not all these levels of influence.

Consequently, the school-system is a popular vehicle used to prevent childhood obesity. Cohen et al. (2014) point to the positive effects of the federal K-12 school-system intervention. The U.S. Department of Agriculture (USDA) made substantial changes to school meal standards in the 2012-2013 school year. The standards increased the availability of whole grains, fruits, and vegetables; increased the portion sizes of fruits and vegetables offered; and required the selection of a fruit and vegetable. Cohen et al. (2014) concluded that the federal nutrition intervention administered through the National School Lunch and Breakfast Programs improved nutritional and health outcomes. Results showed fruit selection increased by 23.0% while entrée and vegetable selection remained unchanged. The selection of fruits and vegetables is distinct from the consumption of these food items. The results also showed the consumption of entrée and vegetables increased by 15.6% and 16.2% respectively. Similar to Cohen et al. (2014), Smith (2013) found that food consumed under the National School Lunch and Breakfast Programs do improve diets of many children whom otherwise would have poorer dietary quality. The implication is that U.S. schools are fertile grounds to improve nutrition.

At the state level Georgia has its own school-based policies and practices to prevent childhood obesity. The Georgia Department of Health advocates that schools should encourage healthy lifestyles for students by adopting policies and environmental features supporting healthy diets and regular physical activity (GA DPH, 2010). Yet the 2013 CDC Prevention Status Report on Nutrition, Physical Activity and Obesity in Georgia indicates poor progress in these school-based policies and practices. The report provides an overview of solutions (i.e. evidence-based or expert-recommended policy and practice options) for addressing nutrition, physical activity, and obesity in Georgia. It also reports the status of these solutions (CDC, 2013). The first solution involves implementing state-level nutrition standards to limit availability of less nutritious foods

and beverages in schools. Having less than 50% of schools keep this practice is rated by the CDC as a solution that is not widely implemented or is not in accordance with supporting evidence or expert recommendations (CDC, 2013). In 2012, Georgia had only 35.8% of secondary schools keeping the first practice (CDC, 2013). However, this is not the only indication of Georgia's overall performance in combatting childhood obesity. Leaving the school-based environment and turning to the community category, Georgia is doing better in the CDC ratings.

The Georgia Department of Public Health explains that communities can promote healthy lifestyles in children by creating safe and supportive environments for healthy eating and physical activity (GA DPH, 2010). The definition of the community environment is a bit vague compared to the school environment. The CDC adds some clarity by specifying a community food environment where there are convenience stores or fast food stores with greater fresh and healthy food selection like those found in farmers' markets (CDC, 2013). Within the CDC's State Indicator Report on Fruits and Vegetables, the section on healthier food retail in communities has six major indicators. Georgia ranks above the national average in two of these. Seventy-one percent of Georgia's census tracts have at least one healthier food retailer located within the tract or within one half of tract boundaries. The national average is 69%. Also 22% of Georgia farmer's markets accept the Supplemental Nutrition Assistance Program (SNAP) benefits compared to the national average of 21%. The other four indicators are below the national average. Interestingly, Georgia has seen improvements in its obesity rate compared to other states, despite the poor ratings in their school-environment and policies. In 2013 Georgia's rank fell from 2nd to 17th in the nation for childhood obesity (GA DPH, 2013).

Looking more at the community food environment, over the last two decades Georgia Organics and several other established agriculture-based non-profits have been working to

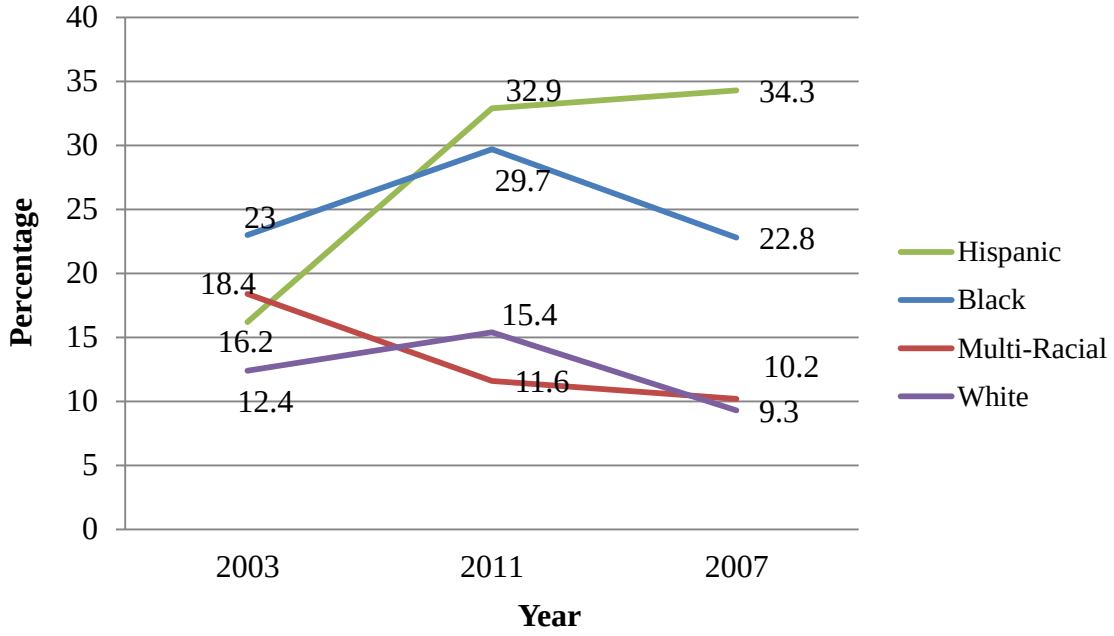
integrate healthy, sustainable, and locally grown food into the lives of all Georgians. This entails agriculture and nutrition education within and outside of the school-system (National Farm to School Network, 2014). Incidentally, Georgia Organics is the facilitator of the Georgia Farm-to-School program. Yet, the school-system is not the only area where they extend their practices. Their network of farmers extends to community development focused organizations like Truly Living Well Center for Urban Agriculture (TLW) and Piedmont Park Conservancy (PPC) whose leaders are members of Georgia Organics. Both organizations are host to regular farmers' markets and are part of a community food environment in Atlanta. These organizations work to improve their community food environment through community based programs like summer camps.

1.3 Research Objective

In light of the above, this thesis aims to contribute a quantitative study on the impact of non-school related community-based gardening and nutrition summer camps on child participants' food knowledge and preferences. A secondary aim is to evaluate the differential impact across racial and ethnic groups. This is in light of notable historical differences among obese children from different racial and ethnic groups in Georgia mentioned in section 1.1 and highlighted in Figure 1.1.1 (GA DPH, 2011 and Data Resource Center, 2013). To address the chief objective of the study, there are three major research questions that informed the study design, methodology and data analysis. Working with two of the established Atlanta-based summer gardening camps for urban youth, TLW and PPC this study assesses 1) what is the immediate impact of garden camps, particularly TLW and PPC on child participants' food knowledge? Specifically, are participants able to correctly identify foods with certain nutrients from the six food groups as well as relevant fresh fruit and vegetables following at least one camp session compared to

before? 2) What is the immediate impact of these garden camps on stated (hypothetical) food preferences? And 3) what is the immediate impact of these garden camps on revealed (non-hypothetical) food preferences? With the first two research questions, this study adds to the lack of sufficient evidence and comparable results on community-based garden programs (CDC, 2014). It uses the standard survey approach to gather changes in food knowledge and stated preference for fruits and vegetables. The last research question departs from previous studies where only stated preference approaches (e.g. surveys) were used (Hermann et al. 2006, Blair 2009, Davis et al 2011, and Branscum and Sharma 2012). In addition to the survey we employ a more quantitative measure using a field experiment that captures revealed preferences. This measure is a unique contribution to the current research. In the remainder of this thesis, we present a brief literature review in chapter 2. In chapter 3, we introduce the study design and methodology, which uses the stated and revealed preference model as a pre- and post-intervention survey and field experiment. Then we present the data analysis in chapter 4. Finally in chapter 5, we end with conclusions, suggestions for future work and policy implications.

Figure 1.1.1 - Obese weight status of Georgia children 2003-2011, based on BMI for age: children age 10-17 by race



CHAPTER 2: LITERATURE REVIEW

2.1 Influence of Behavioral Economics: Information vs. Experiential Learning Practices in Childhood Obesity Prevention

In the agricultural economics literature on childhood obesity prevention, it is noted that a popular practice to combat the obesity epidemic in children and adults has centered on access to information. This practice is within the school and community environments described in section 1.2. A common example is the Nutrition Labeling and Education Act implemented by the FDA in 1994 (Downs et al., 2009). A more recent example could include the Smart Snacks in Schools nutrition guidelines that originate from the 2010 Healthy Hunger-Free Kids Act. The Smart Snack guidelines center more on marketing and information than experiential-garden based learning (NPR, 2014 and USDA Food and Nutrition Service, 2014). These information-oriented practices have displayed only modest effects on consumer consumption, yet they remain popular in part because they are cost-effective (Unnevehr, 2013).

In response to disappointing results from attempts to change dietary behavior through information only, behavioral economists and practitioners in the horticulture and public policy fields are focusing on new approaches that centers on "nudging" individual behavior toward self-interest (Downs et al., 2009, Unnevehr, 2013). These could be considered more of a behavioral modification practice. Such nudging practices facilitate individuals who behave irrationally to achieve improved outcomes with minimal consequences to rationally behaved individuals (Downs, et al., 2009). Behavioral economic applications to dietary and obesity interventions incorporate heuristic-based (e.g. status quo) strategies to packaging, price, and promotion

necessary to counter food marketers' use of these strategies (Gittelsohn and Lee, 2013). Interventions that change the food environment and employ behavioral economic strategies can potentially contribute to healthier diets (Gittelsohn and Lee, 2013). Gardening programs are suitable places where these health interventions and nudging strategies can be integrated. Capacci et al. (2012) explain that gardening programs temporarily make fresh fruit and vegetables more prevalent, appealing and convenient to eat for youth at risk for obesity or associated chronic diseases. In the same vein, Davis et al. (2011) in California used a quasi-experimental, garden-based intervention for Latino youth (LA Sprouts). Compared with control subjects (N=70), LA Sprouts participants (N=34) had an increased preference for vegetables overall, increased preferences for three target fruits and improved perceptions of garden fresh vegetables. In the overweight/obese subgroup (N=61), LA Sprouts participants had a 16% greater increase in their preference for vegetables compared to the control group. Davis et al. (2011) concluded that cooking, nutrition, and gardening after-school programs in a garden-based setting can improve attitudes and preferences for fruits and vegetables that can lead to improved nutritional habits and dietary intake to reduce health disparities among minorities. Other similar studies coming from the horticulture literature have also examined the impact of after-school gardening programs on outcomes that could lead to healthier diet choices by children. Poston et al. (2005) found no improvements in knowledge of vegetables or vegetable preferences resulting from two after-school programs in Kansas, but had a very small sample to work with in each (N=11, N=18). Nor did they find children consistently felt more confident in their ability to achieve goals related to fruit and vegetable consumption. Hermann et al. (2006) found more encouraging results from an after-school garden program in Oklahoma (N=43). Children were more likely to report eating vegetables every day and being physically active every day after

attending the program. Most recently, Langellotto and Gupta (2012) used meta-analytical techniques to examine the efficacy of garden-based nutrition education programs for increasing children's nutrition knowledge, preference for fruit and vegetables and consumption of fruit and vegetables. The meta-analysis found that gardening increased children's consumption of vegetables, while a broad range of nutritional educational programs had no effect. Similar conclusions about the improvement such interventions can make have been reported recently (Blair 2009, Branscum et al. 2012, and Robinson-O'Brien et al. 2009). Not incidentally, there has been a move toward more experiential, hands-on gardening techniques in several states including Georgia.

2.2 Gaps in the Agricultural Economics Research on Evidence of Childhood Obesity Prevention Practices

Economic research is beginning to offer more evidence about the effect of diet and health interventions on households (Gittelsohn and Lee, 2013, Liu et al., 2014). Yet the research considers adult individuals or households as decision makers and does not consider children or adolescents as agents of change. There is extensive literature on school lunch programs, and other school-based nutrition and health interventions (Cappacci et al., 2012, Sassi et al., 2009). However it does not account for children's food environment outside of school, where children may be at particular risk for weight gain (von Hippel et al., 2007). Non-school, community-based programs - particularly intensive summer programs - may be an important complement to school-based programs. Not only do summer programs offer more intensive nutritional education in a different environment, they also occupy children's time when they have more freedom to make their own choices regarding food.

The outstanding issue on the research in economics and other social science fields is the lack of enough quantitative data (Phibbs and Relf, 2005). All the aforementioned studies in section 2.1 and 2.2 use more of a qualitative approach consisting of hypothetical questions. Hypothetical questions are often the only way for researchers to capture the preferences of subjects, yet these questions can often lead to social desirability and hypothetical bias (Harrison and Rustrom, 2008). Consequently, this thesis attempts to bridge some of the gaps in the research by the design and methods further detailed in the next chapter.

CHAPTER 3: STUDY, SURVEY AND FIELD EXPERIMENT DESIGN

3.1 Study Site

For the study design our research team employed a unique field experiment to measure proximate results that indicate early changes in the revealed food preferences for fresh fruit and vegetables among participating youth. It also uses a survey to measure changes in food knowledge and stated food preferences. The survey and experiment design together capture changes in 1) food knowledge, 2) stated food preferences, and 3) revealed food preference.

In the summer of 2013 a child and parent survey were administered to garden camp participants. Participants were recruited from two summer garden camps in Atlanta, TLW and PPC. Both camps advertise their desire to improve children's diet and physical activity habits through community environment and agricultural hands-on learning practices. This includes activities in edible gardens, like planting and harvesting food. The organizations promoted the camps to families through websites, flyers and posters, and networking at Atlanta school assemblies. Neither camps advertise as being weight loss or "fat camps" and thus do not target families combating childhood obesity. The solicitation of families to the camp is distinct from the recruitment to participate in the study. The families selected to attend the camp before agreeing to participate in the study. All camp families were invited to participate in the study through the organizations. First camp directors introduced the study to all participating families. Then a follow up email and phone call was made to each family by the research team. The email contained details on the study objective and included an overview of the survey. As an incentive to solicit the greatest amount of participants, families from TLW were offered gift certificates

worth $20 of goods at the organization's farmer's market. Similarly, for PPC, gift certificates worth $10 were offered. Different amounts were given to acquire racial and ethnic diversity in the sample size. Camp TLW attracted more families from Hispanic and Black backgrounds.

The surveys were conducted with the gradual rollout of the camp sessions. The children in the study provided self-reported responses to the survey. The parent or guardian of the child provided survey response to questions about the child. The children also participated in the field experiment. TLW had four two-week camp sessions limited to 25 children per session. PPC had eight one-week sessions limited to 40 children per session. Our total sample size is 71 campers with 31 in TLW and 40 in PPC. There was some attrition where families who participated in the pre-camp survey were unable to complete the post-camp survey due to various reasons. One reason involved the school-year starting again. Nonetheless, the sample is a relatively large size compared to existing evaluations of non-school garden programs (Blair 2009, and Robinson-O'Brien et al. 2009).

An identical survey was used for pre- and post-camp measurement to capture any changes in food knowledge and stated food preferences. The pre-camp child and parent survey were administered before the start of the camper's participation in the activities. Due to time constraints, pre-camp surveys that could not be conducted at the participating family's home or selected public location, took place at the camp instead. Though the pre-camp location was not always consistently in the home, the research team took due diligence to ensure that there was consistency in the administration of the survey at the camp. Surveys were conducted away from other campers during the drop-off and free-play period of the camp. There were two enumerators, both graduate students familiar with the design and objective of the study. When administering the survey one enumerator would start with reviewing the instructions with the

parent while the other began with the child for consistency. In instances with more than one child, an enumerator would administer the survey to one child at a time. Like the pre-camp survey, the post-camp child and parent surveys were administered as early as the first day after the participant's camp session ended. There is no control group, i.e. no families of children who did not attend the camp included in this study.

The field experiment was also administered twice with the survey. During the instructions for the survey, children were told they could select a choice of one snack and one drink. The field experiment took the form of a basket with the choices in full display prior to finishing the survey. Fresh fruit and vegetables were kept cool as well as the drinks prior to conducting the experiment. The basket itself was decorative, made of wicker and lined with cloth. It was large enough where all 15 food and drink items were visible and campers were free to look and touch each item before making their final choice. The time the survey and field experiment were conducted varied across families, some in the morning, afternoon and evening, depending on the availability of the families.

Table 3.1.1 summarizes child and parent characteristics. The average camper was 8 years old, and approximately half are female. The sample has 54% minorities (Asian, Biracial/Multiracial, Black, or Hispanic) and 46% non-minorities (White). The average median household income is $71,000. The average family has two children. Just under 13% of families received financial aid to attend the camp, and the average time spent attending the camp was 1.7 weeks (40 hours a week).The Atlanta metropolitan zone with the highest frequency (based on zip code) is zone 6 (see Appendix for map and frequency table). This speaks to the reach of the camps recruitment. Each camp is located in zone 6. The location profile of the families is mostly

urban rather than suburban or rural. Thus both camps are community-based in that they educate, train and provide food options mainly to families residing within or nearby their zone.

Table 3.1.1 Summary of Child and Parent Characteristics

Variable	Variable Definition	Mean	Std. Dev.	Min	Max
Age	Age of camper in Years	7.944	2.190	5	14
Gender	1 if camper is Female	0.479	0.503	0	1
Asian	1 if camper is Asian	0.056	0.232	0	1
Black	1 if camper is Black	0.254	0.438	0	1
Hispanic	1 if camper is Hispanic	0.028	0.167	0	1
Biracial	1 if camper is Biracial	0.197	0.401	0	1
White	1 if camper is White	0.465	0.502	0	1
Minority	1 if camper is Minority	0.535	0.502	0	1
TLW	1 if camper attended TLW camp	0.437	0.500	0	1
Income	Median household income (in 1000s) based on camper residence zip code	70.792	29.121	26.367	141.205
Scholarship	1 if camper awarded financial aid	0.127	0.335	0	1
Weeks	Number of weeks attended camp	1.690	0.994	1	4
Kids	Number of children in same house as camper participating in camp	2.070	0.662	1	4

3.2 Survey Design

Both the child and parent surveys were modeled after modules from the CDC's National Health and Nutrition Examination Survey (NHANES), considered to be the gold standard for nutrition surveys. NHANES is designed to assess the health and nutritional status of adults and children in the United States. It is unique in that it combines interviews with physical examination (CDC, 2013). The survey also draws from the National Cancer Institute's Automated Self-Administered 24-hour Recall survey and the American Heart Association's Teaching Garden's curriculum (National Cancer Institute, 2013 and American Heart Association, 2013). These survey instruments were used to create the four major sections of the child and parent survey. Each section helped to reach the study's objective. As seen in Table 3.1.1, the target group included children age five to fourteen. In consideration of the target group age, the enumerators consistently read the survey out loud to child participants younger than eight and used the graphics in the survey that were drawn from similar previously published garden and nutrition studies (Jones 2008).

The child survey was divided into four parts. There were just over 50 questions (see Appendix for complete survey). The first part of the survey elicited general socio-demographic information including age, gender and ethnicity. It also gathered weight and height using measuring tape and a portable scale. Measurements were taken by the enumerators. Using height and weight, children's BMI percentiles were calculated by established CDC procedures. This involved entering date of birth, sex, and then height and weight of the child into the CDC BMI Percentile Calculator for Child and Teen (CDC, 2014). The second part of the survey elicited information about the child's time use. This included questions about time spent watching TV or playing on a computer, participating in competitive or recreational sports, and gardening. The

third part elicited questions about food knowledge. The section asked respondents to identify nutrients in the six major food groups (fruit, vegetables, grains, meat, dairy and fats). The section also contained questions about making healthy food choices, where three out of five items were to be identified as healthy options for breakfast, lunch, snack, and dinner. Next was a plant identification section where herbs, fruits, and vegetables common to Georgia agriculture (or grown in the particular camp) were displayed in a photo. Three photos of each item were displayed for participants to select one of the four multiple-choice answers. This section ended with questions on agriculture and nutrition relating to the camp curriculum. The last part elicited the child's stated food preferences using fifty-five photos of food items in alphabetical order. There were four food categories: fresh vegetables, fruits, snacks and fast-food. Alongside each photo was an emoticon-like face representing a preference level of love, like a lot, like/ok (average), dislike and hate. There is a never tried category as well.

Similarly, the parent survey was divided into four sections with just over 20 questions concerning physical attributes, food environment, and food access for their participating child or children. The questions in part one and two matched those in the child survey. There was no food knowledge part in the parent survey; instead the third part addressed the food preferences and access of children, using the same fifty-five food items from the child survey. Parents were asked to rank on a 5-point scale how their child feels about each food item, and also how much the child eats of each food item on average per week. Parents were offered a serving guide based on National Cancer Institute's 24-hour Recall tool to estimate serving sizes, but not every parent completed this section of the survey accurately (National Cancer Institute, 2014). The last part inquired about the food environment at home.

3.3 Revealed Preference Field Experiment Design

The revealed preference experiment conducted with children consisted of two parts: 1) a choice between a variety of healthy and less healthy snack foods and 2) a choice between a variety of drink options. The snack food options had four different categories: 1) fresh vegetables, 2) fresh fruit, 3) processed/refined salty snacks, and 4) processed/refined sugary snacks. The drink option had three categories including soda, water, and 100% fruit juice options (See Appendix for detailed table and photo). This revealed food preference design was loosely based on non-hypothetical examples of taste tests used in previous studies on nutrition and agricultural education (Morris et al. 2002). There were 12 snack options in total and 3 drink options with enough variety to appeal to certain diet or allergy restrictions. For example, children who had peanut allergies or who were gluten-free could still select one or more of the snack options. The variety in the snack and drink options also reflects real world options where child consumers will progressively have to exercise their own judgment and self-control to make healthy food selections amidst less healthy options. The full list of snack and drink options is found in table 3.3.1

Table 3.3.1 Revealed Preference Field Experiment - List of Snack and Drink Options

Fresh Vegetables
Carrot bites
Celery sticks
Baby Cucumbers
Fresh Fruit
Apple Slices
Apple Sauce
Peaches
Packaged Salty Snacks
Chips (Lays, Doritos)
Crackers (Goldfish, Ritz or Cheez-Its)
Packaged Sugary Snacks
Fruit Snacks (Welch's)
Granola bar (Chocolate covered)
Oatmeal Pie
Drinks
Fruit Juice (100% Juice)
Soda (Coke)
Water

CHAPTER 4: DATA ANALYSIS AND RESULTS

4.1 Research Questions

Our data analysis involves the three research questions outlined in section 1.3. We take each question - the impact of the camp treatment on 1) food knowledge, 2) stated food preferences and 3) revealed food preferences - in turn. We first consider unconditional tests of significance for a continuous or categorical dependent variable and then look at the conditional test of significance using Ordinary Least Squares (OLS).

4.2 Food Knowledge

Table 4.2.1 highlights the impact of the camp treatment on participants' food knowledge. It includes a two-sample t-test with equal variances. The camper aggregate food knowledge section has a total score of 57 points. The pre-camp mean score was 37. Post-camp, the mean score improved to 40 ($p=0.02$). Separately, both TLW and PPC mean scores improved from pre- to post-camp.

Table 4.2.2 is the linear regression model of the difference in pre- and post-camper aggregate food knowledge. The dependent variable is continuous and transformed into the log of the difference in aggregate food score to yield statistical results in percentage terms. The independent variables included in the model are similar to those used in the literature review (Davis et al., 2011, Langellotto and Gupta, 2012). The underweight, overweight, and obese dummy variables are based on the major weight categories defined on the CDC BMI for Children and Teens webpage. Underweight children are less than the 5^{th} percentile, healthy

weight children are in the 5th to less than 85th percentile, overweight children are in the 85th to less than the 95th percentile and obese children are equal to or greater than the 95th percentile for their age (CDC, 2011). The healthy weight categorical variable is part of the constant. The entire model is significant ($p < 0.05$) with a R^2 of 0.358.

The two variables that are individually significant are income and obese, which are both noteworthy. The negative value of the coefficient for income means that an additional $1000 in household income is associated with a 0.4% decrease in the change in aggregate food knowledge score. This implies that those campers from less wealthy families achieved greater improvements in their knowledge about food and nutrition. This is a favorable impact, particularly for groups who aim to help lower-income families achieve healthier food choices. While this is a favorable outcome for the underlying goal of community garden programs, the results with respect to the obese variable is not. The estimated coefficient for obese is negative implying that being obese on average corresponds to a 74% decrease in the improvement in food knowledge from attending the camp. Hence, this implies that children, who have the most to gain from improved nutrition and food knowledge, did not experience an improvement even close to being on par with their normal weight counterparts. It is unclear why this is the case. Out of the sample, pre-camp there were 13 children in the overweight and obese category. Post-camp there was 6. The change in number was not due to attrition, but instead due to change in weight categories.

Table 4.2.1 Camper Aggregate Food Knowledge Score Pre- and Post-Camp

Variable		Mean	Std. Dev.	Min	Max
Pre-Camp Aggregate Score	(all Campers, n =71)	37.070[1]	9.117	11	53
Post-Camp Aggregate Score	(all Campers, n =71)	40.521[1]	7.600	3	54
Pre-Camp Aggregate Score	(TLW only, n= 31)	39.161	8.295	14	53
Post-Camp Aggregate Score	(TLW only, n= 31)	41.839	6.435	31	51
Pre-Camp Aggregate Score	(PPC only, n=40)	35.450[2]	9.492	11	53
Post-Camp Aggregate Score	(PPC only, n=40)	39.500 [2]	8.330	3	54

Note: The difference between Pre- and Post-camp scores is significant at the 5% significance level for 1) p-value =0.016 and for 2) p-value =0.046. P-value for TLW is 0.161.

Table 4.2.2 Linear Regression Model of Camper Change in Aggregate Food Knowledge (n=71)

	Coef.	Std. Err.
Age	-0.002	0.021
Gender	0.094	0.084
Income	-0.004**	0.002
Minority	-0.008	0.096
Underweight	0.120	0.125
Overweight	0.266	0.256
Obese	-0.737***	0.194
Scholarship	-0.198	0.158
Weeks	0.010	0.061
TLW	-0.042	0.110
Constant	0.403	0.212
R-Squared	0.358	
F-Statistic	3.34**	

Note: ***, **, ***** denote significance at the 10%, 5% and 1% significance level respectively

4.3 Stated Food Preferences

Next, tables 4.3.1 - 4.3.3 summarizes campers stated food preferences and highlights the impact of the camp treatment on stated preferences of 55 food items. Out of the 55, there are 16 fresh vegetables, 25 fresh fruit, 8 snack foods and 6 fast food items. Several of these fruit and vegetables were served at the camps during the snacks or taste tests while harvesting. These are marked with bold print in the tables. To navigate these tables, we asked, 1) which food items had the greatest change from "never tried" to "tried"? 2) Which of the targeted fresh fruits and vegetables served at the camps had the greatest change in mean, indicating an improvement in preference? 3) Which of all the food items had at least a 10% change in mean? And 4) what changes do we see in the least healthy food items? The change in mean is the difference between the pre-camp and post-camp averages across all participants for each food item.

Table 4.3.1 answers the first question. Out of the 71 campers, there were 12 who stated they tried squash, 11 tried cauliflower, 11 tried cucumbers, 8 tried collard greens, 7 tried kale or mustard greens, 7 tried okra, 6 tried beets, 6 tried cherries, 5 tried lima beans and 4 tried cabbage - and all for the 1st time during the camp treatment period per the child's self-reporting. All except one of these top ten changes is a vegetable. Interestingly, squash was grown in both camps and some campers helped to harvest the vegetable which reaches its peak harvest time in Georgia during the months of June and July (Georgia Fruit and Vegetable Growers Association, 2013).

Turning to question 2, there were a total of 12 fresh fruits and vegetables served at the camps. All but two of them had a positive change in mean score. Table 4.3.2 shows that spinach had the highest change in mean score with 41%, then cauliflower with 24%, lettuce with 20%, cucumber with 19%, cantaloupe with 16%, blackberry with 9%, strawberry with 6%, carrot with

4%, grape with 3% and blueberry with 1%. Similarly, table 4.3.3 answers the third question. It shows all the food items with at least a 10% positive change in mean change. Spinach, which has the highest change overall in mean score with 41%, was grown in both camps and camp TLW used spinach in its taste test and cooking demonstrations.

Lastly to answer the fourth question we go back to table 4.3.2. We see here that the least healthy foods - the refined sugary and salty snack foods as well as fast food items - had mostly negative changes in mean scores. Out of the 12 least healthy, three ranked in the top ten with the highest negative change in mean. Chicken nuggets ranks at first with a -40% change in mean score, pizza ranks at ninth with -18% and fried chicken ranks at tenth with -15%. Going to the next tier, hamburgers rank at eleventh with -15%, chips at twelfth with -13%, cookies at thirteenth with -13% and french-fries at fourteenth with -13% change in mean score.

This section has favorable outcomes with respect to the camp treatment effect on all campers. It shows that the fresh snack foods, in particular the vegetables that were grown, harvested or served at the camp had some of the most favorable changes in children's stated preferences. Similarly, it highlights the camps positive influence of moving camper's stated preferences from the least healthy to the healthier snack options. Improving campers stated preferences for healthy options coupled with reducing campers stated preferences for less healthy food items has some strong and encouraging implications for the camps health and nutrition practices. These implications can be of significant benefit to obesity prevention policies and practices within the community environment.

Table 4.3.1 Camper Stated Food Preferences: "Never Tried" Pre- and Post- camp and Difference in Pre- and Post-camp

	Pre- Camp Never Tried	Never Tried	Change to "Tried"
Apple	0	0	0
Banana	0	0	0
Green Bean	1	0	1
Lima	22	17	5
Beet	36	30	6
Blackberry	5	3	2
Blueberry	4	3	1
Broccoli	0	0	0
Cabbage	22	18	4
Cantaloupe	4	4	0
Carrot	0	0	0
Cauliflower	21	10	11
Cherry	8	2	6
Chip	0	0	0
Collard Green	32	24	8
Cookie	0	0	0
Corn	1	1	0
Cracker	2	0	2
Cucumber	13	2	11
Eggplant	37	36	1
Fruit/Granola bar	1	1	0
Juice	1	0	1
Fruit Snack	3	3	0
French Fry	0	0	0
Fried Chicken	4	1	3
Grape	1	1	0
Greens (mustard, kale)	33	26	7
Hamburger	5	4	1
Kiwi	17	17	0
Lettuce	2	2	0
Milk	1	1	0
Mushroom	16	16	0

Chicken Nugget	2	0	2
Okra	34	27	7
Onion	13	13	0
Orange	0	0	0
Pea	8	5	3
Peach	3	3	0
Pear	3	0	3
Pepper – Bell	22	19	3
Pepper – Chili	28	25	3
Persimmon	59	56	3
Pineapple	3	3	0
Pizza	0	0	0
Plum	13	9	4
Potato	4	4	0
Soda	6	5	1
Spinach	8	7	1
Squash	27	15	12
Strawberry	0	0	0
Sweet Potato	9	9	0
Taco	6	6	0
Tomato	5	1	4
Watermelon	2	2	0
Zucchini	30	26	4

(Bold denotes food served or used in cooking demonstration at garden camp)

Table 4.3.2 Camper Stated Food Preferences: Mean Score and Std. Dev. Pre-camp, Post-camp and the difference Pre-and Post-camp

	Pre-Camp Mean	Std. Dev.	Post-Camp Mean	Std. Dev.	Change in Mean	Std. Dev.
Apple	4.14	0.99	4.04	1.08	-0.11	0.92
Banana	3.96	1.24	3.77	1.15	-0.18	1.11
Green Bean	3.76	1.25	3.57	1.23	-0.18	1.29
Lima	3.16	1.50	3.11	1.41	-0.05	2.07
Beet	2.54	1.50	2.87	1.45	0.34	1.97
Blackberry	4.02	1.31	4.10	1.19	0.09	1.61
Blueberry	4.09	1.23	4.10	1.31	0.01	1.55
Broccoli	3.68	1.19	3.64	1.30	-0.03	1.19
Cabbage	3.16	1.38	3.26	1.42	0.10	1.70
Cantaloupe	3.78	1.46	3.94	1.27	0.16	1.38
Carrot	3.90	1.08	3.94	1.04	0.04	0.88
Cauliflower	3.12	1.53	3.36	1.41	0.24	1.32
Cherry	4.40	1.04	4.27	1.07	-0.12	1.28
Chip	4.11	1.02	3.99	0.99	-0.13	1.22
Collard Green	3.36	1.51	3.53	1.48	0.17	1.58
Cookie	4.38	0.97	4.25	0.97	-0.13	0.98
Corn	4.33	1.15	4.31	1.05	-0.01	1.19
Cracker	3.93	1.10	4.04	0.97	0.11	0.99
Cucumber	3.45	1.54	3.64	1.42	0.19	1.49
Eggplant	2.88	1.43	2.57	1.28	-0.31	1.85
Fruit/Granola bar	4.00	1.07	4.10	0.98	0.10	1.18
Juice	4.29	1.02	4.32	0.91	0.04	1.15
Fruit Snack	4.11	1.09	4.10	1.08	-0.01	0.98
French Fry	3.85	1.20	3.72	1.19	-0.13	1.23
Fried Chicken	3.91	1.19	3.76	1.20	-0.15	1.36
Grape	4.41	0.89	4.44	0.77	0.03	0.95
Greens (mustard, kale)	3.39	1.46	3.40	1.45	0.01	1.64
Hamburger	3.73	1.29	3.58	1.17	-0.15	1.62
Kiwi	3.83	1.41	4.04	1.25	0.20	1.44
Lettuce	3.46	1.35	3.67	1.16	0.20	1.32

Milk	4.09	1.21	4.36	1.04	0.27	1.37
Mushroom	2.68	1.59	2.94	1.04	0.26	1.22
Chicken Nugget	4.20	1.00	3.80	1.04	-0.40	1.17
Okra	3.70	1.80	3.52	1.53	-0.18	1.58
Onion	2.76	1.44	4.06	1.44	0.34	1.57
Orange	4.14	1.07	4.06	1.10	-0.08	0.75
Pea	3.56	1.36	3.65	1.17	0.10	1.57
Peach	4.25	1.08	4.34	0.97	0.09	1.10
Pear	3.87	1.17	3.92	1.20	0.05	1.10
Pepper – Bell	3.12	1.49	3.50	1.42	0.38	1.75
Pepper – Chili	2.51	1.68	2.70	1.41	0.18	1.96
Persimmon	3.58	1.37	3.33	1.50	-0.25	1.92
Pineapple	4.09	1.14	4.19	0.98	0.10	1.10
Pizza	4.21	1.12	4.03	1.14	-0.18	1.11
Plum	4.07	1.15	4.32	1.02	0.25	1.35
Potato	3.92	1.17	3.92	1.08	0.21	1.31
Soda	3.63	1.46	3.67	1.36	0.04	1.56
Spinach	3.06	1.50	3.47	1.39	0.41	1.52
Squash	2.86	1.60	2.77	1.37	-0.10	1.49
Strawberry	4.33	1.10	4.39	0.99	0.06	1.01
Sweet Potato	3.92	1.27	3.73	1.32	-0.19	1.66
Taco	4.01	1.09	4.26	0.97	0.25	1.42
Tomato	3.56	1.54	3.34	1.54	-0.22	1.52
Watermelon	4.25	1.14	4.54	0.93	0.29	0.82
Zucchini	2.76	1.56	2.73	1.40	-0.02	1.10

(Bold denotes food served or used in cooking demonstration at garden camp)

Table 4.3.3 Changes in Stated Food Preferences with at least 10% Change in Mean

Food	Change in Mean
Spinach	41%
Pepper (banana, bell)	38%
Onion	34%
Beet	33%
Watermelon	29%
Milk	27%
Mushroom	26%
Plum	25%
Taco	25%
Cauliflower	24%
Potato	21%
Kiwi	20%
Lettuce	20%
Cucumber	19%
Pepper – Chili	18%
Collard Greens	17%
Cantaloupe	16%
Cracker	11%
Cabbage	10%
Granola Bar	10%
Pea	10%
Pineapple	10%

(Bold denotes food served or used in cooking demonstration at garden camp)

4.4 Revealed Food Preferences

Table 4.4.1 summarizes the revealed food preferences and outlines the impact of the camp treatment on campers' non-hypothetical food selection. In all of the dependent variables there are changes in the means pre- and post-camp. The *healthy* dependent variable, where choosing a fruit or vegetable is considered a healthy choice, increases from 20% to 22%. For the healthy snack variable, where choosing a fruit, vegetable or nothing for a snack is considered a healthy choice, 21% chose a healthy snack pre-camp while 31% chose a healthy snack post-camp. Similarly, for healthy drink variable, where choosing a drink other than soda is considered a healthy choice, 41% chose a healthy drink pre-camp while 59% chose a healthy drink post-camp. The last variable considers not selecting any drink or a drink other than soda a healthy choice. It shows an increase from 68% to 77%. Table 4.4.1 also includes results from a Pearson chi-square test of significance for the dependent categorical variables. The chi-square tests indicate that there is no statistical difference between the pre- and post-camp healthy snack choice and healthy drink choice variables at conventional levels. The p-value for each dependent variable (*healthy, healthysnack, healthydrink,* and *nosoda*) is 0.754, 0.181, 0.178 and 0.188 respectively

Table 4.4.2 gives the results of a probit regression for the changes in *healthy, healthysnack, healthydrink,* and *nosoda*. Each model as a whole is not statistically significant at the conventional levels. However, for the changes in *healthy, healthysnack,* and *nosoda* there are different independent variables that are statistically significant. In the *healthy* model the gender and income variables are both significant ($p < 0.10$) and ($p < 0.05$), respectively. Since the probit regression coefficients give the change in the z-score for a unit increase in each predictor, it is more useful to look at the marginal effects to help interpret the impact of these variables. Table 4.4.3 gives the conditional marginal effects at the mean (MEM). In the output, the MEM for

female of .136 ($p < 0.10$) tells us that individuals with an average age of 8.01, an income of $69,760, a BMI percentile of 41 (healthy weight) and 1.7 weeks at camp, gives a predicted probability of choosing a healthy snack at .136 greater for the female than the male.

For a continuous variable like income MEM gives the instantaneous rates of change. Thus the MEM for income of -0.006 ($p < 0.05$) tells us that an additional $1000 increase in income will produce a -0.006 decrease in the probability of choosing a healthy snack for an average individual. Average in this case means age 8, with a household income of $69,760, BMI percentile of 41 (healthy weight) and 1.7 weeks at the PPC garden camp.

Turning back to Table 4.4.2 in the *healthysnack* model only income is significant ($p < 0.05$). The MEM for income is again -0.006 ($p < 0.05$). In this case the average individual changes. The MEM for income of -0.006 ($p < 0.05$) tells us that an additional $1000 increase in income will produce a -0.006 decrease in the probability of choosing a healthy snack for a child who is 7.94, with a household income of $70,791, BMI percentile of 43 (healthy weight), and 1.69 weeks at PPC. The difference in the average is due to the different definitions between *healthy* and *healthysnack. Healthy* does not include the entire sample because some children decided not to select a snack. While *healthysnack* does include the entire sample because in this case choosing nothing is considered a healthy choice. Lastly for the *nosoda* model only gender ($p < 0.10$) is significant. Table 4.4.3 shows the MEM for female. In this case, being female changes the predicted probability of not selecting a soda by -0.182.

Similar to the results within the food knowledge measurement (4.2), in this section we see children from less wealthy families achieved greater improvements in their revealed preferences for fruits and vegetables. This reinforces earlier implications for these community-based garden camps highlighted in section 4.2 and 4.3. Results from this last measurement imply

that the changes we see in food knowledge and stated preferences align positively with revealed preference changes. The results indicate that these garden camps have the potential to help lower-income families achieve healthier food choices by 1) instilling a greater knowledge base of healthy foods, 2) encouraging greater stated preferences for fruits and vegetables and, 3) cultivating greater revealed preferences for fruits and vegetables.

Finally, based on Table 4.4.4, a summary of the average median household income by the race/ethnic characteristic of families in our sample, the table shows that the families with the lowest incomes are Black, Biracial and Hispanic. The average median household income is $60,056, $63,799 and $65,154 respectively. Tying the implications these camps have on lower-income families to the above summary statistics, it follows that the camps greater rate of positive impact on lower-income families extends to Black, Biracial and Hispanic families who hold the lowest average incomes out of the sample.

Table 4.4.1 Camper Aggregate Revealed Food Preferences Pre- and Post-Camp Chi-Square Test of Significance

Variable	Variable Definition	Mean	Std. Dev.
Pre-Camp Healthy	1 if camper chose fruit or veggie as snack, all Campers, n =70	0.200[1]	0.403
Post-Camp Healthy	1 if camper chose fruit or veggie as snack, all Campers, n =63	0.222[1]	0.419
Pre-Camp HealthySnack	1 if camper chose fruit, veggie or nothing as snack, all Campers, n= 71	0.211[2]	0.411
Post-Camp HealthySnack	1 if camper chose fruit, veggie or nothing as snack, all Campers, n= 71	0.310[2]	0.466
Pre-Camp Healthydrink	1 if camper chose water or fruit juice as drink, all Campers, n=41	0.439[3]	0.502
Post-Camp Healthydrink	1 if camper chose water or fruit juice as drink, all Campers, n=39	0.590[3]	0.499
Pre-Camp Nosoda	1 if camper chose water, fruit juice or nothing as drink, all Campers, n=71	0.676[4]	0.471
Post-Camp Nosoda	1 if camper chose water, fruit juice or nothing as drink, all Campers, n=71	0.775[4]	0.421

Note: The differences between Pre- and Post-camp revealed preferences are not significant at the conventional levels for any of the dependent variables 1) (p=0.754), 2) (p=0.181), 3) (p=0.178), and 4 (p=0.188)

Table 4.4.2 Probit Regression Model of Camper Revealed Food Preferences

	Coef.	Std. Err.		Coef.	Std. Err.
Change in Healthy			**Change in Healthy Drink**		
Age	-0.067	0.105	Age	-0.018	0.197
Female	0.755*	0.447	Female	-0.930	0.859
Income	-0.034**	0.016	Income	-0.022	0.028
Minority	-0.149	0.523	Minority	-0.397	0.940
BMI Percentile	-0.004	0.008	BMI Percentile	0.008	0.024
Obese	0.743	1.175	Obese	28.736	2197.360
Scholarship	0.303	0.695	Scholarship	23.720	1780.231
Weeks	-0.055	0.287	Weeks	-11.366	890.129
TLW	-0.783	0.630	TLW	10.947	890.129
Constant	1.892	1.532	Constant	12.370	890.134
Pseudo R^2	0.2053		Pseudo R^2	0.3579	
LR chi^2	12.60		LR chi^2	11.74	

	Coef.	Std. Err.		Coef.	Std. Err.
Change in Healthy Snack			**Change in non-soda**		
Age	-0.069	0.092	Age	-0.069	0.096
Female	0.288	0.355	Female	-0.677*	0.388
Income	-0.022**	0.011	Income	-0.012	0.009
Minority	-0.406	0.423	Minority	0.326	0.454
BMI Percentile	0.001	0.001	BMI Percentile	0.009	0.007
Obese	0.217	0.970	Obese	0.326	0.839
Scholarship	0.262	0.659	Scholarship	0.611	0.586
Weeks	-0.032	0.270	Weeks	0.061	0.224
TLW	-0.867	0.543	TLW	-0.362	0.479
Constant	1.751	1.197	Constant	0.242	1.074
Pseudo R^2	0.1286		Pseudo R^2	0.1508	
LR chi^2	10.61		LR chi^2	11.79	

Note: ***, **, ***** denote significance at the 10%, 5% and 1% significance level respectively

Table 4.4.3 Conditional Marginal Effects in Camper Revealed Food Preferences

	Marginal Effect	Std. Err.		Marginal Effect	Std. Err.
Change in Healthy			**Change in Healthy Drink**		
Age	-0.012	0.019	Age	-0.004	0.637
Female	0.136*	0.084	Female	-0.229	31.025
Income	-0.006**	0.002	Income	-0.047	0.778
Minority	-0.271	0.097	Minority	-0.081	13.762
BMI Percentile	-0.001	0.001	BMI Percentile	0.002	0.270
Obese	0.190	0.386	Obese	0.981	4.399
Scholarship	0.062	0.157	Scholarship	0.992	2.860
Weeks	-0.010	0.051	Weeks	-2.480	230.265
TLW	-0.141	0.101	TLW	0.999	0.019

	Marginal Effect	Std. Err.		Marginal Effect	Std. Err.
Change in Healthy Snack			**Change in non-soda**		
Age	-0.020	0.027	Age	-0.018	0.026
Female	0.084	0.104	Female	-0.182*	0.098
Income	-0.006**	0.003	Income	-0.003	0.002
Minority	-0.119	0.124	Minority	0.088	0.121
BMI Percentile	0.000	0.002	BMI Percentile	0.002	0.002
Obese	0.068	0.322	Obese	0.010	0.282
Scholarship	0.082	0.218	Scholarship	0.197	0.210
Weeks	-0.009	0.079	Weeks	0.017	0.067
TLW	-0.239	0.129	TLW	-0.097	0.123

Note: ***, ****, ***** denote significance at the 10%, 5% and 1% significance level respectively

Table 4.4.4 Summary of Income by Race/Ethnic Group Characteristic

Variable	Variable Definition	Mean	Std. Dev.	Min	Max
Asian Income	Median household income (in 1000s) for Asian households, n =4	90.220	37.242	51.700	141.205
Biracial Income	Median household income (in 1000s) for Biracial households, n =14	63.799	22.818	33.268	108.114
Black Income	Median household income (in 1000s) for Black households, n =18	60.056	32.582	29.723	141.205
Hispanic Income	Median household income (in 1000s) for Hispanic households, n =4	65.154	26.634	46.321	82.987
White Income	Median household income (in 1000s) for White households, n =33	77.600	27.280	26.367	141.205

CHAPTER 5: CONCLUSIONS AND POLICY IMPLICATIONS

5.1 Conclusions

This thesis looks exclusively at the impact of community environment garden camps. Our results indicate that the combination of environment, policies and practices found in community-based agricultural education summer camps like TLW and PPC lead to the necessary changes to prevent and reduce childhood obesity in Georgia. Given the recent drop in Georgia's childhood obesity rate and the favorable ratings toward community-based environments highlighted in chapter 1, there is reason to believe these types of treatments can continue to contribute to the cause.

The combination of traditional survey instruments, choice experiments and a non-hypothetical food experiment provided new evidence on the impact of summer garden programs. It simultaneously produced a quantitative assessment of the impact of community-based garden programs on child nutrition and knowledge and provided an example of implementing incentive-compatible experimental markets to measure youth food preferences and intervention impacts. The results of this study align with the positive results highlighted in Chapter 2. It has similar results and makes comparable conclusions to those found in Hermann et al. (2006), Davis et al. (2012), and Langellotto and Gupta (2012). In particular the improvements in stated food preferences for vegetables can be compared to the results in Davis et al. (2012). Similar to these studies we see campers' participation in growing and harvesting nutrient-dense food items added an element of access not seen in information only or even healthy school lunch programs. The mere act of gardening, coupled with the greater access to garden-grown produce, encouraged and

provided for greater knowledge, stated and revealed preference for certain fresh fruit and vegetables like spinach, squash, peppers, cauliflower and cucumbers. The rate at which these camps helped lower-income families is higher than wealthier families and by extension has positive implications for children from Black, Biracial and Hispanic racial and ethnic groups who reside in these lower income levels.

5.2 Recommended Future Contributions and Policy Implications

Agricultural economists can continue to contribute to this research by adding more quantitative data on community garden camp interventions. An improved food experiment that includes a simulated market may add more statistical significance to results. Other factors to consider include incorporating a refined parent or guardian survey or mechanism to capture food availability in the home as well as food purchases away from the home (e.g. capturing scanner data from grocery stores). Partnering with large and well established organizations that will draw in or even target the overweight or obese populations may be of interest as well. Once these issues are addressed properly, agricultural economists can continue to contribute to the work by researching the cost effectiveness of proven interventions.

One hope for future policy implications is that this study and similar evidence will help policy makers and funding agencies assess the positive potential of non-school related programs for engaging at-risk children belonging to lower income families and communities in the battle against poor food choices and the resulting obesity epidemic. Based on evidence from this thesis, the community environment in the form of summer camps does offer promise in achieving better diet and health standards for children.

REFERENCES

Alfnes, Frode, and Kyrre Rickertsen. 2003. "European Consumers' Willingness to Pay for US Beef in Experimental Auction Markets." *American Journal of Agricultural Economics* 85(2):396-405.

American Heart Association. Accessed February 2013. Web.http://www.heart.org/HEARTORG/GettingHealthy/HealthierKids/TeachingGardens/Teaching-Gardens-Curriculum_UCM_436630_SubHomePage.jsp

Blair, Dorothy. 2009. "The Child in the Garden: An Evaluative Review of the Benefits of School Gardening." *The Journal of Environmental Education* 40(2): 15-38.

Branscum, Paul, and Manoj Sharma. 2012. "After-School Based Obesity Prevention Interventions: A Comprehensive Review of the Literature." *International journal of environmental research and public health* 9(4): 1438-1457.

Capacci, Sara, et al. 2012. "Policies to Promote Healthy Eating in Europe: A Structured Review of Policies and Their Effectiveness." *Nutrition reviews* 70(3): 188-200.

Centers for Disease Control and Prevention. Adolescent and School Health. Accessed January2013.Web. http://www.cdc.gov/healthyyouth/obesity/facts.htm

Centers for Disease Control and Prevention. The Community Guide. Obesity Prevention and Control. Accessed April 2014. Web. http://www.thecommunityguide.org/obesity/provider.html

Centers for Disease Control and Prevention. NHANES. Accessed April 2013. Web. http://www.cdc.gov/nchs/nhanes.htm

Centers for Disease Control and Prevention. Overweight and Obese. Strategies and Solutions. Accessed April 2014. Web. http://www.cdc.gov/obesity/childhood/solutions.html

Centers for Disease Control and Prevention. Prevention Status Report 2013. Nutrition, Physical Activity, and Obesity. Georgia. Accessed April 2014. Web. http://www.cdc.gov/stltpublichealth/psr/npao/2013/GA-npao.pdf

Centers for Disease Control and Prevention. Progress on Childhood Obesity. Accessed April 2014. Web. http://www.cdc.gov/vitalsigns/childhoodobesity/#Problem

City of Atlanta. Atlanta Police Department. Accessed March 2014. Web. http://www.atlantapd.org/findmyzone.aspx

Cohen, Juliana FW, et al. 2014. "Impact of the New U.S. Department of Agriculture School Meal Standards on Food Selection, Consumption, and Waste." *American Journal of Preventive Medicine* 46(4):388-394.

Data Resource Center. Child and Adolescent Health. Accessed May 2013. Web. http://www.nschdata.org/home

Davis, Jaimie N., et al. 2011. "LA Sprouts: A Gardening, Nutrition, and Cooking Intervention for Latino Youth Improves Diet and Reduces Obesity." *Journal of the American Dietetic Association* 111(8): 1224-1230.

Demont, Matty, et al. 2013. "Experimental Auctions, Collective Induction and Choice Shift: Willingness-to-Pay for Rice Quality in Senegal." *European Review of Agricultural Economics* 40(2): 261-286.

Downs, Julie S. et al. 2009. "Strategies for Promoting Healthier Food Choices." *The American Economic Review* 99(2):159-164.

Georgia Department of Public Health. Obesity in Children and Youth. Accessed April 2013. Web.http://dph.georgia.gov/sites/dph.georgia.gov/files/related_files/site_page/2010%20Child%20and%20Youth%20Obesity%20Data%20Summary.pdf

Georgia Department of Public Health. 2011 High School Obesity. Accessed April 2013. https://dph.georgia.gov/sites/dph.georgia.gov/files/related_files/site_page/2011%20High%20School%20Obesity%20Data%20Summary.pdf

Georgia Department of Public Health. Accessed April 2013. https://dph.georgia.gov/press-releases/2013-09-04/georgia-children-no-longer-second-most-obese-nation

Georgia Fruit and Vegetable Grower's Association. Accessed May 2013. Web. http://gfvga.org

Georgia Organics. Farm to School in Georgia. Accessed March 2014. Web. http://georgiaorganics.org/for-schools/frequently-asked-questions-f2s/

Georgia Shape. About Georgia Shape. Accessed April 2014. Web. http://www.georgiashape.org/story/about-georgia-shape

Gittelsohn, Joel and Katherine Lee. 2013 "Integrating Educational, Environmental, and Behavioral Economic Strategies May Improve the Effectiveness of Obesity Interventions." *Applied Economic Perspectives and Policy* 35(1):52-68.

Gustafson, C.R., T.J. Lybbert, and D.A. Sumner. 2012 "Consumer Sorting, Characteristics ,Identification, and Hedonic Valuation of Wine Attributes: Exploiting Data from

a Field Experiment."*Working paper, University of California-Davis*.

Harrison, G.W., and E.E. Rutström. 2008. "Experimental Evidence on the Existence of Hypothetical Bias in Value Elicitation Methods." *Handbook of Experimental Economics Results* 1:752-767.

Hermann, Janice R., et al. 2006. "After-School Gardening Improves Children's Reported Vegetable Intake and Physical Activity". *Journal of Nutrition Education Behavior* 38(3): 201-202.

Von Hippel, Paul T., et al. 2007. "The Effect of School on Overweight in Childhood: Gain in Body Mass Index during the School Year and during Summer Vacation." *American Journal of Public Health* 97(4): 696-702.

Langellotto, Gail A., and Abha Gupta. 2012. "Gardening Increases Vegetable Consumption in School-Aged Children: A Meta-Analytical Synthesis."*HortTechnology*22(4):430-445.

Let's Move! Learn the Facts. Accessed April 2014. Web. http://www.letsmove.gov/learn-facts/epidemic-childhood-obesity

Liu, Peggy J., et al. 2014. "Using Behavioral Economics to Design More Effective Food Policies to Address Obesity". *Applied Economic Perspectives and Policy* 36(1): 6-24.

Lybbert, Travis J. et al. 2012. "Farmer's Heterogeneous Valuation of Laser Land Leveling in Eastern Uttar Pradesh: An Experimental Auction Approach to Informing Segmentation and Subsidy Strategies." 2012 Conference, August 18-24, 2012 Foz Do Iguacu, Brazil. No. 126806. International Assocation of Agricultural Economists, 2012.

National Cancer Institute. Accessed February 2013. Web. http://www.cdc.gov/nchs/nhanes.htm

National Collaborative on Childhood Obesity Research (NCCOR). Accessed April 2014. Web. http://nccor.org/projects/economics_obesity.php

National Farm to School Network. Georgia Profile. Accessed April 2014. Web. http://www.farmtoschool.org/our-network/Georgia?A=SearchResult&SearchID=168101&ObjectID=4289662&ObjectType=35

NPR.Accessed February 2014. Web. http://www.npr.org/blogs/thesalt/2014/02/25/282507974/new-rules-would-curb-how-kids-are-sold-junk-food-at-school.

Phibbs, Elizabeth J. and Diane Relf. 2005."Improving Research on Youth Gardening ."*HortTechnology* 15(3): 425-428.

Poston, Suzanne A, et al. 2005. "A Comparison of a Gardening and Nutrition Program with a Standard Nutrition Program in an Out-of-school Setting." *HortTechnology* 15(3): 463-467.

Robinson-O'Brien, Ramona, et al. 2009. "Impact of Garden-Based Youth Nutrition Intervention Programs: A Review." *Journal of the American Dietetic Association* 109(2): 273-280.

Smith, Travis A. 2013. “"Billions and Billions Served" Heterogeneous Effects of Food Source on Child Dietary Quality." 2013 Annual Meeting, August 4-6, 2013, Washington, DC. No. 151212. Agricultural and Applied Economics Association, 2013.

University of Georgia. Obesity Initiative. Obesity Facts. Accessed April 2014. Web. https://obesity.ovpr.uga.edu/obesity-facts/

Unnevehr, Laurian J. 2012. Food and Health: Can Economics Contribute to Improved Outcomes? *American Journal of Agricultural Economics* 95(2):220-227.

USDA. Food and Nutrition Service. Accessed March 2014. Web. http://www.fns.usda.gov/school-meals/child-nutrition-programs

APPENDIX

CHILD SURVEY

The University of Georgia

2013 FOOD ENVIRONMENT & CHOICE SURVEY

GENERAL INSTRUCTIONS FOR CAMPERS:

- The estimated time to take the survey is 15-20 minutes or less.
- Answer each question as best as you can.
- Estimate your answer if you're not sure.
- Guessing is better than leaving a blank

SECTION 1: Background/Food Environment	Camper ID No. 1 0	Comments:
1	What is your gender? (Choose one) Male ☐ Female ☐	
2	How old are you? ☐☐	
3	How do you describe yourself? (Select one or more) -American Indian or Alaska Native ☐ -Asian ☐ -Black or African American ☐ -Hispanic or Latino ☐ -Native Hawaiian or Other Pacific Islander ☐ -White ☐ -Other ☐ -Don't Know/Not sure ☐ -Prefer not to answer ☐	

2 | Page

SECTION 2: Background /Anthropometric	Camper ID No. 1 0	Comments:
1	What is your height? (Write your height in shaded blank boxes and fill in matching oval below)	

Height	
Feet	Inches
①	0
②	1
③	2
④	3
⑤	4
⑥	5
	6
	7
	8
	9
	10
	11

☐☐.☐☐ (in Feet and inches)

3 | Page

SECTION 2: Background/Anthropometric	Camper ID No. 1 0	Comments:
2	What is your weight? (Write your height in shaded blank boxes and fill in matching oval below)	

Weight		
Pounds		
0	0	0
1	1	1
2	2	2
3	3	3
	4	4
	5	5
	6	6
	7	7
	8	8
	9	9

☐☐☐ (in feet and inches)

4 | Page

SECTION 2: Background/Anthropometric		Camper ID No. 1 0		Comments:
3	Yesterday how much time did you spend...	(Please put a mark in only one box per question)		Minutes: 0 15 30 — Hours: 1 2 3 4 5 6+
4	Watch television (including videos, movies on a VCR or DVD player), play on a computer/laptop or tablet OR play video games?	(Please put a mark in only one box per question)		Minutes: 0 15 30 — Hours: 1 2 3 4 5 6+
5	Play a competitive or recreational sport (indoors or outdoors)?	(Please put a mark in only one box per question)		Minutes: 0 15 30 — Hours: 1 2 3 4 5 6+
6	Play outside other activities outside of sports?	(Please put a mark in only one box per question)		Minutes: 0 15 30 — Hours: 1 2 3 4 5 6+

SECTION 2: Background/Anthropometric		Camper ID No. 1 0		Comments:
7	Reading a book or magazine?	(Please put a mark in only one box per question)		Minutes: 0 15 30 — Hours: 1 2 3 4 5 6+
8	Does your household have a yard?			Yes ☐ No ☐
9	Does your house have a garden?			Yes ☐ No ☐
10	Gardening or doing lawn care (like planting, weeding, or mowing the lawn)?	(Please put a mark in only one box per question)		Minutes: 0 15 30 — Hours: 1 2 3 4 5 6+

SECTION 3: Food and Nutrition Knowledge		Camper ID No. 1 0		Comments:
1	Fruits are full of : -Proteins -Calcium - and Vitamins A and D True ☐ False ☐ Don't know ☐			
2	Vegetables are full of: -Carbohydrates, -Vitamins, especially A and C - Minerals, -And Fiber True ☐ False ☐ Don't know ☐			
3	Breads, Cereals, Pasta and Starchy vegetables are full of: -Carbohydrates, -B Vitamins, -Iron, - And Fiber True ☐ False ☐ Don't Know ☐			

SECTION 3: Food and Nutrition Knowledge		Camper ID No. 1 0		Comments:
4	Fat-Free and Low-Fat Milk Products are full of : -Carbohydrates, -Vitamins, especially A and C -Minerals, - And Fiber True ☐ False ☐ Don't Know ☐			
5	Lean Meat, Poultry and Fish are full of : -Proteins, - B Vitamins, - and Iron and other Minerals True ☐ False ☐ Don't Know ☐			
6	Check three foods that would make the MOST healthy breakfast:			

SECTION 3: Food and Nutrition Knowledge		Camper ID No. 1 0	Comments:
7	Check three foods that would make the MOST healthy lunch:		
8	Check three foods that would make the MOST healthy snack:		
9	Check three foods that would make the MOST healthy dinner:		

SECTION 3: Food and Nutrition Knowledge		Camper ID No. 1 0	Comments:
		The following images are of the same type of Herb or Spice Plant, but may include different varieties:	
10	Correctly identify the HERB or Spice Plant in the adjacent picture: A: Mint ☐ B: Rosemary ☐ C: Basil ☐ D: Sage ☐		
11	A: Thyme ☐ B: Dill or Fennel ☐ C: Basil ☐ D: Mint ☐		
12	A: Garlic ☐ B: Onion ☐ C: Shallot ☐ D: Turnip ☐		

SECTION 3: Food and Nutrition Knowledge		Camper ID No. 1 0	Comments:
		The following images are of the same type of Herb or Spice Plant, but may include different varieties:	
13	Correctly identify the HERB or Spice Plant in the adjacent picture: A: Mint ☐ B: Rosemary ☐ C: Basil ☐ D: Sage ☐		
14	A: Rosemary ☐ B: Sorrel ☐ C: Lavender ☐ D: Mint ☐		
15	A: Cilantro ☐ B: Sorrel ☐ C: Parsley ☐ D: Mint ☐		

SECTION 3: Food and Nutrition Knowledge		Camper ID No. 1 0	Comments:
		The following images are of the same type of Fruit, but may include different varieties:	
16	Correctly identify the FRUIT in the adjacent picture: A: Blackberries ☐ B: Muscadines ☐ C: Grapes ☐ D: Blueberries ☐		
17	A: Blueberries ☐ B: Muscadines ☐ C: Blackberries ☐ D: Grapes ☐		
18	A: Figs ☐ B: Muscadines ☐ C: Blackberries ☐ D: Grapes ☐		

SECTION 3: Food and Nutrition Knowledge		Camper ID No. 1 0	Comments:
19	Correctly identify the FRUIT in the adjacent picture: A: Grapes☐ B: Figs☐ C: Blackberries☐ D: Muscadines☐	The following images are of the same type of Fruit, but may include different varieties: 	
20	A: Peaches☐ B: Nectarines☐ C: Apples☐ D: Figs☐		
21	A: Plums☐ B: Nectarines☐ C: Apples☐ D: Figs☐		

SECTION 3: Food and Nutrition Knowledge		Camper ID No. 1 0	Comments:
22	Correctly identify the VEGETABLE in the adjacent picture: A: Beans - Lima☐ B: Beans - Pole☐ C. Peas☐ D: Okra☐	The following images are of the same type of Plant, but may include different varieties: 	
23	A: Beans - Lima☐ B: Beans - Pole☐ C: Peas☐ D: Okra☐		
24	A: Lettuce☐ B: Greens – Kale ☐ C: Greens - Collard☐ D: Cabbage ☐		

SECTION 3: Food and Nutrition Knowledge		Camper ID No. 1 0	Comments:
25	Correctly identify the VEGETABLE in the adjacent picture: A: Zucchini ☐ B: Squash☐ C: Radish☐ D: Eggplant☐	The following images are of the same type of Plant, but may include different varieties: 	
26	A: Peas – Field ☐ B: Beans - Lima☐ C: Beans – Pole ☐ D: Corn ☐		
27	A: Pumpkin ☐ B: Squash☐ C: Shallot☐ D: Turnip☐		

SECTION 3: Food and Nutrition Knowledge		Camper ID No. 1 0	Comments:
25	Click each of these that is a FRUIT in the adjacent picture:	 ☐ ☐ ☐ ☐	
26	Click each of these that is a VEGETABLE in the adjacent picture:	 ☐ ☐ ☐ ☐	
27	Which of these animals produce milk?	 ☐ ☐ ☐ ☐	

SECTION 3: Food and Nutrition Knowledge		Camper ID No. 1 0	Comments:
25	Where does the fruit in the adjacent picture grow? ☐ In the ground ☐ On a bush ☐ On a tree		
26	Where does the fruit in the adjacent picture grow? ☐ In the ground ☐ On a bush ☐ On a tree		
27	Where does the fruit in the adjacent picture grow? ☐ In the ground ☐ On a bush ☐ On a tree		

SECTION 3: Food and Nutrition Knowledge		Camper ID No. 1 0	Comments:
25	Where does the fruit in the adjacent picture grow? ☐ In the ground ☐ On a bush ☐ On a tree		
26	Where does the fruit in the adjacent picture grow? ☐ In the ground ☐ On a bush ☐ On a tree		
27	Click each of these foods that is high in calcium: ☐ ☐ ☐ ☐		

SECTION 3: Food and Nutrition Knowledge		Camper ID No. 1 0	Comments:
25	Click each of these foods that is high in vitamin C: ☐ ☐ ☐ ☐		
26	Click each of these foods that is high in iron: ☐ ☐ ☐ ☐		
27	What is calcium good for?; ☐ bones ☐ eyes ☐ muscles		

SECTION 3: Food and Nutrition Knowledge		Camper ID No. 1 0	Comments:
25	What do plants need to grow?	_____ _____	
26			
27			

SECTION 4: Food Preference/Food Frequency Questionnaire		Camper ID No. 1 0	Comments:				
1	CHECK the one smiley face category that best describes how you like the following FRUIT, VEGETABLE, OR SNACK: (Check "never tried" if you have never eaten this item)		I love it – can't get enough	I like it a lot – good stuff	I like it – it's ok	I dislike it – I may eat it with other things	I hate it – no way would I eat it
A	 Apple Never Tried ☐ If tried, how many servings do you have per week_____		☐	☐	☐	☐	☐
B	 Banana Never Tried ☐ If tried, how many servings do you have per week_____		☐	☐	☐	☐	☐
C	 Beans - green Never Tried ☐ If tried, how many servings do you have per week_____		☐	☐	☐	☐	☐

SECTION 4: Food Preference/FFQ		Camper ID No. 1 0	Comments:				
D	 Beans - lima Never Tried ☐ If tried, how many servings do you have per week_____		☐	☐	☐	☐	☐
E	 Beets Never Tried ☐ If tried, how many servings do you have per week_____		☐	☐	☐	☐	☐
F	 Blackberries Never Tried ☐ If tried, how many servings do you have per week_____		☐	☐	☐	☐	☐
G	 Blueberries Never Tried ☐ If tried, how many servings do you have per week_____		☐	☐	☐	☐	☐

SECTION 4: Food Preference/FFQ		Camper ID No. 1 0	Comments:				
h	 Broccoli Never Tried ☐ If tried, how many servings do you have per week_____		☐	☐	☐	☐	☐
I	 Cabbage Never Tried ☐ If tried, how many servings do you have per week_____		☐	☐	☐	☐	☐
J	 Cantaloupes Never Tried ☐ If tried, how many servings do you have per week_____		☐	☐	☐	☐	☐
K	 Carrots Never Tried ☐ If tried, how many servings do you have per week_____		☐	☐	☐	☐	☐

SECTION 4: Food Preference/FFQ		Camper ID No. 1 0	Comments:				
L	 Cauliflower Never Tried ☐ If tried, how many servings do you have per week_____		☐	☐	☐	☐	☐
M	 Cherries Never Tried ☐ If tried, how many servings do you have per week_____		☐	☐	☐	☐	☐
N	 Chips Never Tried ☐ If tried, how many servings do you have per week_____		☐	☐	☐	☐	☐
O	 Collard Greens Never Tried ☐ If tried, how many servings do you have per week_____		☐	☐	☐	☐	☐

SECTION 4: Food Preference/FFQ		Camper ID No. 1 0				Comments:
p	 Cookies Never Tried ☐ If tried, how many servings do you have per week_____	☐	☐	☐	☐	☐
2	CHECK the one smiley face category that best describes how you like the following FRUIT, VEGETABLE, OR SNACK: (Check "never tried" if you have never eaten this item)	I love it – can't get enough	I like it a lot – good stuff	I like it – it's ok	I dislike it – I may eat it with other things	I hate it – no way would I eat it
a	 Corn Never Tried ☐ If tried, how many servings do you have per week_____	☐	☐	☐	☐	☐
b	 Crackers Never Tried ☐ If tried, how many servings do you have per week_____	☐	☐	☐	☐	☐

SECTION 4: Food Preference/FFQ		Camper ID No. 1 0				Comments:
c	 Cucumbers Never Tried ☐ If tried, how many servings do you have per week_____	☐	☐	☐	☐	☐
d	 Eggplant Never Tried ☐ If tried, how many servings do you have per week_____	☐	☐	☐	☐	☐
e	 Fruit/Granola Bar Never Tried ☐ If tried, how many servings do you have per week_____	☐	☐	☐	☐	☐
f	 Fruit Juice Never Tried ☐ If tried, how many servings do you have per week_____	☐	☐	☐	☐	☐

SECTION 4: Food Preference/FFQ		Camper ID No. 1 0				Comments:
g	 Fruit Snacks Never Tried ☐ If tried, how many servings do you have per week_____	☐	☐	☐	☐	☐
h	 French fries Never Tried ☐ If tried, how many servings do you have per week_____	☐	☐	☐	☐	☐
I	 Fried Chicken Never Tried ☐ If tried, how many servings do you have per week_____	☐	☐	☐	☐	☐
J	 Grapes Never Tried ☐ If tried, how many servings do you have per week_____	☐	☐	☐	☐	☐

SECTION 4: Food Preference/FFQ		Camper ID No. 1 0				Comments:
k	 Greens – Kale, turnip, mustard Never Tried ☐ If tried, how many servings do you have per week_____	☐	☐	☐	☐	☐
l	 Hamburger Never Tried ☐ If tried, how many servings do you have per week_____	☐	☐	☐	☐	☐
m	 Kiwi Never Tried ☐ If tried, how many servings do you have per week_____	☐	☐	☐	☐	☐
n	 Lettuce Never Tried ☐ If tried, how many servings do you have per week_____	☐	☐	☐	☐	☐

SECTION 4: Food Preference/FFQ		Camper ID No. 1 0		Comments:
o	 Milk Never Tried ☐ If tried, how many servings do you have per week_____			
p	 Mushrooms Never Tried ☐ If tried, how many servings do you have per week_____			
q	 Nuggets, chicken Never Tried ☐ If tried, how many servings do you have per week_____			
r	 Okra Never Tried ☐ If tried, how many servings do you have per week_____			

SECTION 4: Food Preference/FFQ		Camper ID No. 1 0		Comments:
s	 Onions Never Tried ☐ If tried, how many servings do you have per week_____			
t	 Oranges Never Tried ☐ If tried, how many servings do you have per week_____			
u	 Peas – Cow, Field Never Tried ☐ If tried, how many servings do you have per week_____			
v	 Peaches Never Tried ☐ If tried, how many servings do you have per week_____			

SECTION 4: Food Preference/FFQ		Camper ID No. 1 0		Comments:
w	 Pears Never Tried ☐ If tried, how many servings do you have per week_____			
x	 Peppers – banana, bell Never Tried ☐ If tried, how many servings do you have per week_____			
y	 Peppers – Chili, hot Never Tried ☐ If tried, how many servings do you have per week_____			

SECTION 4: Food Preference/ FFQ		Camper ID No. 1 0		Comments:
3	CHECK the one smiley face category that best describes how you like the following FRUIT, VEGETABLE, OR SNACK: (Check "never tried" if you have never eaten this item)	I love it – can't get enough	I like it a lot – good stuff	I like it – it's ok	I dislike it – I may eat it with other things	I hate it – no way would I eat it
A	 Persimmons Never Tried ☐ If tried, how many servings do you have per week_____					
B	 Pineapples Never Tried ☐ If tried, how many servings do you have per week_____					
C	 Pizza Never Tried ☐ If tried, how many servings do you have per week_____					

SECTION 4: Food Preference/FFQ		Camper ID No. 1 0			Comments:		
D	 Plum Never Tried ☐ If tried, how many servings do you have per week_____						
E	 Potatoes Never Tried ☐ If tried, how many servings do you have per week_____						
F	 Soda Never Tried ☐ If tried, how many servings do you have per week_____						
G	 Spinach Never Tried ☐ If tried, how many servings do you have per week_____						

SECTION 4: Food Preference/FFQ		Camper ID No. 1 0			Comments:		
H	 Squash Never Tried ☐ If tried, how many servings do you have per week_____						
I	 Strawberries Never Tried ☐ If tried, how many servings do you have per week_____						
J	 Sweet Potatoes Never Tried ☐ If tried, how many servings do you have per week_____						
K	 Tacos Never Tried ☐ If tried, how many servings do you have per week_____						

SECTION 4: Food Preference/FFQ		Camper ID No. 1 0			Comments:		
L	 Tomatoes Never Tried ☐ If tried, how many servings do you have per week_____						
M	 Watermelon Never Tried ☐ If tried, how many servings do you have per week_____						
N	 Zucchini Never Tried ☐ If tried, how many servings do you have per week_____						

PARENT SURVEY

The University of Georgia

2013 FOOD ENVIRONMENT & CHOICE SURVEY

GENERAL INSTRUCTIONS FOR CAMPERS:

- The estimated time to take the survey is 15-20 minutes.
- Answer each question as best as you can.
- Estimate your answer if you're not sure.
- Guessing is better than leaving a blank

SECTION 1: Background/Food Environment	Camper ID No. 1 0	Comments:

1 What is your child's gender?
(Choose one)
Male ☐
Female ☐
(repeat per child if applicable)

2 How old is your child? (repeat per child if applicable)
☐☐

3 How do you describe your child?
(Select one or more)
-American Indian or Alaska Native ☐
-Asian ☐
-Black or African American ☐
-Hispanic or Latino ☐
-Native Hawaiian or Other Pacific Islander ☐
-White ☐
-Other ☐
-Don't Know/Not sure ☐ -Prefer not to answer ☐

SECTION 2: Background /Anthropometric	Camper ID No. 1 0	Comments:

1 What is your child's height? (a measuring tape is available for your convenience)
(Type height in blank boxes below)

Height	
Feet	Inches
1	0
2	1
3	2
4	3
5	4
6	5
	6
	7
	8
	9
	10
	11

☐☐.☐☐
(in Feet and inches)

SECTION 2: Background/Anthropometric	Camper ID No. 1 0	Comments:

2 What is your child's weight? (a scale is available for your convenience)
(Type height in blank boxes below)

Weight		
Pounds		
0	0	0
1	1	1
2	2	2
3	3	3
	4	4
	5	5
	6	6
	7	7
	8	8
	9	9

☐☐☐
(in feet and inches)

SECTION 2: Background/Anthropometric		Camper ID No. 1 0		Comments:
3	On a typical day, approximately how much time does your child …	(Please put first letter of child's name under most approximate number, in the adjacent table i.e. J for Joanna and G for Galus…		Minutes: 0 15 30 — Hours: 1 2 3 4 5 6+
4	Watch television (including videos, movies on a VCR or DVD player), play on a computer/laptop or tablet OR play video games?	(Please put a mark in only one box per question)		Minutes: 0 15 30 — Hours: 1 2 3 4 5 6+
5	Play a competitive or recreational sport (indoors or outdoors)?	(Please put a mark in only one box per question)		Minutes: 0 15 30 — Hours: 1 2 3 4 5 6+
6	Play outside other activities outside of sports?	(Please put a mark in only one box per question)		Minutes: 0 15 30 — Hours: 1 2 3 4 5 6+

5 | Page

SECTION 2: Background/Anthropometric		Camper ID No. 1 0		Comments:
7	Reading a book or magazine?	(Please put a mark in only one box per question)		Minutes: 0 15 30 — Hours: 1 2 3 4 5 6+
8	Does your household have a yard?	(Please answer this on behalf of your household or the residence where your child lives)		Yes ☐ No ☐
9	Does your household have a garden or free access to community/neighborhood garden?	(Please answer this on behalf of your household or the residence where your child lives)		Yes ☐ No ☐

6 | Page

SECTION 3: Food Access/Food Frequency Questionnaire			Camper ID No. 1 0					Comments:
1	In the last week did you buy this fruit for your child…? IF so, then Click the box of one smiley face category that best describes your child's preference. (Use 1st letter of child names per child and use printed pictures provided for serving size)		He/she loves it – can't get enough	He/she likes it a lot – good stuff	He/she likes it – it's ok	He/she dislikes it – I have to add a lot of spice/flavor, etc…to it for them to eat it	He/she hates it – they rarely eat it, even if I add spice/flavor…etc to it	
A		Apple Yes ☐ No ☐ If yes, how many servings does your child have per week_____	☐	☐	☐	☐	☐	
B		Banana Yes ☐ No ☐ If yes, how many servings does your child have per week_____	☐	☐	☐	☐	☐	
C		Blackberries Yes ☐ No ☐ If yes, how many servings does your child have per week_____	☐	☐	☐	☐	☐	

SECTION 3: Food Access/FFQ			Camper ID No. 1 0					Comments:
D		Blueberries Yes ☐ No ☐ If yes, how many servings does your child have per week_____	☐	☐	☐	☐	☐	
E		Cantaloupes Yes ☐ No ☐ If yes, how many servings does your child have per week_____	☐	☐	☐	☐	☐	
F		Cherries Yes ☐ No ☐ If yes, how many servings does your child have per week_____	☐	☐	☐	☐	☐	
G		Grapes Yes ☐ No ☐ If yes, how many servings does your child have per week_____	☐	☐	☐	☐	☐	

SECTION 3: Food Access/FFQ		Camper ID No. 1 0	Comments:
h	Kiwi Yes ☐ No ☐ If yes, how many servings does your child have per week_____		
i	Oranges Yes ☐ No ☐ If yes, how many servings does your child have per week_____		
j	Peaches Yes ☐ No ☐ If yes, how many servings does your child have per week_____		
k	Pears Yes ☐ No ☐ If yes, how many servings does your child have per week_____		

SECTION 3: Food Access/FFQ		Camper ID No. 1 0	Comments:
L	Persimmons Yes ☐ No ☐ If yes, how many servings does your child have per week_____		
m	Pineapple Yes ☐ No ☐ If yes, how many servings does your child have per week_____		
n	Plum Yes ☐ No ☐ If yes, how many servings does your child have per week_____		
o	Strawberries Yes ☐ No ☐ If yes, how many servings does your child have per week_____		

SECTION 3: Food Access/FFQ		Camper ID No. 1 0					Comments:
p	Watermelon Yes ☐ No ☐ If yes, how many servings does your child have per week_____						
2	In the last week did you buy this vegetable for your child...? IF so, then Click the box of one smiley face category that best describes your child's preference. (Use 1st letter of child names per child and use printed pictures provided for serving size)	He/she loves it – can't get enough	He/she likes it a lot – good stuff	He/she likes it – it's ok	He/she dislikes it – I have to add a lot of spice/flavor, etc...to it for them to eat it	He/she hates it – they rarely eat it, even if I add spice/flavor...etc to it	
a	Beans - green Yes ☐ No ☐ If yes, how many servings does your child have per week_____						
b	Beans - lima Yes ☐ No ☐ If yes, how many servings does your child have per week_____						

SECTION 3: Food Access/FFQ		Camper ID No. 1 0	Comments:
c	Beets Yes ☐ No ☐ If yes, how many servings does your child have per week_____		
d	Broccoli Yes ☐ No ☐ If yes, how many servings does your child have per week_____		
e	Cabbage Yes ☐ No ☐ If yes, how many servings does your child have per week_____		
f	Carrots Yes ☐ No ☐ If yes, how many servings does your child have per week_____		

SECTION 3: Food Access/FFQ		Camper ID No. 1 0		Comments:
g	 Cauliflower Yes ☐ No ☐ If yes, how many servings does your child have per week_____			
h	 Collard greens Yes ☐ No ☐ If yes, how many servings does your child have per week_____			
i	 Corn Yes ☐ No ☐ If yes, how many servings does your child have per week_____			
j	 Cucumber Yes ☐ No ☐ If yes, how many servings does your child have per week_____			

SECTION 3: Food Access/FFQ		Camper ID No. 1 0		Comments:
k	 eggplant Yes ☐ No ☐ If yes, how many servings does your child have per week_____			
l	 Greens – Kale, turnip, mustard Yes ☐ No ☐ If yes, how many servings does your child have per week_____			
m	 Lettuce Yes ☐ No ☐ If yes, how many servings does your child have per week_____			
n	 mushrooms Yes ☐ No ☐ If yes, how many servings does your child have per week_____			

SECTION 3: Food Access/FFQ		Camper ID No. 1 0		Comments:
o	 Okra Yes ☐ No ☐ If yes, how many servings does your child have per week_____			
p	 Onions Yes ☐ No ☐ If yes, how many servings does your child have per week_____			
q	 Peas – field, cow Yes ☐ No ☐ If yes, how many servings does your child have per week_____			
r	 Peppers – banana, bell Yes ☐ No ☐ If yes, how many servings does your child have per week_____			

SECTION 3: Food Access/FFQ		Camper ID No. 1 0		Comments:
s	 Peppers- Chili, Hot wax Yes ☐ No ☐ If yes, how many servings does your child have per week_____			
t	 Potatoes Yes ☐ No ☐ If yes, how many servings does your child have per week_____			
u	 Spinach Yes ☐ No ☐ If yes, how many servings does your child have per week_____			
v	 Squash Yes ☐ No ☐ If yes, how many servings does your child have per week_____			

SECTION 3: Food Access/FFQ		Camper ID No. 1 0			Comments:
w	Sweet Potatoes  Yes ☐ No ☐ If yes, how many servings does your child have per week_____				
x	Tomatoes  Yes ☐ No ☐ If yes, how many servings does your child have per week_____				
y	Zucchini  Yes ☐ No ☐ If yes, how many servings does your child have per week_____				

SECTION 3: Food Access/ FFQ		Camper ID No. 1 0			Comments:
S	In the last week did you buy this snack for your child...? IF so, then Click the box of one smiley face category that best describes your child's preference. (Use 1st letter of child names per child and use printed pictures provided for serving size)	He/she loves it – can't get enough	He/she likes it a lot – good stuff	He/she likes it – it's ok	He/she dislikes it – I have to add a lot of spice/flavor, etc...to it for them to eat it	He/she hates it – they rarely eat it, even if I add spice/flavor....etc to it
A	Chips  Yes ☐ No ☐ If yes, how many servings does your child have per week_____					
B	Cookies  Yes ☐ No ☐ If yes, how many servings does your child have per week_____					
C	Crackers  Yes ☐ No ☐ If yes, how many servings does your child have per week_____					

SECTION 3: Food Access/FFQ		Camper ID No. 1 0			Comments:
D	Fruit Juice  Yes ☐ No ☐ If yes, how many servings does your child have per week_____				
E	Fruit/Granola Bar  Yes ☐ No ☐ If yes, how many servings does your child have per week_____				
F	Fruit Snacks  Yes ☐ No ☐ If yes, how many servings does your child have per week_____				
G	French Fries  Yes ☐ No ☐ If yes, how many servings does your child have per week_____				

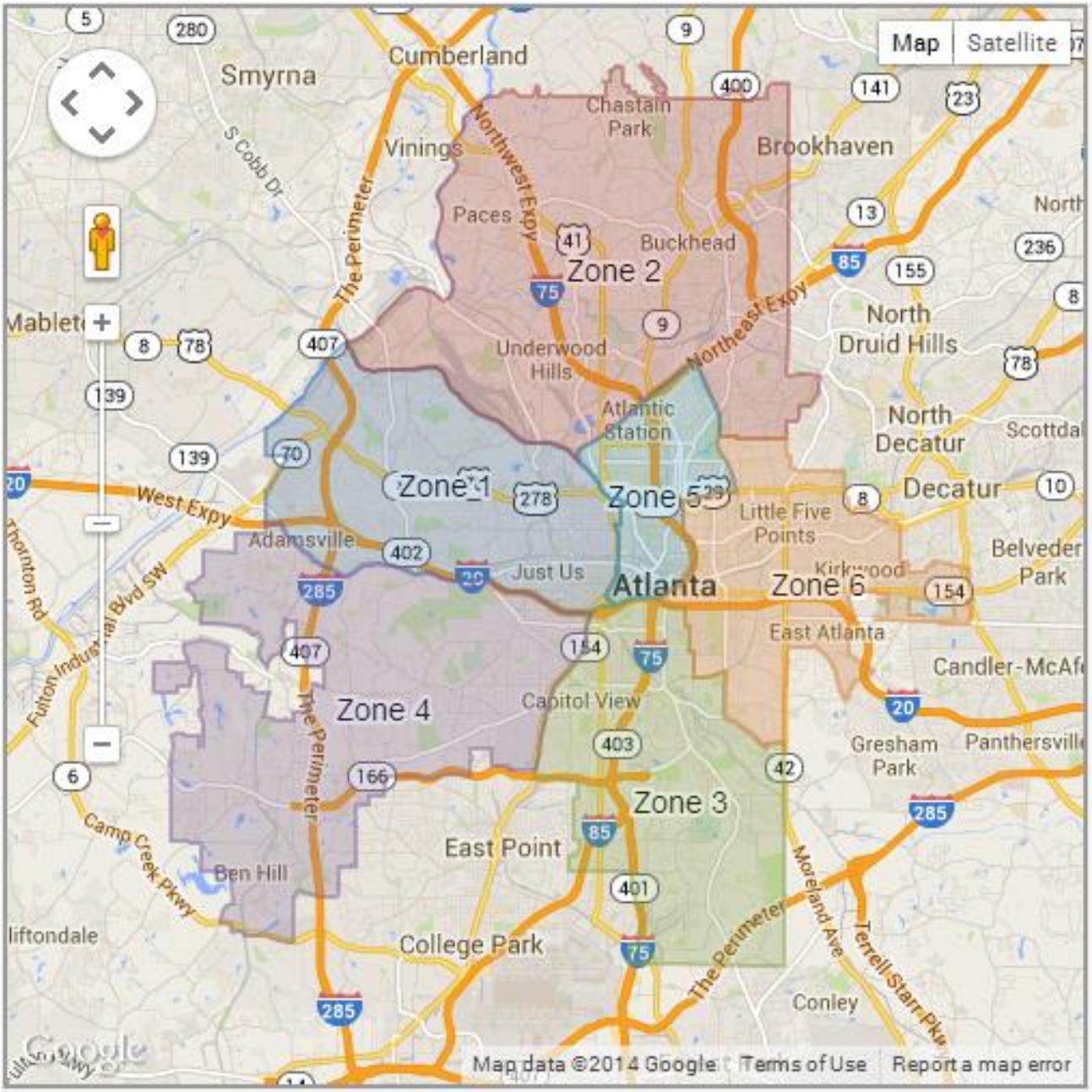
SECTION 3: Food Access/FFQ		Camper ID No. 1 0			Comments:
H	Fried Chicken  Yes ☐ No ☐ If yes, how many servings does your child have per week_____				
I	Hamburgers  Yes ☐ No ☐ If yes, how many servings does your child have per week_____				
J	Milk  Yes ☐ No ☐ If yes, how many servings does your child have per week_____				
K	Nuggets (chicken)  Yes ☐ No ☐ If yes, how many servings does your child have per week_____				

SECTION 3: Food Access/FFQ		Camper ID No. 1 0		Comments:		
L	 Pizza Yes ☐ No ☐ If yes, how many servings does your child have per week_____	 ☐	 ☐	 ☐	 ☐	 ☐
M	 Tacos Yes ☐ No ☐ If yes, how many servings does your child have per week_____	 ☐	 ☐	 ☐	 ☐	 ☐
N	 Soda Yes ☐ No ☐ If yes, how many servings does your child have per week_____	 ☐	 ☐	 ☐	 ☐	 ☐

SECTION 4: Food Environment		Camper ID No. 1 0		Comments:		
1	In a typical week, how many meals are cooked at home? (type answer below) _____					
A	In a typical week, how many meals does your family eat together? (type answer below) _____					
B	How many kids are in your household? (type answer below) _____					
C	Would you agree that your child eats enough fruits and vegetables in a typical week?	I strongly Agree ☐	I agree ☐	I disagree ☐	I strongly disagree ☐	I am not sure ☐

22 | Page

Map and Frequency Table of Campers from Atlanta Metropolitan Zones[1]



[1] City of Atlanta. Atlanta Police Department. Accessed March 2014. Web. http://www.atlantapd.org/findmyzone.aspx

Zip Code	Zone	Frequency
30002	Non- Metro Atlanta zone	2
30030	Non- Metro Atlanta zone	1
30087	Non- Metro Atlanta zone	1
30269	Non- Metro Atlanta zone	1
30303	Zone 5	2
30305	Zone 2	3
30306	Zone 6	20
30307	Non- Metro Atlanta zone	4
30308	Zone 6	5
30309	Zone 5	2
30310	Zone 4	1
30311	Zone 4	2
30312	Zone 6	8
30317	Zone 6	1
30318	Zone 1	2
30324	Zone 2	2
30327	Zone 2	6
30337	Non- Metro Atlanta zone	1
30344	Non- Metro Atlanta zone	3
30345	Non- Metro Atlanta zone	3
30349	Non- Metro Atlanta zone	1

Detailed Table and Photo of Field Experiment Revealed Food Preference Snack and Drink Options

Fresh Vegetables
Carrot bites
Celery sticks
Baby Cucumbers

Fresh Fruit
Apple Slices
Apple Sauce
Peaches

Packaged Salty Snacks
Chips (Lays, Doritos)
Crackers (Goldfish, Ritz or Cheez-Its)

Packaged Sugary Snacks
Fruit Snacks (Welch's)
Granola bar (Chocolate covered)
Oatmeal Pie

Drinks
Fruit Juice (100% Juice)
Soda (Coke)
Water*****

*****Note: these items were in the field experiment but not captured in picture above.