CULTIVATING THE CONNECTION BETWEEN SOUTH BOSTON GROWS, A GARDEN-BASED NUTRITION EDUCATION INTERVENTION, AND COMMUNITY EATING HABITS

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ABSTRACT

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The document looks at the connection between the eating habits among those who grow food in local, urban gardens in the neighborhood of South Boston, Massachusetts before, during, and after participating in this Garden-Based nutrition education intervention, known as South Boston Grows. The purpose of this intervention was to identify ways to improve eating habits in urban areas of need, otherwise known as food deserts. It has become apparent over recent years that a growing number of youth, as well as a growing number of those with reduced socioeconomic status in urban areas, are at a higher risk for being overweight or obese. Thus, this type of garden-based nutrition education intervention was put in place to improve eating habits and ultimately, intake of produce from the project gardens and farms in these urban areas of need and beyond. Annually, approximately a dozen teen participants are involved in the summer program for 7-10 weeks and 10-12 school and after school programs are involved during the school year, in appropriate garden-based education topics, including growing and preparing food in and from urban gardens, composting, seed saving, cooking healthy food at a nearby kitchen with produce they grew, and even looking at how to farm in large scale suburban and/or rural farms. To evaluate the success of the intervention, participants completed a pre- and a post-test (when appropriate) that evaluated fruit juice and vegetable (of many varieties) intake before, during, and after the intervention. The results of these surveys showed that participants were much more likely to try new foods that they grew themselves than they may have been before participating in the intervention. Some of the most popular foods to eat out of those grown included; green salad, peas, carrots, and broccoli. Participants were significantly more likely to try new foods they never tried, when they grew them. A sense of community and appreciation for the environment has also grown among participants through this intervention. Retention rates of the program were significant with many teens involved for >2 years. Vegetable intake increased significantly post-intervention, according to the survey results. This Garden-Based nutrition education intervention improves community eating habits and interactions among participants while increasing physical activity among participants, inadvertently.
Thank You to Our Partners and Supporters:

Bowling Green State University Professors and Staff of the Graduate College, The South Boston Neighborhood Development Corporation, The South Boston Community Health Center, Youth Ambassadors/Young at Arts/MBTreeA, Boston Housing Authority, St Monica's/St Augustine's, West Broadway Task Force, Old Colony Task Force, Mary Ellen McCormack Task Force, Planet Southie, City Growers, The Paraclete Academy, Boston Natural Areas Network, South Boston Literary Gazette, The Farm-Based Education Association, Nike's Back Your Block Partnership

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As a Registered Dietitian who believes strongly in experiential learning, and who is a strong supporter of locally grown food, both from gardens and farms, this researcher is proud to say that five and a half years after the inception of South Boston Grows, all identified goals and objectives have been met. There is always room for improvement when it comes to fruit and vegetable intake among teens, youth and urban residents in general. However, this document makes it clear that this Garden-Based nutrition education intervention has remained an effective tool to help both youth and families appreciate foods they can grow, and prepare, affordably. There are many people and organizations to thank for this lofty project. It is obvious to the researcher/program manager that without the support of these individuals and groups, the South Boston Grows program would not be nearly as successful as it currently is. As researcher, I am grateful for the constant support and continued patience of the professors and staff at Bowling Green State University. Dr Joe’s and other’s encouragement, patience, and willingness to believe in this project from the very beginning was obvious and greatly appreciated. As this project moved forward with some barriers and many successes, I thank BGSU with all my heart. We are also lucky to have a partnership with the South Boston Neighborhood Development Corporation and the South Boston Community Health Center as well as various Boston Public Schools, and neighborhood after school programs in the area in addition to the South Boston Association of non-profits and those associated. We are gracious to our funders; The City of Boston’s Department of Neighborhood Development Grassroots Program, The South Boston Neighborhood Development Foundation, New England Grassroots Environment Fund, The Patagonia Foundation, Social Southie, The South Boston Mom’s Club and many individual neighborhood supporters Thank you!
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter I. Introduction</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statement of the Problem</td>
<td>2</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>3</td>
</tr>
<tr>
<td>Specific Aims</td>
<td>4</td>
</tr>
<tr>
<td>Objectives of the Study</td>
<td>4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter II. Literature Review</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Garden-Based Education Nutrition Interventions: A Literature Review</td>
<td>6</td>
</tr>
<tr>
<td>Effects of the Lack of Access to Healthy Food</td>
<td>7</td>
</tr>
<tr>
<td>Connection Between Socioeconomic Status (SES) and Obesity in Children</td>
<td>7</td>
</tr>
<tr>
<td>Impact of Farm, Garden-Based Education, and Farm2School Interventions</td>
<td>9</td>
</tr>
<tr>
<td>Gardens, Green Space, and Health</td>
<td>11</td>
</tr>
<tr>
<td>Garden-Based Education and Dietary Habits</td>
<td>12</td>
</tr>
<tr>
<td>Garden-Based Education and Academic Achievement</td>
<td>13</td>
</tr>
<tr>
<td>Garden-Based Education Programs and Overall Community Involvement</td>
<td>14</td>
</tr>
<tr>
<td>Garden-Based Nutrition Education Interventions Affect Dietary Habits</td>
<td>16</td>
</tr>
<tr>
<td>Urban Gardening May Help Alleviate Negative Impact Of The Urban Food Desert</td>
<td>17</td>
</tr>
<tr>
<td>Explanation of Curricula Used to Implement the South Boston Grows Project</td>
<td>19</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Chapter III. Methods and Procedures</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>The History</td>
<td>22</td>
</tr>
<tr>
<td>Study Design</td>
<td>22</td>
</tr>
<tr>
<td>Curricula Used To Implement The South Boston Grows Project</td>
<td>23</td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>-----------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Conclusion Applications</td>
<td>70</td>
</tr>
<tr>
<td>REFERENCES</td>
<td>72</td>
</tr>
<tr>
<td>APPENDIX A. i, ii, iii SOUTH BOSTON GROWS PARTICIPANT MATERIALS</td>
<td>77</td>
</tr>
<tr>
<td>APPENDIX B. 2009-2013 PROJECT TIMELINE</td>
<td>87</td>
</tr>
<tr>
<td>APPENDIX C. SOUTH BOSTON GROWS COMMUNITY COLLABORATIONS</td>
<td>91</td>
</tr>
<tr>
<td>APPENDIX D. CURRICULUM RESOURCES</td>
<td>95</td>
</tr>
<tr>
<td>APPENDIX E. SURVEY</td>
<td>97</td>
</tr>
<tr>
<td>APPENDIX F. INTERVIEWS</td>
<td>100</td>
</tr>
<tr>
<td>APPENDIX G. FOOD DISTRIBUTED</td>
<td>102</td>
</tr>
<tr>
<td>APPENDIX H. EXTENDED INFORMATION ON FIGURES 1-6</td>
<td>103</td>
</tr>
</tbody>
</table>
# LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure/Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1    Responses to, “How Often was Salad Consumed in the Last 7 Days”</td>
<td>38</td>
</tr>
<tr>
<td>2    Responses to, “How Often Were Other Vegetables (Collards, Kale, Beet Greens) Consumed in the Last 7 Days”</td>
<td>41</td>
</tr>
<tr>
<td>3    Responses to, “How Often Were Other Vegetables (Tomato, Squash, Cucumber) Consumed in the Last 7 Days”</td>
<td>44</td>
</tr>
<tr>
<td>4    Responses to, “How Often Were Other Vegetables (Carrots, Peas, Broccoli) Consumed in the Last 7 Days”</td>
<td>47</td>
</tr>
<tr>
<td>5    Responses to, “How Often Were Other Vegetables (New, Never Tried) Consumed in the Last 7 Days”</td>
<td>49</td>
</tr>
<tr>
<td>6    Fruit Juice Intake among Participants from 2010 through 2012</td>
<td>51</td>
</tr>
</tbody>
</table>
CHAPTER I
INTRODUCTION

As the US and the world economy worsen, and America's food supply becomes seemingly more unpredictable, more and more people are seeking local food to purchase; not only because they want to know the source of the food they consume, but also because they want to reduce the transportation and storage costs added to the food cost (1). Additionally, utilizing urban land wisely, such as with clean soil in raised garden beds, can be an effective way to increase food production within city limits (2). A 2009 Boston Globe article documented an "urban forager's" daily quests for food around the same time that the South Boston Grows program was initiated (3). A safer and more sustainable activity, which has the added value of a venue for nutrition education, is to obtain urban green space for food production, and to build raised gardening beds on urban soil (2, 4). Urban gardening and farming, when done properly, allow for nutrition education and food production in a more controlled environment. With increasing rates of children being overweight, and even higher rates of childhood obesity in poverty-stricken neighborhoods, the educators, health professionals, and the community need to take action to improve the health of their communities’ citizenry (5). By utilizing urban green space for food production, citizens are empowered to improve soil, reduce their carbon footprint, and ultimately have the ability to impact the food crisis that is becoming a bigger and bigger problem in society.

Michelle Obama has been focusing on educational gardens (6) since her husband was elected president. In another famous publication, Michael Pollan is quoted, in the In Defense of Food: An Eater’s Manifesto: “Eat food. Not too much. Mostly Plants” (7).
Individuals have brought attention to societal food woes. Humans were not designed physiologically to overeat without negative consequences, and should eat not just what is quickly available, but rather they should gravitate to those natural choices found in nature; grains, fruits, and vegetables. However, healthy food still costs the consumer more, and cash crop farms and gardens are disappearing at alarming rates (8). The cost of healthy food will continue to rise unless action is taken to teach the next generation about local agriculture, and its relationship to personal health.

Societal leaders must take action to re-establish the connection between the natural environment and health, and research results show that there is a positive connection between garden education and eating habits (5). Efforts are needed to prove to societal leaders that farm and garden-based education interventions are an effective, powerful, and inspirational form of education, and meeting societal needs require ongoing research in these venues to be continuously conducted (5).

**Statement of the Problem**

There is a defined connection between diet and health, but regardless of the evidence that increased fruit and vegetable intake has positive health benefits, the average child eats less than five servings of fruits and vegetables per day; and, the US population has reached a national crisis, where 16.9% of all ages of children and adolescents are overweight/obese (NHANES 2007-2008), up from 5% about 30 years ago [NHANES 1971-1974] while the CDC reports that more than one third of youth were overweight or obese in 2010 (9, 10, 11).

This current study aims to identify the positive impact that using Garden-Based nutrition education interventions may have on participants’, specifically urban youth and
their families, dietary habits and behavior, access and exposure to fresh produce, knowledge of growing edible plants; and finally, will also determine the project’s impact on the community. Program development will enable a sustainable educational program that engages urban residents in food growing, both in and outside of the city, when applicable. Farm2School and Garden-Based Education programs allow for the opportunity to teach participants various subjects, from science to history, all the while reinforcing the importance of both youth and the community’s lost connection with the food system and their environment (12, 13).

**Significance of the Study**

South Boston Grows follows other similar programs, which have been conducted nationally, in an effort to define the connection between hands-on Garden-Based nutrition education interventions and participants’ individual eating habits, specifically the consumption of fresh fruits, vegetables, and herbs. This current study is unique because it is being conducted in an area of need, in a housing development located in an urban neighborhood, where such interventions may prevent or treat the higher rates of overweight and obesity. This assumption of need on nutrition intervention is based on reported evidence that has shown a connection between low socioeconomic status and obesity (14, 15, 16).

The current study will target participants living in or near one of the oldest housing developments in the United States. Neighborhood schools surrounding the area have approximately 70-90% of students receiving a free or reduced priced meal, and students and families are in need of both access and exposure to healthy food and nutrition education (17, 18). South Boston Grows will be working in collaboration with
various neighborhood youth groups, community programs, and after school programs. Farm2School and Garden-Based nutrition education interventions can seemingly and effectively teach community members, both youth and adults, about food, health, and the environment (13). By targeting community members at risk for obesity, and youth who may still be able to change the way they eat, the study will have a potential positive impact on participants’ eating habits, access to fresh produce, knowledge of growing edible plants, and interest in continuing this type of nutrition education programming. Garden-Based nutrition education interventions include, but are not limited to: education about growing edible plant nutrition and related health education as well as, increased access, exposure to, and consumption of fresh fruits, vegetables, and herbs in South Boston, Massachusetts neighborhoods.

**Specific Aims**

The main aim of this study is to establish a Garden-Based nutrition education program in the South Boston, Massachusetts community that will teach youth and families about the true benefit, importance, and correct implementation for growing food in this urban neighborhood, and in neighborhoods beyond, when appropriate. Participation in this Garden-Based nutrition education intervention will be shown to positively influence the fruit and vegetable intake of children, teens, and adult participants in the South Boston Grows program.

**Objectives of the Study**

**Goal 1:** To improve community green space use in South Boston.

**Objective a:** To include South Boston community partners in the planning and growing of locally grown produce.
Objective b: To provide resource and personnel support for individual, family, and community partners to improve their South Boston neighborhoods, by using urban green space for food production.

Goal 2: To increase participants’ knowledge of how to grow edible plants in South Boston.

Objective a: To include South Boston community partners in the participants’ education concerning planting and growing of locally grown produce.

Goal 3: To increase the community, specifically urban youths’, intake, access, and exposure to fresh fruits, vegetables, and herbs in South Boston.

Objective a: To grow fresh fruits and vegetables in various locations in South Boston using a combination of raised beds and container planting.

Objective b: To increase knowledge of nutrition and sustainable agriculture in South Boston via nutrition, farm, and garden-based education. This will be achieved through farm to School interventions, garden-based education, and increased exposure to Farmers Markets in South Boston.

Goal 4: To demonstrate sustainability of this urban agriculture education program; South Boston Grows.

Objective a: To evaluate participant and community interest and desired changes in the South Boston Grows’ program and its ongoing implementation.
CHAPTER II
LITERATURE REVIEW

Garden-Based Nutrition Education Interventions: A Literature Review

This literature review was conducted by searching research and other journals that focused on nutrition education, agriculture, health behaviors, and related topics; publications on farm to school and farm and garden-based education; periodicals, and websites. Newspaper articles related to health, nutrition, farm to school, and education were also reviewed. Various search engines were used to conduct this literature review, including University libraries: EBSCO complete, BGSU and The University of Vermont nutrition journal search engines, including, Medline, Pub Med, and Elsevier, The American Dietetic Association’s website for links to relevant nutrition journals, and Google Scholar for relevant journals on Garden-Based nutrition education. Key words and phrases typed into the search engines used to conduct this search included: dietary habits, fruit and vegetable intake, socioeconomic status, and obesity; farm and garden-based education and farm to school; open-space, farms, parks, gardens and health; and community involvement, gardens, health, dietary habits, and academic involvement.

In conducting the search for data on the relationship between farm and garden-based interventions and dietary habits, few sources of data were able to identify specific benefits of such efforts to urban areas of need. Searching data on the relationship between socioeconomic status and fruit and vegetable intake, in addition to open space and health, was very useful to this literature review. The paucity of information found initially on garden-based education related to dietary habits make it evident that when the South Boston Grows Garden-Based nutrition education intervention first began, more research
needed to be conducted on this topic to determine the benefits of farm and garden-based education and nutrition interventions for youth and others (5). The data obtained from this intervention as well as other studies that may be conducted at the same time, will be useful in understanding the benefits to low income participants of Garden-Based nutrition education interventions.

**Effects of the Lack of Access to Healthy Food**

When families with limited income are faced with choices about quantity vs. quality, they often choose higher energy dense foods over the healthier, high nutrient, but low energy dense foods, because they can satiate hunger longer, which is important when a family may not know either the source or the time of their next meal (15). Over time, this type of excess dietary energy can have an adverse effect on health. Research shows food insecure women are at higher risk for obesity (14). This may be attributed to the lack of access to, and the high cost of healthy foods, and the need for people to choose high calorie foods to satiate hunger immediately, when in the presence of food (14, 15). Fresh produce is markedly more expensive than its more calorie dense, but lower cost, food alternatives like cheese, cheaper breads, peanut butter, and canned goods; but, produce can also be produced economically and virtually anywhere, utilizing safe raised bed gardening methods (4).

**Connection Between Socioeconomic Status (SES) and Obesity in Children**

There are many other factors that may affect obesity, but socioeconomic status (SES) has shown a defined effect on obesity as a whole (16). Low SES may be tied to a person’s reduced access to good schools, reasonably priced grocery stores, health clubs, and other environmental resources that can help prevent obesity (16). With only one
grocery store, three housing developments, and a large population at or below the poverty line in South Boston, there is an obvious need for nutrition interventions that may increase access and exposure to fresh produce in low-income neighborhoods (15, 16, 17, 18).

In South Boston, more than 70% of students in the public schools are receiving a free or reduced priced meal (18). South Boston is part of the greater Boston Public School system, where most meals through the end of the 2011 school year were served from the Preferred Meals product line, produced in Pennsylvania, whose contract was up for renewal at the end of the 2011 school year (19). By 2013, another similar company had been awarded the food service, but the contract will only last for three years, so the baton will continue to be passed back and forth between food purveyors, who have limited commitment to local or even freshly made food. These sub-contracted meals are packaged in Pennsylvania and sent to Boston to be reheated and distributed to children (19). A number of schools are piloting a menu with healthier food choices to improve the quality of the meals, and to ultimately fight obesity in the schools (20, 21). Some schools have chosen to hire a chef to improve the meals, and others have been a part of the Boston Public Schools Farm to School pilot program, in order to improve access to locally grown produce through Farm to School, as well as participate in gardening activities (20, 21). The South Boston High School/Boston Green Academy, and their different programs have been a part of the Massachusetts Farm2School pilot program to bring locally grown food into schools on a more regular basis, and would benefit from increased access and exposure to Garden-Based nutrition education interventions and fresh produce (21).
Targeting lower income students, and other community members, by providing access and exposure to Garden-Based nutrition education interventions and fresh and local produce may have a positive impact on the dietary habits of these participants (5). Research has reported that less than half of children between the ages of 4-18 eat more than five servings of fruits and vegetables per day (10). Thus, more nutrition interventions are needed to increase access and exposure to fresh fruit and vegetables, and research data has indicated that Garden-Based nutrition education interventions can play a role in making these interventions more effective (5, 22-24).

**Impact of Farm, Garden-Based Education, and Farm2School Interventions**

Researchers have looked at the effects that Farm2School interventions have on the habits of youth in both schools and communities. Farm2School and Garden-Based nutrition education interventions can take place in the school cafeteria, or outside, like in an educational garden. There are four programs that were evaluated in the *Bearing Fruit: Farm to School Program Evaluation Resources and Recommendations* (13). These were Garden-Based Education focused nutrition education interventions, including a farm or garden based curriculum component. The evaluated programs included: The Edible School Yard (ESY) in California, the Michigan Mixed Greens Study (MIG), Pennsylvania’s Farm to Kindergarten through The Food Trust (FTK), and Illinois’ Fresh from the Farm (FFF) (25-28). ESY participants reported an increased understanding of the environment and garden cycles, while the MIG study reported increased knowledge of and skills for gardening, as well as an increased ability of the participants to identify the plants, both edible and otherwise, growing in their garden (13, 25, 26, 29-31). MIG
participants in general also demonstrated greater interest in trying new vegetables, while participating in the program over the summer (13, 26, 30).

The FTK survey results indicated that participants were overall more likely to identify healthy foods, to be aware of the health benefits of fruits and vegetables, to know and understand the source of their food, and to have had greater access to healthy food, after participating in the FTK program (13, 27, 32, 33). Most students participating in the FFF program knew more about and understood the growing cycles of food, and the source of their food (13, 27, 34, 35). Additionally, FFF participants increased their likelihood of eating fruits and vegetables, in addition to reporting healthier eating habits after the intervention (13, 27, 34, 35). There is significant evidence that Garden-Based nutrition education interventions are effective in improving dietary habits, and they should be used as a way to bring improved access and exposure to fresh produce to an urban neighborhood.

There are many positive benefits of Garden-Based nutrition education interventions, including: increased motivation to learn about environmental science and nutrition, as well as, improved behavior, self-esteem, and motivation to learn (36, 37). Garden-Based nutrition education interventions have the opportunity to engage youth and the community on many levels. The limited research data have shown positive outcomes in knowledge of healthy eating and behaviors, and an improved desire to eat fruits and vegetables (13, 37). Also, most studies measured nutrition knowledge gained or physical activity outcomes (37). In being able to participate in Garden-Based nutrition education interventions, participants were able to both engage in exercise and nutrition education opportunities. However, more research still needs to be conducted to determine the
effectiveness of these nutrition interventions on improved consumption of fresh fruits and vegetables (5, 13, 37).

**Gardens, Green Space, and Health**

Gardens not only expose community members to a local food source, but they are also an outlet for exercise (37). Engaging in gardening tasks, while not extremely vigorous, provides participants working in the garden with potential stress release, and a place where they can expend energy (37). Additionally, working on farms and in gardens provides people in the community a source of real and meaningful work, a place to support environmental conservation and education, a neighborhood food source, as well as an obvious social venue (12).

According to Dutch research studying the relationship between green space and health, the presence of a garden nearby is a positive indicator of the caretaker’s health (38). Reasons that green space may have a positive effect on health included: existence of green space lead to a less polluted environment, and created more frequent avenues for physical activity (38). This research showed that there are more positive correlations between health and proximity to rural agricultural space than to urban green space. Limitations of this study included: persons living in an urban environment may have low incomes and the inability to have a home near agricultural land, and those that have higher incomes may have the ability to have a home in a suburban or rural area and/or commute to their agricultural land (38). Thus, the greater financial resources may be a factor contributing to increased personal access to green space. Results of this research supported the need to incorporate agricultural and Garden-Based nutrition education interventions in low-income neighborhoods in order for future generations to be able to
sustain the green space. Such exposure enables the participants to reap the health benefits of proximity to agricultural space, as well as have increased access to a healthy food production site (38).

**Garden-Based Education and Dietary Habits**

In Massachusetts, Body Mass Index (BMI) testing is and will continue to take place as part of in-school interventions to curb childhood obesity (39). However, tater tots are considered a vegetable, and bologna a protein in the school lunchroom. These inexpensive foods are a luncheon staple, because the government has not historically offered enough reimbursement for the nutritious foods that school children should be fed (40). According to the CDC, at least one third of children were overweight or obese in 2010 (11). That being said, each community needs to be as concerned about children going outside the school for exercise, as they are for their food consumption. With this in mind, educators, health professionals, and the community have a responsibility to focus on the prevention of obesity and other nutrition-related medical conditions, and target the younger generation in an effort to improve the overall health of the community members.

Lautenschlager and Smith’s research stated that youth [n=26] who have participated in garden interventions are more willing to choose nutritious foods, try cultural and new foods, and even be more likely to appreciate new cultures (22). Cason reported that a multi-faceted approach to gardening and nutrition education interventions is very effective in helping students to identify fruits and vegetables, and such activity increases their willingness to taste the harvested foods, which might decrease their choice of junk food for snacks (23). This particular study involved many different parts of the community to help implement the intervention. Teachers, community members, families,
and others worked together to bring gardening interventions into many parts of the school’s curricula. As a result, students were more likely to identify and taste fruits and vegetables (23). However, this was a small study. Garden-Based nutrition education interventions can have a positive impact on dietary habits, and may result in youths’ willingness to try new vegetables, but there is a need for more long-term Garden-Based nutrition education interventions to sustain the participants’ improved health status. (5, 24).

**Garden-Based Education and Academic Achievement**

Garden-Based Education provides alternative ways for students to learn about food sources, and exposes the students to new and exciting foods that can be grown easily and eaten as fresh foods. Garden-Based Education supports many different subjects: math can be taught through planning and building raised beds, and laying out the plant design; history and geography can be taught through the history and cultivation of native varieties; and essential nutrition available in the foods grown can be identified from the harvesting (raw) through the proper preparation of fresh produce (13, 37). Some subjects may be more interesting to students when they experience them through active-gardening than they would be in a traditional classroom (37). Garden-Based Education can also invite student creativity and provide students with the opportunity to be interested in the natural sustainable environment (12, 41). Garden-Based Education also brings together students who might not otherwise be interested in working with peers (37, 42-44). The work on farms and gardens requires that many participants work together, and as a result of this collaborative work, students may become better suited to work with their peers both in and out of the classroom (2, 37, 42-44). Research supporting evidence of an
improved learning environment as a result of Garden-Based Education implementation was documented in the ESY survey. Teachers participating in the ESY intervention self-reported better learning environments in their classrooms than did those in the control schools, most likely because the garden-learning environment enhanced the classroom experience (13, 25, 29).

Garden-Based Education provides for alternative learning environments for youth and the community at large, and it is important to note that those who may not feel comfortable in a traditional educational setting may better enjoy or better perform in the garden teaching environment (5, 13, 37). For example, the SAGE Crossing Farm in Massachusetts supports an adult autism work program, and finds meaningful work on the farm to be an effective way to engage those who have difficulty learning (12, 45). Additionally, teachers of educational programs, including Head Start, who have incorporated gardens in their curricula, have reported that difficult students can find solace in the garden projects (37, 45). Garden-Based Education can provide benefits to engaged participants by creating increased access and exposure to fresh produce, and may have a positive impact on learning, academic achievement, overall knowledge, and behaviors related to healthy eating (13).

**Garden-Based Education Programs and Overall Community Involvement**

From the apparent use of and desire for community gardens, to the excitement around the town Farmers Market in urban neighborhoods, Garden-Based Education also has a place in the lives of those who are interested in taking care of their community. Community gardens are very difficult to begin and establish in urban neighborhoods, due to the limited space and high population density (47). Regardless, open space needs to be
procured in order to improve health and food access (38). By bringing different parts of the community together to share and take care of space, open space will be preserved; and, the community will be exposed to Garden-Based nutrition education interventions that will increase their knowledge of growing edible plants and possibly improve their eating habits, especially in urban environments. Evidence of such community progress and involvement has been documented in the MIG, ESY, FFF, and FTK studies (25-35).

There are more than 2000 school gardens in California being used as laboratories for both students and teachers (37, 48). These gardens allow the students to participate in the greater community, and be part of the greater goal of growing food (37, 49). Additionally, school and community gardens give those who take care of them the opportunity to feel a sense of ownership over the space they are maintaining (37). Thus, these garden activities affect the entire community, and research has shown that when students feel connected to school and community, they are less likely to engage in risky behavior, according to the National Longitudinal Study of Adolescent Health (50). There is also evidence that when a community area is maintained well, other members of the community will respect the effort, and continue to take care of it in a way that improves the look, feel, and safety of the neighborhood. This has been shown to be true through *The Broken Windows Theory* (51). The tenets of *The Broken Windows Theory* have been adapted by many crime fighters in cities across the nation, as they work with neighborhood youth and community members to clean up neighborhoods and make them safer for residents (51).

The Burlington School Food Project evaluated many community members to determine the effectiveness of the Garden-Based Education and Farm2School
intervention. Parent evaluations showed that participants were more willing to try new foods and eat more fruits and vegetables, and they had improved social skills/self-esteem, work ethic, and knowledge of the environment as a result of more hands on Garden-Based Education in the classroom, on field trips, and consuming farm fresh foods coming into the school cafeteria (13, 52). According to research, school gardens consistently involve parents, which brings more volunteer workers into the garden, as well as increasing the exposure to and benefits of the Garden-Based nutrition education interventions throughout the whole family (37, 48, 53). Additionally, some parents might have barriers interfering with participating in their children’s regular school activities. Families with lower incomes may be less likely to be involved in their children’s school activities than those without financial pressures (37, 54). However, the garden can be a potential way for parents to engage in education with their children, and support their learning environments (37). Perhaps those parents with greater financial pressures should be encouraged to participate in the garden, if they know that it is a source of food and exercise (37). By engaging parents and families of low Socio-Economic Status (SES) in the garden, those persons at higher risk for obesity will be targeted with interventions to increase their knowledge of and behaviors for healthy eating, and also have a place to expend energy and be relieved of stress.

**Garden-Based Nutrition Education Interventions Affect Dietary Habits**

Garden-Based Education focused youth programs may help children increase their fruit and vegetable intake and try new fruits, vegetables, and other new and/or unfamiliar foods (5). Additionally, the incorporation of Garden-Based Education focused youth programs, in inner cities and suburban neighborhoods, allows for continued learning
opportunities in the fields of nutrition, environment, and agriculture for youth, their families, and their community (5). Other researchers have reported that including Garden-Based Education focused youth programs in the public school curricula has a positive effect on participant’s overall academic achievement, and their knowledge about the environment and nutrition (5, 13, 26, 27). With the high rates of poverty in all of South Boston’s public schools, educators, health professionals, and the community must take action to provide a healthier environment for the children of the community (17, 18). More research needs to be conducted to determine the effectiveness of specific types of intervention programming to achieve positive thriving environments for children and families (5, 24). A result of continuing research in this area is the development of more avenues for garden-based learning curricula (5, 13). South Boston Grows aims to improve community green space, and to increase participants’ knowledge of growing edible plants, with the long-term goal of increasing access and exposure to, and intake of fresh fruits, vegetables, and herbs in South Boston.

**Urban Gardening May Help Relieve Negative Impact of the Urban Food Desert**

South Boston Grows aims to engage South Boston residents in urban land cultivation and food production. The ultimate goal of this project is to ensure that residents not only have access to fresh and local produce, but are also empowered and educated to carry out sustainable urban gardening and healthy eating practices for years to come. As recent researchers have stated, there is a huge need for more research in this field (5, 24).

In September of 2009, various Boston community members came together to build raised garden beds from scratch, prepare ground, and plan what to grow in nearly 100 raised garden beds on approximately 3,000 square feet of urban land, located inside in
one of the oldest housing developments in the country. Both the Mary Ellen McCormack Housing Development (one of three housing developments in South Boston), and a neighborhood church own this land. The space has been dedicated for use by youth and adults in the community from various youth and after school programs, neighborhood housing development task forces, community service programs, neighborhood schools, and other committed community groups, interested in gardening as a collaborative community on-site (Appendix C shows a full list of collaborations). This garden space is a venue for education and a food source for neighborhood families, who have experienced a lack of healthy food access in their communities. This flagship South Boston Grows garden produced nearly two tons of fresh produce, (almost 1500 plastic grocery store bags), during the 2010 growing season. Foods grown during this first season included many varieties of lettuce, tomatoes, herbs, squash, kale, collard greens, broccoli, green beans, eggplant, beets, turnips, and much, much more. In June 2010, another (small) garden was built in the second housing development (Old Colony), currently under HUD redevelopment/construction; so, this garden will be a pilot for another potential South Boston Grows expansion in South Boston. This garden was maintained independently by partners after South Boston Grows helped to set it up in 2010. From 2011-2012, South Boston Grows oversaw the garden, and it was taken care of by community groups located in the housing development, under the Researcher/Program Manager’s guidance. In 2013, the garden was significantly expanded for food growing capacity. It was apparent to neighbors and community members that without an overall collaboration with South Boston Grows, this garden would not be as
productive as it was when maintained independently, which is why the control of it switched by the second year.

By April of 2011, after a successful first growing season at the flagship site, plans for a new garden in the West Broadway Housing Development were under way. By the end of the second growing season in 2011, all housing developments in South Boston will have had access to a community growing space in which to grow healthy, fresh, affordable produce. As of 2013, three gardens in each of the housing developments expanded to include at least 2,500 square feet of food growing space.

Through the use of these spaces, community members have greater access to fresh produce, and they learned how to sustain a food system in an urban environment. In bringing neighborhood youth programs and committed community supporters together with South Boston Grows, South Boston residents are playing an integral role in the development of this urban sustainable agriculture program by helping to initiate, sustain, and maintain the site over time; i.e., a neighborhood food production site, which provides more community benefits than just food growing. South Boston Grows brings various community members and stakeholders together to ensure a multi-faceted approach for maximum effectiveness of the Garden-Based nutrition education intervention program. This helps ensure food security in this urban food desert.

**Explanation of Curricula Used to Implement the South Boston Grows Project**

The Food Project curriculum was developed in 1992, when the program was initiated, and has been used in both the Academic Year and Summer Programs by high school age youth and their program leaders, and has been effective in promoting leadership and work ethics through farm-based education. (2, 55-57). The National Farmers Union “Eat Fresh,
Buy Local” curriculum was developed in 2007, and focuses on a sustainable food system and its relationship to farms, gardens, and healthy eating (58). This project’s specific curricula will be used with high school aged youth in this current study. The curriculum, entitled *A Growing Relationship*, is targeted to elementary school age youth, and was specially designed for use in elementary school farm-gardens (59). These curricula were chosen based on their use in existing farm and garden-based education programs in Massachusetts and other New England states, where the growing season is similar to that of Boston.

The Nourishlife.org curriculum is a “multi-year media and education initiative” that utilizes modern technology to deliver important messages and information concerning how we can improve our food system (60). This is a compelling tool to use for the very fast-paced middle school and teen-age groups, who appreciate the use of modern technology. This curriculum is currently being used in collaboration with hands on educational, and urban Garden-Based nutrition education interventions, including but not limited to: discussions about where, how, and what to grow in gardens; where food comes from; and the history of the foods’ origins, how to access healthy food, what good nutrients are in the foods being grown, and other nutrition/health related topics (60). This curriculum was created for use in a California growing season, and so it requires some adaptation to meet the needs of the New England climate.

There are a number of additional topics covered by the National Farmers Union curricula, which will be used to supplement the aforementioned educational curricula, to meet the needs of the topics discussed and the age groups covered (61). In addition to these various curricula, other media including the films “The Future of Food” and “Food
Inc.” will be used to help the participants understand the importance of local farming in our society (62, 63). And finally, Boston Natural Area Network’s (BNAN) “Students learning through urban gardening” (SLUG) curricula is continually suggested to teachers, and others looking to enhance their educational environment with Garden-Based nutrition education interventions. These activities were developed specifically for use alongside a school gardening program (64).

The very first goal of South Boston Grows was to improve community green space. This has been improved through what will be the implementation of nearly ¼ of an acre of food growing space in South Boston by the end of 2013. Neighbors enjoy the garden, and they along with participants in the program, enjoy the space and the fresh produce it produces.

Like many of the programs mentioned in this literature review, knowledge of growing edible plants has been shown to certainly improve, when participants in various Garden-Based nutrition education projects were exposed to the wealth of knowledge that gardening provides. As recent researchers have stated, there is a huge need for more applied research in the Garden-Based nutrition education field (5, 24).
CHAPTER III

METHODS AND PROCEDURES

The History

From 2009-2014, long-term project goals and objectives of South Boston Grows have been identified and implemented through urban community partnerships and outreach, targeted to involve local participants (initially South Boston youth), in the growing and harvesting of food in more than 100 raised garden beds on St. Monica’s church property, which is across from one of the oldest housing developments in South Boston. This garden was the first of what will result in at least three different South Boston Grows food production gardens maintained by different groups, but all serving the same purpose of providing improved access to fresh produce in urban areas of need (currently in South Boston). The current project researcher is also involved in the initiation and maintenance of two other large garden sites within or abutting a neighborhood housing development property and another 3-5 food production gardens in nearby areas of Boston, Massachusetts where fresh produce will also be grown specifically for people in urban areas of need.

Study Design

The study design was a pre-test, post-test, quasi-experimental design. The control group data was gleaned from the Youth Ambassador participants who filled out the South Boston Grows pre-test in fall 2009, before the nutrition education interventions began, and included an interview (written and oral) component. Data were collected on an ongoing basis throughout the garden seasons from the Youth Ambassadors, as well as middle school students enrolled in various afterschool programs with whom the
researcher/program manager worked, including the Boston Collegiate Charter School’s after school program (BCCS+); [See Appendix C for a list of this and other partnerships].

**Curricula Used to Implement the South Boston Grows Project**

The South Boston Grows project will continue to implement the best methods for Garden-Based nutrition education interventions in South Boston, while enhancing work that others are doing in the field of science, health, and nutrition, as they relate to the garden projects. Nutrition education knowledge and expertise will be developed by the researcher, a Registered Dietitian, who will use information from: the Food Project books and manuals, The National Farmers Union’s curricula, other video and published media with a collaborating message, Friends of Holly Hill Farm’s curriculum: *A Growing Relationship*, The Nourishlife.org curriculum, and Boston Natural Areas Network’s (BNAN) “Students learning through urban gardening” (SLUG) activities, in addition to using archived farm-based education curricula for all ages from The Farm Based Education Association (2, 12, 55-64), in order to implement sound Garden-Based nutrition education interventions.

The South Boston Grows advisory board and this researcher will continue to learn and implement the best methods to ensure the highest yield for this urban farm, and to enhance curriculum standards, with the ultimate goal to use the garden as not just a fresh produce market, but also as an outdoor classroom for youth and community members of all ages (2, 55-59, 61-64). The curricula will be adapted for all age ranges participating in the project using knowledge this researcher has gleaned from working with various age groups (12, 64).
Ethnographic data was collected throughout the growing seasons, which began in 2010. There was *quantitative* data collected from pre- and post-tests in both the fall of 2009, and ongoing bi-annually, when applicable and reasonable. Each participant (when applicable) completed a minimum of a pre- or a post-test survey, but most on-going participants completed both a pre and a post-test. There were also participants who only filled out a post-test, because it was too difficult to monitor each walk-in/drop-in participant in order to have them always fill out a survey, because of staffing limitations.

Surveys were compiled and categorized into groups based on the age and gender of the participant, and were described based on their level of participation in the program. For example, the surveys obtained from participants in the beginning of the program were compared to those taken at the mid-point, and at the end of the intervention. The intervention was on-going, thus the importance of examining participants’ data changes over time. Also, there was *qualitative* data collected from interviews during the off-season, as well as ethnographic observations tracked throughout the four season(s).

The study evaluated (through interviews described), and determined if participation in the project/program increased knowledge of growing edible plants; if the program increased access and exposure to fresh produce among participants; and finally, if the program ensured sustainability of the project over time; as determined through interviews with participants. Multiple-choice surveys were filled out by applicable participants as one way to determine knowledge. Additionally, the participants' time spent on the project/program was tracked (by participants and/or the program manager, through surveys and/or attendance records when possible), in an effort to make a correlation between responses to the pre- and post-test, the interviews data, and their participation in
the study. And finally, the improvement and perception of the improved green space was
time tracked through interviews, as a way to ensure that sustainability was achieved as
part of the project/program. The results of these interviews are described in detail in the
results section.

Additional help was obtained from Boston University’s School of Public Health
graduate students, who focused their Fall 2010 semester efforts on the viability of an
extended nutrition education project, in collaboration with the South Boston Community
Health Center’s Institute for a Healthier Community (65, 66, 67), in addition to interns
working with the South Boston Grows program. These researchers added the questions
designed for the South Boston Grows Garden-Based nutrition education intervention to
the overall survey used for the Youth Ambassadors in order to cast a wider net of data
collection for these purposes. Going forward, the questions designed for South Boston
Grows will always be part of this survey, ensuring that ongoing evaluation and
monitoring of associated programming can take place.

The Human Subject Review Board (HSRB) at Bowling Green State University
deemed this project exempt from needing their approval. In spring of 2010, the Office of
Research and Evaluation (RAE) at the Boston Public Schools provided approval to track
data on participants in the project for the current study/evaluation (Appendix A) The
application and consent/assent forms that participants were asked to complete before
participating in the study/evaluation for South Boston Grows, if they were a minor and
are not part of Boston Public Schools, can be found in (Appendix B). In the case that the
participant is a Boston Public Schools student or a participant in one of the South Boston
Grows partner programs, the application process to participate was not nearly as
extensive, because there were existing approvals from Boston Public School’s RAE, and the partnerships that South Boston Grows had developed with other organizations, including groups listed in Appendix C.

Participants for the South Boston Grows project have been recruited from housing developments and their associated task forces, the local community health center, neighborhood associations, and in school and after school programs in South Boston, to be involved in gardening on open green space on or near housing developments in South Boston. Participants included youth and adults from all over South Boston, as well as other parts of the city. Many were youth volunteers from the neighborhood, as well as from programs with which South Boston Grows has direct partnerships, as listed in Appendix C. Many of the youth were participating in established youth programs, and when at the garden site, they were supervised by leaders from these established groups, as well as the current researcher from South Boston Grows. Many of these adult and youth volunteers are committed to the garden projects, and they are interested in participating in the development of gardens and production of food for the duration of this project, through 2011 and beyond. The knowledge and expertise gained from a successful first growing season allowed the researcher to focus on the evaluation of the program in 2011, for further education program improvements during the 2012, 2013 and other growing seasons.
South Boston Grows: A Garden-Based Nutrition Education Intervention

Both youth and adult community members were given the opportunity to be involved in the planning, planting, and growing processes, and the ownership of a variety of community food growing spaces in South Boston, as part of this project during the group gardening hours. The project goal was to recruit about 100 participants, including: 50-75 youth of all ages, and 50-75 adults for this project/program; and subsequently, to conduct the study/evaluation by the end of the 2011 growing season. Participants were recruited from the aforementioned school and community groups (Appendix C).

Garden-Based nutrition education classes were offered to participants at each garden site at least two times weekly, to ensure that these community members, students in schools, and others involved would be learning about a similar topic that is related to nutrition and sustainable agriculture. During these sessions, participants planned what to grow, started and transplanted seedlings, maintained a compost bin, weeded, watered, planted, and participated in other urban agriculture and nutrition related activities; including nutrition, food procurement, cooking, and even diabetes management classes, using the garden as the venue, when possible [N=64]. Not all participants involved filled out a survey.

The greater community was also invited to participate on the regular program days, (the program schedule depended on which garden was being maintained), to start the garden, where a critical mass of participants, as well as volunteers were required on-site. Family members and friends of participants were encouraged to attend these events to ensure larger community access to the Garden-Based nutrition education interventions. Also, they were asked to participate in the study/evaluation, especially if they spent a
significant period of time on the project, and might thereby, be impacted by the potential program benefits as well [N=100].

**Duration of South Boston Grows’ Garden-Based Nutrition Education Intervention**

Initially, participants involved in the South Boston Grows project were encouraged to participate in group gardening days at the flagship site on Tuesday, Thursday, and Sunday afternoons, to learn from one another and work together on this community food production system. The second South Boston Grows garden hours were designated as Monday, Wednesday, and Friday afternoons, so that additional times for gardening were available to the community. The third garden hours also took place on other available afternoons, and were staffed by youth and an intern, while overseen by the Program Manager/Researcher of the project. As other gardens were initiated and planned, similar schedules were implemented to ensure that a successful model that meets the needs of all residents and organizers is followed for each food production garden in South Boston and beyond.

The overall time commitment from participants varied, based on their commitment to the project. Starting in the spring of 2010 and continuing through 2014, 1-3 weekly garden education and care days were held at various times during the week at each of the existing South Boston Grows gardens, and participants were expected to attend at least one of these sessions at their garden(s) of choice. The South Boston Grows advisory board and this researcher anticipated that up to 20 older youth would spend the most time on the project; from 10-40 hours per month, depending on the season, and the students’ enrollment in a summer program devoted to environmental issues. Other participants were to participate in no less than 1, and up to 3, classes per week on topics, including:
urban gardening workshops focused on planting, composting, harvesting, garden food preparation, healthy cooking classes, and other work; including many facets of nutrition education and organic garden maintenance related to the season. Students from local schools (Perry, Condon, Perkins, and South Boston High) were invited to attend the garden through field trips, to ensure sustainability of this urban, educational, community garden project. Many of the students from the local schools were also exposed to South Boston Grows outside of school hours, as well due to the nature of their involvement in the community and the proximity of their homes to the garden(s).

Over the summer months, when youth were out of school, and the garden needed the most attention, teenagers interested and involved spend a significant period of time, approximately 10 hours per week, in this Garden-Based nutrition education intervention. This researcher and South Boston Grows intern(s) organized educational garden oversight, and encouraged other participants to spend more time in the garden during the summer months as well. This was an effective way to involve families of participants in the growing and harvesting of food, to ensure that increased access and exposure to fresh produce and herbs extended to other community members, in addition to increasing the sample size for the study/evaluation.

**The Control Versus the Intervention Group**

This study researcher asked the same pre- and post-evaluation questions of the volunteer control group who choose not to be a part of the project/program and study/evaluation initially. Their reasons for not being involved may have been related to lack of time due to school, family, or other commitments. Regardless, many became involved in the program later; if they became interested or able. Many of these volunteers
were part of one of the South Boston Grows collaborations called the Young at Arts/Youth Ambassadors in South Boston (Appendix C shows a full list of collaborations), who were involved in community service in South Boston, and who were part of a larger, Healthy Communities study (65). Many, but not all of these youth, also participated in the summer South Boston Grows program in the years following the initial evaluation, so this comparison among peers was very important [N=30].

The intervention group included those who were invited and interested in attending the South Boston Grows community gardening programs. Each person involved in this intervention (when appropriate and possible) was invited and encouraged to fill out a survey about their fruit and vegetable intake. In many instances, only post-test data could be obtained from the various groups involved and these data were included in the final results [N=35].

The Program Manager of South Boston Grows contacted the evaluator for the Healthy Communities study when the program first began to jointly develop a survey to address the objectives for the South Boston Grows study/evaluation in the overall evaluation administered to the youth bi-annually. This evaluation instrument was then used for the entire South Boston Grows program evaluation. These validated evaluation questions, which were added to the fall 2009 pre-test for the Healthy Communities study, were modified and used as a test run for the pre-test questions for the South Boston Grows study/evaluation (Appendix E; note that questions 3d, 3e, and 3f were not included in this initial pre-test). With the help of Social Science Research and Evaluation tools, these pre-/post- tests will continue to be conducted bi-annually, consistent with the pre- and post- growing season times, and the data were analyzed to evaluate the Healthy
Communities study (65, 66). This is significant to the on-going monitoring and evaluation of South Boston Grows.

**Survey Administration: Quantitative Data Collection**

Volunteer participants in the study/evaluation were asked to complete a study participation application, when able and applicable. There were some times when someone was not able to complete the form due to either literacy or language barriers, or did not have the time to complete the form due to the nature of limited staffing, as described previously. However, all attempts were made to help this person fill out an application. In the case of a one-time volunteer event, these volunteers were not considered part of the study because of their limited involvement. In this case, ethnographic and anecdotal data were collected. The pre-test was attached to the application in order to obtain data from participants when they were entering the project and subsequently, used in the study/evaluation. Pre- and Post-tests (Appendix E) were administered as part of the study/evaluation, to determine the benefits of Garden-Based nutrition education interventions, by asking participants their knowledge of growing edible plants, and their fruit and vegetable intake, before and after their participation in the project/program, to determine what might have changed as a result of being involved in the project/program. Additionally, there was also a question on the survey that asked youth participants where they attend school. This question was designed to determine if youth who do not participate in the project, but attend a school involved in Farm2School cafeteria interventions, were increasing their fruit and vegetable intake as a result of being exposed to fresher and locally grown produce at school meals. However, this data did not end up being utilized, as the sample size was too small. Additionally, these
schools changed their availability of local produce from year to year, so any results would have been significantly inconsistent. This question may be useful in the future, however.

Quantitative data on dietary habits were collected before and after the first and the last (weekly) interactive Garden-Based nutrition education interventions, respectively, through pre- and post-tests (Appendix E). Additionally, the researcher conducted interviews during the off-season in 2011, and obtained ethnographic qualitative data from her experience working directly with the participants, by taking notes on participant’s attrition rates, attitude, feedback, and demeanor in the garden over time [N=10].

The pre- and post-test were completed during the initial application (Appendix E) collection process in the winter/spring 2010, (and in the case of the test data, some data was collected in the fall of 2009), and the post-evaluation questions were administered in the off-seasons of 2011-2012, after the interventions had taken place. Some of the data collected for the Healthy Communities study from Social Science Research and Evaluation was usable as well, considering that many of the Healthy Communities study participants were participating in the South Boston Grows project, and subsequently the study/evaluation; and, they completed the pre- and post-tests that include evaluation questions for both studies (65, 66).

Data were compiled by the researcher to evaluate the main youth program with whom South Boston Grows had been working. The data were organized in an excel file and analyzed using frequency distributions. Data has been collected from surveys and put into excel files, and graphs were created to demonstrate the data collected. Responses collected were averaged to illustrate the final answers for quantitative data collected.
Survey Administration: Qualitative Data Collection

Interviews were held with participants after the completion of the project for the season (typically the end of the growing season or the fall) to collect qualitative and/or ethnographic data on the benefits of participating in this Garden-Based Education. The interviews were about 1/2-1 hour in length, and questions included addressed the program objectives by collecting responses via email, phone contact, in written form, or in person (Appendix F). Questions are discussed in greater detail in the results section of this paper. Due to the nature of the length of the study of this topic, the final qualitative responses of participants from the 2013 seasons and beyond will be the most representative of participant change, because these responses will represent almost five years of the program, allowing for shown improvement in the community through this urban agriculture nutrition education program.

The qualitative, ethnographic method allowed the researcher to collect information about peer interaction and overall social interactions of youth and community members, while working in the garden. This allowed the researcher to gather qualitative data on the potential additional positive benefits of improving green space.
CHAPTER IV

RESULTS

The development of the raised garden beds began on the flagship site in the fall of 2009, with up to 30 youth and community participants attending up to five different volunteer garden building events that fall. The first growing season started with approximately 25 volunteers, growing to nearly 100 volunteers involved over 5 years. Approximately 2/3 of these volunteers were significantly involved [N=64]. The summer teen program started with about eight youth in 2010 and grew to include more than a dozen youth involved in 2013. More than ten different school and after school programs participate in the Garden-Based nutrition education intervention during the spring and fall seasons. Participants were not required to fill out an application or a survey but more than half of those who were significantly involved in the South Boston Grows Garden-Based nutrition education intervention filled out a post-test.

In addition to the expansion of this program to include gardens in all of the housing developments in South Boston, the number of participants involved in food growing also increased over time. Since 2009, the garden space has expanded from the first approximately 3,000 sf. garden space, to include another nearly 3,000 sf. garden, and the expansion of a small raised bed garden area into an approximately 3,000 sf garden space. All gardens are nearby or within the Boston Housing Authority grounds. In total, and including other spaces managed by South Boston Grows (3-5 smaller, “backyard sized” gardens throughout Boston), almost 10,000 square feet of community growing space is currently in use, and this acreage will continue to be used and expanded throughout the South Boston Grows partnerships. Growing space has increased as South Boston Grows’
popularity has expanded. Participation in the program has also expanded to include all of the housing task forces, as well as more youth and adults from each of the neighborhoods targeted, including a growing number of school and community groups. At least a dozen youth were involved in the summer program in 2013 (an increase from the first group of less than ten in 2010). Meanwhile, more than ten school and after school programs are participating in Garden-Based nutrition education annually over the spring and fall programming seasons. In addition, community awareness has also increased. Since its inception, South Boston Grows has been featured in the local newspaper, the *South Boston Online* at least ten times, in addition to the *Boston Globe* a handful of times starting in the summer of 2011 (68, 69).

**Pre-Test and Post-Test Survey Data**

*(Knowledge of Fruits And Vegetables Grown in The Massachusetts Climate)*

According to the pre-test in this study, mentioned as the first data collection point [first 2010 data point listed in Figures 1-5], many persons who were interviewed were not very familiar with the foods and crops that are actually grown in Massachusetts [N=30]. Many of those surveyed who were from Caribbean cultures stated that local crops included mangoes and bananas, when asked what foods grow in Massachusetts. These responses may be predicated on their preferences for certain fruits and vegetables, or their cultural background, rather than their knowledge of what is actually grown in this climate. For example, many of the youth involved in this study have come from areas outside the US, including but not limited to Puerto Rico, the Dominican Republic, and a number of nearby locations in the Caribbean. Therefore, the post-test showed that knowledge of what foods are actually grown in Massachusetts increased overtime
For example, many of the responses to the same questions on the 2010 post-test asking “What foods grow in a small garden in Massachusetts,” included Swiss chard, eggplant, tomatoes, carrots, basil, radish, beans, and lettuce. These were also included in many of the staple crops grown in the South Boston Grows garden. Thus, of those surveyed, knowledge of growing edible crops improved. In addition, the post-test showed that those surveyed were significantly more likely to eat the foods they identified as being grown in this climate, than they were before the Garden-Based nutrition education intervention.

The most improvement in healthy eating habits was shown between the 2010 survey results derived from participants who had been participating briefly in the program, when compared to the 2012 survey that was given after these same participants, who had participated in significant Garden-Based nutrition education interventions, including cooking programming for the time leading up to seasonal gardening. The differences included an increase in the intake of all types of vegetables/produce grown, and a decrease in fruit juice intake, which indicated a lower caloric intake.

By the time that the last set of survey data was gathered in May 2012, it was apparent that the more information that participants had about the food they grew, and the more exposure they had to these foods being grown, the more likely they were to try the foods to see if they liked them. Additionally, they were more likely to actually eat what they grew when engaged in Garden-Based nutrition education interventions through cooking classes. For example, middle school students [N=29], who participated in various aspects of the Garden-Based nutrition education intervention over time, showed that they were more likely to try foods to which they were exposed both in the garden setting, and when
they were using the food in a cooking or garden-based nutrition class, led by this researcher.

According to questions asked in the validated survey (Appendix E), food that participants were most likely recognize as being locally grown and eat more of after the Garden-Based nutrition education intervention included: tomatoes, squash, cucumber, chard, lettuce, carrots, basil, beets, kale, beans, zucchini, turnip, spinach apples, cranberries, and pears. This data was collected from the part of the survey that asked “Name 3 fruits or vegetables you can grow in a small garden in the Eastern Massachusetts area” (Appendix E). Additionally after being asked how much time they spent in the program post intervention, many participants had been involved in South Boston Grows for at least 1-5 days, just as many were involved for 6-10 days and some were involved 11 days or more, when surveyed about their involvement. Specific survey questions and more specific, associated data on participant’s fruit and vegetable intake can be found in Figures 1-6.

Figures 1-6 portray the responses to the survey questions asked of different participant groups from 2010-2012. There were seven options to the various questions related to produce intake which included: 1. Did not eat “ “ during the past 7 days, 2. Ate “ “ 1 to 3 times during the past 7 days, 3. Ate “ “ 4 to 6 times during the past 7 days, 4. Ate “ “ 1 time per day, 5. Ate “ “ 2 times per day, 6. Ate “ “ 3 times per day, 7. Ate “ “ 4 or more times per day. The average of the group’s responses has been marked on the graph to show improvement in consumption of fresh produce from the gardens or to represent a decrease in juice intake.
KEY to be Used for Figures 1, 2, 3, 4, 5:

1. Did not eat “ “ during the past 7 days
2. Ate “ “ 1 to 3 times during the past 7 days
3. Ate “ “ 4 to 6 times during the past 7 days
4. Ate “ “ 1 time per day
5. Ate “ “ 2 times per day
6. Ate “ “ 3 times per day
7. Ate “ “ 4 or more times per day

Figure 1

How Often Was Salad Consumed in the Last 7 Days

Y axis: Average Likelihood of Consumption of Produce Identified
X axis: Chronological Order of Groups Interviewed

Responses to, “How Often Was Salad Consumed in the Last 7 Days”
Figure 1, Continued

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<td>1. Spring 2010 Devine Way Participants prior to GBE [N=18]</td>
<td>1.62</td>
</tr>
<tr>
<td>2. Summer 2010 Teen Youth Participants involved in GBE &amp; Cooking for 1 year or more [N=13]</td>
<td>2.06</td>
</tr>
<tr>
<td>3. Fall 2010 Middle School/BCCS+ Participants prior to GBE [N=9]</td>
<td>1.33</td>
</tr>
<tr>
<td>4. Fall 2010 Middle School/BCCS+ Participants involved in GBE &amp; Cooking [N=8]</td>
<td>2.50</td>
</tr>
<tr>
<td>5. Winter 2010 Middle School/BCCS+ Participants who saw garden but no other GBE, [N=2] 2 people responded</td>
<td>1.00</td>
</tr>
<tr>
<td>7. Spring 2011 Middle School/BCCS+ involved in GBE &amp; Cooking, 1 person responded [N=1]</td>
<td>2.00</td>
</tr>
</tbody>
</table>

According to the teen responses to the surveys and questions (Figure 1), at least 27% of participants [N=35] did not eat green salad prior to the intervention, while 25% of participants did not eat green salad post-intervention. When looking at responses across those participants surveyed using questionnaires, the data indicated that those who participated in any sort of garden-based nutrition education intervention learned something from the intervention. Figure 1 shows that those who participated in the Garden-Based nutrition education intervention for the longest period of time were most likely to try new things, and increased their green salad intake. The longer the participants were involved in the Garden-Based nutrition education intervention, the more likely they were to consume green salad. The Researcher/Program Manager taught a class that included Garden-Based nutrition education interventions at Boston Collegiate
Charter School’s after school program (BCCS+). See Appendix C for more information on this collaboration. The class sizes were small, thus the survey sample size was even lower. In general, green salad was popular across all groups. This may be related to the great length of time it grows throughout the season and/or to the ease in which it can be consumed in or around the urban garden sites. This particular variety of produce will continue to be grown widely across all of the South Boston Grows garden sites in order to continue to participants with fresh local produce that they enjoy.
Figure 2

How Often Were Other Vegetables (Collards, Kale, Beet Greens) Consumed in the Last 7 Days

X axis: Chronological Order of Groups Interviewed

Y axis: Average Likeliness of Consumption of Produce Identified

Responses To, “How Often Were Other Vegetables (Collards, Kale, Beet Greens) Consumed in the Last 7 Days”
In Figure 2, the data indicate that those who participated in Garden-Based nutrition education interventions were more likely to make the most of the growing season, and were most interested in attending the sessions where both participants and others were invited and encouraged to be involved, on behalf of South Boston Grows. Greens can be grown virtually anywhere, but seemingly may not be the most popular food, initially, unless people know how to prepare them well. Figure 2 shows that the goals that South Boston Grows set were supported by more people than were initially expected to be involved in the South Boston Grows program, which resulted in food growing, food preparation, and multiple donations of produce (as greens are very prolific). For example,
on any given day during the season, the youth may have distributed up to 10 pounds of lettuce and other greens from the urban gardens. Additionally, those participants who were also involved in multiple interventions were much more likely to try new vegetables than less involved peers. It is normally unusual for people to try different types of greens. However, upon being educated about where the greens were grown, having been involved in harvesting them, and even being part of their distribution was a significant draw for this population to participate in green consumption. Aside from being engaged in the growing season, many South Boston Grows participants were also significantly involved in planting, weeding, growing, and harvesting the food during South Boston Grows educational programmatic times. However, the importance of Figure 2 is to show how people have changed their views on eating greens, especially when grown fresh in a local garden, and prepared well.
Figure 3

How Often Were Other Vegetables (Tomato, Squash, Cucumber) Consumed in the Last 7 Days

Y axis: Average Likeliness of Consumption of Produce Identified

X axis: Chronological Order of Groups Interviewed

Responses to, “How Often Were Other Vegetables (Tomato, Squash, Cucumber) Consumed in the Last 7 Days.”
Figure 3, continued

<table>
<thead>
<tr>
<th>How Often Were Other Vegetables (Tomato, Squash, Cucumber) Consumed in the Last 7 Days</th>
<th>How often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Spring 2010 Devine Way Participants prior to GBE [N=12]</td>
<td>1.50</td>
</tr>
<tr>
<td>2. Summer 2010 Teen Youth Participants involved in GBE &amp; Cooking for 1 year or more [N=15]</td>
<td>2.13</td>
</tr>
<tr>
<td>3. Fall 2010 Middle School/BCCS+ Participants prior to GBE [N=9]</td>
<td>1.56</td>
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<tr>
<td>4. Fall 2010 Middle School/BCCS+ Participants involved in GBE &amp; Cooking [N=8]</td>
<td>2.14</td>
</tr>
<tr>
<td>5. Winter 2010 Middle School/BCCS+ Participants who saw garden but no other GBE, 2 people responded [N=2]</td>
<td>5.33</td>
</tr>
<tr>
<td>6. Winter 2010 Middle School/BCCS+ Participants involved in GBE &amp; Cooking [N=9]</td>
<td>2.22</td>
</tr>
<tr>
<td>7. Spring 2011 Middle School/BCCS+ involved in GBE &amp; Cooking, [N=1] 1 person responded</td>
<td>4.00</td>
</tr>
<tr>
<td>8. Spring/Summer 2012 West Broadway Participants involved in GBE &amp; Cooking [N=4]</td>
<td>2.75</td>
</tr>
</tbody>
</table>

Figure 3 data show that even some of the most common vegetables grown were even more desirable to participants after they have seen them grow in an environment such as the one provided by the South Boston Grows programming. For example, those who have participated in the South Boston Grows programming are now more likely to try new foods, especially those they grew and now they recognize, (as shown in Figures 1-5). Participants, primarily youth, have been educated on how to prepare items grown in the garden, which seems to be a common reason why consumption of vegetables grown in the garden increases over time. Participation of all residents as well as direct participants of South Boston Grows has been a positive addition to the community. Figure 3 shows that mere exposure to vegetables, even well-known ones, may increase intake of these
healthy food items. And while students are increasing their intake of familiar produce items, they are also branching out by participating in other environmental initiatives in collaboration with the South Boston Grows programming. In addition to understanding how to grow food in their community, participants help to plant trees, work on anti-litter campaigns, talk about alternative energy, all the while engaging others in what they have learned in the South Boston Grows programming.
**Figure 4**

How Often Were Other Vegetables (Carrots, Peas, Broccoli) Consumed in the Last 7 Days

Y axis: Average Likelihood of Consumption of Produce Identified

X axis: Chronological Order of Groups Interviewed

Responses to, “How Often Were Other Vegetables (Carrots, Peas, Broccoli) Consumed in the Last 7 Days.”

\[
y = 0.1996x + 2.1982 \quad R^2 = 0.13995
\]
Produce intake increased as a result of the Garden-Based nutrition education interventions. This category of familiar vegetables was also widely accepted by the time that the final surveys from the intervention were collected. Peas, Carrots, and Broccoli are all familiar vegetables, but as the results of Figure 4 show, the consumption of these varieties of produce increased over time. Just as is evident in Figure 3, Figure 4 shows that participants may have become more interested in the vegetables that were familiar to them, and thus, were more likely to try these items, especially when they saw them growing in the garden, or being used in the nutrition education cooking classes. This data indicates that in general, planting familiar produce items to be harvested may help increase participant’s intake of these produce items over time.

<table>
<thead>
<tr>
<th>How Often Were Other Vegetables (Carrots, Peas, Broccoli) Consumed in the Last 7 Days</th>
<th>How often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Spring 2010 Devine Way Participants prior to GBE [N=12]</td>
<td>2.08</td>
</tr>
<tr>
<td>2. Summer 2010 Teen Youth Participants involved in GBE &amp; Cooking for 1 year or more [N=15]</td>
<td>2.87</td>
</tr>
<tr>
<td>3. Fall 2010 Middle School/BCCS+ Participants prior to GBE [N=9]</td>
<td>2.22</td>
</tr>
<tr>
<td>4. Fall 2010 Middle School/BCCS+ Participants involved in GBE &amp; Cooking [N=8]</td>
<td>3.25</td>
</tr>
<tr>
<td>5. Winter 2010 Middle School/BCCS+ Participants who saw garden but no other GBE [N=3]</td>
<td>4.33</td>
</tr>
<tr>
<td>7. Spring 2011 Middle School/BCCS+ involved in GBE &amp; Cooking, [N=1] only 1 person responded</td>
<td>1.00</td>
</tr>
</tbody>
</table>
Figure 5

**How Often Were Other Vegetables (New, Never Tried) Consumed in the Last 7 Days**

Y axis: Average Likeliness of Consumption of Produce Identified

X axis: Chronological Order of Groups Interviewed

Responses to “How Often Were Other Vegetables (New, Never Tried) Consumed in the Last 7 Days.”
How Often Were Other Vegetables (New, Never Tried) Consumed in the Last 7 Days

<table>
<thead>
<tr>
<th>How Often Were Other Vegetables (New, Never Tried) Consumed in the Last 7 Days</th>
<th>how often</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Spring 2010 Devine Way Participants prior to GBE ( N=11 )</td>
<td>1.64</td>
</tr>
<tr>
<td>2. Summer 2010 Teen Youth Participants involved in GBE &amp; Cooking for 1 year or more ( N=12 )</td>
<td>2.08</td>
</tr>
<tr>
<td>3. Fall 2010 Middle School/BCCS+ Participants prior to GBE ( N=6 )</td>
<td>1.83</td>
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<tr>
<td>4. Fall 2010 Middle School/BCCS+ Participants involved in GBE &amp; Cooking ( N=8 )</td>
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<td>5. Winter 2010 Middle School/BCCS+ Participants who saw garden but no other GBE ( N=1 )</td>
<td>1.00</td>
</tr>
<tr>
<td>6. Winter 2010 Middle School/BCCS+ Participants involved in GBE &amp; Cooking ( N=6 )</td>
<td>2.00</td>
</tr>
<tr>
<td>7. Spring 2011 Middle School/BCCS+ involved in GBE &amp; Cooking, ( N=1 )</td>
<td>2.00</td>
</tr>
<tr>
<td>8. Spring/Summer 2012 West Broadway Participants involved in GBE &amp; Cooking ( N=4 )</td>
<td>3.25</td>
</tr>
</tbody>
</table>

The results in Figure 5 indicate that that participants \( N=35 \) were more likely to try new vegetables which they had never tried previously, after participating in this Garden-Based nutrition education intervention. This is important to note because an important objective of South Boston Grows programming was to expose participants to new and different, locally grown vegetables, prepared in different ways. By both teaching participants how to grow the food and how to prepare it, this program intervention has become very successful in improving eating habits as well as producing other positive benefits. One of the most important findings here is that there is the most significant increase in the consumption of both familiar and new, never tried vegetables fro 2010-2012 after participation in the South Boston Grows Garden-Based nutrition education intervention.
Figure 6

(Figure: Fruit Juice Intake among Participants from 2010 through 2012)

(Y axis: How many servings of fruit juice per day; X axis: Number of people)
The data in Figure 6 is not as significant as that data on other produce consumption but does show some very interesting information. The data indicated that fruit juice intake is high among middle and high school students and the younger students were more likely to reduce fruit juice intake with Garden-Based nutrition education interventions. Adults who participated in these interventions were also more likely to reduce fruit juice intake secondary to their participation in Garden-Based nutrition education interventions. It was also apparent that when the program participants were not directly immersed in these Garden-Based nutrition education interventions that they may be more likely to resume fruit juice intake after finishing with nutrition education. Thus, the Garden-Based nutrition education interventions were an effective tool for at least short-term reduction in fruit juice intake. This may be related to lack of access to fruit juice during the programming and/or because participants are becoming more aware of its high sugar content with nutrition education in the program. Figure 6 illustrates that those groups who are more likely to engage in high fruit juice consumption were those who were pre-teens, and teenagers who may already be predisposed to drinking high quantities of fruit juice. Additionally, the middle school group, which was mostly comprised of one-time interventions, was much more likely to drink fruit juice. This may be related to the fact that these participants did not have as long of a Garden-Based nutrition education intervention as the participants in the control group. In general, those participating in more long-term Garden-Based nutrition education interventions were much less likely to drink high quantities of fruit juice.
Summary of Data Analysis for South Boston Grows

Vegetable intake improved as a result of the Garden-Based nutrition education intervention; and, as a result, youth and families were shown that these nutrition interventions are imperative to public health, as evidenced by the themes discovered through the qualitative analysis. This Garden-Based nutrition education intervention strongly suggested to engage the participants in the growing and preparing of many of their favorite foods. Additionally, participants were significantly tied to understanding the importance of open space, and they acknowledged access to even more exercise and nutrition education opportunities than they recognized before the intervention.

The data in Figures 1-5 illustrated that out of all produce grown, traditional garden vegetable intake increased the most as a result of the Garden-Based nutrition education intervention. There was also an increase in other, more unfamiliar vegetables as well; such as, kale, collard greens, and beet greens. The data indicated an increase in the intake of regular and known vegetables overtime, which included mainly but was not limited to: green salad, tomatoes, squash, cucumber, carrots, broccoli, and peas.

The consumption of vegetables in all categories appeared to increase as participants’ interest in teaching others how to prepare the harvested foods increased. South Boston Grows has been instrumental in educating people in both how to prepare, and telling other people how to prepare these food items. By engaging youth in cooking classes and nutrition education programming through Garden-Based nutrition education interventions, participants in the current study were more likely to try new foods; and, when they are exposed to healthy, locally grown produce, and education programs concerning how to prepare these foods, their consumption of these foods increased,
which supports results by Lautenschlager, Smith, and Cason (22, 23). This current study identified a positive connection between hands-on nutrition education and eating habits, which supports carrying forth further programs that engage and support urban and educational agriculture in South Boston and beyond.

The vegetables grown at South Boston Grows (green salad, carrots, peas and broccoli) were the most popular among participants over time. Additionally, those new and often never tried vegetables and herbs (produce) turned out to be some of the most popular among the study participants. This is based on the interpretation of the surveys, and the noted increase in consumption of produce from the first data collection point in 2010 to the last data collection point in the Spring of 2012. All Figures showed a trend toward an increase in consumption of the vegetables and other produce grow in the South Boston Grows urban gardens, which was related to the fact that these produce items became more familiar to the participants, who accepted them; or because they were more widely grown and available from the garden. Additionally, being taught how to prepare and cook these produce items may increase participant consumption because they realize they can prepare these foods easily at home.

The more people who participated in the Garden-Based nutrition education intervention, the more likely they were to be involved in continuing to try new vegetables. The participants’ self-reported data also suggested that participants’ fruit juice consumption decreased, and their vegetable intake increased post-intervention. This is a healthy shift in calorie distribution in the diet. As a whole, at least 3 out of 4 teens who were the most active by helping weed, water, harvest, and prepare fresh food in the South Boston Grows Garden-Based nutrition education intervention showed
improvement in their overall vegetable intake over time (from Spring 2010 - Spring 2012). Fruit juice intake among those surveyed post-intervention decreased among this group, as well.

**Likeliness of Trying New Foods Grown by Participants**

The initial pre-test that was used to survey those participants who would be entering the South Boston Grows program, the average person stated that they were between somewhat likely and most likely (3.67/5) to try new garden grown foods; the group that spent a summer gardening and cooking the garden foods grown was most likely (4/5) to try grown new foods grown. The longer people participated in the Garden-Based nutrition education intervention, the more likely they were to try new foods grown in the garden. For example, the last summer that garden working participants were surveyed (Spring 2012), all responded that they were very likely to try new foods grown. The rest of the groups, most specifically the middle school groups surveyed (over the course of the program, but mainly from 2010-2011) showed that they were more likely to try new foods grown when participating directly in Garden-Based nutrition education with a cooking education component, compared to the groups who participated in plain nutrition education [without a garden basis], but with a cooking component. And, all nutrition education approaches showed positive improvement in participants’ acceptance of new grown vegetable foods.

**Comparison of Produce Intake over Time Since Participation in Program**

The baseline for this survey is data from participants’ who completed forms in May of 2010, prior to the youth’s significant involvement in Garden-Based nutrition education. Participants in the West Broadway gardening team are already significantly
involved in the garden based nutrition education that the South Boston Grows programming provides. Additionally, the longer groups were involved in the Garden-Based nutrition education intervention, the longer they are actually able to have significant nutrition education benefits.

The more times people participated in Garden-Based nutrition education intervention, the more likely they were to make healthier food habit choices, such as those associated with decreasing fruit juice consumption. Some outliers are those that are similar age groups of tweens, and some of the teenagers who are difficult to help establish healthy habits. Middle school youth seemed much more likely to try vegetables when participating in the Garden-Based nutrition education intervention that also included a cooking component. For example, 25% of those middle school youth who participated in the early spring cooking only portion of the nutrition education program did not eat green salad while 17% did not eat green salad after participating in the Garden-Based nutrition education intervention that also included a cooking and food preparation component. Thus, there was an 8% increase in salad consumption among this group after participating in the Garden-Based nutrition education intervention (Appendix H). Additionally, those middle school youth who were surveyed prior to any type of intervention did not eat any green salad either.

Both teens and middle school youth involved in the Garden-Based nutrition education intervention that included a gardening component, combined with a cooking and food preparation component, using the food grown in the South Boston Grows gardens, were much more likely to try different foods, especially those they identified as
being grown in the Massachusetts climate, and they ate healthier and larger portions of fruits and vegetables, especially the produce grown in the urban gardens.

By the end of the 2012 school year, the same students from a number of local schools visited the South Boston Grows garden for a second year in a row or more, during at least one season per year, in an effort to experience a different phase in the garden’s development. Future collaborations between South Boston Grows and the local schools are expanding, as more connections are made between the current project researcher and the decision makers at the public schools (see Appendix C for more information).

**Comparison of Teen and Middle School Intervention**

Middle school youth may have experienced a larger impact on their green salad intake from participating in the Garden-Based nutrition education intervention, based on the frequency of the intervention (Figure 1). The researcher/program manager spent (30 – 60) minute time periods, three days each week, during each quarter (5-7 weeks) of the school year with middle school youth at the garden, when available, while the older teens spent up to 20 hours for 7-10 weeks each summer at the garden. Over time, similar results were obtained from each group; however, it is apparent that the immediate impact of the Garden-Based nutrition education intervention was that middle school youth were more likely to eat foods that they could obtain directly from the garden. Figures (1-5) represented those participants’ increase in vegetable intake, over time, in chronological order of gathered data. There were some outliers in this middle school group, considering the minimal amount of their participation during certain times of the year. Those subjects who had participated in Garden-Based nutrition education intervention, which were
combined with cooking classes, tended to have consumed more vegetables and have less fruit juice intake over time [Figure 6].

Those subjects participating in the Garden-Based nutrition education intervention program gained long-term life skills from the longer, more in depth intervention. These skills included, but were not limited to: better eating habits, improved food growing skills, increased knowledge of community supports, and an understanding of how food is grown and produced. Quantitatively, two of the participating teenagers wrote high school reports on urban agriculture and factory farming as a result of their learning about food growing idiosyncrasies in an urban environment. As their involvement time has progressed, more and more teen participants have discussed their concerns over the environment and our lack of healthy food access in the neighborhood. This has driven them to learn more about how the work done in the garden programs improves their local environment and their food sources in the future.

**Responses by Youth to Both Written/Oral Interviews/Sustainability**

Acquisition of written and oral interviews data from approximately ten participants annually, concerning the question, “What have you learned from participation in this project/program?” indicated the following: Those who cared for the garden over the past three seasons indicated they had learned about independent food growing, healthier nutrition, become more aware of healthy vs. unhealthy food options, and admitted that they feel more empowered to make healthier changes in both their lifestyles and in their community. Some of the examples were demonstrated through the program participants’ interest in cooking and some nutrition education, as well as their dedication to being
outside and helping improve the environment through both urban farming and planting trees, for example.

When queried, “What will you do differently as a result of participating in South Boston Grows?,” approximately ten youth participants responded that they would: continue volunteering to make people aware of healthy eating and living; aim to make healthier choices when purchasing and preparing food; and, look into growing food at home to sustain urban food production. When asked, “What they would like to see done differently in the future to improve the project/program,” the same amount responded that they would: like to see people working harder when at the garden; like to see a wider variety of edible plants growing; and, like to be able to impact how the program can be improved in the future. Thus, those involved are continuously working to engage the participants in Garden-Based nutrition education intervention, as well as environmental education, when appropriate. When asked, “What is your opinion and/or perception of the improved neighborhood green space, as a result of the garden being initiated,” they participants responded that they now see health in a different way, and understand that anyone can grow food. Taken together, these participant responses indicated that the participants in this study understand the importance of both growing food independently, and improving neighborhood green space by such gardening activities.

Depending on the season of the year, gardening during the late spring and early fall, and cooking during the winter and early spring, while combining both with nutrition education, the middle school youth [N=29] seemed much more likely to consume greens than the teens group [N=35], who had not participated in any intervention to try the foods that they identified as being grown in the local gardens, and in Massachusetts. This is
represented in the Figures, where both salad greens and other greens’ consumption was measured. This is shown through the participant’s consumption of the best vegetables that grew in the garden. (Appendix G).

Responses by Youth to Both Written/Oral Interviews/Knowledge

The same participant’s were given a variety of oral questions to answer. Among the questions included, “Has your knowledge of growing edible plants increased as a result of participating in this project/program?” All responses indicated that participants have increased their knowledge of both gardening and farming; including providing information about what they learned about how to grow and prepare food that was traditionally grown. In addition, one participant noted that she has also become much more aware of the issues of agricultural disparities, and the unfairness associated with immigrant farming pressures. She noted that this is an example our country’s oppression, and that she is more interested in growing her own food after learning about the trials and tribulations associated with this industry. Other realizations from the youth participants have also been discussed, from how urban farming can fight hunger, to how it is important to utilize and protect open space, especially in at-risk urban neighborhoods.

Responses by Youth to Both Written/Oral Interviews/Benefits

The final question in the open-ended interview section asked each participant, “Did you/Do you experience greater access and exposure to fresh produce as a result of participating in this project/program?” The approximately ten answers indicated that youth participating in the program have certainly improved access and exposure to fresh produce, and helped their families and neighbors to improve access to these foods, as well. In addition, they also noted that they have improved their knowledge of nutrition
related to both urban farming, gardening, and other food related health benefits. Nutrition Education and particularly Garden-Based nutrition education interventions are constantly going on with South Boston Grows programming. The Researcher/Program Manager will continue to evaluate the programming for both success and to gain knowledge about how to implement necessary programmatic improvements.

**Responses by Youth to Both Written/Oral Interviews/Garden Food Distribution**

Each year since the inception of South Boston Grows, different foods were grown, depending on seed/plant donations, seeds that were saved, and/or crops that came up as volunteers or those that neighbors chose to plant the following year. The main flagship site that grew food in 2009, 2010, and had its best seasons from 2011-2013, was an open space with not much security, thus it was difficult to measure exactly how much food was grown. However, it is obvious from viewing the 2011 food distribution chart (Appendix G), primarily tracked by a teen worker throughout the summer, that the green leafy vegetables, herbs, and those crops that were unfamiliar to many, had the highest yield. Being located in a housing development, on church property, and in a very high traffic area, the flagship site was visited a number of times a day by people in need of food. As the mission of South Boston Grows includes providing improved access to healthy and fresh produce, this was certainly accepted, however, going forward, it would be preferable to determine a way to streamline the distribution, and educate neighbors that if they are interested in a significant amount of produce, than they must make an effort to be involved in the food production, and be transparent about what foods they are taking. Some limitations to tracking the produce both grown and distributed include the fact that
a young teen farmer is in charge of the record keeping, and may need more training on accuracy. Training and development is a goal for future seasons.

Appendix G illustrates foods that were distributed throughout the 2011 growing season, as tracked by a teen worker throughout the summer. This food was distributed to at least five senior feeding programs throughout South Boston and Dorchester, Massachusetts, on a weekly basis. In addition, food was distributed to the South Boston Community Health Center Food Pantry, some local youth feeding venues, and given away twice weekly to neighborhood people, who stopped by the garden during food distribution times. Perhaps, with more outreach and communication with the neighbors throughout the winter months, there will be more understanding among the community members about how to become involved in food production in the garden, or in their homes, and how it is distributed to persons in the area.
CHAPTER V
DISCUSSION

The South Boston Grows Garden-Based nutrition education intervention program demonstrated that there are a number of ways to provide nutrition education and encourage healthy eating habits to participants in local gardening projects. By engaging youth and adults of all ages in this type of garden-based community nutrition intervention programming, a community can build upon already existing assets, and utilize local resources to improve eating habits of the community. There are a number of benefits to community garden programming and nutrition intervention (5, 22-24). In addition to improving local green space, and engaging all ages of persons in the community in urban food growing, the overall community can be improved. It is evident in both the literature review for this study, and in the explanation of South Boston Grows itself, that participants are brought together by growing, preparing, and sharing food from their local community gardens (13, 22-36).

There is, however, quite a bit more work to be done to better engage the overall community in this type of beneficial programming. When the garden program started, it was led by a group of about 10 adults, who had a variety of different resources and expertise. These 10 adults were the primary caretakers and workers on the project, leading the youth participants in their footsteps. The youth involved were a great asset, as they were paid through non-profit and city funding during the summertime, but this program only lasted for about 7-10 weeks. Thus, the rest of the growing season’s work relied upon volunteer youth, but mainly those involved adults, who were also working other jobs, and had other commitments. Going forward with these community gardens,
there are plans to engage more adults in the care and maintenance of the gardens. However, due to the nature of the program and the location of the gardens, it is a challenge to engage some of the local adults. Many people in the areas surrounding the garden are living in housing developments, may be disabled, and may feel an overall sense of entitlement, which is apparent based on the amount of food that is taken from the gardens without their participation, even though a great deal was still distributed to local residents (Appendix G). As time goes on, more gardens are built, and larger partnerships are made, these barriers should be more controlled or overcome.

**Incentives/Benefits of South Boston Grows**

Participants involved in the South Boston Grows project benefitted from a variety of incentives, including but not limited to: access and exposure to fresh produce, (through distribution of food grown in the garden, as well as other food gleaning programs to which South Boston Grows has direct connections); exercise; community engagement; and, education on Diabetes prevention techniques. When extra plants were available, South Boston Grows also provided them to participants in the program, along with safe soil, and when possible, a container in order to grow food at home.

Upon orienting the youth leaders, who started the program in 2010, for the 2013 season, they were familiar with most of the plants. Those that were new to the garden but still resembled another plant were also recognized as “cousins or similar species” of one another. Thus, the participants are increasingly familiar with the food they grow; so much so, that they can often identify the type of plant it is, even if they had never seen it before. Some can also identify the edible weeds. Produce, specifically vegetable intake has also significantly improved in participants over the years. The Results section of this paper
shows that participants in the program have been able to improve their intake of produce
grown in the garden by not only being exposed to it frequently, but also, because they
actually enjoy the different vegetables, herbs, and sometimes, fruit.

After almost five years, South Boston Grows has proven to be a sustainable Garden-
Based nutrition education intervention. With such a focus on healthy food growing and
preparation, it is nearly impossible for those involved to avoid at least trying new fruits
and vegetables, especially produce grown in the gardens. Each year, new plant types are
planted on more and more space, and increasing numbers of participants become
involved. By continuing to educate the participants and their families, South Boston
Grows can sustain positive impacts on the community from these programs in years to
come.

**Ethnographic and Anecdotal Data Collected Over Time**

Ethnographic observations showed that, depending on the individual/family need,
many of the participants were interested in receiving produce, especially when they came
from large families with limited resources. This program has now been in existence over
three growing seasons, it is obvious that growing food has made an impact on both youth
and their families engaging in this Garden-Based nutrition education intervention. As
stated, the press has noticed its impact by focusing stories on youth and community food
production and preparation. The Boston Globe featured many articles on the importance
of youth not just growing food, but also learning how to prepare healthy food with which
they may not have been familiar. It became apparent in this project that food can cross all
cultural barriers by engaging people of different cultures in the food growth and
preparation, and thus this program created an additional channel for inter-cultural communication and relations.

Additionally, gardening has a unique way of healing barriers that people, especially teens may experience. The group that works in the garden each summer is quite diverse. Even though they were from different ages, different cultures, and even different languages spoken, they were all expected to do the same work. Gardening together allows the youth (and adults when applicable) to work together on a common project, to which they can all relate, for the benefit of the group. In the end of the 2009 - 2010 school year, about 7 or 8 students from the high school autistic class spent time at the South Boston Grows garden weekly for the month of May, learning about gardening and nutrition, and being exposed to programming that helped them improve social engagement, while being exposed to Garden-Based nutrition education. This is an additional, unique benefit of the South Boston Grows programming.

**Study Limitations**

Even though the majority of the participants did complete a pre- and post-test, not all study participants did, due to the lack of study manpower to insure collection of all participants’ information in the study. In addition, there were literacy or language barriers, and South Boston Grows staffing was too limited during busy times to assist people with language barriers with the completion of their survey information. The program hired more personnel support to enable better data collection in the summer of 2011 and in future seasons, which allowed some increase in the completion of surveys from the summer teen participant program. Most study participants were, however, involved in the ongoing participants’ interviews in both the spring and fall of 2011. From
experience, this researcher learned that the interviews may be the most accurate way to collect data and information on determining program benefits to the participants.

Anecdotal observation data showed that when one fills out a survey, he/she may be trying to choose the “correct” answer rather than the most accurate answer, which might skew the data. This was truer for the questions about how many fruits and vegetables they are eating, rather than the questions about what is grown in this climate. This was affected by the fact that many study participants may have spent the significant part of their childhood in Caribbean climates, where tropical fruits and veggies (pineapple, avocado, and mango) grow plentifully. Thus, knowing these are healthy, and that they grow at their original “home,” some interesting responses were generated from these surveys [including some participants hoping to grow citrus and mango trees at their current home, which can in fact be grown indoors in New England]. And last but not least, a limitation may include the data entry. If an intern or student was entering the data and make a mistake, this can cause a problem in data analysis as well. Thus, it is important to look over the surveys and their data entry, to ensure accuracy across the completed data analysis.

Additional limitations to the South Boston Grows garden program included bureaucracy related to obtaining space from city, state, and governmental organizations, to expand the garden sizes; this can be a long and daunting process. In addition, the quality of the soil and the possibility that there can be ongoing soil contamination in certain urban areas was also a limitation. Limitations related to crop security should also be mentioned. As stated previously, while produce grown has been tracked over time, it is a challenge to determine the accuracy of this measurement, because many of the
garden spaces are wide open, unprotected, and unattended, so people in the neighborhood can take produce when they want.

Cats and rats are more of a problem in the garden than rabbits and squirrels, but they seem to co-exist, and the cats actually help keep the rats away. There is discussion of continuing to maintain a sign at each garden that asks people passing by to write down what they take from the garden, so that the produce grown in the garden can be more accurately tracked. This sign will continue to be posted in languages necessary to communicate with the neighbors. There may be some concern that they will be judged for admitting they took the produce, but by outreaching to neighbors and communicating, this barrier can be reduced. With the help of creative youth ideas, a plan will continue to be put in place to avoid as much theft and produce wasted from the garden. There is of course the concern that food is taken and not used. A great deal of outreach in the community will continue to be conducted by youth in the community, while overseen by the program coordinator, over the winter months, to determine a plan for more work investment from the community, and an overall understanding about how the produce is distributed, to maximize food production in this urban neighborhood of need.

And finally, it is possible, that data obtained from Social Science Research and Evaluation in this study may not be as usable as desired; depending on the test, the time frame, and whether or not the two study schedules coincided (65, 66). The design was described as quasi-experimental because a set of control group data was not available.
CHAPTER VI
CONCLUSIONS

The type of Garden-Based nutrition education intervention in this study demonstrated positive results on the participants by being effective in engaging community members of all ages in both growing and preparing their own healthy food locally. As many other studies have shown over the years, there are a number of benefits to this type of nutrition intervention (9, 10, 13, 22-36). And, researchers have also shown that these interventions are effective in urban neighborhoods, where there is an obvious lack of diverse healthy food access, overall (14-16). In addition to providing food access, these types of programs can increase participants’ physical activity, as well as lessen the socioeconomic barriers between different groups of people (9, 10, 15, 16). There have been a number of different people involved in this program, from youth to adults, and many speak various different languages. The beauty of community gardening is that while there does need to be some communication, actual hands on gardening does not necessarily require direct verbal communication. People of different cultures may have different knowledge and experience to share, which leads to an overall increase in food production in small urban farming spaces. The results from the South Boston Grows Garden-Based nutrition education intervention makes this increase in vegetable consumption a positive outcome of the study.

In addition to the benefits of gardening on the immediate community, the overall mission of South Boston Grows continues to be fostered by providing an increase in access and exposure to healthy food in an urban area of need. This program will continue to be evaluated and expanded to improve its effectiveness in the community and beyond.
Over time, with the expansion of staffing and improved experience, a standard South Boston Grows curriculum will continue to be written, edited as appropriate, and distributed, to be used as a way to standardize the ongoing work of the SBG program. As a program that involves both nutrition education and urban agriculture interventions, the program is very lucky to have the interactions developed with local businesses and community organizations to support the program’s growth and sustainability.

**Conclusion Applications**

The result of the South Boston Grows program after five years and subsequently, the study/evaluation includes a toolkit outlining the steps necessary to run a successful community-wide Garden-Based nutrition education intervention that will aim to identify resources for people to use to start a similar program in their neighborhoods. The focus of this toolkit will be initiating gardens and community farms in low-income neighborhoods, specifically those with high percentages of community members living in housing developments. This toolkit will include information concerning: (1) how to communicate with community members, policy makers, and other stakeholders about land acquisition; (2) what supplies are needed to initiate a cost-efficient community garden; and, (3) the best approaches to keep the audience engaged in nutrition education in the garden during all seasons. The toolkit will also outline the most effective forms of Garden-Based nutrition education interventions, which were tested as part of the current program’s; as well as, the study’s evaluation, so that others interested in pursuing a similar program are as aware of the best methods that emerged for Garden-Based nutrition education interventions.
Some examples of learning materials that have come out of the Garden-Based nutrition education intervention include a cookbook utilizing more than a dozen produce items grown in the South Boston Grows urban gardens and farms. Songs and a variety of artwork have also been created over the five years that the program has been in existence. Approximately a dozen teenagers participate in the program during the summer while ten-twelve school and after school programs participate in the programming throughout the spring and fall.

Additionally, the results from the evaluations and interviews will be highlighted in an effort to give others interested in starting a similar program the information necessary to: initiate this type of Garden-Based nutrition education intervention; improve upon their own work and the work of others in this field; solicit funding for this form of nutrition education; and ultimately, ensure that Garden-Based nutrition education interventions are making others aware and informed that they may be sustainable in community programs, schools, churches, and beyond, as an effective form of nutrition education. General, anecdotal data over time has shown that most of the older youth participating in the program gain a sense of hard work and dedication to a long-term goal while younger students who participate in the program have access to a unique outdoor learning experience when they participate in this Garden-Based nutrition education intervention. These experiences may lead participants to develop an interest in working in the environmental, health, and even policy field related to the aforementioned. This study can also support and provide more information to researchers about even positive effects that this type of intervention may have on participants in Garden-Based nutrition education.
REFERENCES


22. Lautenschlager L, Smith C. Beliefs, knowledge, and values held by inner-city youth about gardening, nutrition, and cooking. *Agriculture Human Values.* 2007;24:245-258.


31. Summary of Mixed Green Veggie Vote Analysis; C.S. Mott Group for Sustainable Food Systems, Michigan State University and Spectrum Health; Academic Year 2005-06.


APPENDICES
Appendix Ai: Flyer for 2011 – 2013
Appendix Ai:- **Flyer for 2011 – 2013**

The mission of South Boston Grows is to educate youth and families about growing and preparing their own food all the while providing access and exposure to healthy nutrition and fresh produce through sustainable agriculture by facilitating the development of gardens and farms for food production and nutrition education, community development, and the promotion of a healthy environment in an urban area.

HELP US GROW….

- Help us ALL season long from 2-5 pm @70 Devine Way Garden/ Summer: Tuesdays and Thursdays 10-2

- Help us Fall and Spring: Tuesdays and Wednesdays from 6-7 pm @ the George Berlandi Garden/ Summer: Tuesdays and Wednesdays 12:30-2

- Help us Fall and Spring: Mondays and Wednesdays from 5/6-7 pm @ the West Broadway Garden/ Summer: Mondays and Wednesdays 10-2

Are you a teacher wanting to take a field trip the garden or a farm? We welcome field trips on most Tuesday or Fridays and you can be involved in the following age-appropriate activities; planting, composting, transplanting, seed starting, weeding, watering, and activities that match curriculum standards.

Questions?
Are you part of a program interested in gardening? Do you live in another part of the city? Do you want to garden closer to home? Let us know and we can direct you to the right place!
Contact: 617 939 6541 OR southbostongrows@gmail.com
Appendix Aii: **General South Boston Grows Application**
Appendix Aii: **General South Boston Grows Application**

**Other forms may be used in the case of collaborative programming**

Name:

Phone Number and Email (optional):

Emergency Contact (mom, dad, grandma, grandpa, guardian):
   - Name:
   - Phone Number:

(Other) Emergency Contact (mom, dad, grandma, grandpa, guardian):
   - Name:
   - Phone Number:

Allergies:

Age: Grade: Male or Female (circle one)

Please indicate specific time(s) available to participate in the program:
Spring (before school lets out for the summer) –
Summer (when school is out for the summer) -
Fall (after school begins for the fall) -

Rules *(UPDATED each season: must read!)*
By signing below
1. I agree to follow the rules of South Boston Grows and understand that if I break the rules, I may not be able to participate in the program.
2. I agree not to share any *confidential* information about others that I learned while participating in focus groups.

________________________________________________ (Signature required)
Appendix Aiii:
Letter/Assent for adult participants or parents of students
(when applicable and parental consent is necessary):
Appendix Aiii:
Letter/Assent for adult participants or parents of students
(when applicable and parental consent is necessary):

NOT necessary for ALL applicants because Approval was given by:
BGSU HSRB and Boston Public Schools RAI

South Boston Grows – A Community and Educational Garden: A Garden-Based Education Nutrition Intervention

Dear Potential participants interested in the South Boston Grows project/program,

You and/or your child have been invited to participate in the South Boston Grows (SBG) project/program as a participant, and to participate in the study/evaluation of SBG. You and/or your child was selected to participate in this study/evaluation because you and/or your child is participating in the SBG project/program. We encourage you to read this form and ask any questions you may have before consenting and allowing you and/or your child to participate in the SBG study/evaluation. It is important to note that for anyone under the age of 18, a signature from both the participant and the guardian is needed when giving consent to allow your child to participate in the study/evaluation. If 18 or over, only the participant will need to sign, thereby giving the SBG evaluators your consent.

SBG aims to engage South Boston residents in urban land cultivation and food production. The ultimate goal of SBG is to ensure that South Boston residents not only have access to fresh and local produce but are also empowered and educated to carry out sustainable urban gardening practices for years to come. You and/or your child’s participation in this study/evaluation will help this organization to identify the positive connection between hands on nutrition education and eating habits in an effort to carry forth further project/programs that engage and support urban and educational agriculture in South Boston and beyond.

If you and/or your child sign the consent form(s), you agree to participate in the SBG Project study/evaluation. If you are under the age of 18, a consent form and signature from you and your parent/guardian is needed in addition to yours in order to participate in the study/evaluation. If 18 or over, you will need to sign in order to give consent to the SBG evaluators.

Statement of Consent from Guardian/Participant:
I, _______________________, understand that I myself, or my son/daughter, _______________________, have has agreed to participate in the SBG study/evaluation. I have been informed that his/her participation in SBG is voluntary and may be stopped at anytime. I have been informed that his/her identity will be kept strictly confidential in any reports or publications published.
Signed: _______________________ Date: ___________________________
ID #:

Note: ID #s will include the month of the participant’s birth, the participant’s middle initial and once extra random number to identify the participant so data can be coded appropriately.

Please return this form to Phoebe K. Flemming by ______________ to be involved.

This application was adapted from: The Michigan Youth Farm Stand Project's application: http://www.mottgroup.msu.edu/Portals/0/Handbook%202008.pdf (63)
Letter/Assent for youth participants; when applicable/parental consent is necessary

Approval was given by BGSU HSRB and Boston Public Schools RAI
South Boston Grows – A Community and Educational Garden
A Garden-Based Education Nutrition Intervention

Dear Potential participants interested in the South Boston Grows project/program,

You have been invited to participate in the South Boston Grows (SBG) project/program as a participant, and to participate in the study/evaluation of SBG. We encourage you to read this form and ask any questions you may have before signing and participating in the SBG study/evaluation. If you are under the age of 18, a consent form and signature from you and your parent/guardian is needed in addition to yours. Your participation in this study/evaluation will help this organization to identify the positive connection between hands on nutrition education and eating habits in an effort to carry forth further project/programs that engage and support urban and educational agriculture in South Boston and beyond.

If you sign this form, you agree to participate in the SBG Project study/evaluation. If under the age of 18, both you and your guardian will need to sign a form for consent to participate in the study/evaluation. If 18 or over, you will need to sign in order to give consent to the SBG evaluators.

The following language will be inserted here for the appropriate age groups in order ensure that this is understood by different age groups.

4th grade (and below, when applicable) - "You don't have to be in this research study. You can agree to be in the study now and change your mind later."

8th grade - "Participation in this study is entirely voluntary. You have the right to leave the study at any time."

9th - 12th grade (if necessary) - "Your participation in this study is strictly voluntary. You have the right to choose not to participate or to withdraw at any point in this study without prejudice."

If you sign this form, you agree to participate in the SBG Project study/evaluation.

Statement of Consent from Minor/Child Participant:
I, _______________________, understand that I will be a participant in the SBG Project study/evaluation to determine the benefits of garden programming. I have been informed that my participation is voluntary, and that I can stop participating at anytime. I have been informed that my privacy will be respected and kept strictly confidential.

Signed: _______________________ Date: ______________

Please return this form to Phoebe K. Flemming by ______________ to be involved.

This application was adapted from: The Michigan Youth Farm Stand Project's application: http://www.mottgroup.msu.edu/Portals/0/Handbook%202008.pdf (63)
Informed consent for South Boston Grows’ (SBG) study/evaluation on the effectiveness of community garden-based nutrition interventions

NOT necessary for ALL applicants because Approval was given by:
BGSU HSRB and Boston Public Schools RAI

Introduction: My name is Phoebe Flemming and I am a Registered Dietitian with a background in farm and garden-based education. I am the co-founder and project manager of SBG. I am a graduate student at Bowling Green State University studying the effect that garden-based nutrition interventions have on eating habits as well as the overall effect that these interventions have. Thank you for your interest in the SBG Program. You are being asked to participate in the study/evaluation of the program because you are affiliated with one of the groups that SBG is affiliated with and your input is highly valued.

Purpose: The purpose of SBG’s project/program and study/evaluation is to determine:
1. The positive benefits of improving green space in urban neighborhoods;
2. The increase in SBG participants’ knowledge of growing edible plants;
3. The relationship between farm and garden-based education nutrition interventions and participants’ eating habits;
4. The sustainability of this urban agriculture nutrition education project/program in the community so that other like programs can be continued as part of nutrition and wellness programs.

Information gathered from this study will positively affect the ability for other garden and nutrition educators to provide similar interventions in other urban communities. This study/evaluation can help to determine the SBG project/program’s strengths and weaknesses, so that future programming like it can be improved. Further, the SBG advisory board can use this study/evaluation to provide evidence that there is a positive connection between garden-based education project/programs serving as nutrition interventions in a community, and the health of the participants in these programs. The research from this study/evaluation can also be used to request additional funding from federal and state agencies, non-profit organizations, and foundations in order to expand the project/program, so that more youth and community members will be able to sustain the project/program over time.

Procedure: Starting in the spring of 2010, 1-3 weekly classes will be held at various times during the week (at the garden site) and participants will be expected to attend at least one of them. Participants may spend anywhere from 10-40 hours per month in the project/program, depending on the season. Topics included in the urban gardening workshops are; planting, composting, harvesting, garden food preparation/cooking classes, and other work related to nutrition and garden programming related to the season as stated.

Prior to participating in the study/evaluation, it will be required that the consent forms and then the pre-test are filled out. During the fall and after participating in classes for the season, participants will (a) fill out the post-test and (b) participate in focus group(s). Your consent to participate in 1-3, ½ - 1 hour focus group(s) outlining the perceived benefits and/or participant interests in the project/program means that you will be asked to participate in a group that asks questions about your participation and your thoughts and feelings about participating in the
project/program in an effort to collect data and information that will help the researcher to improve this project/program and make it easier and more fun for other participants in the future.

Please understand that project/program evaluators might observe SBG to obtain an understanding of how the project/program is run, and the style and method of interactions and communications between youth, the community, and other SBG stakeholders during the SBG project/program and study/evaluation process. The evaluator is not interested in individual behavior, but is only interested in the way the project/program is run and how it works. Thus, the evaluators will be trained and educated not to record names or any related identifying information. It is possible that you and/or your child may be asked to record personal feelings and thoughts and your perceived benefits and/or interests in the SBG project/program for program evaluation purposes.

**Voluntary nature:** Your participation is completely voluntary. You are free to withdraw at any time. You may decide to skip questions (or not do a particular task) or discontinue participation at any time without penalty. Deciding to participate or not will not affect your grades/class standing or your relationship with SBG or Bowling Green State University. By participating voluntarily in the SBG study/evaluation, you and/or your child are giving the researchers permission to ask questions and conduct interviews and observations as part of the SBG study/evaluations.

**Confidentiality/Anonymity Protection:** Your privacy will be protected to the ultimate extent allowable by law. Research records will be kept in a locked file to which only the researcher will have access, when necessary and will be kept private. The records will be kept for the amount of time required for the researcher and will be destroyed properly when this time has passed. We will not include any information that will make it in any way possible to identify you in any type of published report. Each participant will be coded using the first letter of his/her middle name and the number of the month and number of the year he/she was born.

**Risks:** There are no significant risks that will result from participating in the SBG project/program and the related research study/evaluation. You do not have to answer or participate in the discussion or any of the survey pieces if any questions make you uncomfortable during any surveys, interviews, or focus groups. We have included only questions most important for the study/evaluation in order to minimize potential questioning discomfort, and make the study/evaluation a welcoming and comfortable experience for participants.

**Contact information:** Phoebe K. Flemming is the researcher conducting this study/evaluation. Ask any questions or provide any concerns you have now. If you have questions after you have filled this form out, you may contact her at phoebekflemming@gmail.com or 617-939-6541. If you have questions or concerns regarding this study/evaluation or participation in the study/evaluation, feel uncomfortable at any time, or have concerns about your rights during your participation, please contact the following anonymously: Dr. Joe Williford, Jr. Bowling Green State University Bowling Green Ohio 43403 jwillif@bgsu.edu or call 419-372-7833. You may also contact the Chair, Human Subjects Review Board at 419-372-7716 or hrsb@bgsu.edu, if you have any questions about your rights as a participant in this research. Thank you for taking the time to be a participant in this evaluation.
I have been informed of the purposes, procedures, risks and benefits of this study. I have had the opportunity to have all my questions answered and I have been informed that my participation is completely voluntary. I agree to participate in this research. *

Participant Signature: _____________________________________

By obtaining a waiver of written consent, participants taking the survey or participating in interviews have indicated consent to participate in the study/evaluation for SBG.

*The following language will be used for the above assent forms for different age groups

4th grade (and younger when applicable) - "You don't have to be in this research study. You can agree to be in the study now and change your mind later"

8th grade - "Participation in this study is entirely voluntary. You have the right to leave the study at any time"

12th grade "Your participation in this study is strictly voluntary. You have the right to choose not to participate or to withdraw at any point in this study without prejudice"
Appendix B:

**TIMELINE:** From implementation to data collection to project presentation.
Appendix B:

**TIMELINE: From implementation to data collection to project presentation.**

**September 2009 – December 2009**
Do outreach to solicit community buy-in for educational and community gardens.

Work with Community groups to initiate garden space at 70 Devine Way and other locations in South Boston.

Build organizational structure of SBG; develop board and key volunteers.

**January-February 2010**
Program Manager/Researcher will hold community meetings to sustain the existing garden plots and to expand future urban gardening spaces.

Recruit key participants for the SBG project/program

Work with involved groups to choose edible plants vegetable for each of the raised beds. Each community group will have a say in determining what is grown.

Work on Fundraising: Identify other sources of funding: Boston Grassroots Initiative, Annie’s garden grants, Fiskars Project Orange Thumb, matching grants, fundraising events, and others TBD.

**March 2010**
Program Manager/Researcher will hold community meetings to sustain the existing garden plots and to expand future urban gardening spaces.

Plant seedlings inside in various locations.

Initiate monthly education and garden volunteer session(s).

Talk about community ownership of garden – divide up responsibilities for each part of the garden. Identify key partners in the development of garden.

Identify and secure other land for use by SBG.

Determine viability of summer work program for targeted teens.

**April - July 2010**
Continue to expand the SBG project

Recruit participants for the SBG study/evaluation

Implement viable plan for summer work group for targeted volunteer, parentally consented teens.
Disseminate and collect applications from interested youth and community groups.
Collect pre-test data

Prepare the ground and plant seeds and starter plants.

Initiate weekly education sessions with parentally consented youth and other community members.

Incorporate cooking and nutrition education sessions using produce from gardens.

**August - November 2010**
Work with community groups to care for the garden over the season.
(See list of groups involved for specific responsibilities from each)

Continue weekly education sessions including cooking and nutrition classes using produce from the gardens.

**December 2010 – February 2011**

Secure a core group of volunteers and community groups to care for garden #1 and #2

Solicit further funding sources to continue SBG for another season.

Plan and initiate garden #3 and repeat the community outreach cycle for garden #1 and #2 including but not limited to; holding community meetings, identifying community volunteers, and creating incentives for being involved in this community, educational, urban garden.

Work on Fundraising: Identify other sources of funding:

Focus on Fruits. Work with community groups to determine which fruit trees they are interested in taking care of in the community. Regardless of the fact that fruit will not bear in 1 season, this discussion will help participants to be involved in the sustainability of the program for years to come knowing that they will have fruit years from now if planted this season. Identify space for fruit trees to be planted.

Complete Interviews with those involved in the 2010 growing season in order to obtain an initial data set.

**March 2010 – April 2011**

Secure a core group of volunteers and community groups to care for garden #1 and #2

Manage current and new funding sources to continue SBG for another season.

**April - May 2011**
Collect post-test (and pre-tests when applicable) and conduct interviews

Train and educate community members on the benefits of garden-based education and help the community to sustain the SBG project

Continue community meetings and focus on the development of garden #3

**June - December 2011**
Work with community groups to care for the gardens over the season.

Implement viable plan for summer work group for targeted volunteer, parentally consented teens.

Continue weekly education sessions including cooking and nutrition classes using produce from the gardens.

Compile data, complete project, present results.

**2012-2013 and continuing through 2014**
Work with community groups to care for the gardens over the season.

Continue to implement gardens in all of the Boston Housing Development properties and engage all residents in the growing and preparation of fresh food.

Follow the same timeline for each garden as listed above to initiate, harvest and implement throughout the season with the goal of improving food access
Appendix C: Community Collaborations
Appendix C:

Community Collaborations

Groups committed to SBG:

South Boston out of school Youth Programs are the heart of SBG

- Youth Ambassadors – 12-18 year olds - http://www.search-institute.org/hc-hy/initiative/institute-healthier-community/asset/south-boston-youth-create-community-art - The summer youth program funded through Martin Luther King Scholars and ABCD in 2010 was able to sustain the garden. Cooking classes, art, literacy, and music workshops were held on-site in the hot afternoons after gardening was finished; to ensure a well-rounded food based curriculum. This program will continue in 2011 and the group will take care of the flagship garden site primarily.
- South Boston Collaborative Center http://southbostoncollaborativecenter.org/ – court ordered teens who are involved in summer farm field trip programming started to take care of garden #2 under the oversight of the SBG Program Manager in 2011.
- South Boston Basketball Academy – helped to start the flagship garden and with the help of SBG, initiated the first summer foodservice program through ESE to feed children in the neighborhood using produce from the garden.
  - In collaboration with; Round Table Inc. - 8-18 year olds - http://roundtableinc.org
- Paraclete Academy– 8-12 year olds - http://www.paraclete.org/ - has been a collaborator at the flagship garden site since the beginning of the project in 2009.
- South Boston High School Football team – helped to build raised beds at the flagship garden site in 2009.
- Neighborhood children and teens who were off during after school hours and school vacations helped fill beds, weed, etc. Most filled out applications and we have them on file.

Schools

- Condon Elementary School - This school started an outdoor classroom in the fall of 2010. SBG will be involved in the planning of the outdoor play space at the Condon Elementary School to ensure that as this gets developed that there is a space for a garden for teachers, students and the families living near by to have access to during the school day. Additionally, the City of Boston’s Grassroots Open Space Program (17) has agreed to fund initiation of a garden on Boston Housing Development property nearby and will be working with the researcher of SBG to work out the details. This is garden #3.
- Perry Elementary School – field trips from this elementary school took place in the Spring of 2010 to engage the students in the planting of the flagship garden
and future collaborations will continue. This school also has an outdoor classroom on-site where vegetables can be planted and maintained closer to the school.

- Odyssey High School – autistic class has been involved in both 2010 and 2011.
- Dever Elementary School – This nearby middle school was very interested in starting their own raised beds so SBG provided technical assistance for them to start their own garden for food growing on-site in the Fall of 2010.
- Boston Collegiate Charter School’s after school program – Starting in the Fall of 2010, 5-10 middle school aged students participated in a farming and/or cooking class related to gardening and healthy eating. This program took place most Tuesdays, Wednesdays, and Thursdays aside from days off from school and continues through the year. However, there is less participation from this group when standardized testing is taking place.
- Perkins School and other community members- The school and other associated after school programs will care for this 12, raised bed garden with support and technical assistance from SBG. This school also has an outdoor classroom on-site where vegetables can be planted and maintained closer to the school.
- Boston Green Academy will continue with programming collaborations with their in school and out of school programs

South Boston Adults/Housing Developments

- Old Colony Task Force/Mothers in the CWU program, and their children
- Mary Ellen McCormack – adults in the neighborhood were very instrumental in the care of the garden. A list of constituents is available.
- South Boston Kit Clark Elder Service Plan members – received produce from the SBG garden from the summer youth program participants. Youth Distributed produce to the South Boston sites and the researcher distributed to sites outside of South Boston that were in need of improved food access.
- D Street and West Broadway Housing Development – adults continue to participate in the new garden project in collaboration with SBG and the fiscal sponsor for this project; The South Boston Neighborhood Development Corporation.
- Bay Cove Human Services St. Vincent House Group Home; has a relatively large amount of open space for South Boston, is located within very close proximity to neighborhood church and the South Boston Community Health Center, and is comprised of South Boston residents in need of a constructive activity related to health and wellness as well as improved food access.
  - Evaluation of this program is yet to be determined.

Parent/Child programs that could be approached for future educational collaborations that focus on nutrition education and improved food access. This should happen when we have steady labor from older youth and adults.

- Julie’s Family Learning Center – mothers and their children
- South Boston Head Start – teachers and preschoolers
- WIC program – mothers and their children
- UMass Extension
o Labore/Catholic Charities – Diabetics in need of education and improved food access

Collaborations for extended food production outside of urban gardening (fruit/nuts)

o Fruit and Nut tree planting space
  • 7 Roxbury Russet Apple trees are planted in South Boston as of June, 2011. As of 2013, 49 trees were planted with a collaborating group called Southie Trees.
  • South Boston Grows continues to work with the Southie Trees Organization to implement all of the programming associated with fruit tree harvesting as they mature.
Appendix D: Curriculum resources include the following curricula targeted to the respective age groups and includes adaptations of this curriculum, when necessary.
Appendix D: **Curriculum will include the following curricula targeted to the respective age groups and will also include adaptations of this curriculum, when necessary**

**ADULTS AND OLDER YOUTH:**
1. The Food Project Manuals (55)
   a. Academic Year and Summer Program (55)
   b. Urban Growing Guide (4)
   c. French Fries in the Food System (56)
   d. Growing Together (57)

The above can be accessed at [http://thefoodproject.org/books-manuals](http://thefoodproject.org/books-manuals)

2. National Farmers Union Youth Curriculum: Grades 9-12 (58)

**ELEMENTARY through HIGH SCHOOL AGED YOUTH:**
1. A Growing Relationship: The School Garden, Classroom, and Organic Farm (59)
2. Nourishlife.org – a media-based educational intervention focused on our food system (60)
3. National Farmers Union Youth Curriculum for all ages (61)
4. The Future of Food. (62)
5. Food Inc (63)
6. Boston Natural Areas Network’s Students Learning through urban gardening activities (64)

**PRESCHOOL AGED YOUTH:**
The Farm-Based Education Association’s DataBarn (12). Accessed via the following link - [http://www.farmbasededucation.org/page/the-fbea-databarn](http://www.farmbasededucation.org/page/the-fbea-databarn) - Under “Education” tab, choose “Preschool Gardening Lesson Plan”

Topics covered in the above curriculum are focused on important issues related to the growing season, food access, hunger, building community relationship, cultural competency, and other topics that can be covered through Garden-Based Education. The researcher will choose specific topics related to nutrition, food access, and urban agriculture in an effort to meet the mission of SBG community and educational garden which is “to ensure that South Boston residents not only have access to fresh and local produce but are also empowered and educated to carry out sustainable urban gardening practices for years to come. This organization will identify the positive connection between hands on nutrition education and eating habits in an effort to carry forth further programs that engage and support urban and educational agriculture in South Boston and beyond.”
Appendix E:
Survey Questions (to be attached to application)
Appendix E:
Survey Questions (to be attached to application)
These questions will be directed to individual participants with the exception of participants under the age of 10 years old. In the event that data is needed from participants under the age of 10, their parents or guardians will be asked to answer the questions on behalf of their children.

1. Name 3 fruits or vegetables you can grow in a small garden in the Eastern Massachusetts area.
   (1) _______________________, (2)_________________________, (3)__________________________

2. How likely are you to eat any of the fruits or vegetables you named above? (circle one)
   1. (1) Not At All;  (2) Not Very Likely;    (3) Somewhat Likely;    (4)  Most Likely;   (5) Very Likely
   2. (1) Not At All;  (2) Not Very Likely;    (3) Somewhat Likely;    (4)  Most Likely;   (5) Very Likely
   3. (1) Not At All;  (2) Not Very Likely;    (3) Somewhat Likely;    (4)  Most Likely;   (5) Very Likely

3. a. During the past 7 days, how many times did you eat fruit or drink 100% fruit juices? (Do not count punch, Kool-Aid, sports drinks, or other fruit-flavored drinks.) (circle one)
   • I did not eat fruit or drink 100% fruit juice during the past 7 days;
   • 1 to 3 times during the past 7 days;
   • 4 to 6 times during the past 7 days;
   • 1 time per day;
   • 2 times per day;
   • 3 times per day;
   • 4 or more times per day.

b. During the past 7 days, how many times did you eat green salad (circle one)
   • I did not eat green salad during the past 7 days
   • 1 to 3 times during the past 7 days
   • 4 to 6 times during the past 7 days
   • 1 time per day
   • 2 times per day
   • 3 times per day
   • 4 or more times per day

c. During the past 7 days, how many times did you eat other vegetables such as carrots, peas, or broccoli? (Do not count green salad)
   • I did not eat other vegetables during the past 7 days
   • 1 to 3 times during the past 7 days
   • 4 to 6 times during the past 7 days
   • 1 time per day
   • 2 times per day
   • 3 times per day
   • 4 or more times per day

d. During the past 7 days, how many times did you eat other vegetables such as kale, collard greens, beet greens or other greens? (Do not count green salad)
   • I did not eat other vegetables during the past 7 days
   • 1 to 3 times during the past 7 days
   • 4 to 6 times during the past 7 days
   • 1 time per day
   • 2 times per day
   • 3 times per day
   • 4 or more times per day

e. During the past 7 days, how many times did you eat other vegetables such as tomatoes, squash, or cucumbers? (Do not count green salad)
   • I did not eat other vegetables during the past 7 days
   • 1 to 3 times during the past 7 days
   • 4 to 6 times during the past 7 days
   • 1 time per day
   • 2 times per day
   • 3 times per day
   • 4 or more times per day.
f. During the past 7 days, how many times did you eat other vegetables that you never tried before? (Do not count green salad)
   • I did not eat other vegetables during the past 7 days;
   • 1 to 3 times during the past 7 days;
   • 4 to 6 times during the past 7 days;
   • 1 time per day; 2 times per day;
   • 3 times per day;
   • 4 or more times per day.

For all participants who do not fill out a pre-test prior to participation in the project/program and study/evaluation, the following question will be added to questions 3a-3f: “Is this more or less than you would have consumed or eaten prior to participating in SBG?”

4. How active have you been in SBG?
   • Not at all active
   • Not very active
   • Somewhat active
   • Mostly active
   • Very active

5. Please check how much time you spent working with SBG
   • Less than 1 day
   • 1-5 Days
   • 6-10 Days
   • 11 days or more

6. What school do you attend? Please circle one or "none of the above" if you go to a school that is not listed.
   • Young Achievers K-8
   • Hennigan Elementary School
   • Edwards Middle School
   • South Boston Ed Complex (Monument, Excel, or Odyssey)
   • Dorchester Ed Complex (Dorchester Academy, Tech Boston, or Upper Academy)
   • Fenway High School
   • Boston Arts Academy High School
   • None of the above

This survey was created/adapted from the Youth Risk Behavior Surveillance System, Illinois Fresh From the Farm, and Michigan Youth Farm Stand Project surveys and was created and will be implemented in collaboration Scott Formica from Social Science Research and Evaluation in Burlington, Massachusetts (13,34,35,66,70,71)

Going forward, we will make sure to document schools that youth attend in an effort to make curriculum connections
Appendix F: Interview questions to address knowledge and behavior of the program
Appendix F:
Interview questions to address knowledge and behavior of the program
- This will be the beginning of the 5th growing season for South Boston Grows.

“Did the participant's knowledge of growing edible plants increase as a result of participating in this project/program?”

“Do participants experience greater access and exposure to fresh produce as a result of participating in this project/program?,”

And questions to address sustainability of the project/program

"What have you learned from participation in the project/program?", "What will you do differently as a result of participating in the project/program?",

"What would you like to see done differently in the future to improve the project/program?,"

“What is your opinion and/or perception of the improved green space as a result of the garden being initiated."
Appendix G

The average amount of produce distributed in the most productive years from an average 2000-3000 square foot urban garden

<table>
<thead>
<tr>
<th>Vegetable</th>
<th>Measured in Plastic Shopping Bags</th>
<th>2011</th>
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<tbody>
<tr>
<td></td>
<td>1.00</td>
<td>1.50</td>
</tr>
<tr>
<td>Squash</td>
<td>1.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Beets</td>
<td>1.00</td>
<td>2.00</td>
</tr>
<tr>
<td>Lettuce</td>
<td>4.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Peas</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Tomatoes</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>oregano &amp; Basil</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Turnips</td>
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<td>2.00</td>
</tr>
<tr>
<td>Collard</td>
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<td></td>
</tr>
<tr>
<td>Greens</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Kohlrabi</td>
<td>5.00</td>
<td></td>
</tr>
<tr>
<td>Beans</td>
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<td>4.00</td>
</tr>
<tr>
<td>Kale</td>
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<td>1.00</td>
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<tr>
<td>Chard</td>
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<td>Zucchini</td>
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<td>1.00</td>
</tr>
<tr>
<td>Cucumber</td>
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<td>1.00</td>
</tr>
<tr>
<td>Beet greens</td>
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<td>1.00</td>
</tr>
<tr>
<td>Eggplant</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Peppers</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Potatoes</td>
<td>2.00</td>
<td></td>
</tr>
<tr>
<td>Radishes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Broccoli</td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Arugula</td>
<td></td>
<td>2.00</td>
</tr>
</tbody>
</table>
Appendix H: Extended Information On Figures 1-6
Appendix H

Spring 2010 Devine Way participants right as one of the first seasons started: How often was salad consumed in the last 7 days?
Average = 1.615

Summer 2010 Youth Ambassadors involved in 1st year of SBG: How often was salad consumed in the last 7 days?
Average = 2.056

Fall 2010 (early) Bccst students before participation in garden: How often was salad consumed in the last 7 days?
Average = 1.33

Fall 2010 Bccst students involved in garden, cooking, and nutrition education: How often was salad consumed in the last 7 days?
Average = 2.5

Winter 2010 Bccst students who saw garden and harvested but no other nutrition education: How often was salad consumed in the last 7 days?
Average = 1

Winter 2010 Bccst students involved in cooking, garden, and nutrition education: How often was salad consumed in the last 7 days?
Average = 4.11

Spring 2011 Bccst students involved in cooking, garden, and nutrition education: How often was salad consumed in the last 7 days?
Average = 2

May 2012 West Broadway gardening team: How often was salad consumed in the last 7 days?
Average = 4.5

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>1</td>
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</tr>
<tr>
<td>2</td>
<td>1-3 times within the last 7 days</td>
</tr>
<tr>
<td>3</td>
<td>4-6 times within the last 7 days</td>
</tr>
<tr>
<td>4</td>
<td>1 time per day</td>
</tr>
<tr>
<td>5</td>
<td>2 times per day</td>
</tr>
<tr>
<td>6</td>
<td>3 times per day</td>
</tr>
<tr>
<td>7</td>
<td>4 or more times per day</td>
</tr>
</tbody>
</table>
Spring 2010 Devine Way participants right as one of the first seasons started: How often were other vegetables (carrots, peas, broccoli) consumed in the last 7 days?

Average = 2.083

Summer 2010 Youth Ambassadors involved in 1st year of SBG: How often were other vegetables (carrots, peas, broccoli) consumed in the last 7 days?

Average = 2.867

Fall 2010 (early) Bccst students before participation in garden: How often were other vegetables (carrots, peas, broccoli) consumed in the last 7 days?

Average = 2.22

Fall 2010 Bccst students involved in garden, cooking, and nutrition education: How often were other vegetables (carrots, peas, broccoli) consumed in the last 7 days?

Average = 3.25

Fall 2010 Bccst students who saw garden and harvested but no other nutrition education: How often were other vegetables (carrots, peas, broccoli) consumed in the last 7 days?

Average = 4.33

Winter 2010 Bccst students involved in cooking, garden, and nutrition education: How often were other vegetables (carrots, peas, broccoli) consumed in the last 7 days?

Average = 4.22

Spring 2011 Bccst students involved in cooking, garden, and nutrition education: How often were other vegetables (carrots, peas, broccoli) consumed in the last 7 days?

Average = 4.8

Average = 1 (Outlier: only 1 survey back)

May 2012 West Broadway gardening team: How often were other vegetables (carrots, peas, broccoli) consumed in the last 7 days?

Average = 4.8

 Rankings:

1. 1 did not eat --- in the last 7 days
2. 1-3 times within the last 7 days
3. 4-6 times within the last 7 days
4. 1 time per day
5. 2 times per day
6. 3 times per day
7. 4 or more times per day
Spring 2010 Devine Way participants right as one of the first seasons started: How often were other vegetables (kale, collards, beet greens) consumed in the last 7 days?

Average = 1.538

Summer 2010 Youth Ambassadors involved in 1st year of SBG: How often were other vegetables (kale, collards, beet greens) consumed in the last 7 days?

Average = 2.4

Fall 2010 (early) Bccst students before participation in garden: How often were other vegetables (kale, collards, beet greens) consumed in the last 7 days?

Average = 1.33

Fall 2010 Bccst students involved in garden, cooking, and nutrition education: How often were other vegetables (kale, collards, beet greens) consumed in the last 7 days?

Average = 2

Winter 2010 Bccst students who saw garden and harvested but no other nutrition education: How often were other vegetables (kale, collards, beet greens) consumed in the last 7 days?

Average = 4.5

Winter 2010 Bccst students involved in cooking, garden, and nutrition education: How often were other vegetables (kale, collards, beet greens) consumed in the last 7 days?

Average = 3.33

Spring 2011 Bccst students involved in cooking, garden, and nutrition education: How often were other vegetables (kale, collards, beet greens) consumed in the last 7 days?

Average = 1

May 2012 West Broadway gardening team: How often were other vegetables (kale, collards, beet greens) consumed in the last 7 days?

Average = 1.75

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
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<tbody>
<tr>
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<td>I did not eat --- in the last 7 days</td>
</tr>
<tr>
<td>2</td>
<td>1-3 times within the last 7 days</td>
</tr>
<tr>
<td>3</td>
<td>4-6 times within the last 7 days</td>
</tr>
<tr>
<td>4</td>
<td>1 time per day</td>
</tr>
<tr>
<td>5</td>
<td>2 times per day</td>
</tr>
<tr>
<td>6</td>
<td>3 times per day</td>
</tr>
<tr>
<td>7</td>
<td>4 or more times per day</td>
</tr>
</tbody>
</table>
Spring 2010 Devine Way participants right as one of the first seasons started: How often were other vegetables (tomato, squash, cuke) consumed in the last 7 days?

Average = 1.5

Summer 2010 Youth Ambassadors involved in 1st year of SBG: How often were other vegetables (tomato, squash, cuke) consumed in the last 7 days?

Average = 2.133

Fall 2010 (early) Bccst students before participation in garden: How often were other vegetables (tomato, squash, cuke) consumed in the last 7 days?

Average = 1.556

Fall 2010 Bccst students involved in garden, cooking, and nutrition education: How often were other vegetables (tomato, squash, cuke) consumed in the last 7 days?

Average = 2.14

Winter 2010 Bccst students who saw garden and harvested but no other nutrition education: How often were other vegetables (tomato, squash, cuke) consumed in the last 7 days?

Average = 5.33

Winter 2010 Bccst students involved in cooking, garden, and nutrition education: How often were other vegetables (tomato, squash, cuke) consumed in the last 7 days?

Average = 2.22

Spring 2011 Bccst students involved in cooking, garden, and nutrition education: How often were other vegetables (tomato, squash, cuke) consumed in the last 7 days?

Average = 4

May 2012 West Broadway gardening team: How often were other vegetables (tomato, squash, cuke) consumed in the last 7 days?

Average = 2.75

<table>
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<th>Frequency</th>
<th>Description</th>
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<td>1</td>
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</tr>
<tr>
<td>2</td>
<td>1-3 times within the last 7 days</td>
</tr>
<tr>
<td>3</td>
<td>4-6 times within the last 7 days</td>
</tr>
<tr>
<td>4</td>
<td>1 time per day</td>
</tr>
<tr>
<td>5</td>
<td>2 times per day</td>
</tr>
<tr>
<td>6</td>
<td>3 times per day</td>
</tr>
<tr>
<td>7</td>
<td>4 or more times per day</td>
</tr>
</tbody>
</table>
Spring 2010 Devine Way participants right as one of the first seasons started: How often have you tried a new vegetable (do not include green salad) in the last 7 days?

Average = 1.636

Summer 2010 Youth Ambassadors involved in 1st year of SBG: How often have you tried a new vegetable (do not include green salad) in the last 7 days?

Average = 2.083

Fall 2010 (early) Bccst students before participation in garden: How often have you tried a new vegetable (do not include green salad) in the last 7 days?

Average = 1.83

Fall 2010 Bccst students involved in garden, cooking, and nutrition education: How often have you tried a new vegetable (do not include green salad) in the last 7 days?

Average = 1.857

Winter 2010 Bccst students who saw garden and harvested but no other nutrition education: How often have you tried a new vegetable (do not include green salad) in the last 7 days?

Average = 1

Winter 2010 Bccst students involved in cooking, garden, and nutrition education: How often have you tried a new vegetable (do not include green salad) in the last 7 days?

Average = 2

Spring 2011 Bccst students involved in cooking, garden, and nutrition education: How often have you tried a new vegetable (do not include green salad) in the last 7 days?

Average = 2

May 2012 West Broadway gardening team: How often have you tried a new vegetable (do not include green salad) in the last 7 days?

Average = 3.25

1 1 did not eat --- in the last 7 days
2 1-3 times within the last 7 days
3 4-6 times within the last 7 days
4 1 time per day
5 2 times per day
6 3 times per day
7 4 or more times per day
Appendix G
Appendix I

Key:
1. I did not eat -- in the last 7 days
2. I ate -- 1-3 times within the last 7 days
3. I ate -- 4-6 times within the last 7 days
4. I ate -- 1 time within the last 7 days
5. I ate -- 2 times within the last 7 days
6. I ate -- 3 times within the last 7 days
7. I ate -- 4 times within the last 7 days
<table>
<thead>
<tr>
<th>How Often was salad consumed in the 7 days</th>
<th>likeliness</th>
<th></th>
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<tbody>
<tr>
<td>Spring 2010 Devine Way Participants prior to GBE</td>
<td>1.62</td>
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</tr>
<tr>
<td>Summer 2010 Teen Youth Participants involved in GBE &amp; Cooking for 1 year or more</td>
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<tr>
<td>Fall 2010 Middle School/BCCS+ Participants prior to GBE</td>
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<tr>
<td>Fall 2010 Middle School/BCCS+ Participants involved in GBE &amp; Cooking</td>
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<td></td>
</tr>
<tr>
<td>Winter 2010 Middle School/BCCS+ Participants who saw garden but no other GBE</td>
<td>1.00</td>
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<tr>
<td>Winter 2010 Middle School/BCCS+ Participants involved in GBE &amp; Cooking</td>
<td>4.11</td>
<td>only 1 person responded</td>
</tr>
<tr>
<td>Spring 2011 Middle School/BCCS+ involved in GBE &amp; Cooking</td>
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</tr>
<tr>
<td>Spring/Summer 2012 West Broadway Participants involved in GBE &amp; Cooking</td>
<td>4.50</td>
<td></td>
</tr>
</tbody>
</table>
How Often were other vegetables (carrots, peas, broccoli) consumed in the 7 days

- Spring 2010 Devine Way Participants prior to GBE: 2.08
- Summer 2010 Teen Youth Participants involved in GBE & Cooking for 1 year or more: 2.87
- Fall 2010 Middle School/BCCS+ Participants prior to GBE: 2.22
- Fall 2010 Middle School/BCCS+ Participants involved in GBE & Cooking: 3.25
- Winter 2010 Middle School/BCCS+ Participants who saw garden but no other GBE: 4.33
- Winter 2010 Middle School/BCCS+ Participants involved in GBE & Cooking: 4.22
- Spring 2011 Middle School/BCCS+ involved in GBE & Cooking: 1.00
- Spring/Summer 2012 West Broadway Participants involved in GBE & Cooking: 4.80

**Key:**

1. I did not eat -- in the last 7 days
2. I ate -- 1-3 times within the last 7 days
3. I ate -- 4-6 times within the last 7 days
4. I ate -- 1 time within the last 7 days
5. I ate -- 2 times within the last 7 days
6. I ate -- 3 times within the last 7 days
7. I ate -- 4 times within the last 7 days
<table>
<thead>
<tr>
<th>Event Description</th>
<th>Likelihood</th>
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<tr>
<td>How Often were other vegetables (collards, kale, beet greens) consumed in the last 7 days</td>
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<tr>
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<td>1.75</td>
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<tr>
<td>How Often were other vegetables (tomato, squash, cuke) consumed in the last 7 days</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>1. I did not eat -- in the last 7 days</td>
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</tr>
<tr>
<td>2. I ate -- 1-3 times within the last 7 days</td>
<td></td>
</tr>
<tr>
<td>3. I ate -- 4-6 times within the last 7 days</td>
<td></td>
</tr>
<tr>
<td>4. I ate -- 1 time within the last 7 days</td>
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<tr>
<td>5. I ate -- 2 times within the last 7 days</td>
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<tr>
<td>6. I ate -- 3 times within the last 7 days</td>
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</tr>
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<td>7. I ate -- 4 times within the last 7 days</td>
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</table>

**How Often were other vegetables (tomato, squash, cuke) consumed in the last 7 days**

<table>
<thead>
<tr>
<th></th>
<th>How often</th>
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<tbody>
<tr>
<td>Spring 2010 Devine Way Participants prior to GBE</td>
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<tr>
<td>Summer 2010 Teen Youth Participants involved in GBE &amp; Cooking for 1 year or more</td>
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</tr>
<tr>
<td>Fall 2010 Middle School/BCCS+ Participants prior to GBE</td>
<td>1.56</td>
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<tr>
<td>Fall 2010 Middle School/BCCS+ Participants involved in GBE &amp; Cooking</td>
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<td>Winter 2010 Middle School/BCCS+ Participants who saw garden but no other GBE</td>
<td>5.33</td>
</tr>
<tr>
<td>Winter 2010 Middle School/BCCS+ Participants involved in GBE &amp; Cooking</td>
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</tr>
<tr>
<td>Spring 2011 Middle School/BCCS+ involved in GBE &amp; Cooking</td>
<td>4.00</td>
</tr>
<tr>
<td>Spring/Summer 2012 West Broadway Participants involved in GBE &amp; Cooking</td>
<td>2.75</td>
</tr>
</tbody>
</table>
How Often were other vegetables (new, never tried) consumed in the last 7 days

- Spring 2010 Devine Way Participants prior to GBE: 1.64
- Summer 2010 Teen Youth Participants involved in GBE & Cooking for 1 year or more: 2.08
- Fall 2010 Middle School/BCCS+ Participants prior to GBE: 1.83
- Fall 2010 Middle School/BCCS+ Participants involved in GBE & Cooking: 1.86
- Winter 2010 Middle School/BCCS+ Participants who saw garden but no other GBE: 1.00
- Winter 2010 Middle School/BCCS+ Participants involved in GBE & Cooking: 2.00
- Spring 2011 Middle School/BCCS+ involved in GBE & Cooking: 2.00 1 person responded
- Spring/Summer 2012 West Broadway Participants involved in GBE & Cooking: 3.25

Likelihood

0 1 2 3 4 5 6 7 8 9

0.00 0.50 1.00 1.50 2.00 2.50 3.00 3.50

How often