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Planting Seeds for the Future: A Childhood Nutrition, Cooking and Gardening Study

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Principal Investigator

Introduction

According to the 2010 National Health Interview Survey, 62 percent of U.S. adults are either overweight or obese and 17 percent of American children are obese (Huang et al., 2007). The health risks associated with obesity, such as diabetes, heart disease, and cancer, are calling attention to the severe consequences of being excessively overweight. For many Americans, the root of the problem lies in unhealthy habits, which often develop during childhood and are influenced by parental behaviors (Patrick et. al. 2013). There are many approaches to combating this healthcare crisis, but focusing on childhood nutrition education as a preventative method is now gaining attention for its widespread use.

Many studies focus on exposing children to healthier habits through community and school gardening, nutrition education, and early exposure to fruits and vegetables. Studies have shown that when children partake in the growing process, they are more likely to consume the fruits and vegetables that are grown, as well as others in the future (Robinson-O’Brein, et. al., 2009). They consistently emphasize the behavioral and dietary improvements of the child involved (Patrick et. al., 2013), but often neglect, or suggest further research to examine the effects that these interventions have on family members of the participants. This area of research has the potential to be significant. What has not been explored is the potential of a child to take what he or she has learned from an intervention and carry it over into his or her family. Studies have shown that parental eating behaviors affect those of their children (Patrick et. al. 2013), but there is also potential for the children’s healthy eating habits to affect those of their parents.

Methods:

Study Design:

Families were recruited from the Trumbull Gardens community in Bridgeport, Connecticut. The program *Planting Seeds for the Future* was implemented as an enrichment program within the Trumbull Gardens Community Center summer camp. The day camp offered four weeklong sessions throughout the summer, and most campers attended all four sessions. All child subjects received the same intervention. Due to the small sample size, a control group was not obtainable. The summer camp provided the children with free breakfast and lunch each day. In collaboration with one of Green Village Initiative’s community farms, *Planting Seeds for the Future* was given three 8 by 4 foot gardening plots at Reservoir Community Farm, which is located down the street from the Community Center.

The Institutional Review Board of the University of Connecticut approved this study, as did the directors of the summer camp and community farm using standard consent protocols. Parent and

child consent for the project and for photo consent (*See Appendix A*) was obtained using IRB-approved documents for the study.

Intervention:

The *Planting Seeds for the Future* program took place from 9 a.m. to 12 p.m. on Tuesdays and Thursdays throughout the duration of the camp. The girls group attended their session on Tuesdays, and the boys group was held on Thursdays. Group totals varied per week, with an average of 15 children participating per session, and at least three adults present at all times. In total, each child attended one two-hour program session once per week for four weeks. The children's parents were not involved in the intervention itself, in keeping with the study's aims.

The program was broken into three parts. The children were first taught a brief nutrition lesson, followed by an interactive game. They were then given a survey to fill out about what they learned. Lesson topics included:

- MyPlate Overview – (Food Groups)
- Portion Sizes and Nutrition Labels
- Physical Activity
- How to Treat Yourself – (Enjoying Treats in Moderation)

Next, they participated in a hands-on cooking activity, in which they prepared and ate healthy snacks. The children made snacks that did not require a stove or an oven:

- Strawberry pineapple yogurt smoothies
- Garlic hummus and vegetable sticks for dipping
- Salsa with whole grain tortilla chips and zucchini slices
- Pudding, whipped cream, and berry parfaits

Then, the group was divided in half, and each of these two groups went to the garden at different times. This was done in order to make the gardening experience more personal for the children.

Several adaptations had to be made throughout the program. The number of sessions was decreased from five to four due to a funding shortage, which caused the summer camp to cut out one week of its service. For convenience and safety several snacks were altered to avoid the use of ovens and stoves. The number of parent surveys was decreased from one per week to solely a pre-study and post-study survey, due to difficulties in obtaining completed surveys from the parents. Ten-dollar gift cards to Stop and Shop were offered as an incentive for parents to fill out and turn in both of these surveys. The children received t-shirts with the program's and summer camp's logos on them for completing the program, as well as small gift bags containing crayons, sugar free gum, coloring paper, and dark chocolate, to promote healthy eating and activities.

The nutrition educator that led the program had previous experience in teaching nutrition lessons to preschoolers via a University of Connecticut Nutrition Program called Husky Reads. She was also assisted by two volunteers, both of whom are University of Connecticut Nutritional Sciences majors with previous nutrition educating experience. In addition, the program was designed by

the leading nutrition educator, and approved by a mentor with previous nutrition education research experience as well as credentials as an EFNEP (Expanded Food and Nutrition Education Program) educator.

Assessment

Surveys for both parent and child participants included hedonic preference measurements as well as questions on topics such as their eating habits and nutrition information that the children learned. Compared to self-reporting food consumption, the hedonic method of assessing liking and disliking of foods, beverages, and activities was more likely to be factual data (Duffy, et. al. 2009). Preference was measured on a scale of one to seven, with pictures of faces that indicated happiness felt when eating the food. A score of one was the low end of the scale and a score of seven was the high end.

The parent pre-study and post-study surveys both included the same 25 items to rank for preference. They also contained questions about frequency per day that fruits and vegetables were consumed, frequency that meals were cooked at home, and knowledge about MyPlate.

The child pre-study and post-study surveys both included the same 19 items to rank for preference. They were also asked how many times per day they ate fruit and vegetables and questions about MyPlate. The children completed surveys for weeks two and three in addition to their pre-study and post-study surveys. In week two, they were asked about MyPlate food groups and the recommended number of servings for each and portion sizes. Week three documented whether or not the children cooked and ate any of the recipes at home with their families, retention of information about the food label, and whether or not they ate fruits and vegetables as a snack in the past week.

Analysis:

When examining data obtained from parent and child surveys, some of the data was not usable. For example, the total number of campers that attended the session in week one (7) was much smaller than the number that attended week four (24). Results were tallied only for those who completed both pre- and post-program surveys. Therefore, data from only 7 children out of a sample size of 24 was used. In total, n = 19 parents turned in pre-study and post-study surveys.

The mean was taken from the usable data to look for changes from beginning to end of the program. Graphs were also created to demonstrate the change in preference, fruit and vegetable consumption, and nutritional knowledge.

Results:

Surveys took approximately fifteen minutes to complete. Nineteen parents returned both the pre-study and post-study surveys. In total, seventeen children returned surveys, although only seven completed all four.

Fruit and Vegetable Preferences:

From the child survey data, it was shown that overall liking toward fruits and vegetables in preference questionnaire increased slightly. Several fruits and vegetables increased noticeably (one point or more) from week one to week four, including apples and salad. Both of these foods were very common survey answers for self-reporting the fruits and vegetables eaten on a weekly basis.

Table I: Child Overall Fruit and Vegetable Liking (n = 7)

Food	Pre	Post
Apple	5.63	7
Grapes	6.5	6.5
Carrots	4.5	4.88
Strawberries	6.63	5.5
Broccoli	6.38	5.63
Bananas	6.5	6.38
Tomatoes	6	5.13
Blueberries	5	5.75
Zucchini	3.13	3.88
Spinach	3.88	6
Salad	5.75	6.75
String Beans	5.88	5.25
Total	5.481666667	5.720833333

Parent survey preference data showed that parent liking toward fruits and vegetables that their children tasted during the lessons increased. Although the increases were less significant for parents, liking of zucchini increased more than twice as much as any other item. It was also the only item that the children took home to their families from the garden. This was due to the fact that the zucchini plants in the garden produced a large quantity of the vegetable.

Table II: Parent Fruit and Vegetable Liking Based on Food Tasted by Children in Lesson (n = 19)

Food	Pre	Post
carrots	4.611	4.833
tomatoes	5.944	5.944
zucchini	2.278	3
strawberries	7	6.778
blueberries	4.333	4.389
Total Mean	4.8332	4.9888

Nutrition Knowledge Retention:

Child survey questions were specified to assess the children’s knowledge about the lessons from the current week and prior weeks. In the first week of the study, only three out of the seven children who submitted surveys from week one and week four could explain what MyPlate was. However, by week four, all seven children could explain it. Surveys obtained from weeks two and three had a larger sample size of seventeen children. Out of these children, twelve could name all five food groups, fourteen knew the recommended amount of fruit to eat per day, and fifteen knew the recommended amount of vegetables to eat per day. In addition, in the surveys from weeks two and three, all of the children responded that they ate fruit and vegetables as a snack.

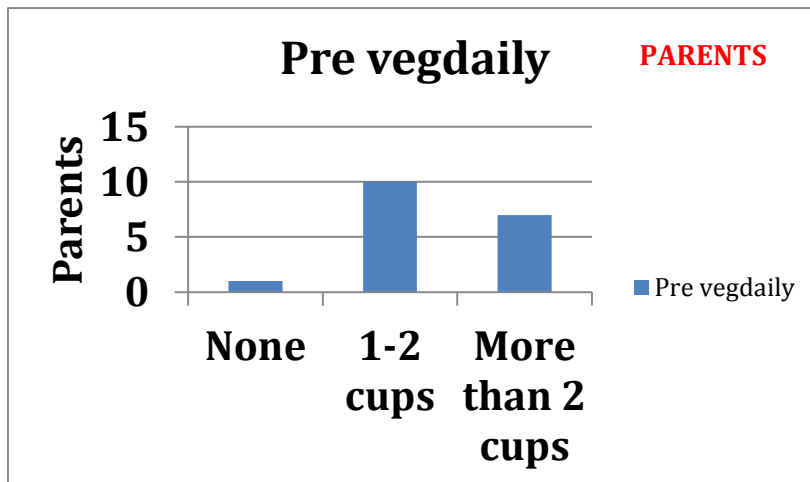
Parent surveys contained fewer questions about nutrition knowledge. They were asked in both surveys if they could explain MyPlate. Out of the nineteen parents surveyed, knowledge about MyPlate did not improve.

Fruit and Vegetable Consumption:

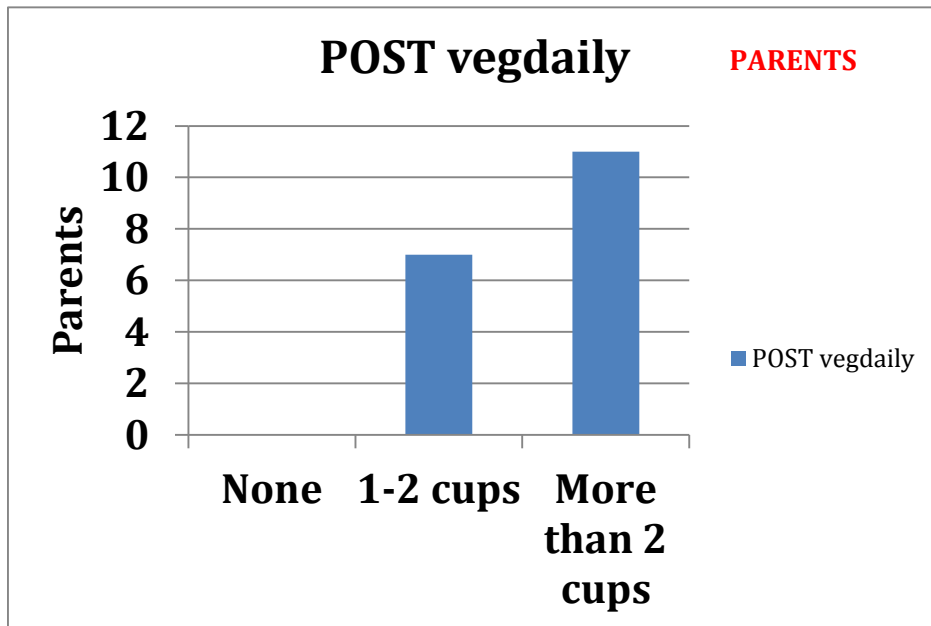
Self reported child fruit and vegetable consumption did not improve from week one to week four. This may have been due to the low number of completed pre- and post-study surveys that were completed out of the larger total sample size of twenty-four participants.

Parent fruit and vegetable consumption was assessed in pre-study and post-study surveys. For both fruit and vegetables, small increases were noted. By week four, all parents reported eating at least one to two cups of fruit and one to two cups of vegetables per day. The amount of parents that reported consuming more than two cups of both fruits and vegetables per day increased as well.

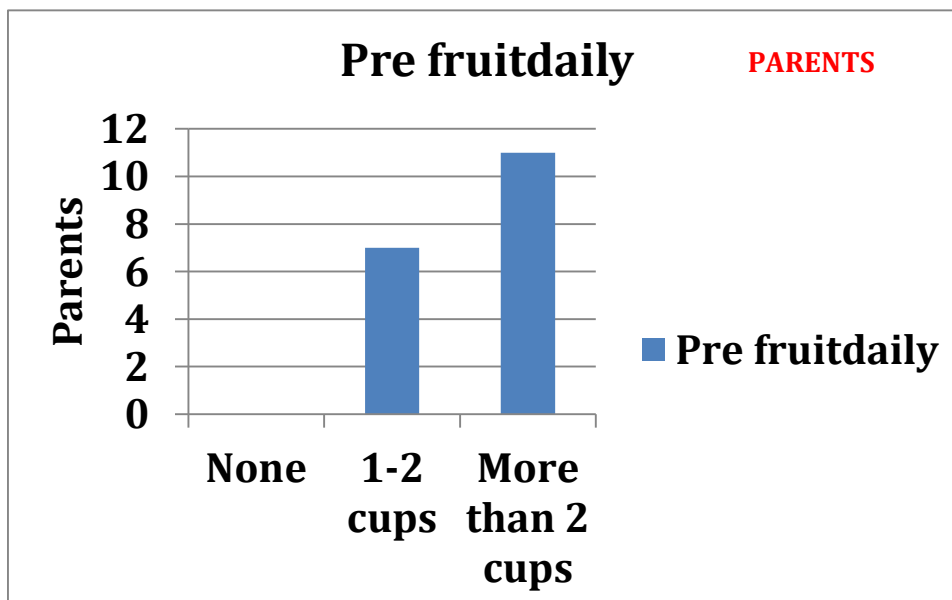
Graph I: Parent Pre-Study Vegetable Consumption Daily



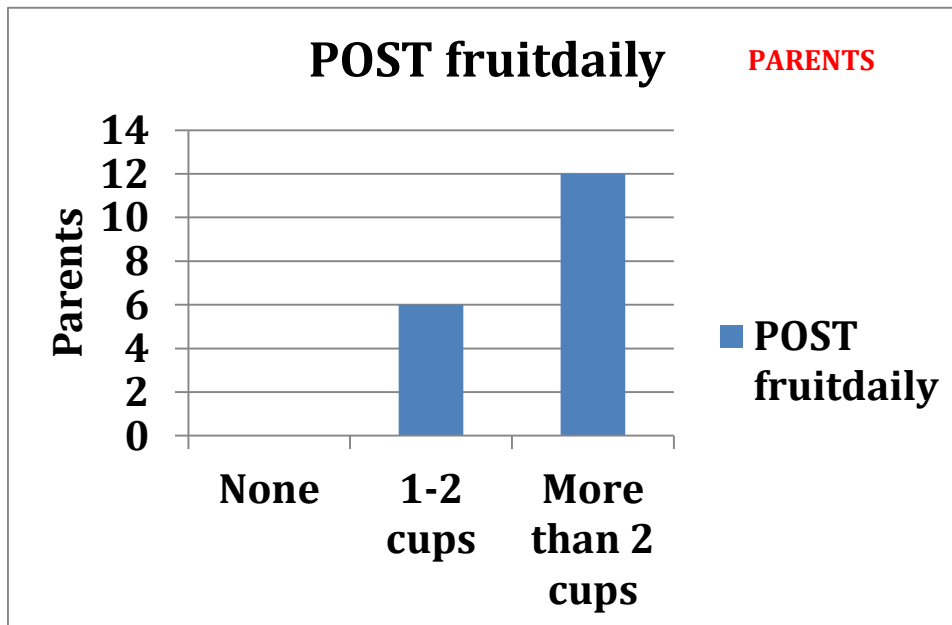
Graph II: Parent Post-Study Vegetable Consumption Daily



Graph III: Parent Pre-Study Fruit Consumption Daily



Graph IV: Parent Post-Study Fruit Consumption Daily



Discussion:

This study demonstrated that a multimodal nutrition education program for school aged children using didactic, gardening and cooking methodologies had a positive influence on family healthy eating habits. Children’s and parents’ preferences and attitudes about fruits and vegetables became more positive. Not unexpectedly, the effect was more noticeable on the children than on the parents. An increase in healthy eating habits as demonstrated by increased fruit and vegetable consumption was not noted in the children, however, a minimal increase in healthy eating habits was noted in the parents. Of note, there was also an increase in preference for healthy lifestyle habits, including increased liking for walking, gardening, and less liking for watching television. More research could be done in order to look for the effects that a long-term study may have on parent lifestyle habits and fruit and vegetable liking.

Limitations:

One limitation of this study was a small and inconsistent sample size. This resulted in a delayed return rate of surveys, especially those of the parent. Extra steps were taken to request the surveys, including multiple trips to the site and in-person requests for the surveys to be returned. The study was conducted over a short period of time, making it difficult to measure the long-term effect that such interventions may have on both parents and children. The results of these surveys may have been biased due to the uncertainty of truth that comes with self-reporting eating habits. After the surveys were developed and approved by the IRB, modifications were made to the snack recipes to make them more feasible for cooking without an oven, therefore,

the preference items in the surveys did not reflect all fruits and vegetables consumed by the participants during the cooking lesson.

Conclusions:

This study shows that parental eating habits and health promoting behaviors can be influenced by the nutrition, cooking and gardening interventions done by their children. The children's preference for the fruits, vegetables and gardening listed in their surveys noticeably increased. The fruit and vegetable preferences of the parents increased less noticeably, and only in those foods tasted by their children during the program. This small change suggests that over a longer period of time, a more significant increase in liking of fruits and vegetables could occur. More extensive research should be done to explore this possibility.

Since the program is not a continuous curriculum, it is possible that its effects will not be long-term. However, they have learned about tools such as MyPlate that can be used to make healthy food choices and have been exposed to gardening, nutrition, and healthy eating at a young age.

Appendix:

Appendix A: Parent and Child Permission Form

Parent Permission Form for Participation in a Research Study



Principal Investigator: Heather Peracchio, MS, RDN, CD-N (University of Connecticut)

Student Researcher: Elizabeth Lamonte

Study Title: Planting Seeds for the Future: A Childhood Nutrition and Gardening Study

Introduction

You and your child are invited to participate in a nutrition and gardening program that aims to improve the health and diet of you and your children. *Planting Seeds for the Future* is a summer program that will take place at the Green Village Initiative's Reservoir Farm once per week for six weeks.

The *Planting Seeds for the Future* program will last 1 ½ hours each week for four weeks of the summer (the week of July 12th through the week of August 2nd). The children will meet in small groups and at least two adults will be with the children at all times. The children will be planting fruits and vegetables at the Reservoir Community Farm. They will water, weed and harvest from the garden throughout the program. They will also use the fruits and vegetables from the garden to cook and bake healthy snacks. They will taste these snacks and rate how much they like them. Another part of the program is a short nutrition lesson and activity that changes each week and is relevant to home eating habits.

Why is this study being done?

We want to study if the program's activities focused on gardening and nutrition influence children's behavior and attitudes toward health, and if these affects on the child extend to the family.

What are the study procedures? What will my child and I be asked to do?

As part of your participation as a parent/caregiver, we would like you to fill out to the best of your ability the surveys that your child brings home each week for you. They will ask about any changes in your child's food behavior at home, and if they affect your own food behavior. For example, if your child requests fruit as a snack, do you find yourself eating more fruit as well? These surveys will also give you a list of foods on the survey and ask you how much you like them before and after the program to look for any changes in your own food liking.

Your child will participate in the nutrition program, *Planting Seeds for the Future*, within Trumbull Gardens Community summer camp. He or she will be watering and weeding a garden plot at the Reservoir Community Farm, assisting in cooking and tasting healthy snacks, and learning about nutrition in the form of six lessons: MyPlate, Portion Sizes and Food Labels, Physical Activity, and How to Treat Yourself.

What other options are there?

You should feel free to withdraw consent and discontinue participation for you and/or your child at any time during the program.

What are the risks or inconveniences of the study?

There is no risk involved in participating in this program. It will take your time to participate in the program by completing surveys on your eating habits and foods you like to eat. We do not want to serve any foods that your child may have a reaction to. Please list any food allergies your child has here:

What are the benefits of the study?

Participation may help you to build skills that can improve you and your family's healthful behaviors. Your children will learn more about growing fresh vegetable and fruit, healthy eating and have a chance to try healthy snacks. At the end of the program your child will be given gardening tools and seeds to take home. Also, if available children may take home fruits or vegetables grown in the garden.

Will I receive payment for participation? Are there costs to participate?

You will not be paid for the study, but you and your child may gain knowledge regarding nutrition and healthy habits from the program in which the child participates. If you complete every survey given to you over to six-week period, you will be given a five dollar gift card to a nearby grocery store for taking the time to fill out all of the surveys.

How will my personal information be protected?

You and your child will be assigned a code at the beginning of the program that will replace your name in the data that we collect from your survey responses. Your responses will be kept in a locked cabinet in the UConn Extension Center at Bethel. The data collected will be added to an excel graph that will only be accessed on a computer when the computer is offline. Your name will not be connected to the surveys that you fill out.

You should also know that the UConn Institutional Review Board (IRB) and Research Compliance Services may inspect study records as part of its auditing program, but these reviews will only focus on the researchers and not on your responses or involvement. The IRB is a group of people who review research studies to protect the rights and welfare of research participants.

Can I stop being in the study and what are my rights?

You do not have to be in this study if you do not want to. If you agree to be in the study, but later change your mind, you may drop out at any time. There are no penalties or consequences of any kind if you decide that you do not want to participate.

Whom do I contact if I have questions about the study?

Feel free to ask questions at any time. This study has been explained to you by Elizabeth Lamonte and Principal Investigator Heather Peracchio. If you have further questions about this project, please contact the Principal Investigator or student researcher Elizabeth Lamonte at (203) 207-3266 or CT Department of Public Health at (860) 509-7836. If you have any questions about your rights and your child's rights as a research participant, please call the University of Connecticut institutional Review Board at (860) 486-8802.

Documentation of Consent:

I have read this form and decided that I will participate in the project described above. Its general purposes, the particulars of involvement and possible risks and inconveniences have been explained to my satisfaction. I understand that I can withdraw at any time. My signature also indicates that I have received a copy of this consent form.

Participant Signature:

Print Name:

Date:

Relationship (only if not participant): _____

Assent of Minor Signature:

Print Name:

Date:

Signature of Person
Obtaining Consent

Print Name:

Date:

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