Cooking and Menu Planning Confidence of Children Participating in a Cooking Camp

Elizabeth Dixon
Clemson University, dixonlizj@gmail.com

Follow this and additional works at: https://tigerprints.clemson.edu/all_theses
Part of the Education Commons

Recommended Citation
https://tigerprints.clemson.edu/all_theses/1364

This Thesis is brought to you for free and open access by the Theses at TigerPrints. It has been accepted for inclusion in All Theses by an authorized administrator of TigerPrints. For more information, please contact kokeefe@clemson.edu.
COOKING AND MENU PLANNING CONFIDENCE OF CHILDREN PARTICIPATING IN A COOKING CAMP

A Thesis
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Master of Science
Food, Nutrition, and Packaging Science

by
Elizabeth Jane Dixon
May 2012

Accepted by:
Dr. Margaret Condrasky, Committee Chair
Dr. Julia Sharp
Dr. Karen Kemper
ABSTRACT

Childhood obesity has been steadily increasing in recent decades. This study was conducted at cooking camp to analyze the cooking and menu planning self-efficacy of children and to determine if these skills could influence healthier eating habits. Four surveys were used to evaluate the participants. The Let’s Eat Healthy Questionnaire observed significant increases in MyPlate and food group knowledge (p-value<0.0001). The Cooking Skills and Food and Nutrition Skills Questionnaire reported significant increases in the ability to sauté (p-value=0.0026) and how to stir fry (p-value=0.0015), and significant increases in agreement for actions like limiting fat intake, limiting sugar intake, and eating more fiber (p-value<0.0001 for all respectively). The Confidence and Motivation Questionnaire reported significant increases in the confidence ranking for preparing healthy snacks (p-value<0.0001), using healthy cooking techniques (p-value<0.0001), eating healthy foods (p-value<0.0001) and having positive feelings toward eating healthy (p-value=0.0012). The Menu Planning Questionnaire revealed a significant decrease in agreement with the statement that planning meals could increase vegetable intake (p=0.008) and a non-significant decrease for fruit intake ((p=1.000). For participants that completely agreed that planning meals could increase fruit and vegetable intakes, it was estimated that fruit servings would increase by roughly 2.8 (pre-questionnaire) to 2.9 (post-questionnaire) servings per day, and vegetable servings would increase from 2.7 (pre-questionnaire) to 2.8 (post-questionnaire) servings per day. Significant increases in confidence to plan a meal, meals for a day, and meals for a week were observed (p=0.0010, p<0.0001 and p<0.0001 respectively). Participants used the Menu Planning Plate website throughout the week to plan meals: 90.2% of participants
used the website during camp, 84.31% stated it was easy to use, 52.94% stated that they used the Menu Planning Plate to plan to eat camp recipes at home, 64.71% of participants stated they could plan a meal according to MyPlate guidelines, and 76.47% of participants stated that they would use the Menu Planning Plate after camp. 80.39% of the participants stated that they could teach someone else to plan menus. Teaching children how to plan and cook their own meals could increase the likelihood of choosing healthy foods.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>TITLE PAGE</td>
<td>i</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>ii</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>vi</td>
</tr>
<tr>
<td>CHAPTER</td>
<td></td>
</tr>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Theories Supporting Nutrition Education</td>
<td>3</td>
</tr>
<tr>
<td>Cooking Skills</td>
<td>5</td>
</tr>
<tr>
<td>Cooking Confidence for Children</td>
<td>9</td>
</tr>
<tr>
<td>Menu Planning</td>
<td>12</td>
</tr>
<tr>
<td>Discussion</td>
<td>18</td>
</tr>
<tr>
<td>II. COOKING CAMP</td>
<td>20</td>
</tr>
<tr>
<td>Introduction</td>
<td>20</td>
</tr>
<tr>
<td>Materials and Methods</td>
<td>24</td>
</tr>
<tr>
<td>Results</td>
<td>28</td>
</tr>
<tr>
<td>Discussion</td>
<td>32</td>
</tr>
<tr>
<td>Recommendation and Limitations</td>
<td>35</td>
</tr>
<tr>
<td>Conclusions</td>
<td>36</td>
</tr>
<tr>
<td>References</td>
<td>36</td>
</tr>
<tr>
<td>III. MENU PLANNING</td>
<td>40</td>
</tr>
<tr>
<td>Introduction</td>
<td>40</td>
</tr>
<tr>
<td>Materials and Methods</td>
<td>48</td>
</tr>
<tr>
<td>Results</td>
<td>52</td>
</tr>
<tr>
<td>Discussion</td>
<td>57</td>
</tr>
<tr>
<td>Recommendation and Limitations</td>
<td>59</td>
</tr>
<tr>
<td>Conclusions</td>
<td>60</td>
</tr>
<tr>
<td>References</td>
<td>61</td>
</tr>
</tbody>
</table>
IV. DISCUSSION ............................................................................................................. 66
   Confidence Leads to Self-Efficacy ............................................................................. 66
   Menu Planning Tool Design and Testing .................................................................. 67
   Future Work ............................................................................................................. 69

V. RECOMMENDATIONS .......................................................................................... 71

VI. CONCLUSION ....................................................................................................... 73

APPENDICES ............................................................................................................. 74
   A. Parental Consent Form ....................................................................................... 74
   B. Questionnaires ................................................................................................... 76
   C. Menu Planning Placemat Outline ...................................................................... 82
   D. Child Assent Form ............................................................................................. 83

REFERENCES ............................................................................................................... 84
# LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>2.1</td>
<td>Percentage and Frequencies of Cooking Camp Participants.</td>
</tr>
<tr>
<td>2.2</td>
<td>Frequencies and P-values of “Yes” Responses to Confidence Pre and Post Cooking and Food and Nutrition Skills Survey (n=51)</td>
</tr>
<tr>
<td>2.3</td>
<td>Percentages of Correct Answers for Let’s Eat Healthy Survey</td>
</tr>
<tr>
<td>3.1</td>
<td>Percentage and Frequencies of Menu Planning Participants</td>
</tr>
<tr>
<td>3.2</td>
<td>Participant Responses for Whether Menu Planning Increases Fruit and Vegetable Intake</td>
</tr>
<tr>
<td>3.3</td>
<td>Mean, Standard Deviation, and p-value of Estimated Servings for Vegetables and Fruits for Matched Pre-Post Participants</td>
</tr>
<tr>
<td>3.4</td>
<td>Mean of the Pre-test and Post-test rankings, Standard Deviation, and p-value for Confidence and Self-efficacy</td>
</tr>
<tr>
<td>3.5</td>
<td>Relative Frequencies of Post Only Menu Planning Questions</td>
</tr>
</tbody>
</table>
INTRODUCTION

You are what you eat. This statement has become very apparent in American society. Heart disease, diabetes, stroke, and cancer—all food related diseases—rank in the top ten leading causes of death in the United States; other food-related diseases include overweight/obesity, hypertension, and osteoporosis. Some of these food related threats have recently begun to threaten younger generations, arguably the most prominent being obesity. According to the Center for Disease Control and Prevention’s National Health and Nutrition Examination Survey it is estimated that approximately 17% or 19.5 million children between the ages of 2 and 19 are obese; this is triple that from 1980. With childhood obesity on the rise, it has become more important than ever to teach children the significance of healthy eating and give them the skills and the confidence to cook for themselves. Cooking skills cover a broad array of techniques and knowledge starting with the idea of a meal all the way to its preparation and completion.

The importance of cooking skills has come to the forefront in the past decade. In interviews with 5,553 people, it was noted that 98.5% of women in England thought it fairly or very important to teach boys how to cook with 99.2% believing the same for girls, and 95.3% of men thought it was fairly or very important to teach boys how to cook with 97.6% believing the same for girls. Caraher et al. (1999) determined that “the relevance of cooking skills for health promotion could be significant” since almost a tenth of the people surveyed, over 500 people, reported not knowing how to cook as a factor that prevented them from choosing several healthy food options. A good diet is imperative for a healthy child. Research has demonstrated that eating breakfast can improve cognitive brain function among children and that an inadequate diet has the
potential to cause great damage to a child’s wellbeing. Americans live busy lifestyles which could create barriers towards healthy cooking such belief that it is difficult, takes too much time, and is expensive. These barriers can be passed down to younger generations. Barriers like these can be removed by exposing children to different foods, giving them chance to work hands-on with food, and encouraging them to spend time in the kitchen and cook.

The increased rate of obesity has also been partly attributed to the portion sizes children observe and consume in away from home-eating facilities such as restaurants which then translate to the home. Research has illustrated that meals at home have greater nutritional value, have more realistic portions, and generally contain healthier foods than meals served in a restaurant. Women who prepared meals at home four to five times a week were 1.4 times more likely to eat two or more servings of fruit and 2 times more likely to eat two or more servings of vegetables than those that did not. Therefore, it could be assumed that if more people consumed meals at home rather than meals at restaurants, better weight balance could be maintained and healthier diets could be recognized. Weight loss would be achieved through higher fiber consumed through additional fruits and vegetables, which are more filling than fat and sugar laden convenience foods. People who are more confident in their cooking abilities are more likely to cook for themselves than go out and therefore could reduce their caloric intake.

Gaining cooking confidence through improving cooking skills has been well documented, but an observation in several research discussions has been the narrowed scope of the definition of cooking skills. Cooking skills in most cooking classes
has been limited to teaching cooking technique and use of kitchen tools. There is a need for a greater range of cooking skills to be taught such as sanitation principles, menu planning, grocery shopping, cost effective buying, etc.\textsuperscript{11, 12, 16} Two research areas can be adapted from past research: teaching children to be self-sufficient in cooking and designing a template for children that would allow and encourage them to plan to eat healthier. This research reviews the importance of one of those additional skills, menu planning, and how it is the next step to a successful cooking and nutrition education program.

**Theories Supporting Nutrition Education**

There are various theories that support the reasoning behind teaching cooking skills. Three models for the development of cooking and nutrition education are described below including: Social Cognitive Theory, Contento’s Logic Model, and Food Choice Process Model.

*Social Cognitive Theory*

Like the idiom teach a man how to fish and he can feed himself for a lifetime, teaching a child how to cook provides them with the skills and confidence to possibly make healthier food choices. Social Cognitive Theory (SCT) states that changes in a person’s “knowledge, behaviors, and attitudes” are “reliant upon self-efficacy, expectations, and goals.”\textsuperscript{10 (pp 39), 19} The theory proposes that one’s self-efficacy, defined as “perceived confidence on his or her ability to perform a behavior in a prospective situation”, is a determinant in changing health related behavior.\textsuperscript{17 (pp 883)} Without any cooking training, children lack the confidence to prepare snacks for themselves and
therefore are more likely to turn to the more processed, easy-access food options instead.\(^{11}\) Many nutrition education programs have been founded on the SCT theory in teaching children how to cook with the hope of influencing their dietary choices.\(^{6,11,13,16,18,19}\)

*Contorno’s Logic Model*

This model designed by Contorno, based on a logic model, consists of inputs, outputs, and outcomes.\(^{20}\) Inputs include the people, resources, needs assessments, etc. that are essential for administering a nutrition program.\(^{20}\) The outputs are the motivational, action, and environmental phases that a person goes through during a nutrition education program.\(^{20}\) The outcomes are perceived behavioral impacts of the nutritional program.\(^{20}\) The system reads that the implementation of a nutrition education program for children (input) would give children the ability to cook (output) and they could choose healthier recipes as a result (outcome).

*Food Choice Process Model*

Bisogni helped develop the Food Choice Process Model.\(^{21}\) In this conceptual model, three events-circumstances, standards, and food management skills- all interact to create food choice capacity.\(^{21}\) The model states that people use their knowledge about what and how they should eat (standards), skills in budgeting, cooking, and food preparation (food management knowledge), and “personal, social, and environmental” influences (circumstances) to convey their ability to meet the goals that they had set for their personal food system (food choice capacity).\(^{21}\) (pp 286)
Cooking Skills

Knowledge about nutrition and cooking is necessary but not sufficient to support behavior change. Using concrete actions as opposed to abstract concepts help children apply their cooking knowledge. Anderson (2002) noted that:

“Increasing familiarity with food through preparation and eating food prepared with peers in a positive affective context is a practical way to potentially increase nutrition knowledge, positive attitudes towards foods, and consumption of ‘more healthful’ foods in line with current government recommendations.”

Studies have documented that poor cooking skills could be a determining stumbling block to variety in food choices and therefore limit exposure and consumption of healthy food. Concern over the decrease in cooking skills in the younger generations has gotten attention from international governments. Social, technological, and transportation evolution has created new ways that the younger generation deals with food.

Behavior

A person’s behavior is a factor in determining food choices, portions sizes, and other eating patterns. Substituting a healthy behavior for one that is unhealthy is the goal of most nutrition education and cooking programs.

Learned behaviors associated with food are usually developed through childhood and influenced by outside experiences such as food availability from parents and school lunches. These behaviors can be learned through watching or acting out behaviors observed. King et al. (2004) determined that four factors may affect food and beverage
choices: a food or drink’s “function as a meal component, social interaction during consumption, the environment in which food is selected and consumed, and food choice freedom.” An example of a food or beverage’s function as a meal component would be comparing a side item versus an entree; eating with friends would be an example of social eating; restaurants versus the home would be an example of different environment; and choice of ingredients from a buffet would be an example of food choice freedom. Contento noted four different factors that affected food choice: biologically determined behavioral predispositions, experience with food, personal factors such as beliefs, attitudes, and social norms, and environmental factors like cultural practices or food marketing.

Behavior is often driven by perception of foods and what a person believes they can do. Larson et al. (2006) found that for 18 to 23 year olds, the “perceived adequacy of [cooking] skills and resources for food preparation” were significant for dietary quality. Young people who prepared their own food more often and frequented fast food restaurants less were more likely to eat according to the dietary guidelines for the Healthy People 2010 objective for fat, calcium, fruits, vegetables, and whole grains. Cooking less at home increases the likelihood of eating in restaurants, and food from restaurants usually contain more calories than meals from home. Restaurants are not the only situation where overeating can occur, e.g. pre-conceived ideas of cleaning your plate and satiety of foods can distort portion sizes.

Pre-meal expectations can be a key factor in determining portions sizes for different foods. Fay et al. (2011) showed the pre-planned meals had a direct relationship with “plate-cleaning”, a process in which everything is eaten on the plate. It was
reported that 86% of the participants planned to clean their plate to eating a meal and thus did, which points to assumption that if a person plans to eat less or leave leftovers, they are more likely to eat correct portions and control their weight.\textsuperscript{26} The theory of planned behavior states that a person’s behavior is affected by their intention to do an action, therefore, the intention to clean the plate regardless of portion sizes encourages overeating.\textsuperscript{26, 27, 28} Perception of different foods and the expected volume it takes to feel satisfied by those foods have a significant influence on the portion size as well.\textsuperscript{9} For example, a person may believe that salad and pizza in equal portions would not give equal feelings of satiety.\textsuperscript{9} Nutrition education classes teach proper portions sizes and the types of nutrients that are consumed from different sources which can help stop overeating; for example high fiber from salads will lead to increased satiety faster than the high fat pizza.

\textit{Nutrition Education}

Contento (2008) defined nutritional education as “any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food and nutrition-related behaviors conducive to health and well-being…”\textsuperscript{20 (pp 176)} Nutrition education can be accomplished in a variety of venues and “involves activities at the individual, community, and policy levels.”\textsuperscript{20 (pp 177)} Hands-on cooking classes help children develop confidence in cooking, emotional, and social skills.\textsuperscript{4} Nutrition education has begun an evolutionary stage in recent years. The nutrition books and MyPyramid charts have been expanded into cooking sessions and taste demos.\textsuperscript{6, 10, 11, 12, 14} Culinary nutrition is a new science that combines food science, nutrition, and culinary skills which helps unite “nutrition concepts and healthy cooking
techniques into sustainable eating practices…” Food knowledge alone has failed to change behavior, but with the addition of hands-on interaction with food, knowledge can be learned in many forms. It has been documented in over 300 studies that food knowledge interventions will fail without the addition of an action or behavior changing component connecting “theory, research, and practice” to create motivation.

Contento (2008) stated that successful nutrition education programs are divided into 3 parts: a motivational phase, an action phase, and an environmental phase. The motivational phase explains why changes in food habits needs to be altered, increases nutritional awareness, and encourages motivation to action. The action phase handles how to make food habit changes and gives the people the ability to instigate the change. The environmental component is the external situation which encourage the continuation of learned knowledge and actions. Successful nutrition education also must take into account cultural differences; a “cookie-cutter” program cannot succeed. In a study interviewing women from Pakistani/Bangladeshi, Zimbabwean, and Somali now living in the United Kingdom, “culture, time, availability, cost, health, and price” were all noted as factors affecting food choices. Participants also noted different food preparation techniques and food choices which were based on cultural traditions; for example, Zimbabwean women put a big emphasis on eating fresh ingredients while Pakistani/Bangladeshi women frequently use frying techniques to prepare daily food. To have a positive impact on food choice confidence, an effective and efficient nutrition education program must be developed for the target group.
Cooking Confidence for Children

Existing Programs

Research has shown a connection between poor cooking skills and declined cooking confidence. A lack of cooking confidence causes greater dependence on convenience foods that generally contain higher fat, sugar, and sodium which can contribute to weight gain. Gaining confidence from nutrition education has been documented in many programs.

Children’s food preference is greatly influenced by their experiences and interactions with different foods. The Cookshop Program was one of the first nutritional education programs in the 1990’s designed to bring the lunchroom and classroom together in an effort to connect children’s food experiences with their environment. Children were taught cooking lessons with different foods for which the recipes were also used in the lunchroom menu.

The Cook Like a Chef camp was established in 2002 at Pennsylvania State University. It aims to encourage confidence in 10-14 year old campers and motivate them to choose healthier foods. This camp not only gives children hands-on experience with various recipes and cooking techniques, but informs participants of the importance of nutrition and exercise.

Cooking with Kids is an experimental Nutrition Curriculum implemented in 2006 that was designed to improve the cooking experience of elementary school children in the United States. This program is a hands-on, in-classroom, experience for children where they learned about applied nutrition, cooking skills, working with others, and different cultural foods. The curriculum connected food information to other school subjects such
as noting where foods come from for geography, and even connect their classroom food experiences to what was served in the lunchroom.\textsuperscript{14} Of the 165 teachers surveyed, 98\% reported that children successfully learned about healthy food, and, since part of the course focused on exposing children to new foods, they said 93\% of children also gained an interest for new foods.\textsuperscript{14} This type of exposure can lead to a child getting over his or her fear of unknown foods and encourage them to broaden their food choices.

Many countries and organizations have begun to recognize the importance of confidence gained from learning how to cook. In the UK, Grainchain.com and \textit{License to Cook}, both nutrition education sources for teachers, started the \textit{Inspire!} contest to encourage teachers to develop food-based lesson plans for 11 to 14 year old children.\textsuperscript{31} Their main objective was to give children the confidence to make healthy food choices and do this through the school system.\textsuperscript{31} Other cooking programs implemented in the United Kingdom have been gaining momentum and changing the lives of thousands of children. \textit{Let’s Get Cooking} is an after-school cooking club available to children of all backgrounds, and currently has over 5,000 clubs in existence and 164,395 members.\textsuperscript{6} After a year, the program children were surveyed and the program’s success was evident; 87\% of club members said they practiced at home, 59\% said they increased their intake of healthy foods, and 27.69\% showed their skills to someone else exposing an additional 96 people to those skills.\textsuperscript{6} These confidence ratings were achieved in a short amount of time and the children were already impacting others around them. Being able to show and teach others how to cook helps children gain self-confidence and learn how enjoyable cooking can be.\textsuperscript{6,11,12} Another program that has been implemented in the UK is the \textit{Get Cooking!} which targets disadvantaged youth, young mothers, and the young
The course was noted to have positively impacted many participants’ cooking ability and self-efficacy; 79% of participants disagreed on the post survey with the phrase “healthy food doesn’t always taste nice” as opposed to 44% on the pre-survey, 43% disagreed with the phrase “take-aways always taste nicer than food I could make” on the post as to 28% on the pre-survey, and 64% people disagreed on the post survey with the phrase “I don’t know much about how to cook” as the 52% on the pre survey. 7 (pp 22)

Evaluation Methods

Changes in dietary knowledge help support the need for continuing nutrition education.22 These improvements in dietary knowledge help people modify negative behaviors by overcoming barriers with skill, and lead them to have a healthier lifestyle.22 Measuring the degree of change in dietary knowledge is important to continue to obtain funding for nutrition and cooking classes for those in need. Anderson (2002) developed an assessment of nutritional knowledge for 10 to 13 years olds with pre- and post-questionnaire containing questions about their “knowledge of applied nutrition, knowledge of food preparation, and perceived confidence in cooking skills.”22 (pp 500-501)

The questionnaire was validated and deemed appropriate to be used with or without an intervention.22 The Cook Like a Chef program used two pre/post surveys and one post survey to evaluate the success of the program.11,12 Modified questionnaires were used to assess nutrition knowledge, food preparation skills, food selection knowledge, and attitude and behavioral changes.11,12 A short qualitative portion was included to give children the opportunity to voice their likes and dislikes about the camp, and what they want to learn.11,12 The Cookwell program used demographic questionnaires, cooking skills questionnaires (which referred cooking confidence, factors that influence food
choice, and shopping behaviors), 7-day food diaries (to measure dietary intake), and a food-frequency questionnaire. Qualitative analysis of the Cookwell program revealed an increase in cooking confidence after completing cooking classes. Studies have used various types of questionnaires to track changes in dietary knowledge and behavior. Standardized forms such as the food-frequency survey are usually available to most nutritionists and can be tailored to a specific group of people. Pre- and post-measurements of participants are usually conducted so that an increase in confidence for any task or skill can be calculated. Qualitative analysis is especially important when dealing with people to gain specific personal insight into struggles and successes.

**Menu Planning**

Moderation in respect to portion sizes is a method to control overeating. Menu planning is a way to visualize and apply nutritious eating. It is frequently used in hospitals, schools, and other institutional cafeterias to reduce costs, add variety, create balanced meals, control portions, and appease the intended audience. Abbot (2010) states that menu planning is the “key component in nutritional counseling-by planning meals ahead of time, clients are better able to modify their diets to manage their body weight or diet-related diseases…” It is an important management step for people with diabetes, cardiovascular disease, weight management and other food related ailments. In order to prevent chronic diseases, society desires “optimal nutrition.” One of the two key factors that Crawford found that leads to greater intake of fruits and vegetables was “forward-planning and organizing of food/meals.” This included making a grocery list prior to shopping for the week, planning lunch the day...
before, planning dinner at breakfast, and preparing dishes ahead of time. A sample of 5,551 primary food preparers found that families with a strict food budget who therefore planned out their meals had healthier meal considerations and practices than those who were not restricted. Planning meals ahead of time for each meal of each day can save money by preventing the buying of unneeded items, preventing the spoilage of unused food, making grocery shopping more efficient, and reducing the amount of trips to the grocery store. Menu planning can achieve nutritional wellness though increasing fruits and vegetable intake, making mealtimes easier and thus more relaxed, and reducing negative barriers to cooking healthy such as lack of time, not having ingredients, and preparation skills.

Many nutrition researchers have begun to realize that the description of cooking skills goes beyond just cooking. Knowing how to cook is not the complete answer to improving cooking confidence since many people still lack the “menu-planning skills necessary to organize a meal.” Ternier (2010) stated that what has been overlooked in many cooking confidence skill tests is that cooking skills are more than just mechanical tasks, but also include “conceptual, perceptual, planning, and fundamental skills of food nutrition, hygiene, and chemistry.” Stead (2004) also recognized that cooking is a broad process that begins with “planning for shopping and meal organization.” Participants in this study identified organizing and planning cost effective meals as a difficulty. Beshara (2010) noted that barriers to perceived healthy cooking confidence included time pressure, use of convenience products, and meal-preparation that “prior meal planning” could possibility overcome. Crawford (2007) suggested that nutritional interventions could “benefit from promoting increased
forward-planning…” in regards to influencing food and meal choices. Many of the early cooking skills classes have focused on teaching technique; the next stage in cooking classes is the skill of menu planning.

Teaching Method

The Cook Like a Chef cooking camp report noted that a next step in building cooking confidence in children was teaching menu planning. A study on UK children’s view of cooking and food preparation showed that children somewhat recognize a balance plate in their view of a “traditional” British meal, or a “proper meal”, that involves a main entrée and two “unsupported elements.” In the evaluation of the Get Cooking! program, two things noted as barriers were the fact that teenagers were unable to control shopping budget and primarily cooking responsibility which limited their ability to choose what they ate for their meals. This gap of planning a meal can be addressed with the assistance of a menu-planning template that allows for a child to build or plan a plate and parental involvement.

A hypothesized template could give a variety of common foods to choose from as well as the option to add favored foods, healthy methods of preparation, and optional seasoning blends to help plan a whole meal in a short time. Some menu planning programs have been created to help targeted groups. Ohio State University Extension developed the Quick and Healthy Meals: Tips and Tools for Planning Meals for Your Family for low-literacy audiences. This book used a 4th to 6th grade reading composition to provide nutrition education, healthy recipes, and menu planning information. It was well received by the public with 77% of recipients using the book, 100% of that group saying they’d recommend it to a friend, and several already having shared it with
Rutgers University also developed a menu planner that was designed as a tool for mothers. The first column of the menu planner held days of the week with designated meals and the following columns had sections of the grocery store under which to put ingredients needed for the chosen meal. Mothers indicated that the menu planner was useful in planning weekly meals for the family, helped organize grocery shopping, made meal planning less stressful, changed shopping lists so that they were now based off menu plans, and agreed that it felt better to plan ahead. These programs show that there are groups of people who have the skills to cook but want to further their cooking education.

**Computer/Website**

In the age of computers, many manual tasks have been recreated into computer programs to make the process quicker and easier. Menu planning can be time consuming taking a trained nutritionist anywhere from 30 minutes to 3 hours to plan one day’s worth of menus for a client. Seljak (2009) introduced a computer-based menu planning program that can create three weeks of menus in the same amount of time as it takes a nutritionist to make a menu for one day. Schools generally use one of five different types of menu planning techniques- Nutrient Standard Menu Planning, Assisted Nutrient Standard Menu Planning, traditional Food-Based Menu Planning, enhanced Food-Based Menu Planning, and mixture of these methods- to help them meet the requirements of the School Meals Initiative for Healthy Children. Of these programs, Nutrient Standard Menu Planning and Assisted Nutrient Standard Menu Planning use a computer nutritional system to track dietary quality of recipes served. Several computerized menu-planning
tools are available to nutritionists who design meals, but recently there have been more menu planning tools available for everyday people.

Many computer menu-planning services are readily available, but private services are expensive and less expensive services are usually time consuming. This was recognized by Osaka University in Japan which designed an easy-to-use system that combines a nutritional database of 1,882 standard Japanese ingredients, information-sharing capabilities (such as social networking sites), calorie calculation of individual menus, and menu planning support into a user friendly system. Since there is no standard menu planning process, algorithmic solutions vary greatly between different menu planning programs. MenuGene is an automated computer menu planner that is integrated with Cordelia, a project designed to prevent cardiovascular disease. This program uses factors about the user, such as height, weight, cholesterol rating, gender, age, etc and personal preferences set by the user to plan daily and weekly menus. MenuGene allows for flexibility of nutrient content from meal and daily menus, but keeps the nutrients within check for the week. Another user-friendly menu generator is DietPal, a Web-based menu planner created to help rural doctors who have no nutritional experience design menus for their patients. DietPal incorporates information about patient demographics, foods and menus, and uses 5 databases and 2 modules to generate diet plans and menus. The fact that DietPal is so user-friendly has set it apart from other more intensive menu planners.

The Internet is a prime location for a menu planner. The vast amount of space available on the Internet and worldwide access it has gives it the best chance of making
an impact.\textsuperscript{41} Based on this, a free website would be impertinent for a basic menu planning function.

\textit{Menu Planner Design}

It is important to get children involved in planning menus as early as possible.\textsuperscript{42} Thinking of a meal as a piece of art that effects all the senses allows for creativity and variety for meals.\textsuperscript{43} Watz (2008) noted that having “creative courage” can help overcome restrictions and problems as well as gain confidence and discover new meal ideas.\textsuperscript{43 (pp 98)} Menu planning begins with the imagining of a healthy meal. Two aspects to remember when planning a menu are the “quality of nutrients” in the meal and the “harmony of the meal’s components.”\`{\textsuperscript{40 (pp 655-656)}} Important rules for menus planning include balancing the meals, making sure there is variety, adding contrasting colors, textures, and flavors, and remembering that the eyes eat before the mouth.\textsuperscript{35} Planning ahead to keep healthy ingredients on hand such as frozen or canned vegetables contribute to quick and healthy meals.\textsuperscript{42} But the complexity of menu planning needs to be broken down into a quick and easy process.

Simplicity is the key when teaching something as complex as menu planning especially to children.\textsuperscript{10} Hornick’s study on how dietary changes can cause improvements in diet quality of menus noted that consumers “want realistic and personalized guidance to help them” be more healthy.\textsuperscript{44 (pp 2077)} The evaluated technique in this study was a transitional set of menus that took the participants from an unhealthy common menu to a healthy menu that was in compliance with the 2005 MyPyramid dietary guidelines.\textsuperscript{44} These planned menus were a simple way for the general population to actively adopt
healthier eating habits. Remley (1999) showed how increases in menu planning confidence meant diabetics were more likely to stick to their meal regime.\(^{17}\)

To learn proper portions for menu planning, one method is to visualize the plate; this contributes to increased memory retention of dietary guidelines.\(^{10,45}\) This has been demonstrated in both the MyPlate, the Plate Model, and other research reports.\(^{10,45}\) In April of 2011, the United States government recognized that the MyPyramid image was hard for people to apply so it was reformed into MyPlate, a plate visual divided into balanced portions.\(^{45}\) The plate is divided so that half contained fruits and vegetables and the other half had proteins and grains with a portion of dairy connected to the side; the portions for vegetables and grains were slightly larger than the fruit and proteins portions respectively.\(^{45}\) The Plate Model gives half the plate to vegetables alone, one quarter to grain products, the remaining quarter to proteins, and has a side of fruit, low fat dairy, and a bread.\(^{10}\) These simplified models give people a real-life backdrop they can use to eat a balanced meal. Using a pre-portioned plate to give applicable visualization will be important for children to have so they can comprehend how much food they are supposed to eat.

**Discussion**

The success of cooking skills and nutrition education classes in increasing cooking confidence has been well documented. But, the scope of what has been taught in many of these programs is limited to cooking techniques only. Nutrition and cooking skills need to be expanded to include more pre-planning of meals so that children have the opportunity to chose their own meals and not only eat what they are told. This allows
for more creativity and the chance to expand skills and food choices. The idea of a child planning to eat healthy and then having the confidence to cook the healthy concept they chose presents an opportunity to begin reversing the obesity epidemic. The purposes of this research project are to determine whether teaching children how to cook increases their self-efficacy in cooking, knowledge about cooking, and range of cooking techniques as well as to determine whether teaching children to plan healthy meals will encourage healthy eating habits.
CHAPTER 1: COOKING SELF-EFFICACY AND HEALTHY BEHAVIOR OF CHILDREN PARTICIPATING AT A COOKING CAMP

Introduction

Food related diseases such as heart disease, diabetes, stroke, and cancer rank in the top ten leading causes of death in the United States, and other food-related diseases such as overweight/obesity, hypertension, and osteoporosis are becoming more prevalent.\(^1\) The most prominent food related threat have that has begun to manifest in younger generations is obesity. The Center for Disease Control and Prevention’s National Health and Nutrition Examination Survey estimates that 17% or 19.5 million children between the ages of 2 and 19 are obese, triple that from 1980.\(^2\) With childhood obesity on the rise, teaching children the significance of healthy eating and giving them the skills to cook for themselves has become very important.

The obesity epidemic has been partly credited to the portion sizes children see in away from home eating facilities, such as restaurants and cafeterias, translating to the home.\(^4\) Research has documented that meals at home have greater nutritional value and have more realistic portions than meals seen in a restaurant.\(^5, 6, 7, 8, 9\) Women who prepared meals at home four to five times a week were 1.4 times more likely to eat two or more servings of fruit and 2 times more likely to eat two or more servings of vegetables than those who ate outside of the home.\(^9\) This could mean that a healthier diet could be accomplished if more meals were made at home. People who are confident in their cooking abilities are more likely to cook for themselves and therefore can control what they eat; this contributes to better weight and healthier diets.\(^7, 8, 10\) The main theory supporting this notion is the Social Cognitive Theory (SCT).\(^6, 7, 8\) This theory states that
modifications in knowledge, behaviors, and attitudes are “reliant upon self-efficacy, expectations, and goals.” Self-efficacy, defined as “perceived confidence on his or her ability to perform a behavior in a prospective situation”, is a “major determinant” in changing health related behavior. Many nutrition education programs have been based off the SCT theory; teaching children how to cook could influence their dietary choices. With no cooking skills, children lack the ability to prepare healthy snacks for themselves and therefore, instead turn to the more processed, easy-access foods.

_Nutrition Education and Cooking Skills_

Studies have documented that people who lack cooking skills are less likely to add variety in their diets; this limits their exposure to and consumption of new and healthy food. Behavior modification is a factor in determining food choices, portions sizes, and other eating patterns. The goal of most nutrition education and cooking programs is to substitute a healthy behavior for an unhealthy one. Food behaviors are developed through childhood and influenced by outside experiences such as food availability from parents and schools. In line with the SCT, behavior is often driven by a person’s perception of what they believe they can do. One study reported that for 18 to 23 year olds “perceived adequacy of [cooking] skills and resources for food preparation” significantly affected dietary quality. People in this age group who prepared their own food more than they ate out were more likely to eat according to the Healthy People 2010 dietary guidelines for fat, calcium, fruits, vegetables, and whole grains.
Merely knowing about nutrition and cooking is not sufficient to cause behavior change; a person must possess these skills and be able to apply them. Anderson noted that:

“Increasing familiarity with food through preparation and eating food prepared with peers in a positive affective context is a practical way to potentially increase nutrition knowledge, positive attitudes towards foods, and consumption of ‘more healthful’ foods in line with current government recommendations.”

Engaging children in concrete actions as opposed to merely teaching abstract concepts help children apply their cooking knowledge. It has been acknowledged in over 300 studies that without the addition of an action or behavior changing component to create motivation through connecting theory, research, and practice a food knowledge interventions will be unsuccessful. Food knowledge alone has failed to change behavior, but with the addition of hands-on interaction with food, knowledge can increase cooking confidence.

Contento (2008) described nutritional education as “any combination of educational strategies, accompanied by environmental supports, designed to facilitate voluntary adoption of food choices and other food and nutrition-related behaviors conducive to health and well-being…” Hands-on cooking classes help children not only encourage children to adopt healthier eating habits, but nurture the development of overall well-being through enhancing emotional and social skills. Recently, Nutrition education has begun evolving. Many programs incorporate cooking sessions and taste demos along with nutritional lessons. Culinary nutrition is a new are of
focus that merges food science, nutrition, and culinary skills which helps unite “nutrition concepts and healthy cooking techniques into sustainable eating practices…”\textsuperscript{6 (pp 1)}

\textit{Cooking Self-Efficacy for Children}

A decrease in cooking self-efficacy has been associated with the decrease likelihood to alter or try new behaviors.\textsuperscript{19} A lack of cooking self-efficacy causes greater reliance on convenience foods that generally contain higher fat, sugar, and sodium.\textsuperscript{7, 15} This paper evaluates the effectiveness of a cooking camp to increase the cooking confidence and self-efficacy of children. Several nutrition education programs have been documented to raise confidence.

\textit{The Cookshop Program} was one of the first nutritional education programs in the 1990’s.\textsuperscript{14} It was designed to bring the lunchroom and classroom together in an effort to link children’s food experiences with their environment.\textsuperscript{14} The recipes that children cooked during cooking lessons were also used in the lunchroom.\textsuperscript{14}

\textit{Cooking with Kids} is an experimental Nutrition Curriculum implemented in 2006 that was designed to engage elementary school children in cooking.\textsuperscript{10} This program is a in classroom experience during which children learn about nutrition, cooking, teamwork, and cultural foods.\textsuperscript{10} The program uses a holistic approach to connect the food the children prepare to other school subjects like geography and math, and even connect their classroom food experiences to what was served in the lunchroom.\textsuperscript{10}

Other countries have begun to recognize the importance of confidence gained from learning how to cook. In the United Kingdom, Grainchain.com and \textit{License to Cook}, nutrition education sources for teachers, started the \textit{Inspire!} contest to encourage teachers to create food-based lesson plans for preteen students.\textsuperscript{20} Their objective was to
give children the confidence to make healthy food choices. Other cooking programs in
the UK have been gaining momentum. Let’s Get Cooking is an after-school cooking club
available to children of all backgrounds. Currently it boasts over 5,000 clubs and
164,395 members. Get Cooking! is another UK program, which targets disadvantaged
youth, young mothers, and the young homeless.

Evaluation Methods

Recorded changes in dietary knowledge help support the need for continuing
nutrition education. Improvements in dietary knowledge help people modify their
negative behaviors by overcoming barriers with skill. Measuring the level of change in
dietary knowledge is important for continued funding and modification of cooking
programs. Most studies with cooking workshops include a pre-post comparison to track
goals such as an increase in confidence measures. Other measures include
demographic surveys, qualitative questions, food diaries, food frequency questionnaires,
and 24 hour dietary recalls. Standardized forms such as the food-frequency survey
are available and can be tailored to a specific group of people such as Americans,
children, or any ethnic group.

Materials and Methods

Cooking Camp

The Cook Like a Chef camp was established in 2002 at Pennsylvania State
University. There are three different versions of the camp available to campers: “The
Basics”, “The Ethnic Chef”, and “The American Chef”. Camps go Monday through
Friday from morning to early afternoon. The camp aims to encourage confidence in 10-
14 year old campers through teaching cooking techniques and motivate them to choose healthier foods.\textsuperscript{7,8} Scholarships are available so that children of any background can attend the camp.\textsuperscript{7,8} Twelve fully-equipped kitchen units are available in this lab; two to four children are assigned to each unit. Children are debriefed on the recipes available and then choose a recipe. Under the mentor of the counselors, children prepare the recipes themselves with full use of all kitchen tools and facilities including stoves, ovens, and knives. The campers make a total of twelve or more different recipes each day and then sit down for a meal. During this meal, they are taught proper dining etiquette. This camp not only gives children hands-on experience with various recipes and cooking techniques, but also informs participants of the importance of nutrition and exercise.\textsuperscript{7,8}

For example, children are taught about MyPlate/MyPyramid and given the opportunity to play games like Dance, Dance Revolution\textsuperscript{®}. This study procedure began with giving the children a pre-survey on the first day, and a post survey on the last day to detect changes in behavior, knowledge, and skills.

The Office of Research Compliance at Pennsylvania State University and Clemson University approved this study. Participants and their parents were asked to sign consent forms for the study (parent form in Appendix A). The data in this report is from the 2010 and 2011 camp years. The 2010 data was gathered as secondary data and the 2011 data was gathered first hand. A total of 97 children attended the four camps and were asked to participate in the study.
Questionnaires

Three different questionnaires were used to quantify different aspects of children’s cooking confidence, nutritional knowledge, and food preparation skill. Copies are available in Appendix B.

The Confidence and Motivation questionnaire developed and validated at Clemson University was applied to this study. Children were asked to rate their confidence for fourteen statements. The first eight statements included things such as “Use herbs and spices in cooking”, “Make fruit snacks or foods for myself”, and “Try new recipes with vegetables”. Participants were asked to rate their confidence on a 6-point scale with choices ranging from 1=“Very Unsure I Can” to 6=“Very Sure I Can”. For the remaining five questions, participants were asked how much they agreed with statements such as “I take pride in healthy eating.” and “I am very excited about eating more healthy foods on a daily basis”. One statement, “I do not really care if I eat lots of junk food.” was a negative-based question and responses were reversed in analysis to reflect the true agreement value of the participants. The ranking scale ranged from 1=”Strongly agree” to 6=”Strongly disagree”. The survey was given in a pre/post format.

The Let’s Eat Healthy questionnaire measured nutritional knowledge and was adapted from the validated Michigan State University Extension’s questionnaire Eating is Fun: Food and Me. This is an eight question, multiple-choice questionnaire. Questions covered topics such as “What information can we learn from MyPlate?”, “What are the healthiest choices for an afternoon snack?”, and “Why should we not eat foods that have been sitting out for more than 2 hours?”. A pre-questionnaire and post-questionnaire were given to determine the knowledge change from attending the camp.
The *Cooking Skills* and *Food and Nutrition Skills* questionnaires were adopted from validated Cornell Cooperative Extension survey *Cooking Up Fun!* The *Cooking Skills* questionnaire has fifteen statements that participants are asked to check all the statements that applied on a six-point confidence scale. Statements addressed various aspects of cooking skills such as “washing hands”, “using measuring cups, spoons”, and “how to bake”. The scale went from 1 to 6 with 1=“I tried for the first time.” and 6=“I taught someone else.” The *Food and Nutrition Skills* questionnaire had nine statements that participants were asked to rate on a five-point scale. Statements addressed food activities like “Choose a variety of foods”, “Limit sugar intake”, “Eat more vegetables”, and “Read food labels”. The scale ranged from 1=“I heard about this for the first time” to 6=“I taught someone else”. The two questionnaires were altered for 2011 year with the addition of a “Yes” and “No” column along with the ranking in order to acknowledge that a camper might not be able to perform an action at all. This questionnaire was also given as a pre/post format for the first time in 2011. This data was collected first hand and only the 2011 data was used (n=53).

Pre-questionnaires were given as the first item on the Monday camp started and post questionnaires were given at the end of the week on Friday morning. Campers were allowed to ask questions to the study investigators who distributed the questionnaire, camp assistants, or counselors, but were asked not to talk to each other.

*Statistics*

The statistical analysis for all three data sets -*Confidence and Motivation, Cooking Skills* and *Food and Nutrition Skills*, and *Let’s Eat Healthy-* were run using SAS 9.2. All tests were conducted using a significance level of 0.05.
For the *Confidence and Motivation* questionnaire, the Wilcoxon rank test was used to analyze the data from the combined Cooking Camps 2010 and 2011 years. The eight questions were grouped into five categories: choosing healthy snacks, healthy cooking techniques, healthy eating choices, healthy mind-set toward food, and actions to be healthier. Pre and post scores for each category were tested to determine if there was an increase in confidence.

The *Cooking Skills and Food and Nutrition Skills* questionnaire was used to judge the confidence about given statements and skills. McNemar’s test was used to consider differences in the pre and post proportions that participants had selected for a particular statement; a “yes” or “no” response.

The Wilcoxon rank test was used to consider changes in the responses on the *Let’s Eat Healthy* questionnaire. The questions from this survey were grouped into three categories: food safety, food nutrients and sources, and food groups and MyPlate. Of the 100 original surveys taken from the 2010-2011 camp years, 95 observations were used. Three observations were eliminated due to children who participated in both cooking camps for one year. One observation was removed due to a delay in the child taking the pre-survey. Another observation was removed due to the child’s illness from Tuesday-Thursday of the camp week.

**Results**

The *Cook Like a Chef* camp catered to children ranging in age from 10 to 14 with mainly 11 and 12 year olds in attendance. *Table 1* lists the frequencies and percentages of the ages, grades and genders of the camp participants. Most of the children (76.84%)
were in grades 6 or 7. Roughly two-thirds of the children were female and one third was male.

**Table 1 Percentage and Frequencies of Cooking Camp Participants.**

<table>
<thead>
<tr>
<th>Demographic</th>
<th>% (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>6.32 (6)</td>
</tr>
<tr>
<td>11</td>
<td>34.84 (33)</td>
</tr>
<tr>
<td>12</td>
<td>37.89 (36)</td>
</tr>
<tr>
<td>13</td>
<td>16.84 (16)</td>
</tr>
<tr>
<td>14</td>
<td>4.21 (4)</td>
</tr>
<tr>
<td><strong>Grade</strong></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4.21 (4)</td>
</tr>
<tr>
<td>6</td>
<td>32.63 (31)</td>
</tr>
<tr>
<td>7</td>
<td>44.21 (42)</td>
</tr>
<tr>
<td>8</td>
<td>14.74 (14)</td>
</tr>
<tr>
<td>9</td>
<td>4.21 (4)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>F</td>
<td>64.21 (61)</td>
</tr>
<tr>
<td>M</td>
<td>35.79 (34)</td>
</tr>
</tbody>
</table>

**Confidence and Motivation**

The *Confidence and Motivation* questionnaire was divided into five categories: confidence to prepare and eat healthy snacks, use of healthy cooking techniques, making healthy eating choices, having positive feelings toward healthy foods, and making an active effort to be healthier. The categories of healthy snacks, healthy cooking, and healthy eating were derived from the first eight statements of the questionnaire. For this questionnaire a value of “1” was the lowest confidence ranking and a value of “6” was the highest. It was seen that the confidence ranking for preparing healthy snacks (p-value<0.0001), using healthy cooking techniques (p-value<0.0001), and eating healthy foods (p-value<0.0001) significantly increased from pre-questionnaire to post-questionnaire. The categories of healthy feeling (positive attitudes) and healthy eating
(actions) were associated with the subsequent five questions for which the lowest agreement was a value of “6”, and the highest agreement value was a “1”. It can be noted that the confidence for having positive feelings toward healthy food significantly increased from pre-questionnaire to post-questionnaire (p-value=0.0012), but did not significantly increase in doing healthy actions (p-value=0.1606).

Cooking, Food, and Nutrition Skills

The data presented in Table 2 represents the statements on the Cooking Skills and Food and Nutrition Skills questionnaires that reflect cooking skills confidence and healthy eating choices of the participants. The participants answered on a dichotomous scale of either “yes” they had confidence to perform a task or “no” they did not. Five out of twelve statements were found to have a significant increase in “yes” ratings (sauté, p-value=0.0026; how to stir fry, p-value=0.0015; limit fat intake, p-value<0.0001; limit sugar intake, p-value<0.0001; and eat more fiber p-value<0.0001). Broiling, steaming, and eating vegetables were found not to have a significant increase in confidence for doing these tasks. The four statements of using measuring spoons/cups, using a stovetop burner, how to bake, and eating more fruit had high percentages of “yes” for either pre and/or post, as seen in Table 2; 90.25% to 100% confidence was reported for those four tasks.
Table 2 Frequencies and P-values of “Yes” Responses to Confidence Pre and Post Cooking and Food and Nutrition Skills Questionnaire (n=51)

<table>
<thead>
<tr>
<th>Question</th>
<th>Pre-Questionnaire</th>
<th>Post-Questionnaire</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Using measuring cups, spoons</td>
<td>100.00</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>Sauté</td>
<td>48.00</td>
<td>78.43</td>
<td>0.0026</td>
</tr>
<tr>
<td>Using a stovetop burner</td>
<td>90.20</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>How to steam</td>
<td>64.71</td>
<td>76.47</td>
<td>0.1796</td>
</tr>
<tr>
<td>How to stir fry</td>
<td>50.98</td>
<td>80.39</td>
<td>0.0015</td>
</tr>
<tr>
<td>How to broil</td>
<td>62.00</td>
<td>76.47</td>
<td>0.1185</td>
</tr>
<tr>
<td>How to bake</td>
<td>94.12</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>Limit fat intake</td>
<td>74.51</td>
<td>98.04</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Limit sugar intake</td>
<td>70.59</td>
<td>96.08</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Eat more fruits</td>
<td>96.08</td>
<td>100.00</td>
<td></td>
</tr>
<tr>
<td>Eat more vegetables</td>
<td>94.12</td>
<td>98.04</td>
<td>0.6250</td>
</tr>
<tr>
<td>Eat more fiber</td>
<td>70.00</td>
<td>96.08</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Let’s Eat Healthy

The Let’s Eat Healthy questions were divided into three groups: Food Nutrients and Sources, Food Groups and MyPlate, and Food Safety. The pre and post questionnaire results for the Food Safety category did not show a statistically significant increase in knowledge (pre-knowledge mean=1.5684, post-knowledge mean=1.5684, p-value=0.9659). The category of Food Nutrients and Sources also did not have a statistically significant increase in knowledge from pre to post questionnaire (pre-knowledge mean=1.9145, post-knowledge mean=1.9474, p-value=0.3750). The category of Food Groups and MyPlate had a statistically significant increase in knowledge (pre-knowledge mean=2.4632, post-knowledge mean=2.7684, p-value<0.0001). The percentages for each of the eight questions of correct answers from pre/post are represented in Table 3.
Table 3 Percentages of Correct Answers for Let’s Eat Healthy Questionnaire (n=97)

<table>
<thead>
<tr>
<th>Question</th>
<th>Pre Questionnaire Percentage</th>
<th>Post Questionnaire Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>What information can we learn from MyPlate?</td>
<td>67.37</td>
<td>88.42</td>
</tr>
<tr>
<td>Eggs and nuts are a good source of what?</td>
<td>91.58</td>
<td>94.74</td>
</tr>
<tr>
<td>Which food is the best source of whole grain?</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>We should wash fruits and vegetables before we eat them…</td>
<td>94.74</td>
<td>90.53</td>
</tr>
<tr>
<td>How many servings per day should we have from the milk group?</td>
<td>80.00</td>
<td>89.47</td>
</tr>
<tr>
<td>Which of these is the healthiest choice for an afternoon snack?</td>
<td>98.95</td>
<td>98.95</td>
</tr>
<tr>
<td>Why should we not eat foods that have been sitting out for more than 2 hours?</td>
<td>62.11</td>
<td>66.32</td>
</tr>
</tbody>
</table>

Discussion

The use of hands-on teaching sessions and educational nutritional lessons has contributed to increased confidence in children. Increased confidence in cooking skills may transfer into healthier eating habits. Children in the UK Let’s Get Cooking afterschool program were surveyed a year following the program; 87% of program attendants said they practiced at home, 59% said they increased their intake of healthy foods, and 27.69% participants showed their skills to someone else exposing an additional 96 people to those skills. Cooking confidence can also alter the perception of foods and meal preparation. The Get Cooking! course documented a positive impact on many of the participants with 79% of participants disagreeing on the post questionnaire with the phrase “healthy food doesn’t always taste nice” as opposed to 44% on the pre-questionnaire, 43% disagreed with the phrase “Take-aways always taste nicer than food I could make” on the post as to 28% on the pre-questionnaire, and 64% people disagreed
on the post-questionnaire with the phrase “I don’t know much about how to cook” as compared to the 52% on the pre questionnaire.\textsuperscript{21 (pp 22)}

During the two years of the \textit{Cook Like a Chef} camp, the \textit{Confidence and Motivation} questionnaire indicated increased confidence in choosing healthy snacks (p-value<0.0001), using healthy cooking techniques (p-value<0.0001), healthier eating habits (p-value<0.0001), and positive attitudes toward healthy foods (p-value=0.0012). There was not a significant change (p-value=0.1606) in the category of healthy actions that included statements of “Eating healthy is a major priority in life” and “I am involved in planning daily meals so that I eat plenty of healthy foods.” This shows an area that can be improved upon in the next program offering with possible additions of a menu planning lesson and/or getting the parents involved in encouraging their children to be more active in the mealtime planning and preparation.

Cooking skills and knowledge of food and nutrition give children the opportunity to be active in their own health. Cooking camps expose children to new cooking techniques and foods. Walters documented that for the 165 teachers surveyed in the \textit{Cooking with Kids} program, 98% reported that children successfully learned about healthy food, and 93% of children also gained an interest in new foods.\textsuperscript{10}

In the 2011-year, the participants in \textit{Cook Like a Chef} camp had a significant increase in knowledge of cooking skills. Sautéing and stir-frying both had significant increases in knowledge (p-value=0.0026 and p-value=0.0015 respectively). Other techniques such as steaming, broiling, baking, using a stove top, and using measuring cups and spoons did not indicate significant changes. It was observed that a ceiling affect had occurred; children had already been exposed to using of measuring cups and spoons,
using a stovetop, and baking due to high frequencies in the pre-questionnaire “yes” responses (100% for pre-questionnaire for measuring cups and spoons, 92% pre-questionnaire for using a stovetop, and 94.12% pre-questionnaire for baking).

In the 2011 year, a significant increase in food and nutrition knowledge was also observed at the *Cook Like a Chef* camp. Techniques for limiting fat, limiting sugar, and eating more fiber were found to have significant increases in agreement (p-value<0.0001 for all). Significant increases in knowledge were not observed for eating more fruits and vegetables. It was observed that a ceiling affect had occurred in that children had been previously exposed to ways of eating more fruits (96.08% “yes” pre responses).

To have the confidence to cook and eat healthy, a strong knowledge base has to be in place first. The knowledge base is used to connect all the skills learned and allows a child to apply the skills to their everyday life. The *Let’s Eat Healthy* questionnaire saw a significant increase in only one category of questions: Food groups and MyPlate (p-value<0.0001). The other two categories, food safety, and food nutrients and sources, did not have significant increases. The children indicated prior knowledge for food nutrients and sources with 100% correct answer for both pre and post questionnaires for a question asking about what is considered a whole grain, and 91.58% pre-correct responses and 94.74% post-correct responses for of what eggs and nuts are a good source. The food safety category had the same mean for pre and post responses (pre-knowledge mean=1.5684, post-knowledge mean=1.5684) due to the increases in correct responses (62.11% to 66.32%) for one statement being cancelled out due to an equivalent increase in incorrect responses of another question in the same category (94.74% to 90.53%). For future camps, food safety aspects may be more directly
addressed to lessen confusion children might have about topics like leaving food out and washing fruits and vegetables.

**Recommendations and Limitations**

There are some limitations and recommendations for this study. There are only two camps a year with roughly 20-35 campers a session; this limits the sample size unless, like for this study, multiple years of data are used. A recommendation would be to take “The Basics” camp and format it so that it could be reproduced in other parts of the country. This would not only create a larger sample size, but a more varied one as well. Another limitation is that children are able to attend multiple camps from year to year and even attend back-to-back camps in the same year. This could cause a carry over effect for the results since the same questionnaires are used year to year and therefore children are already exposed to them. Campers are encouraged to attend more than one of the three camps offered, so removing duplicate questionnaires could remove the carry over effect. The carry over effect can decrease the initial effect size because pre-questionnaire results will be higher. Another limitation is that there was no control group or random assignment for the alternative intervention. Random assignment of the intervention and a control group would decrease the threat to the reliability of the study. For future studies, all counselors need to be trained for every specific questionnaire so that counselors can be fully equipped to answer all questions from the campers. The instructions for the *Cooking Skills* and *Food and Nutrition Skills* questionnaire need to be formatted in a way that stands out from the rest of the questionnaire. Also, the questionnaire needs to be re-
validated and re-worded since it is now given in a pre/post form and had “yes” and “no” columns added.

**Conclusion**

The *Cook Like a Chef Camp* gives children the opportunity to have hands-on interaction with food. It has proven to encourage the cooking confidence, improve many cooking skills, and improve food and nutritional knowledge. This type of camp can be easily replicated throughout the United States. *Cook Like a Chef Camp* and cooking camps like it could possibly be one method in preventing and reversing obesity in children.

**References**


CHAPTER 2: PROMOTING LIKELIHOOD OF HEALTHY COOKING IN THE HOME: MENU PLANNING SELF-EFFICACY OF CHILDREN’S COOKING CAMP PARTICIPANTS

Introduction

In American society, heart disease, diabetes, stroke, and cancer, all food related diseases, rank in the top ten leading causes of death; other food-related diseases include overweight/obesity, hypertension, and osteoporsis. Some of these food related threats have begun to affect younger generations with one of the most prominent being obesity. According to the Center for Disease Control and Prevention’s National Health and Nutrition Examination Survey, the amount of children who are obese has tripled from the 1980’s with an estimated 17% or 19.5 million children between the ages of 2 and 19 being obese. A nutritious diet is imperative for a healthy child. Research has shown that eating breakfast can improve cognitive brain function among children. An inadequate diet has the potential to cause significant impact on children’s health and cognitive development. With childhood obesity on the rise, it has become more important than ever to provide children with the knowledge and skill to support healthy eating.

The increase in the obesity epidemic has been partly attributed to the oversized portions children observe in restaurants becoming common at home. Kuo and et al. (2009) hypothesized that if 20% of restaurant patrons chose meals that had at least 125 calories fewer than that of their typical order, this would prevent a 101.5% increase in weight gain in this population. Various studies have indicated that meals at home may have better nutritional value, more realistic portions, or generally contain healthier foods than that seen in a restaurant. Crawford (2010) observed that women who prepared food at home four to five times a week were 1.4 times more likely to eat two or
more servings of fruit and 2 times more likely to eat two or more servings of vegetables than those that did make as many meals at home. It could be therefore implied that if more people consumed meals at home rather than at restaurants that a better weight balance and healthy diet could be achieved. People who are confident in their cooking abilities are more likely to cook for themselves than go out to eat; this could reduce caloric intake. This relationship between an individuals self-efficacy and specific behavior is described in the Social Cognitive Theory (SCT) which states that changes in a person’s “knowledge, behaviors, and attitudes” are “reliant upon self-efficacy, expectations, and goals.” The belief is that one’s self-efficacy, defined as “perceived confidence on his or her ability to perform a behavior in a prospective situation”, is a major contributor to changing health related behavior. Without any cooking training, children lack the ability to prepare food for themselves and therefore eat more processed, convenience foods instead. Several successful nutrition education programs have been founded in the SCT theory; teaching children how to cook with the intention of influencing their dietary choices.

Gaining confidence in cooking through learned cooking skills has been well documented, but an observation in several research discussions has been the narrowed scope of the definition of cooking skills. Cooking skills in most cooking classes has been limited to teaching cooking technique and use of kitchen tools. There is a need for a greater range of cooking skills to be taught such as hygiene, menu planning, grocery shopping, cost effective buying, and more. This paper examines the importance of one of those additional skills, menu planning, and how it is the next step for a successful cooking and nutrition education program for children.
Menu Planning

Nutrition researchers have realized that the description of cooking skills goes beyond just cooking. Knowing how to cook is necessary but not sufficient for improving cooking confidence since many people still lack the “menu-planning skills necessary to organize a meal.” Ternier (2010) stated some cooking confidence skill tests have overlooked that cooking skills are more than just mechanical tasks, but also include “conceptual, perceptual, planning, and fundamental skills of food nutrition, hygiene, and chemistry.” Stead (2004) also recognized that cooking is a broad process that begins with “planning for shopping and meal organization.” Participants in this study identified organizing and planning cost effective meals as a difficulty they wanted to overcome. Beshara noted that barriers to perceived healthy cooking confidence included time pressure, use of convenience products, and meal-preparation that “prior meal planning” could possibility overcome. Crawford (2010) found that women were more likely to consume two or more servings of fruits daily if they that planned meals for the week prior (odds ratio = 1.7 with a range of 1.2-2.5), plan the evening meal in the morning (odds ratio = 2.3 with a range of 1.6-3.4), and planned the day before what they were going to eat for lunch (odds ratio=2.2 with a range of 1.5-3.3) as opposed to women who did not plan at all. Women reported intakes of two or more servings of vegetables a day if they planned meals before going grocery shopping (odds ratio= 1.8 with a range of 1.2-2.7), planned the evening meal in the morning (odds ratio= 1.9 with a range of 1.2-2.8), and planned what they ate for lunch (odds ratio= 1.2 with a range of 0.8-1.9) as compared to women who did not plan at all. Crawford suggested that nutritional interventions could “benefit from promoting increased forward-planning…” in
regards to influencing food and meal choices.\textsuperscript{9} (pp 263) Research on early cooking skills classes have focused on teaching technique; the next logical stage in design of cooking classes is the inclusion of menu planning skills.

Moderation in respect to portion sizes is a method to control overeating.\textsuperscript{6, 20} Menu planning is a way to visualize and apply nutritious eating. It is frequently used in hospitals, schools, and other institutional cafeterias to reduce costs, add variety, create balanced meals, control portions, and appease the intended audience.\textsuperscript{21} Abbot states that menu planning is the “key component in nutritional counseling-by planning meals ahead of time, clients are better able to modify their diets to manage their body weight or diet-related diseases…”\textsuperscript{22} (pp 66) It is an important management step for people with diabetes, cardiovascular disease, weight management, and other food related ailments.\textsuperscript{13, 14, 19, 22}

In order to prevent chronic diseases, society desires “optimal nutrition.”\textsuperscript{12} One of the two key factors that Crawford found that lead to greater intake of fruits and vegetables was “forward-planning and organizing of food/meals”.\textsuperscript{9} (pp 263) Forward-planning included items such as making a grocery list prior to shopping for the week, planning lunch the day before, planning dinner at breakfast, and preparing dishes ahead of time.\textsuperscript{9} A sample of 5,551 primary food preparers and found that families with a strict food budget who therefore planned out their meals had healthier meal considerations and practices than those who were not on a budget.\textsuperscript{23} Planning meals ahead of time can save money by preventing the purchase of unneeded items, reducing spoilage of unused food, reducing gas costs by reducing trips to the grocery store, and make shopping more efficient so that the food bought is only what is needed.\textsuperscript{20, 22, 24} Menu planning can achieve nutritional adequacy through increasing fruit and vegetable intake, reducing
mealtime stress, and reduce negative barriers to cooking healthy such as lack of time and planning, and preparation skills.22

**Teaching Menu Planning**

The *Cook Like a Chef* cooking camp report noted that a next step in building cooking confidence in children was teaching menu planning.7 A study on UK children’s view of cooking and food preparation showed that children somewhat recognize a balanced plate in their view of a “traditional” British meal, or a “proper meal”, that involves a main entrée and two “unsupported elements.”25 (pp 259) In the evaluation of the *Get Cooking!* program, two things noted as barriers were the fact that teenagers do not normally do the grocery shopping and have primary cooking responsibility which limited their ability to choose what they ate for their meals.26 Parental involvement should be included to overcome these barriers. Menu planning can also address the present need for tools for a child to build their own plate with the assistance of a menu-planning template.

General menu planning concepts have been created to help targeted groups. Ohio State University Extension developed the *Quick and Healthy Meals: Tips and Tools for Planning Meals for Your Family* for low-literacy audiences.36 This book used a 4th to 6th grade reading composition to provide nutrition education, healthy recipes, and menu planning information.27 Seventy-seven percent of recipients used the book, 100% of that group said they would recommend it to a friend; several had already shared it with others.27 Rutgers University also developed a menu planning grid for mothers.22 The first column of the menu planner held days of the week with designated meals and the following columns depicted sections of the grocery store under which to put ingredients needed for the chosen meal.22 Mothers indicated that the menu planner was useful in
planning weekly meals for the family, helped organize grocery shopping, made meal planning less stressful, changed shopping lists so that they were now based off menu plans, and agreed that it felt better to plan ahead. These programs demonstrate that there are groups of people who have the skills to cook, but desire to further their cooking education.

**Computer/Website**

In the age of computers, many manual tasks common to nutrition assessment and planning have been recreated into computer programs to make the process quicker and easier. Menu planning can be time consuming taking a trained nutritionist anywhere from 30 minutes to 3 hours to plan one day’s worth of menus for a client. Seljak introduced a computer-based menu planning program that can create three weeks of menus in the same amount of time. Some schools use Nutrient Standard Menu Planning and Assisted Nutrient Standard Menu Planning which are computer nutritional system to track dietary quality of recipes served and make sure they meet the requirements of the School Meals Initiative for Healthy Children. Several computerized menu-planning tools are available to nutritionists who design meals, but recently there have been more menu planning tools available for application in the home.

Private menu planning services may be costly, but the less expensive, public services are usually time consuming. This was recognized by Osaka University in Japan which designed an easy-to-use system that combines a nutritional database of 1,882 standard Japanese ingredients, information-sharing capabilities (such as social networking sites), calorie calculation of individual menus, and menu planning support into a user friendly system. *MenuGene* is an automated menu planner which uses
personal anthropometric data and other user factors, such as height, weight, cholesterol level, gender, age, etc., and personal preferences set by the user to plan daily and weekly menus.  

MenuGene allows for flexibility of nutrient content in daily menus, but keeps the nutrients within check for the week’s diet. Another user-friendly menu generator is DietPal, a Web-based menu planner created for to help rural doctors who have limited nutritional experience design menus for their patients. DietPal incorporates information about patient demographics and food and menus, and uses five databases and two modules to generate diet plans and menu. The fact that it is so user-friendly has set DietPal apart from other more intensive menu planners.

Menu Planner Design

It is important to get children involved in planning menus at early age as possible. Remley (1999) noted how increases in menu planning confidence meant diabetics were more likely to stick to their meal regime. Thinking of a meal as a piece of art that impacts all the senses allows for creativity and variety for meals. Watz (2008) noted that having “creative courage” can help overcome restrictions and problems as well as gain confidence and discover new meal ideas. (pp 98) Menu planning begins with the image of a healthy meal. Two aspects to remember when planning a menu are the “quality of nutrients” in the meal and the “harmony of the meal’s components.” Important rules for menu planning include balancing the meals, making sure there is variety, watching calories, and adding contrasting colors, textures, and flavors. Planning ahead to keep healthy ingredients on hand such as frozen or canned vegetables contribute to quick and healthy meals. But the complexity of menu planning needs to be broken down into a quick and easy process.
Simplicity is the key when teaching a skill as complex as menu planning. Hornick’s study on how dietary changes can cause improvements in diet quality noted that consumers “want realistic and personalized guidance to help them” be more healthy. The evaluated technique in this study was a transitional set of menus that took the participants from an unhealthy, common menu to a healthy menu that was in compliance with the 2005 MyPyramid dietary guidelines. These planned menus were a simple way for the general population to actively adopt healthier eating habits. To learn proper portions for menu planning, one method is to visualize the plate; this contributes to increased memory retention of dietary guidelines. This has been demonstrated in both the MyPlate plate put out by the United States government, the Plate Model, and other research reports. In April of 2011, the United States Department of Agriculture recognized that the MyPyramid image was hard for people to apply to eating habits so it was reformed into MyPlate, a plate visual divided into balanced portions. The plate is divided so that half contained fruits and vegetables and the other half had proteins and grains with a portion of dairy connected to the side; the portions for vegetables and grains is slightly larger than the fruit and proteins portions respectively. The Plate Model gives half the plate to vegetables alone, one quarter to grain products, the remaining quarter to proteins, and has a side of fruit, low fat dairy, and a bread. These simplified models give people a real life backdrop they can use to eat a balanced meal. Using a pre-portioned plate to give an applicable visual will be important for children to have so they can comprehend portion sizes.

The success of cooking skills and nutrition education classes in increasing cooking confidence has been well documented. But, the scope of what has been taught in
many of these programs is limited to cooking techniques only. The literature suggests that nutrition and cooking skills need to be expanded to include more pre-planning of meals so that children have input into the foods they eat. This allows for more creativity and the chance to expand skills and food choices. The goal of this research was to instruct children in menu planning and healthy eating, thus encouraging children to plan to eat healthier. This concept could be a method to reversing the obesity epidemic. This study was conducted to examine whether teaching children how to plan meals would increase fruit and vegetable intake and whether children felt they could plan their own meals.

**Materials and Methods**

*Intervention Development*

The concept of the menu planning plate was designed by adaptation of the DASH concept. The DASH diet, or Dietary Approach to Stop Hypertension, designates that a plate should be half vegetables, a quarter protein, a quarter whole grain, and have a serving of fruit and low-fat dairy. The study Menu Planning Plate template incorporated one to four blanks for designated food choices, preparation techniques, and/or seasoning choices for each food group. Both the whole grain and protein food sections included blanks for the item name, method of preparation/cooking, and seasoning. The fruit and vegetable food sections display four blanks: one for a color of item, one for food item choice corresponding to the color selected, method of preparation/cooking, and seasoning blend selection. For the dairy portion, participants could only pick a food item. A participant could design a partial or complete meal.
Design Piloting and Testing

Proto-types

A proto-type of the Menu Planning Plate template was developed using magnets as the medium. It consisted of a circular plate design with two additional food items attached to the top (similar to Mickey Mouse™). The template roughly measured six inches in diameter and 9 inches in height. An additional thirty-four magnets designed to fit only in designated parts of the template were used to build a meal. The proto-type menu planning tool was tested at two area events for the Faith Activity and Nutrition (FAN) Project. This project works with the African Methodist Episcopal (AME) church groups to promote a healthy lifestyle through exercise and eating according to the DASH diet. The events were a FAN conference and FAN cooking training session in which different questionnaires were distributed to survey items such as where the plate would be used, whether the design usable, and was it something participants thought children could understand. The proto-type tool consisted of 35 magnets and it was determined that an alternative medium was needed in order to improve and simplify user-friendliness. A Menu Planning Placemat was developed. It was an 11’ by 17’ laminated template that consisted of a color-coded, pre-portioned plate model with designated blanks. Food choices, cooking techniques, and seasoning blends were in color-coded sections around the plate. A sample of the placemat is provided in Appendix C.

Pilot

Children ages 10-14 from a community center in Sumter, South Carolina were asked to participate in a pilot review of the practical application for the Menu Planning Placemat. Children were read a verbal assent script and given the opportunity to decline
participating in the study (Appendix D). Ten participants were given a short presentation on the new MyPlate and a demonstration on how to use the plan meals with the Menu Planning Placemat. During the session, the children practiced menu planning and were encouraged to ask questions. A questionnaire was developed to detect changes in self-reported confidence in menu-planning for any participants. The questionnaire was administered in a pre/post format. Questions included fruit and vegetable consumption, increased confidence in planning meals, and usability of the menu-planning template. Participants also completed the questionnaire developed to evaluate practical application of the menu planning plate. Participants were allowed to keep the placemats through the remainder of the week and encouraged to practice with it at home. The children were surveyed again a week later and participated in a focus group to determine if they encountered any difficulty in using the Menu Planning Placemat. This group of participants was also given the opportunity to ask any question they had with respect to the questionnaire instrument.

During the focus group, a majority of the participants indicated that they would prefer an electronic version of the Menu Planning Plate. Subsequently, a website was developed to support the Menu Planning Placemat. The website allowed participants to plan, save, and print up to six weeks worth of meals. The menu planning web template was tested at a cooking camp for the study.

Cooking Camp

The Office of Research Compliance for Pennsylvania State University and Clemson University approved this study. This study used a convenience sample from the existing camp and was a pre-post one-sample study. Pennsylvania State University has
been hosting a children’s cooking camp for 10 years. Children ages 10 to 14 participated in hands-on cooking lessons and prepared their own food under the mentoring of counselors. The counselors consist of college students that are majoring in nutrition. *Cook Like a Chef* offers three camps, which are rotated over the years: “The Basics”, “The Ethnic Chef”, and “The American Chef”. Children spend from 9am to 1pm from Monday through Friday at the camp. Children are taught a wide range of topics including MyPlate, foods from countries around the world, and how to properly use and clean knives. Children learn various preparation and cooking techniques, are given lessons on nutrition, and sample a variety of foods.

The 2011 camp was the first camp that a menu-planning lesson was implemented. A parent newsletter explaining the menu planning template was distributed when parents registered their children. The pre-questionnaire was given as the first activity on Monday, first day of camp, and the post-questionnaire was given as the first activity on Friday, the last day of camp. The *Menu Planning* questionnaire was attached to the bottom of the *Confidence and Motivation* questionnaire, and the post questionnaire contained additional questions. After the pre-questionnaire on the first day, the children were given a presentation on MyPlate, rationale for planning meals, and how to use the Menu Planning Plate website. The participants at the *Cook Like the Camp* were given a private account. They could click on a part of the Menu Planning Plate and page-by-page instruction walked them through planning each portion of the plate. During the week of camp, they had the opportunity to interact with the website, ask questions, and receive personal assistance from the project investigator in menu planning accordingly. Children’s activity on the website were tracked through an administrators website which allowed the
investigators to see what day and time the children went to the Menu Planning Plate website, their duration on the site, and the meal the child planned. Children who had not interacted with the website by Thursday morning or did not have access to a computer were able to interact with the website and receive personal assistance during or after the camp hours. Children received a copy of the Menu Planning Placemat to take home on the last day of camp, and were encouraged to continue to use the website following the camp. A follow up e-mail was sent two weeks later encouraging them to continue to use the website and share it with their parents.

SAS 9.2 and several different analytical methods were used to analyze the data. The Wilcoxon signed rank test was used to determine whether or not there was a significant increase in confidence for the confidence ranking questions, and to determine if there was a significant increase in the fruit and vegetable consumption estimations.\(^7\),\(^8\) The McNemar’s test was used to determine significant changes in agreement for the dichotomous, yes/no questions.\(^37\) Descriptive analysis using relative frequencies was used for the questions that were solely on the post-questionnaire.

**Results**

A total of 53 children participated in the two sessions of the 2011 *Cook Like a Chef* camp. Ages ranged from 10-14 with the majority of the children being either 11 (35.85%) or 12 (39.62%). Grades of the participants ranged from 5\(^{th}\)-9\(^{th}\) with the majority of the children being in 7\(^{th}\) grade (42.17%). The participants consisted of almost two-third females (62.26%). The remaining demographics are listed in **Table 1**.
Table 1 Percentage and Frequencies of Menu Planning Participants.

<table>
<thead>
<tr>
<th>Demographic</th>
<th>% (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>3.77 (2)</td>
</tr>
<tr>
<td>11</td>
<td>35.85 (19)</td>
</tr>
<tr>
<td>12</td>
<td>39.62 (21)</td>
</tr>
<tr>
<td>13</td>
<td>13.21 (7)</td>
</tr>
<tr>
<td>14</td>
<td>7.55 (4)</td>
</tr>
<tr>
<td>Grade</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5.66 (3)</td>
</tr>
<tr>
<td>6</td>
<td>28.30 (15)</td>
</tr>
<tr>
<td>7</td>
<td>47.17 (25)</td>
</tr>
<tr>
<td>8</td>
<td>11.32 (6)</td>
</tr>
<tr>
<td>9</td>
<td>7.55 (4)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>62.26 (33)</td>
</tr>
<tr>
<td>Male</td>
<td>37.74 (20)</td>
</tr>
</tbody>
</table>

Children were asked separate questions on whether or not they believed planning their meals would increase their intake of vegetables and/or their intake of fruits. A negative relationship was seen from pre to post questionnaire. Of the children, 88.24% indicated that planning daily meals would result in eating more vegetables on the pre-questionnaire, but only 72.55% indicated so on the post survey. This was a significant decrease in agreement (p=0.008). On the pre survey, 82.35% of the children believed planning daily meals would increase fruit intake, but only 80.39% of the children agreed with this on this post survey. This was a non-significant change (p=1.000). Table 2 displays the percentages and frequency of observations.
Table 2 Participant Responses for Whether Menu Planning Increases Fruit and Vegetable Intake

<table>
<thead>
<tr>
<th>Question</th>
<th>Pre-Questionnaire Percent Yes (n)</th>
<th>Post-Questionnaire Percent Yes (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would planning a meal increase the amount of vegetables you eat?</td>
<td>88.24% (45)</td>
<td>72.55 (37)</td>
</tr>
<tr>
<td>Would planning a meal increase the amount of fruit you eat?</td>
<td>82.35% (42)</td>
<td>80.39% (41)</td>
</tr>
</tbody>
</table>

Participants were also surveyed to determine how many additional servings of fruits and vegetables they believed they would eat if they planned their meals. Only the participants that answered “Yes” for both pre and post questionnaire were used in the analysis for consistency. The average estimated increase for servings of fruits and vegetables was determined. Participants indicated a non-significant mean increase in vegetable consumption of 2.7 (pre-questionnaire) to 2.8 (post-questionnaire) servings per day if meals were planned (p-value=0.4455). Participants also indicated a non-significant increase of 2.8 (pre-questionnaire) to 2.9 (post-questionnaire) more servings of fruit that would be eaten if the meals for the day were planned (p-value =0.4997). Post scores were slightly higher for both estimates of different types of vegetables and of different types of fruits consumed as related to menu planning (Table 3).

Table 3 Mean, Standard Deviation, and p-value of Estimated Servings for Vegetables and Fruits for Matched Pre-Post Participants

<table>
<thead>
<tr>
<th>Category</th>
<th>Mean Pre-Questionnaire</th>
<th>Mean Post-Questionnaire</th>
<th>Standard Deviation of Differences</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated increase in daily vegetable servings</td>
<td>2.722</td>
<td>2.833</td>
<td>1.063</td>
<td>0.4455</td>
</tr>
<tr>
<td>Estimated increase in daily fruit servings</td>
<td>2.816</td>
<td>2.895</td>
<td>0.882</td>
<td>0.4997</td>
</tr>
</tbody>
</table>
Participants were asked whether they felt confident to plan a meal, a days worth of meals, and a weeks worth of meals. Table 4 illustrates the means for the pre and post questionnaire data. The participants were asked to select a ranking from 1 to 3 with 1= “No, I do not feel confident”, 2=“Somewhat confident”, and 3=“Yes, I feel completely confident.” Participants had a significant increase in mean values from 2.510 to 2.765 in confidence for planning a meal (p=0.0010). The shift from directly in between “Somewhat confident” and “Yes, I feel completely confident” to a closer to the latter can be observed. For planning a day’s worth of meals, a shift closer from a solid “Somewhat confident” or “2” (pre mean=2.275) to closer to “Yes, I feel completely confident” (post mean=2.647) was observed. This change was also significant (p<0.0001). The change in confidence for planning a whole week of meals had the lowest confidence means (pre mean = 1.980 and post mean =2.353). This could be because a greater amount of work is needed to do this task. This was a significant change (p<0.0001), but remained near to the value of “2” or “Somewhat confident.”

Table 4 Mean of the Pre-test and Post-test rankings, Standard Deviation, and p-value for Confidence and Self-efficacy.

<table>
<thead>
<tr>
<th>Category</th>
<th>Mean Pre-Questionnaire</th>
<th>Mean Post-Questionnaire</th>
<th>Standard Deviation of Differences</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planning a meal</td>
<td>2.510</td>
<td>2.765</td>
<td>0.483</td>
<td>0.0010</td>
</tr>
<tr>
<td>Planning a whole day of meals</td>
<td>2.275</td>
<td>2.647</td>
<td>0.692</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Planning a whole week of meals</td>
<td>1.980</td>
<td>2.353</td>
<td>0.662</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Participants were asked several items that were only on the post-questionnaire (Table 5). Almost two-thirds of the participants (64.71%) said they were completely confident in their ability to plan a meal according to the MyPlate guidelines. Of the
participants, 84.31% said the menu planning plate was easy to use, and 80.39% said they could teach someone else to use it. Over half of the participants (52.94%) said that they planned eating recipes from the cooking camp at home by using Menu Planning Plate. Over 75% of the participants said that they would use the Menu Planning Plate after camp, and 90.2% of the participants used the Menu Planning Plate while attending camp.

Table 5 Relative Frequencies of Post Only Menu Planning Questions

<table>
<thead>
<tr>
<th>Question</th>
<th>Category</th>
<th>Percentage (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>How confident are you in planning a meal that would meet the MyPlate guidelines?</td>
<td>No, I do not feel confident</td>
<td>7.84 (4)</td>
</tr>
<tr>
<td></td>
<td>Somewhat confident</td>
<td>27.45 (18)</td>
</tr>
<tr>
<td></td>
<td>Yes, I feel completely confident</td>
<td>64.71 (33)</td>
</tr>
<tr>
<td>Was the menu planning plate easy for you to use?</td>
<td>No</td>
<td>3.92 (2)</td>
</tr>
<tr>
<td></td>
<td>Somewhat</td>
<td>11.76 (6)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>84.31 (43)</td>
</tr>
<tr>
<td>Did the menu planning plate help you use recipe(s) from Cooking Camp at home?</td>
<td>No</td>
<td>13.73 (7)</td>
</tr>
<tr>
<td></td>
<td>Somewhat</td>
<td>33.33 (17)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>52.94 (27)</td>
</tr>
<tr>
<td>Could you teach the menu planning plate to someone else?</td>
<td>No</td>
<td>1.96 (1)</td>
</tr>
<tr>
<td></td>
<td>Somewhat</td>
<td>17.65 (9)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>80.39 (41)</td>
</tr>
<tr>
<td>Would you use the menu planning plate after camp?</td>
<td>No</td>
<td>23.53 (12)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>76.47 (39)</td>
</tr>
<tr>
<td>During the camp, did you use the menu planning website?</td>
<td>No</td>
<td>9.80 (5)</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>90.20 (46)</td>
</tr>
</tbody>
</table>
Discussion

The benefits of teaching children how to cook for themselves in order to encourage healthier food choices has supportive evidence, but the next step is teaching children how to plan a meal. Many researchers have noted that teaching menu planning skills are an important missing piece in the traditional cooking curricula. Several designs and models of menu planning are available on the market including MyPlate and the Plate Model. Hornick noted that small changes in daily menus could dramatically improve dietary quality. This change could be interpreted as something as small as planning to eat healthier by including a variety of fruit and vegetable within a weeks menu.

Planning meals can lead to healthier eating choices. Participants in this study stated that planning a meal ahead of time could result in eating more fruits and vegetables, but a decrease in belief was observed from pre-questionnaire to post-questionnaire. This could be attributed to children not fully understanding what meal planning entails in the beginning of the intervention and therefore being over confident. For the participants who agreed on both questionnaires that planning meals could increase fruit and vegetable consumption, a possible increase of 2-3 servings of fruit and vegetables per day was noted if eating them was pre-planned.

Children in the camp reported an increase in self-reported menu planning confidence. For the meal, day, and week there was a significant increase in confidence (0.001, <0.0001, and <0.0001, respectively). This increase confidence means that children are able to forward plan healthier food choices. It is important to get parents
involved with children menu planning practices to encourage menu planning self-efficacy and connect children with the weekly grocery list and cooking schedule.

Post questionnaire questions about confidence were given to participants in this study. Participants learned about MyPlate at the beginning of the week. They were asked on the post questionnaire about their confidence in planning a meal according to the MyPlate guidelines; 92.16% of the participants felt at least “Somewhat confident” if not more confident that they could. Camelon (1998) noted how giving people a “blueprint” of a meal and color-coded sections allowed for a “transition of food guide recommendations to healthy meal planning.”\textsuperscript{13} (pp 1156) Being able to plan a meal according to the MyPlate recommendations indicates that the children in this study have the ability to plan a meal that would be considered “healthy” according the USDA standards.\textsuperscript{36} Another important confidence question involved whether or not the participants believed they could teach another person how to use the Menu Planning Plate. About 80% of the participants were completely confident that they could teach another person. This is a significant confidence indicator because it transitions the participant from the role of a student to that of a teacher.

Several questions on the post-questionnaire involved the usability of the Menu Planning Plate. Three of the questions involved the use of the Menu Planning Plate during camp: did you use the Menu Planning Plate, was it easy, and did you use it to plan to make cooking camp recipes at home? Almost 90% of the children used the Menu Planning Plate; this was confirmed on the administrators’ website. Roughly 96% of participants felt comfortable using the Menu Planning Plate (either “Somewhat” or “Yes”). About half of the participants used the template to plan recipes from camp for
meals at home. When asked whether or not participants would use the menu planning plate after the camp, over 75% said they would. The administrator’s website reflected no activity after camp though. To engage the children after camp, games, weekly e-mail reminders, and parental involvement should be considered. Teaching both parents and children forward planning in meals could be a new tool in implementing healthy eating in people’s lives.

**Recommendations and Limitations**

Integrating the menu-planning concept into a children’s cooking camp is novel. Suggested improvements to the implantation include setting a detailed time each day during lecture or demonstration part of the curriculum for children to learn about planning meals. Then designate a 15 minute segment of time for children to practice planning meals. Also, a lesson on healthy food choices versus unhealthy ones should be taught to give children background information to use. Since children are unable to purchase groceries, parents should be included in at least one face-to-face or virtual menu planning discussion. They could also benefit from detailed hand out materials, such as a companion guide, describing the importance of menu planning and encouraging them to plan meals with their children. This was the first year that the menu-planning template was introduced at the *Cook Like a Chef* camp. Each camp holds 20-30 campers a session and usually two sessions are held a year. This is a limited sample so a proposed expansion of the camp could be done using “The Basics” cooking camp. “The Basics” camp could be modified and used at university extensions throughout the country to teach children how to make healthy meals, and to increase sample size and regional variety.
For evaluation improvement, the confidence ranking on the questionnaire needs to be increased to a 5-point Likert scale to increase reliability and answer diversity. One of the post-questionnaire questions, “How confident are you in planning a meal that would meet the MyPlate guidelines?”, should be included on the pre-questionnaire. The questions “Do you feel that planning your daily meals would help you increase the servings of vegetables (or fruits) you ate?” and “Please estimate how many more different types of vegetables you ate each day because you planned your meals.” could be simplified using terminology more easily understood by children.

The Menu Planning Plate could also be made more child friendly. The website application was well received, but pictures and bright colors could be added as an update to increase children’s interest. Also, a reference page with links for websites with more tips and information could be made available. The Menu Planning Plate will be updated to fix problems noticed during this first use and then implemented more solidly into the Cook Like a Chef structure.

Conclusion

The Menu Planning Plate addition to the Cook Like a Chef camp contributed to children’s awareness of eating healthy concepts. Teaching a child to plan and prepare healthy meals could influence healthier eating habits and increase a child’s confidence in preparing their own healthy foods. Providing a companion guide for parents to support children’s menu planning at home can further advance this effort. A key to healthier eating habits could be planning before eating.
References


DISCUSSION OF COOKING CAMP AND MENU PLANNING PROJECTS

Confidence Leads to Self-Efficacy

A cooking camp for children is an active effort to prevent obesity. The need for the spread of such camps is great as the occurrence of childhood obesity continues to rise. Empowering children with the ability as well as confidence to cook for themselves means they have a greater chance of eating healthy. Children are exposed to an abundance of convenience, ready-to-eat foods that often compromise nutrition. Without the ability to cook healthy snacks for themselves, there is a higher possibility of children choosing these unhealthier food choices. Preliminary cooking programs for children have been made available in countries such as the United Kingdom and the United States. Confidence children have gained from such camps has been reported in programs such as Let’s Get Cooking, Cooking with Kids, and Get Cooking. Participants in the Let’s Get Cooking program indicated that they practiced at home, increased their intake of healthy food, and taught other people how to do the skills they learned. Teachers implementing the Cooking with Kids curriculum noticed children learned about and focused on new foods. For the Get Cooking! program, participants changed their opinions about healthy food tasting bad, take-outs tasting better that homemade food, and not being able to cook. The Cook Like a Chef program demonstrated significant increases in confidence in choosing healthy snacks, cooking techniques, eating habits, and positive attitudes toward food. Children reported confidence in skills such as sautéing, stir-frying, baking, using a stove top, and using measuring cups and spoons. Significant increases were observed for sautéing and stir-frying, and children demonstrated prior knowledge for baking, using a stove top, and using measuring spoons.
and cups. Significant increases in agreement with healthy actions were seen in limiting fat, limiting sugar intake, and eating more fiber; prior agreement was seen with eating more fruit. Also, increased knowledge about MyPlate and food groups was observed, and prior knowledge about food nutrients and sources was reported. Increased confidence and knowledge can contribute to a child’s motivation, which could lead to an increase in the tendency to make healthy food choices. Children being knowledgeable in aspects of healthy foods such as portion sizes, food groups, and food safety could increase the likelihood of healthier eating habits.

**Menu Planning Tool Design and Testing**

The importance of menu planning has gained recognition in recent years. With the prevalence of so many food related illness, governments and organizations have developed models for which people can base their diets; two such models include MyPlate and the Plate Model.\(^1\),\(^18\),\(^45\) Both can been used by nutritionists to guide clients to healthier eating habits. Hornick noted how using menu planning to transition people from a traditional unhealthy meal to one that is in concordance with the MyPyramid (now MyPlate) guidelines can be successful if it involves small steps as opposed to dramatic changes.\(^44\) Teaching children to think before they eat could be an important tool to combating obesity. The ability to forward plan has been seen to increase fruit and vegetable intake, reduce gas and grocery costs, and reduce stress associated with preparing meals.\(^13\),\(^34\) In our study though, a decrease in the percentage of agreement that menu planning would increase fruits and vegetable intakes was observed (vegetable 88.24% to 72.55% and fruit 82.35% to 80.39%). This decrease was only significant for
vegetables. This decrease in agreement could be attributed to children being unfamiliar
with menu planning in the beginning of the camp, and therefore answering what they
thought they should say, or it could be attributed to question wording being too
complicated for the children to understand what the question was asking. For the
participants that answered “yes” to the statement that planning meals would increase their
intake of fruits and vegetables on both the pre and post questionnaires, participants stated
that they would consume an additional 2-3 servings of fruits and vegetables every day if
they planned out their meals.

The tool designed for this study was based off the DASH diet. Articles
mentioning the use of the DASH diet or similar health based ideas that demonstrated
increases in health and decreases in weight. The usage of a “color-coded…blueprint”
or pre-portioned background was determined to be helpful for people to transition from
unhealthy meals to healthy ones. The Menu Planning Plate therefore
incorporated the DASH diet, a pre-portioned plate design, and a color-coded system to be
user friendly. Almost 85% of the participants stated the Menu Planning Plate was easy to
use and roughly 12% said it was “Somewhat” easy to use. Of the 53 participants, about
80% believed they could teach someone else how to use it and roughly 18% believe they
possibly could. The ability to teach another person a skill is considered a high confidence
determinant because a participant transitions from the student to the teacher. Another
important consideration is if a participant can plan a healthy meal. The children in the
2011 Cook Like a Chef camp were asked if they believed they could plan a meal
according the MyPlate guidelines and almost 65% said “Yes, I feel completely confident”
and about 28% said they were “Somewhat confident” that they could.
In our study, significant increases in menu planning knowledge were observed. Participants were asked if they were confident enough to plan a meal, day’s worth of meals, and week’s worth of meals. On a 3-point Likert scale with 1= “No, I do not feel confident”, 2= “Somewhat confident”, and 3= “Yes, I feel completely confident”, participants had an average increase in confidence for planning a meal of 2.510 to 2.765 which takes the value from between “Somewhat” and “Completely confident” closer to “Completely confident”. For a planning a day’s worth of meal, the mean confidence increased from 2.275 to 2.647, which moved the value from “Somewhat” closer to “Completely Confident”. Participants were asked about planning a week’s worth of meals; the most labor intensive of the task. A lower value range was observed for this task (mean confidence 1.980 to 2.353), which could be attributed to the greater amount of work needed.

**Future Work**

Giving children the opportunity to interact with a menu planning tool is ineffective if they are lack motivation and do not use it. For this study, participants were encouraged with prizes to use the Menu Planning Plate and progress could be tracked through an administrative website. Children who did not have a computer or did not use the website by the fourth morning of the camp were given the opportunity during camp to do so. About 90% of the participants used the Menu Planning Plate during camp. When asked if they used the Menu Planning Plate to use camp recipes at home, over half responded that they did. For continuing to use the Menu Planning Plate after camp, over 75% said they would. These results for the first trial of the Menu Planning Plate are
encouraging and after fine-tuning the implementation, design, and evaluation of this study will bring even better results.

Other programs involving menu planning have been well accepted. The Ohio State University Extension developed the *Quick and Healthy Meals: Tips and Tools for Planning Meals for Your Family* for low-income families. The intervention had 77% of the participants use the book with those who used the book agreeing wholeheartedly that they should share it with others. Rutgers University designed a menu planning grid for mothers which was observed to improve their attitudes toward cooking and efficiency with grocery shopping. The menu planning tool itself had high approval ratings with a 4.1 out of 5 for mean agreement. The success of the Ohio State University and Rutgers University menu planners show that getting parents involved with the program is the next step for the *Cook Like a Chef* menu planning implementation. Getting the parents involved with the children could increase their self-efficacy in menu planning and cooking by giving children opportunity to actively practice at home.
Cooking camps for children have become more prominent throughout the world. Teaching children how to cook is an important step in fighting obesity. The *Cook Like a Chef* program is a very successful program for teaching children how to cook. For ten years, children in the Pennsylvania State University area have had access to this camp. “The Basics” version of this camp could be easily condensed, adapted, and taught in multiple regions throughout the United States. Local career centers could be used as a location for the camps. The kitchen space available could determine the number of recipes and number of children for the camp.

The four surveys –*Let’s Eat Healthy, Cooking Skills and Food and Nutrition Skills, Confidence and Motivation, and Menu Planning* can all be used as a conducive, multi-regional analysis of the program’s success. Some suggested alterations to the surveys should be done before implementation. For the *Let’s Eat Healthy* questionnaire, the answers for the question “From which food group should you eat the most servings from each day?” should be re-worded. Currently the answers are from a previously changed question and say “a. Vegetable group- ½ cup, b. Meat group- 5 ounces, c. Fruit group- 1 ½ cups, and d. Grains group- 6 ounce equivalents.” The new answers should be “a. Vegetable group, b. Meat group, c. Fruit group, and d. Grain group.” The *Cooking Skills and Food and Nutrition Skills* questionnaire instructions currently state “Check all that Apply”, but the addition of “yes” and “no” columns the instructions need to be changed to “Choose yes or no, if yes is chosen, check all additional columns that apply.” Also the instructions need to be more prominently displayed at the top of the page instead
of in the first box. Same instructions need to be written out for both the *Cooking Skills* and the *Food and Nutrition Skills* sections. The *Confidence and Motivation* survey does not need any improvements at this time. The *Menu Planning* survey has some questions that need to have the wording simplified. The questions “Do you feel that planning your daily meals would help you increase the servings of vegetables (or fruits) you ate?” could be simplified down to terminology that children can understand; for example “If you planned to eat vegetables (or fruit) with lunch, do you think you would actually eat it?” The other question that could be reworded are concurrent to the previous question: “Please estimate how many **more** different types of vegetables (or fruits) you ate each day because you planned your meals.” It could be re-worded into “If you planned to eat vegetables, how many more servings, or types of vegetables (or fruits), do you think you would eat each day?” Finally, the 3-point ranking scale on the *Menu Planning* survey should be changed to a 5-point where 1= “Not at all confident”, 3= “Somewhat confident”, and 5=”Yes completely confident.” All these modifications would create a program that could be used nationally to encourage cooking and menu planning confidence for children.
CONCLUSION

Children need to be taught skills so they can be self-sufficient. When they are taught a skill and gain confidence from practicing that skill, action and/or behavior change is more likely to occur. Teaching children to cook and plan meals is an active step in combating the childhood obesity in young Americans. Forward thinking about consuming healthy foods and having the ability to produce them are more likely to induce healthy actions than when lacking menu planning and cooking skills. More cooking camps are needed throughout the United States to empower more children.
APPENDICIES

Appendix A Parent Consent Form (page 26)

Parent Consent Lessons Learned from Cooking with the Chef Program
Information Concerning Participation in a Research Study Clemson University

During the Cooking Camp this year we will be collecting information on food choices and nutrition/cooking opinions from children. We are looking for children to volunteer to complete some basic questionnaires on food and cooking. Your child is registered for camp at Penn State with Anne Corr and Dr. Margaret Condrasky, RD from Clemson University, 216 P & A, Clemson, SC 29634-0316; phone: (864) 656-6554; mcondra@clemson.edu is assisting with the program development and evaluation for camp. We are asking for parents/guardians to read this information sheet and discuss with your child the possibility of being part of this exciting research study and asking that when you register your child for the camp sign the consent form. We will then explain the questionnaires and the interviews to your child and ask them to sign the assent form to participate.

Your child is invited to participate in a research study consisting of questionnaires (Let’s Eat Healthy, Cooking and Food/Nutrition Skills, and Confidence and motivation for food choices) We would like to understand more about lessons learned and possible behavior changes related to food choices and cooking skills from the campers. The goal is to learn more about what a child does with the cooking experiences and the lessons provided in a cooking with a chef one week summer camp. Information on benefits to cooking practical hands-on activities for the middle school age 10-13 year old child will help with program enhancement and direction for other children in the future. Research will be conducted exclusively in the Penn State foods lab during the cooking camp week and involves normal educational practices. The questionnaires will take approximately 10 minutes to complete at the beginning of the week and during the final day of cooking camp. Also, during the camp week the children will be introduced to menu planning and a computer program that will aid in menu planning.

There are no known risks associated with these activities, however, if some of the questions seem personal or make your child feel slightly uncomfortable, he/she does not need to answer them and they are free to choose not to participate in some parts of the conversation if they wish. This exchange of ideas will be valuable to the research field of children and health promotion for nutrition research. Responses will help us better understand cooking and nutrition practices of families. Identifiers will not be used for this study.
The enclosed information letter will serve as consent and the names of participants (parents/guardians and children) will remain confidential. You must be at least 18 years of age to provide consent for your child’s participation. The only people who will be able to see your answers to the questions will be the people conducting the research. The questionnaires will be maintained in a confidential manner in a locked file in P & A Building research room # A 203 J at Clemson University and destroyed by December 1, 2013.

Your child’s participation is voluntary. Refusing to participate or withdrawing early from the study will involve no penalty or loss of benefits you would be entitled to otherwise. If you have questions or concerns about this study or feel that this study has harmed you or your child, please contact Anne Corr at PSU at 814-865-7431 or Margaret Condrasky at Clemson University at 864-656-6554. If you have any questions or concerns about your rights as a research participant, please contact the Clemson University Office of Research Compliance at 864-656-6460 or Penn State University's Office for Human Research Protections at 814-865-1775. The following may review and copy records related to this research: The Office of Human Research Protections | the U.S. Department of Health and Human Services, the Social Science Institutional Review Board and the PSU Office for Research Protections.

This is to certify that you consent to and give permission for your child ____________ (child’s name) to participate as a volunteer in the Lessons learned from Cooking with a Chef study. You understand that you will receive a signed copy of this consent form after you have read this form, understand the content of this consent form and signed below.

________________________ parent/legal guardian signature
________________________ Date

________________________ investigator
________________________ Date

Page 2 of 2
Appendix B Questionnaires (page 26)

Let’s Eat Healthy!

(this page is a pre and post administration-Revised from Eating Right Is Fun, Food and Me November, 2007)

Name: ________________________________

What is your age? ________ What is your grade? ____________ Date: ________________

Are you a (circle): Boy Girl

1) What information can we learn from MyPlate?
   a. How much food costs
   b. What foods taste good
   c. How to prepare food
   d. How much to eat of different kinds of food
   e. I have never seen the Food Guide Pyramid

2) Eggs and nuts are a good source of what?
   a. Calcium
   b. Protein
   c. Starch

3) Which food is the best source of whole grain?
   a. A tomato
   b. Yogurt
   c. A slice of white bread
   d. A slice of whole wheat bread

4) From which food group should you eat the most servings from each day?
   a. Vegetable group- ½ cup
   b. Meat group- 5 ounces
   c. Fruit group- 1 ½ cups
   d. Grains group- 6 ounce equivalents

5) We should wash fruits and vegetables before we eat them:
   a. To wash off the germs
   b. Only if they are dirty
   c. To keep them fresh
   d. To make them taste better

6) How many servings per day should we have from the milk group?
   a. 1
   b. 3
   c. 5
   d. 9

7) Which of these is the healthiest choice for an afternoon snack?
   a. Chips with a sandwich
   b. Ice cream
   c. Carrot sticks

8) Why should we not eat foods that have been sitting out for more than 2 hours?
   a. The vitamins break down and become bad for you
   b. The color of the food changes
   c. Germs grow on the food quickly
   d. The food starts to taste bad
### Part 2 Cooking Skills
(check all that apply)

<table>
<thead>
<tr>
<th>Skill</th>
<th>I tried for the first time</th>
<th>I improved</th>
<th>I practiced at home</th>
<th>I want to practice more</th>
<th>I can do this well</th>
<th>I taught someone else</th>
</tr>
</thead>
<tbody>
<tr>
<td>Washing hands</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Keeping work area clean</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using sharp knives safely</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using a peeler</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using a melon baller</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using a can opener</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using a strainer</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using measuring cups, spoons</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sauté</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using a stovetop burner</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How to steam</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How to stir fry</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How to broil</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>How to bake</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mise en place</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Food and Nutrition Skills
(check all that apply)

<table>
<thead>
<tr>
<th>Skill</th>
<th>I heard about this for the first time</th>
<th>I learned more</th>
<th>I want to know more</th>
<th>I know this well</th>
<th>I taught someone else</th>
</tr>
</thead>
<tbody>
<tr>
<td>Choose a variety of foods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limit fat intake</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Limit sugar intake</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eat more fruits</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eat more vegetables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Eat more fiber</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Try new and different foods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Read food labels</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Choose locally grown foods</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cooking, Food, and Nutrition Skills questionnaire

My thoughts:

What I enjoy most about cooking is ________________________________.

The hardest thing about cooking is ________________________________.

Other foods I would like to learn about and how to prepare are ________________________________.

Name: ________________________________ Date: ________________________________
Confidence and Motivation Pre Survey

Please answer the following questions. (Add something about confidentiality.)

Please circle one number for each item:

<table>
<thead>
<tr>
<th>Very Unsure</th>
<th>Moderately Sure</th>
<th>Slightly Unsure</th>
<th>Slightly Sure</th>
<th>Moderately Sure</th>
<th>Very Sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>I Can</td>
<td>Unsure I Can</td>
<td>I Can</td>
<td>I Can</td>
<td>I Can</td>
<td>I Can</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

1. Make fruit snacks or foods for myself.  
2. Make vegetable snacks or foods for myself.  
3. Help cook healthy dinners.  
4. Try new recipes with vegetables.  
5. Use herbs and spices in cooking.  
6. Eat fruits and vegetables that are put on my plate.  
7. Stick to eating fruits and vegetables when you feel depressed or bored.  
8. Eat apples, oranges, bananas, or other fresh fruit with breakfast.  

Instructions: Read each statement carefully and place the number from 1 to 6 that shows your agreement level with each statement.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Somewhat Agree</td>
<td>Somewhat Disagree</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
</tbody>
</table>

___ 9. I take pride in eating healthy.  
___ 10. I do not really care if I eat lots of junk food.  
___ 11. Eating healthy is a major priority in life.  
___ 12. I am very excited about eating more healthy foods on a daily basis.  
___ 13. I am involved in planning daily meals so that I eat plenty of healthy foods.

Instructions: Read questions 14-17 carefully and circle your answer.

14. Do you feel that planning your daily meals will help you increase the servings of vegetables you eat?  
   YES   NO

IF YES, ANSWER QUESTION 15. IF NO, SKIP TO QUESTION 16.
15. Please estimate how many more different types of vegetables you think you will eat each day because you planned your meals.

0 1 2 3 More than 4

16. Do you feel that planning your daily meals will help you increase the servings of fruits you eat? YES NO

IF YES, ANSWER QUESTION 17. IF NO, SKIP TO QUESTION 18.

17. Please estimate how many more different types of fruits you think you will eat each day because you planned your meals.

0 1 2 3 More than 4

Instructions: Please circle one number for questions 18-20:

<table>
<thead>
<tr>
<th>No, I do not feel confident</th>
<th>Somewhat confident</th>
<th>Yes, I feel completely confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

18. How confident are you in planning a meal by yourself? 1 2 3

19. How confident are you in planning all of your meals for a day by yourself? 1 2 3

20. How confident are you in planning all of your meals for a week by yourself? 1 2 3
Confidence and Motivation Post Survey

Please answer the following questions. (Add something about confidentiality.)

Please circle one number for each item:

<table>
<thead>
<tr>
<th>Very Unsure</th>
<th>Moderately Unsure I Can</th>
<th>Slightly Unsure I Can</th>
<th>Slightly Sure I Can</th>
<th>Moderately Sure I Can</th>
<th>Very Sure I Can</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
</tr>
</tbody>
</table>

1. Make fruit snacks or foods for myself.
2. Make vegetable snacks or foods for myself.
3. Help cook healthy dinners.
4. Try new recipes with vegetables.
5. Use herbs and spices in cooking.
6. Eat fruits and vegetables that are put on my plate.
7. Stick to eating fruits and vegetables when you feel depressed or bored.
8. Eat apples, oranges, bananas, or other fresh fruit with breakfast.

Instructions: Read each statement carefully and place the number from 1 to 6 that shows your agreement level with each statement.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>Agree</td>
<td>Somewhat Agree</td>
<td>Somewhat Disagree</td>
<td>Disagree</td>
<td>Strongly Disagree</td>
</tr>
</tbody>
</table>

9. I take pride in eating healthy.
10. I do not really care if I eat lots of junk food.
11. Eating healthy is a major priority in life.
12. I am very excited about eating more healthy foods on a daily basis.
13. I am involved in planning daily meals so that I eat plenty of healthy foods.

Instructions: Read questions 14-17 carefully and circle your answer.

14. Do you feel that planning your daily meals helped you increase the servings of vegetables you ate? **YES** **NO**

**IF YES, ANSWER QUESTION 15. IF NO, SKIP TO QUESTION 16.**

15. Please estimate how many **more** different types of vegetables you ate each day because you planned your meals.

<table>
<thead>
<tr>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>More than 4</th>
</tr>
</thead>
</table>
16. Do you feel that planning your daily meals helped you increase the servings of fruits you ate?    YES    NO

IF YES, ANSWER QUESTION 17. IF NO, SKIP TO QUESTION 18.

17. Please estimate how many more different types of fruits you ate each day because you planned your meals.

0    1    2    3    More than 4

Instructions: Please circle one number for questions 18-24:

<table>
<thead>
<tr>
<th>No, I do not feel confident</th>
<th>Somewhat confident</th>
<th>Yes, I feel completely confident</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

18. How confident are you in planning a meal by yourself? 1 2 3
19. How confident are you in planning all of your meals for a day by yourself? 1 2 3
20. How confident are you in planning all of your meals for a week by yourself? 1 2 3
21. How confident are you in planning a meal that would meet the MyPlate guidelines? 1 2 3

<table>
<thead>
<tr>
<th>No</th>
<th>Somewhat</th>
<th>Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

22. Was the menu planning plate easy for you to use? 1 2 3
23. Did the menu planning plate help you use recipe(s) from Cooking Camp at home? 1 2 3
24. Could you teach the menu planning plate to someone else? 1 2 3

Instructions: Read questions 25-26 carefully and circle your answer.

25. Would you use the menu planning plate after camp?    YES    NO
26. During the camp, did you use the menu planning website?    YES    NO

IF NO TO QUESTION 26, CHECK ALL THAT APPLY IN QUESTION 27.

<table>
<thead>
<tr>
<th>Did not have time to use it</th>
<th>Did not want to use it</th>
<th>Did not understand how to use it</th>
<th>No computer access</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>27. Please let us know why you did not use the website:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If other, please state your reason: __________________________________________
Welcome. During the cooking camp, you will participate in 2 nutrition and cooking education sessions. The first session is about two hours with a cooking demo and menu planning discussion. The second visit will be about 5 to 7 days later and should last about an hour. You will fill out a short survey at the end of each session. You will also be asked to participate in a group discussion at the end of the second session. The discussion will be audio-taped, but if you are not comfortable being taped, please let us know. You will receive free materials and be offered snacks during the sessions. Do you have any questions?
REFERENCES FOR INTRODUCTION AND DISCUSSION


