COOKING FOR KIDS: CULINARY TRAINING FOR SCHOOL NUTRITION PROFESSIONALS POSITIVELY AFFECTS SCHOOL NUTRITION PROFESSIONALS' CULINARY PRACTICES AND BELIEFS

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JENNIE TILL

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Oklahoma State University

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COOKING FOR KIDS: CULINARY TRAINING FOR SCHOOL NUTRITION PROFESSIONALS POSITIVELY AFFECTS SCHOOL NUTRITION PROFESSIONALS' CULINARY PRACTICES AND BELIEFS

Thesis Approved:

Dr. Deana Hildebrand

Thesis Adviser

Dr. Gale Gates

Dr. Barbara Brown

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Abstract:
Changes made to the National School Lunch Program and School Breakfast Program in response to the Healthy, Hunger-Free Kids Act 2010, resulted in major challenges for school nutrition professionals (SNPs) to efficiently prepare healthier meals that students find palatable. *Cooking for Kids* is a chef-based culinary skill development training developed to address the specific needs of Oklahoma SNPs. Funding for the program is provided by the Oklahoma State Department of Education Child Nutrition Services through the USDA Food and Nutrition Services. The purpose of this project was to evaluate the effects of *Cooking for Kids* skill development workshops on beliefs related to school meals as well as food preparation and marketing practices of participating SNPs. *Cooking for Kids* Regional Training was offered during June and July, 2015, at six different sites in Oklahoma. Eligible participants were SNPs working in school districts that participate in federally funded Child Nutrition Programs (CNP). Participants completed a questionnaire regarding nutrition attitudes/beliefs and culinary practices on day 1 of training and 6 months post-training. There was an increase in reported use of mise en place ($p < 0.0$) and *Smarter Lunchrooms* practices ($p < 0.0$). SNPs reported a significant increase in beliefs that food they served tasted good ($p = 0.049$); teachers, administration, and staff thought the food tasted good and is healthy ($p = 0.005$, $p = 0.04$ respectively); and parents thought the food tasted good ($p = 0.046$). SNPs also reported an increased belief that food they served impacted health and academic performance of students ($p = 0.001$). There were inconclusive findings for reported frequency of scratch-made entrees as well as reported belief that cooks have the needed skills to prepare more made from scratch entrees. There was no significant difference in reported frequency of menu planning practices, frequency of taste-testing, or remaining attitudes and beliefs. In conclusion, a chef-based culinary training has potential to increase culinary skills of SNPs and create positive attitudes related to their role in student outcomes. Future training efforts should address menu planning and procurement with CNP decision makers to optimize scratch cooking methods, menu variety, and choices.

TABLE OF CONTENTS

Chapter Page

I. INTRODUCTION 1

Research Problem 4
Purpose and Objectives 4
Hypotheses 5
Terms and Definitions 12

II. REVIEW OF LITERATURE 16

National Health Trends 16
Oklahoma's Health Trends 17
Contributing Factors to Obesity Nationwide and in Oklahoma 18
Efforts to Address Childhood/Adolescent Obesity in Schools 23
Challenges of Complying with New School Food Standards 29
Chef-based Culinary Training for School Nutrition Professionals 33
Community Readiness Model 36
Cooking for Kids: Culinary Training for School Nutrition Professionals 38
Social Cognitive Theory 40
Summary 41

III. METHODOLOGY 43

Participants 43
Description of Intervention 43
Data Collection Tools 45
Coding 46
Statistical Analysis 48

Chapter Page

IV. FINDINGS....49

Response Rate....49
Demographics....50
Culinary Practices....52
Attitudes and Beliefs....55
SNPs' Attitudes and Beliefs Toward School Meals....55
SNPs' Perceptions of Students' Attitudes Towards School Meals....56
SNPs' Perceptions of Teachers, Administrators, and Staffs' Attitudes Towards School Meals....57
SNPs' Perceptions of Parents' Attitudes Towards School Meals....58
SNPs' Beliefs Concerning the Effects Food Served has on Students' Health and Academic Performance....59
SBPs' Beliefs Concerning Availability of Resources....60

V. DISCUSSION & CONCLUSION....62

Discussion....63
Limitations....70
Conclusion & Implication....72

REFERENCES....74

APPENDICES....84

Appendix A: *Cooking for Kids* Skill Development Level 1 and Level 2 Learning Objectives....85
Appendix B: *Cooking for Kids* Skill Development Training on Culinary Knowledge and Skill Efficacy....87
Appendix C: *Cooking for Kids* Skill Development Level 1 and Level 2 Daily Agendas....88
Appendix D: *Cooking for Kids* School Meal and Food Preparation Pre-Training Questionnaire....91
Appendix E: *Cooking for Kids* School Meal and Food Preparation Post-Training Questionnaire....99
Appendix F: IRB Approval....107
Appendix G: Codebook for *Cooking for Kids* Pre- and Post-Training Questionnaires Analysis....108

LIST OF TABLES

Table Page

2.1 Comparison of Previous and Current NSLP Regulations under Final Rule *Nutrition Standards in the National School Lunch and Breakfast Program* 25
2.2 Comparison of Previous and Current SBP Regulations under Final Rule *Nutrition Standards in the National School Lunch and Breakfast Program* 26
2.3 Comparison of Previous and Current Nutrient Regulations under Final Rule *Nutrition Standards in the National School Lunch and Breakfast Program* 27
3.1 Dates and locations of 2015 *Cooking for Kids* Regional Trainings.....44
4.1 Demographic information for pre- and post-training training questionnaire respondents 51
4.2 Frequency of made from scratch or almost-scratch entrees (Hypothesis #1).....52
4.3 Frequency of menu planning practices (Hypotheses #2-#4).....53
4.4 Frequency of mise en place practices (Hypothesis #5).....54
4.5 Frequency of *Smarter Lunchrooms* practices (Hypothesis #6).....55
4.6 Frequency of taste-testing (Hypothesis #7) 55
4.7 SNPs' pride in the meals they serve (Hypothesis #8).....56
4.8 SNPs' beliefs regarding taste and healthiness of meals served (Hypotheses #9-#10).....56
4.9 SNPs' perceived thoughts of students (Hypotheses #11-#12).....57
4.10 SNPs' perceived thoughts of teachers, administrators, and staff (Hypotheses #13-#14).....58
4.11 SNPs' perceived thoughts of parents of students (Hypotheses #15-#16).....58
4.12 SNP beliefs regarding effects foods served has on health and academic performance (Hypotheses #17-#19).....59
4.13 Beliefs regarding availability of resources (Hypotheses #20-#22).....61
5.1 Null hypotheses with corresponding interpretation of results 68

LIST OF FIGURES

Figure Page

2.1 Sources of added sugar in the diet of the U.S. population ages 2 years and older 19
2.2 Sources of saturated fat in the diet of the U.S. population ages 2 years and older 20
2.3 Top kitchen equipment and infrastructure needs in order for schools to effectively and efficiently implement new standards 31
2.4 Community Readiness Model.....37
3.1 Locations of 2015 *Cooking for Kids* Regional Trainings in relation to the state of Oklahoma 45

CHAPTER I

INTRODUCTION

Obesity rates among adults, children, and adolescents both nationwide and in the state of Oklahoma remain high. In 2014, 29.6% of the nation's adults were obese, and in 2012, 18% of children (6-11 years) and 21% of adolescents (12-19 years) were obese (Centers for Disease Control and Prevention (CDC), 2014a; 2015c). These percentages are more than double those for adults 35 years ago, and more than tripled for children and adolescents since 1980 (The State of Obesity, 2016). In comparison, recent data indicates 33% of Oklahoma adults and 17% of Oklahoma high school students are obese (Oklahoma State Department of Health (OSDH), 2014b; 2015). Implications of obesity for both adults and youth include heart disease, type 2 diabetes, social and mental issues, obesity-related absenteeism, and increased healthcare costs (CDC, 2013; Levi et al., 2013; Biro & Wen, 2010; CDC, 2016; Story, Kaphingst, & French, 2006).

According to the *2015-2020 Dietary Guidelines* Report, 75% of the U.S. population has a consistently low intake of fruits, vegetables, dairy, and oils, and most of the population exceeds recommendations for added sugars and saturated fat, which are frequently consumed in processed foods (United States Department of Health and Human Services (USDHHS) & USDA, 2015). The state of Oklahoma ranks 50th in fruit consumption and 44th in vegetable consumption (OSDH,

2014a). Research shows that negative dietary factors such as these over time contribute to weight gain and subsequent obesity and chronic disease (Johnson, Mander, Jones, Emmett, & Jebb, 2008; Laska, Murray, Lytle, & Harnack, 2012; Mozaffarian, Hao, Rimm, Willett, & Hu, 2011).

Because adult obesity is predicted in part by weight status during childhood and adolescents, and the latter age groups consume approximately 50% of their calories while at school, the Institute of Medicine (now known as the Health and Medicine Division) has recommended that schools be a focal point in obesity prevention (Biro & Wen, 2010; Suchindran, North, Popkin, & Gordon-Larsen, 2010; Story, Kaphingst, & French, 2006; Institute of Medicine (IOM), 2012). The primary sources of food in schools nationwide are the National School Lunch Program (NSLP) and School Breakfast Program (SBP) authorized by the United States Department of Agriculture (USDA). Nearly 31 million and 14 million children participate in the NSLP and SBP daily (USDA, 2016b). In 2010, the Healthy, Hunger-Free Kids Act was passed authorizing the USDA to make changes to these meal programs in order to address the growing epidemics of childhood obesity and hunger (United States Government Publishing Office, 2010). Changes were implemented in the 2012-13 school year for NSLP and 2013-14 for SBP, and they included caloric, fat, and salt limits and increased quantities of fruits, vegetables, and whole grains to better align with the *2010 Dietary Guidelines* (Office of the Federal Register, 2012).

However, many school food authorities (SFA) have reported challenges in implementing the new standards including limitations of existing kitchen equipment and infrastructure, and lack of proper food service staff training and skills (Urahn et al., 2013a). Specifically, top training needs include nutrition training, cooking skills, and food safety training, and the Pew Charitable Trusts recommends that third-party trainers, such as chefs, be contracted to administer trainings to address these needs (Urahn et al., 2015). There is a limited, yet growing, amount of research evaluating the efficacy of and/or aiming to identify best practices for chef-based skill development trainings for school nutrition professionals (SNP) (Cohen et al., 2012; Perlman et

al., 2012; Condrasky et al., 2014; Casselbury, 2016). It is believed that chefs are the most appropriate experts to equip SNPs with the knowledge and skills needed to efficiently prepare healthier meals using less processed foods that are palatable to the students.

Cooking for Kids: Culinary Training for School Nutrition Professionals is a multi-phase chef-based skill development program for SNPs in the state of Oklahoma developed by a partnership of the Oklahoma State University Department of Nutritional Sciences and School of Hotel and Restaurant Administration and the Oklahoma State Department of Education (Cooking for Kids, 2016a). Phase 1 consists of a hands-on skill development training and phase 2 includes chef-consults for qualifying school districts. Program curriculum was developed based on the national reports mentioned above as well as specific culinary needs of Oklahoma SNPs reported during focus groups with 6 pilot schools using the Community Readiness Model (Blevins, 2015). Further, the program aims to improve the SNPs beliefs as well as perceived beliefs of key stakeholders (i.e. students, parents, and school staff) regarding the valuable role of school nutrition on student health and academic performance. The premise of the program to appropriately induce change among SNPs is based on the constructs of the Social Cognitive Theory (SCT), specifically the idea that improving self-efficacy and outcome expectations of participants will increase confidence to successfully make changes that will be valued and supported by key stakeholders (Bandura, 1989; 1998). Funding for *Cooking for Kids* is provided by the Oklahoma State Department of Education Child Nutrition Services through the United States Department of Agriculture Food and Nutrition Services. The program was piloted Summer 2014 and implemented statewide Summer 2015, and evaluation immediately following the training showed significant improvements in knowledge of various culinary skills and strategies (Birsner & Hildebrand, 2016).

Research Problem

In response to the growing epidemic of childhood obesity and hunger, the Healthy, Hunger-Free Kids Act 2010 was passed, which authorized the USDA to make changes to the NSLP and the SBP (United States Government Publishing Office, 2010). Changes included caloric, fat, and salt limits and increased quantities of fruits, vegetables, and whole grains with the goal of providing appropriate amounts of calories/nutrients for each age group served that better paralleled with the *2010 Dietary Guidelines for Americans* (Office of the Federal Register, 2012). In light of the changes, training for school nutrition professionals (SNP) became necessary (CDC & Bridging the Gap Research Program, 2014; Urahn et al., 2013a; Urahn et al., 2015). *Cooking for Kids* was developed for this purpose. The program was piloted in the summer of 2014, with six schools in Oklahoma, and was fully implemented in the summer of 2015. It is a multi-phase program including regional skill development workshops and customized chef consultations with individual school districts. A mid-term outcome of the 5-year project is for school nutrition professionals to have more positive beliefs related to their role in meeting the 2012 school nutrition standards, and to incorporate skills learned at the skill development training into their daily food production practices.

Purpose and Objectives

The purpose of this project was to evaluate the mid-term outcomes of the *Cooking for Kids* regional skill development workshops on the beliefs and practices of participating school nutrition professionals in the state of Oklahoma. Objectives for this project were as follows:

1. Measure changes in participating school nutrition professionals' practice of culinary skills, menu planning, and marketing strategies prior to attending the chef-based skill development training and 6-months post-training.

2. Measure changes in participating school nutrition professionals' attitudes, specifically the pride they have in the meals they prepare and serve to students, prior to attending the chef-based skill development training and 6-months post-training.
3. Measure changes in participating school nutrition professionals' beliefs concerning personal and perceived thoughts of the students, parents, and teachers/administration regarding the taste and health of meals prior to attending the chef-based skill development training and 6-months post-training.
4. Measure changes in participating school nutrition professionals' beliefs regarding the effects of meals served on the health and academic performance of students prior to attending the chef-based skill development training and 6-months post-training.
5. Measure changes in participating school nutrition professionals' beliefs pertaining to availability of resources (i.e. time, equipment, skills) prior to attending the chef-based skill development training and 6-months post-training.

Hypotheses

1. **Research Hypothesis #1:** As a result of participating in both Levels 1 and 2 of the *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition professionals who report frequent use of scratch cooking practices associated with effectively and efficiently implementing 2012 USDA school nutrition standards.

   Null Hypothesis #1: There will be no change in the frequency of participants' scratch cooking practices as a result of the *Cooking for Kids* Regional Training compared to before the training.

2. **Research Hypothesis #2:** As a result of participating in both Levels 1 and 2 of the *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition

professionals who report an increased number of entrée choices offered to students to better align with 2012 USDA school nutrition standards.

Null Hypothesis #2: There will be no change in the reported number of entrée choices offered as a result of the *Cooking for Kids* Regional Training compared to before the training.

3. **Research Hypothesis #3**: As a result of participating in both Levels 1 and 2 of the *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition professionals who report an increased number of vegetable choices offered to students to better align with 2012 USDA school nutrition standards.

   Null Hypothesis #3: There will be no change in the reported number of vegetable choices offered as a result of the *Cooking for Kids* Regional Training compared to before the training.

4. **Research Hypothesis #4:** As a result of participating in both Levels 1 and 2 of the *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition professionals who report an increased number of fruit choices offered to students to better align with 2012 USDA school nutrition standards.

   Null Hypothesis #4: There will be no change in the reported number of fruit choices offered as a result of the *Cooking for Kids* Regional Training compared to before the training.

5. **Research Hypothesis #5:** As a result of participating in both Levels 1 and 2 of the *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition professionals who report frequent use of mise en place practices associated with effectively and efficiently implementing 2012 USDA school nutrition standards.

Null Hypothesis #5: There will be no change in the frequency of participants' mise en place practices as a result of the *Cooking for Kids* Regional Training compared to before the training.

6. **Research Hypothesis #6:** As a result of participating in both Levels 1 and 2 of the *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition professionals who report frequent use of *Smarter Lunchrooms* practices to encourage students to select healthier foods and help them be more receptive of the 2012 USDA school nutrition standards.

   Null Hypothesis #6: There will be no change in the frequency of participants' *Smarter Lunchrooms* practices as a result of the *Cooking for Kids* Regional Training compared to before the training.

7. **Research Hypothesis #7:** As a result of participating in both Levels 1 and 2 of the *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition professionals who report frequent use of taste-testing practices to aid students in trying new foods and being more receptive of the 2012 USDA school nutrition standards.

   Null Hypothesis #7: There will be no change in the frequency of participants' use of taste-testing practices as a result of the *Cooking for Kids* Regional Training compared to before the training.

8. **Research Hypothesis #8:** As a result of participating in both Levels 1 and 2 of the *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition professionals who report being proud of the meals they prepare and serve to students.

Null Hypothesis #8: There will be no change in reported pride of the school nutrition professionals regarding the meals they prepare and serve to students as a result of the *Cooking for Kids* Regional Training compared to before the training.

9. **Research Hypothesis #9:** As a result of participating in both Levels 1 and 2 of *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition professionals who report positive beliefs regarding the taste of meals served.

   Null Hypothesis #9: There will be no change in participants' beliefs regarding the taste of meals served as a result of the *Cooking for Kids* Regional Training compared to before the training.

10. **Research Hypothesis #10:** As a result of participating in both Levels 1 and 2 of *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition professionals who report positive beliefs regarding the healthiness of meals served.

    Null Hypothesis #10: There will be no change in participants' beliefs regarding the healthiness of meals served as a result of the *Cooking for Kids* Regional Training compared to before the training.

11. **Research Hypothesis #11:** As a result of participating in both Levels 1 and 2 of *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition professionals who report positive beliefs pertaining to perceived thoughts of the students regarding the taste of meals served.

    Null Hypothesis #11: There will be no change in participants' beliefs pertaining to perceived thoughts of the students regarding the taste of meals served as a result of the *Cooking for Kids* Regional Training compared to before the training.

12. **Research Hypothesis #12:** As a result of participating in both Levels 1 and 2 of *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition professionals who report positive beliefs pertaining to perceived thoughts of the students regarding the healthiness of meals served.

    Null Hypothesis #12: There will be no change in participants' beliefs pertaining to perceived thoughts of the students regarding the healthiness of meals served as a result of the *Cooking for Kids* Regional Training compared to before the training.

13. **Research Hypothesis #13:** As a result of participating in both Levels 1 and 2 of *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition professionals who report positive beliefs pertaining to perceived thoughts of the teachers, administrators, and staff regarding the taste of meals served.

    Null Hypothesis #13: There will be no change in participants' beliefs pertaining to perceived thoughts of the teachers, administrators, and staff regarding the taste of meals served as a result of the *Cooking for Kids* Regional Training compared to before the training.

14. **Research Hypothesis #14**: As a result of participating in both Levels 1 and 2 of *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition professionals who report positive beliefs pertaining to perceived thoughts of the teachers, administrators, and staff regarding the healthiness of meals served.

    Null Hypothesis #14: There will be no change in participants' beliefs pertaining to perceived thoughts of the teachers, administrators, and staff regarding the healthiness of meals served as a result of the *Cooking for Kids* Regional Training compared to before the training.

15. **Research Hypothesis #15:** As a result of participating in both Levels 1 and 2 of *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition professionals who report positive beliefs pertaining to perceived thoughts of the parents of students regarding the taste of meals served.

    Null Hypothesis #15: There will be no change in participants' beliefs pertaining to perceived thoughts of the parents of students regarding the taste of meals served as a result of the *Cooking for Kids* Regional Training compared to before the training.

16. **Research Hypothesis #16:** As a result of participating in both Levels 1 and 2 of *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition professionals who report positive beliefs pertaining to perceived thoughts of the parents of students regarding the healthiness of meals served.

    Null Hypothesis #16: There will be no change in participants' beliefs pertaining to perceived thoughts of the parents of students regarding the healthiness of meals served as a result of the *Cooking for Kids* Regional Training compared to before the training.

17. **Research Hypothesis #17:** As a result of participating in both Levels 1 and 2 of *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition professionals who report positive beliefs pertaining to the effects meals served can have on students' health.

    Null Hypothesis #17: There will be no change in participants' beliefs pertaining to the effects meals served can have on students' health as a result of the *Cooking for Kids* Regional Training compared to before the training.

18. **Research Hypothesis #18:** As a result of participating in both Levels 1 and 2 of *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition

professionals who report positive beliefs pertaining to the effects meals served can have on how well students learn at school.

Null Hypothesis #18: There will be no change in participants' beliefs pertaining to the effects meals served can have on how well students learn at school as a result of the *Cooking for Kids* Regional Training compared to before the training.

19. **Research Hypothesis #19:** As a result of participating in both Levels 1 and 2 of *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition professionals who report positive beliefs pertaining to the effects meals served can have on students' behavior while at school.

    Null Hypothesis #19: There will be no change in participants' beliefs pertaining to the effects meals served can have on students' behavior while at school as a result of the *Cooking for Kids* Regional Training compared to before the training.

20. **Research Hypothesis #20:** As a result of participating in both Levels 1 and 2 of the *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition professionals who report positive perceptions regarding time needed to effectively and efficiently implement 2012 USDA school nutrition standards.

    Null Hypothesis #20: There will be no change in the perceptions of participants related to time needed to effectively and efficiently implement 2012 USDA school nutrition standards as a result of the *Cooking for Kids* Regional Training compared to before the training.

21. **Research Hypothesis #21:** As a result of participating in both Levels 1 and 2 of the *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition

professionals who report positive perceptions regarding equipment needed to effectively and efficiently implement 2012 USDA school nutrition standards.

Null Hypothesis #21: There will be no change in the perceptions of participants related to equipment needed to effectively and efficiently implement 2012 USDA school nutrition standards as a result of the *Cooking for Kids* Regional Training compared to before the training.

22. **Research Hypothesis #22:** As a result of participating in both Levels 1 and 2 of the *Cooking for Kids* Regional Training, there will be a larger proportion of school nutrition professionals who report positive perceptions regarding skills needed to effectively and efficiently implement 2012 USDA school nutrition standards.

    Null Hypothesis #22: There will be no change in the perceptions of participants related to skills needed to effectively and efficiently implement 2012 USDA school nutrition standards as a result of the *Cooking for Kids* Regional Training compared to before the training.

Terms and Definitions

- **Community Readiness Model:** Developed by the Tri-Ethnic Center for Prevention Research at Colorado State University (2014), this model of change is similar to the Transtheoretical Model of Change. The Community Readiness Model measures community members' readiness to address an issue on five key dimensions: community knowledge of the issue, knowledge of efforts, community climate, leadership, and resources.

- **Healthy, Hunger-Free Kids Act 2010 (HHFKA):** This act authorizes funding for federal school meal programs, and it includes significant improvements that will increase access of healthy foods to children, educate them about making healthy food choices, and teach them long-term healthy habits (The White House, 2010; United States Government Publishing Office, 2010). The child nutrition reauthorization bill reauthorizes these programs for five years and provides $4.5 billion in funding for these programs over 10 years.
- **Institute of Medicine (IOM):** IOM is a division of the National Academies of Sciences, Engineering, and Medicine, which are private, non-profit institutions that conduct objective analysis to provide evidence-based recommendations to the nation regarding science, technology, and medicine (The Academies, 2016). The aim of the IOM is to help those in government and the private sector make informed health decisions by providing reliable evidence. As of March 15, 2016, the Institute of Medicine (IOM) was renamed to the Health and Medicine Division (HMD).
- **Mise en place:** A French term meaning "everything in its place" (Cooking for Kids, 2016b). Mise en place refers to organizing and planning work in order to prepare/cook/serve efficiently in the kitchen.
- **National School Lunch Program (NSLP):** NSLP is a federally funded meal program administered by the USDA Food and Nutrition Service that operates in public and non-profit private schools of high school grades and lower, and in public and private non-profit residential childcare institutions (USDA, 2016a). The NSLP offers nutritionally balanced lunches to all students in the school district. Income eligible students (i.e. those living in households at or below 185% of poverty guidelines) may receive meals at a free or reduced price. Participating schools and institutions receive reimbursements for all

lunches served as long as the meals meet Federal requirements and are offered for free or reduced cost to eligible children.

- **School Breakfast Program (SBP):** Much like the NSLP, the SBP provides nutritionally balanced breakfast to all students, but eligible children receive free or reduced price meals (USDA, 2016d).
- **School Food Authority (SFA):** The governing body responsible for administration of one or more schools (United States Government Publishing Office, 2016). This body has the legal authority to operate the Child Nutrition Programs under approval of the Food and Nutrition Services.
- ***Smarter Lunchrooms* Movement:** Developed by the Cornell Center for Behavioral Economics in Child Nutrition Programs (2016) and started in 2009, this grassroots movement provides evidence-based lunchroom focused principles that promote healthful eating behaviors.
- **School Nutrition Professional (SNP):** Cooks, kitchen managers, and Child Nutrition Directors or Supervisors responsible for planning, preparing and serving food to students on a daily basis.
- **Social Cognitive Theory:** Behavior change model developed by Albert Bandura in 1986 that posits self-development, adaption, and change occur through an interplay of personal, behavioral, and environmental influences in a relationship Bandura called triadic reciprocal causation, or reciprocal determinism (Bandura, 1989, Davidson, 2003).
- **United States Department of Agriculture (USDA):** USDA provides leadership on food, agriculture, natural resources, and related issues with the overall vision of expanding economic opportunity through innovation, promoting agricultural production sustainability, and preserving the Nation's natural resources (USDA, 2016c). The Food

and Nutrition Service under the USDA administers food assistance programs such as NSLP and SBP.

CHAPTER II

REVIEW OF LITERATURE

National Health Trends

Obesity continues to be a problem nationwide, and the implications reach from top ranking chronic disease related deaths to skyrocketing costs of healthcare (CDC, 2015a; 2013; Levi et al., 2013). Adult obesity is defined as an individual ≥20 years old with a Body Mass Index (BMI) of ≥30.0 (CDC, 2012). BMI is calculated by dividing weight in kilograms by height in meters squared. Adult obesity has more than doubled over the past 35 years with 29.6% of the nation's adults considered obese in 2014 (CDC, 2014a; The State of Obesity, 2016). According to Centers for Disease Control and Prevention, the leading cause of death in 2013 was heart disease, and within the top ten causes of death were stroke, type 2 diabetes, and some cancers, which are also related to obesity (CDC, 2013). With four of the top ten deaths in the United States relating to obesity, healthcare costs are rising in response and are expected to continue to grow if something does not change. In their 2013 report titled, "F as in Fat," members of the Trust for America's Health and the Robert Wood Johnson Foundation estimated cost for obesity-related healthcare to be between $174 billion and $210 billion a year, and obesity-related job absenteeism to cost about $4.3 billion a year (Levi et al., 2013). If current trends continue, the projected percentage of obese adults by the year 2030 is 50% of the population and total obesity-related healthcare costs are estimated to be $630 billion a year.

Adult obesity is predicted in part by weight status during childhood and adolescence (Biro & Wien, 2010; Suchindran et al., 2010). In 2012, 18% of children age 6-11 years and 21% of adolescents age 12-19 years were considered obese (CDC, 2015c). In contrast, in 1980, only 7% of children age 6-11 years and 5% of adolescents age 12-19 years were considered obese. Obesity in childhood/adolescence is defined as a child or teen between the ages of 2 and 19 years with a weight-for-height falling within the 95th percentile, or higher, on the CDC Growth Chart (CDC, 2015b). Because the body composition of boys and girls varies as they grow, the CDC Growth Chart is age- and sex-specific, and it is sometimes referred to as BMI-for-age. Implications of obesity in childhood/adolescence not only include having an increased risk for chronic diseases such as heart disease and type 2 diabetes at a young age, but also carrying obesity and chronic disease into adulthood ultimately leading to an early death (Biro & Wien, 2010; CDC, 2016). Furthermore, obesity in childhood has been shown to be associated with multiple social and mental issues such as low academic performance, low self-esteem, low self-reported quality of life, and behavioral problems in school (Story, Kaphingst, & French, 2006). School performance can also be affected by obesity-related absenteeism due to direct complications of obesity (i.e. joint problems, asthma, sleep apnea) and indirect complications (i.e. bullying, teasing, loneliness). It is important to note, though, that low academic performance is merely associated with obesity rather than caused by it as low academic performance can be caused by a multitude of underlying issues.

Oklahoma's Health Trends

According to the *2014 State of the State's Health Report*, Oklahoma ranks as the 6th most obese state (OSDH, 2014a). More specifically, the 2014 Oklahoma Behavioral Risk Factors Surveillance System (BRFSS) results showed that 33% of Oklahoma adults were obese and 2015

Oklahoma Youth Risk Behavior Survey (YRBS) data showed that 17% of Oklahoma high school students were obese (OSDH, 2014b; 2015). As discussed above, obesity is a major risk factor of heart disease. In 2010, Oklahoma ranked third highest in deaths by heart disease, and in 2012, 1 in 4 Oklahomans died from heart disease (OSDH, 2014a). Furthermore, estimated annual healthcare expenditures related to obesity for the state of Oklahoma was $1,721 million in the year 2009 (National Conference for State Legislatures, 2014). Although this number is just a small percentage of the estimated $174 to $210 billion spent nationwide mentioned previously, it is still a significant amount of money that the state could be putting towards other aspects of the state budget.

Contributing Factors to Obesity Nationwide and in Oklahoma

Obesity refers to an excess of adipose, or fat, tissue in the body. Most generally, obesity occurs as a response to over-consumption of calories coupled with a lack of physical activity needed to burn the excess calories (CDC, 2015a; Obesity Society, 2016). Additionally, this imbalance can be influenced by both genetic and environmental factors.

According to the *2015-2020 Dietary Guidelines* Report released by the 2015 Dietary Guidelines Advisory Committee, 75% of the U.S. population has a consistently low intake of fruits, vegetables, dairy, and oils, and most of the population exceeds recommendations for added sugars, saturated fat, and salt (USDHHS & USDA, 2015). Looking further into the current intakes of the U.S. population, the advisory committee found that food sources of added sugars consumed by individuals 2 years and older consisted primarily of snacks and sweets (31%) and beverages that were not milk or 100% fruit juice (47%). Furthermore, a breakdown of the beverage intake showed 39% was sugar-sweetened beverages which included soft drinks, fruit drinks, and sports and energy drinks. The rest of the 47% was made up of coffee and tea and alcoholic beverages.

Figure 2.1 illustrates the percentage of added sugars in the U.S. population's diet from different food sources.

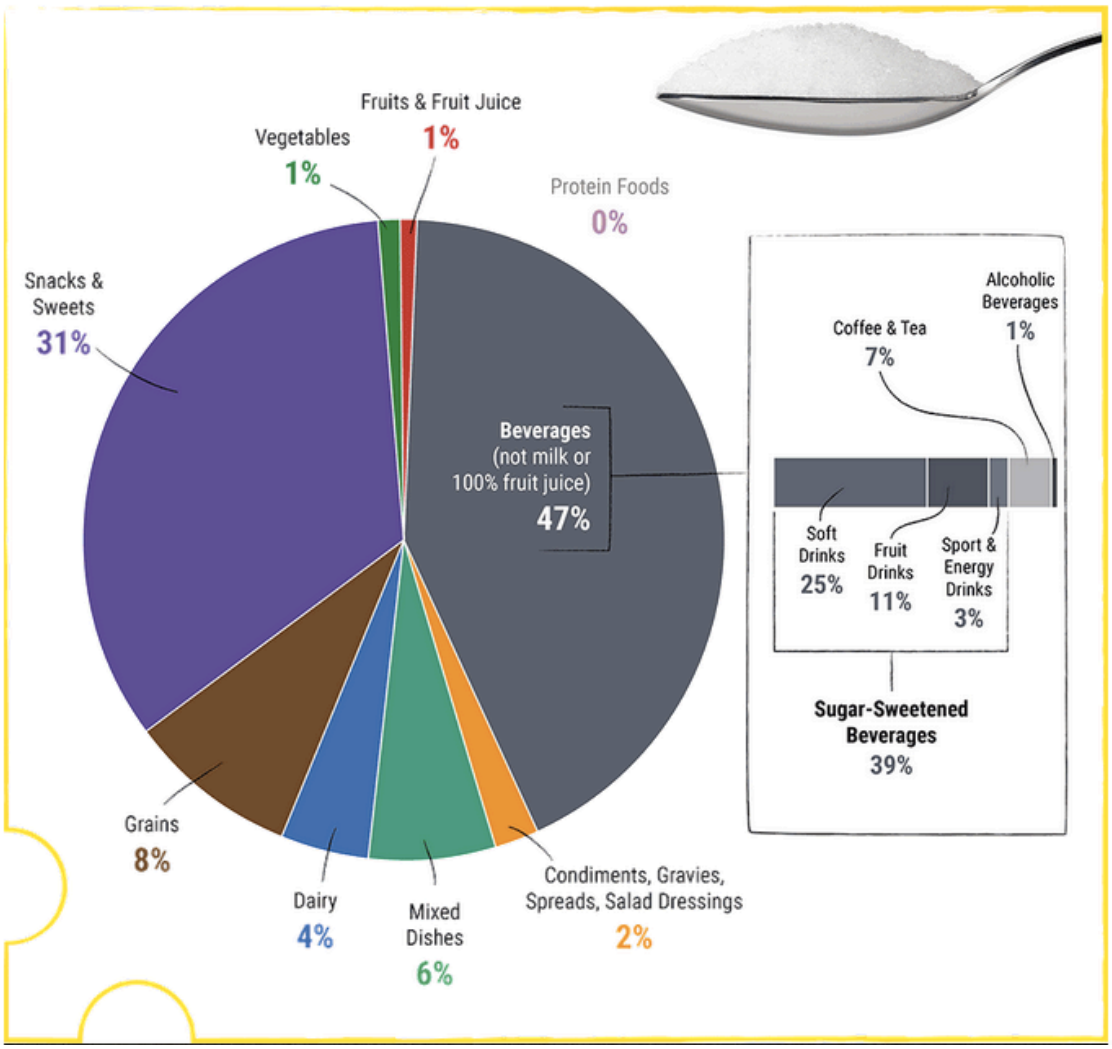

Figure 2.1 Sources of added sugar in the diet of the U.S. population ages 2 years and older (USDHHS & USDA, 2015).

Following the same breakdown with saturated fats, the biggest contributor was mixed dishes (35%). Foods within the mixed dishes category included pizza; burgers and sandwiches; meat, poultry, seafood dishes; rice, pasta, grain dishes; and soups. Figure 2.2. illustrates the percentage of saturated fat in the U.S. population's diet from different food sources. Lastly, the highest contributor to sodium intake was also mixed dishes (44%), which included the same

categories as seen with saturated fat. Burgers and sandwiches accounted for 21% of the 44%; pizza accounted for 6%; meat, poultry, seafood dishes 6%; rice, pasta, grain dishes 7%; and soups 4%. In summary, the greatest contributors of sugar and fat are foods that could be described as energy-dense, processed/convenience, and/or fast foods.

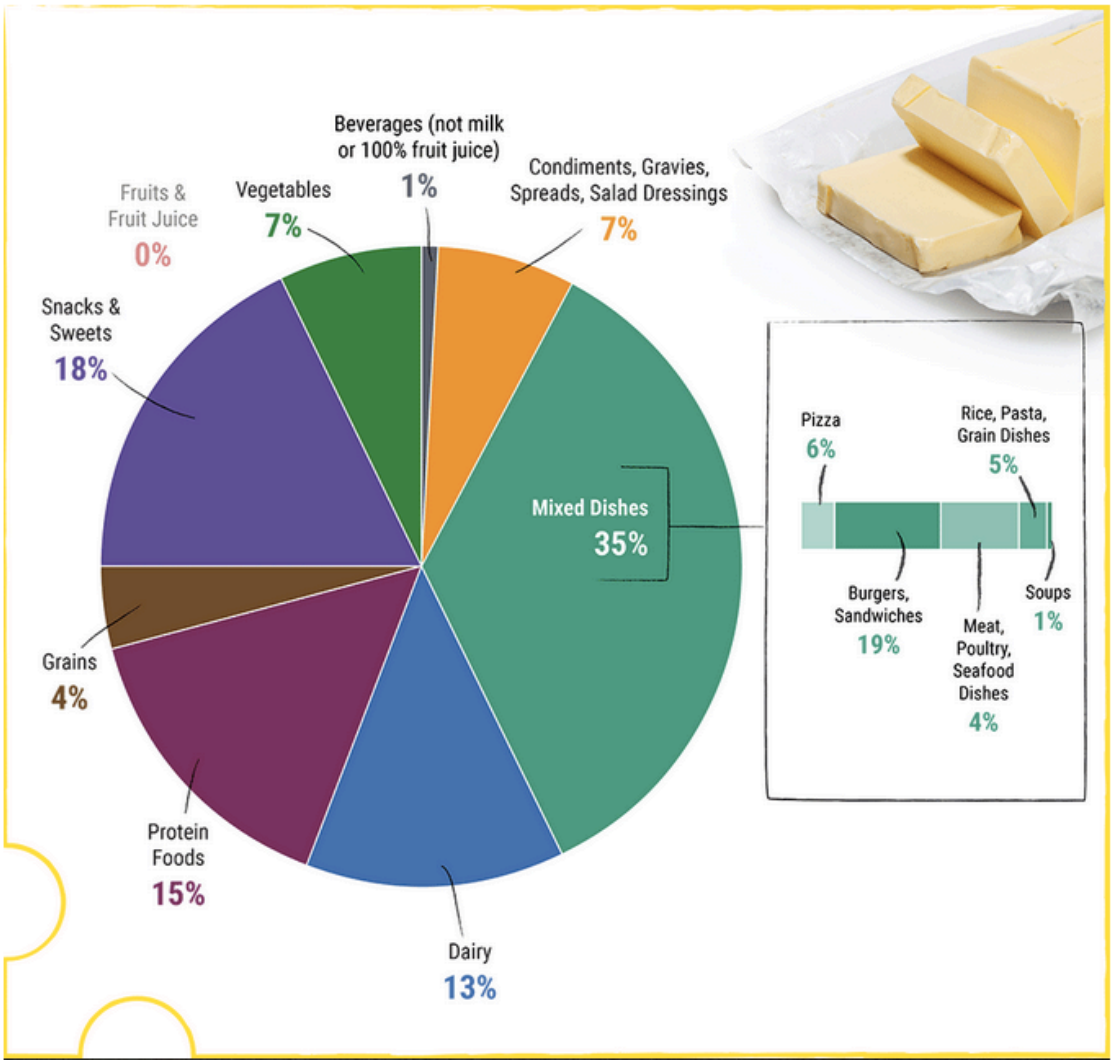

Figure 2.2 Sources of saturated fat in the diet of the U.S. population 2 years and older (USDHHS & USDA, 2015).

The 2015 Dietary Guidelines Committee's report is reflective of food consumption trends in Oklahoma. The *2014 State of the State's Health Report* ranked the state as 50th in fruit consumption and 44th in vegetable consumption nationally (OSDH, 2014a). Half of adults in

Oklahoma did not consume fruit on a daily basis, and 1 in 4 adults did not consume a vegetable every day. Additionally, 44% of Oklahoma youth reported they did "not eat at least one piece of fruit a day," and 40% reported they did "not eat at least one vegetable every day." According to the 2015 Oklahoma YRBS data, 29% of Oklahoma high school age students "drank a can, bottle, or glass of soda or pop one or more times per day during the 7 days before the survey" (OSDH, 2015).

All of the food categories discussed above as sources of added sugars and saturated fat, also known as energy-dense foods, are found in local grocery and convenience stores or frequently obtained in restaurants. Most notably, though, they are foods served in school cafeterias across America. Energy-dense foods are highly available and they are more highly marketed to both youth and adults compared to nutrient-dense foods (IOM, 2012). Further, portion sizes have increased over the last two decades, which encourages overconsumption. While an excessive intake of any food group can lead to negative consequences in the body, a major contributor to obesity is an imbalance in consumption of high added sugars and saturated fat (i.e. energy-dense foods) and low fruit and vegetable, whole grain, and low-fat dairy intake (nutrient-dense foods) (HHS & USDA, 2015).

Johnson et al. (2008) reported that an energy-dense, low-fiber, high-fat dietary pattern in children ages 5 and 7 was associated with higher fat mass and greater odds of excess adipose tissue. In contrast, a longitudinal study examining dietary factors and BMI and body fat percentage of adolescents in 6th through 11th grades found positive associations between sugar sweetened beverage intake and body fat percentage in males, but no significant association was found between fast-food intake and weight change in males or females (Laska et al., 2012). Another longitudinal study of 3 separate cohorts including 120,877 U.S. women and men found that long-term weight gain was strongly associated with increased daily servings of potato chips, potatoes, sugar-sweetened beverages, as well as unprocessed and processed meats while inversely

associated with intake of vegetables, whole grains, fruits, nuts, and yogurt (Mozaffarian et al., 2011). In contrast, research has shown that diets high in fiber (i.e. fruits, vegetables, whole-grains, and legumes) are inversely associated with body weight and body fat in part due to fiber's role in satiety, or the feeling of fullness (Slavin, 2005). Although the associations between dietary factors and weight change in adolescents discussed above are not strong, the associations in adulthood are strong and dietary habits are developed during the school years.

With energy-dense foods, individuals consume a high number of calories with little-to-no nutrient benefit, thus they reach, and exceed, their daily-recommended calorie intake faster (HHS & USDA, 2015). In contrast, nutrient-dense foods are naturally lean or low in solid fats and have little-to-no added solid fats, sugars, refined starches, or sodium, thus providing needed nutrients to the body while avoiding overconsumption of calories. Also, as discussed above, nutrient-dense foods are more likely to contain fibers that are satiating, making you feel fuller longer. Thus, one way to decrease excessive weight gain, along with chances of becoming overweight and obese, is to strive to consume a high intake of nutrient-dense foods and a low intake of energy-dense, low-nutrient foods.

In conjunction with a high energy-dense food intake, lack of physical activity needed to burn off the excess calories consumed can increase an individual's chances of gaining weight. According to the *State Indicator Report on Physical Activity, 2014*, released by the Centers for Disease Control and Prevention, only 20.6% of the U.S. population met both 150-minute aerobic and muscle-strengthening guidelines as recommended by the *2008 Physical Activity Guidelines* for adults aged 18 years and older (CDC, 2014b; HHS, 2016a). Additionally, only 27.1% of U.S. youth in grades 9-12 met the recommended 1-hour aerobic activity guideline for children and adolescents ages 6-17 years (HHS, 2016b). In regards to the state of Oklahoma, the *State Indicator Report on Physical Activity, 2014*, reported 16.2% adults met both 150-minute aerobic and muscle-strengthening guidelines, and 38.5% of youth in grades 9-12 met the 1-hour aerobic

activity guideline (CDC, 2014b). Thus, the adults and youth of both the nation and the state of Oklahoma are not where they should be in terms of meeting recommended intake of nutrient-dense foods, such as fruits and vegetables, and they are not meeting recommended physical activity guidelines, which can contribute to the growing obesity epidemic.

Efforts to Address Childhood/Adolescent Obesity in Schools

In an effort to address the growing epidemic of obesity in the United States, the Institute of Medicine (now known as the Health and Medicine Division) formed the Committee on Accelerating Progress in Obesity Prevention with the main goal of providing direction on what recommendations, strategies, and actions should be implemented to accelerate progress in obesity prevention over the next 10 years (IOM, 2012). In doing so, the committee identified five critical areas, or environments, for change: 1) environments for physical activity, 2) food and beverage environments, 3) message environments, 4) health care and work environments, and 5) school environments. The focus of the remainder of this thesis will be on obesity prevention in school food environments pertaining to children and adolescents.

Children and adolescents spend a large portion of their weekday at school and in before- and after-school programs, meaning they are likely to eat breakfast, lunch, and several snacks while in the school setting (Story et al., 2006; Levi et al., 2015). Thus, the school environment can play a considerable role on children and youths' dietary quality and development of food behaviors. Because youth and children spend a large amount of time at school and consume approximately 50% of their calories while at school, the IOM has recommended that schools be a focal point in obesity prevention efforts (Story et al., 2006; IOM, 2012).

Sources of food that students consume while at school include the USDA school breakfast and lunch programs and competitive foods such as à la carte lines, snack stores, vending

machines, and foods sold to raise funds. According to the USDA, in FY 2015, nearly 14 million children participated daily in the School Breakfast Program (SBP) and 31 million participated in the National School Lunch Program (NSLP) (USDA, 2016b). Additionally, more than 100,000 public schools or non-profit private schools and residential childcare institutions participated in NSLP and more than 90,000 participated in SBP (Levi et al., 2015). The NSLP and SBP are important sources of food for all students, but even more so for children of low-income households for whom school may be the only source of food on weekdays. For the first time in history, a majority (51%) of U.S. public school students were from households eligible to receive free or reduced-price meals. According to the Oklahoma State Department of Education Low Income Report for 2014-2015, 61% of students attending schools that participated in the NSLP were eligible for free or reduced-price meals (Oklahoma State Department of Education, 2016).

In 2010, the Healthy Hunger-Free Kids Act (HHFKA) was passed authorizing the USDA to update the NSLP and SBP in order to address the growing epidemics of childhood obesity and childhood hunger (United States Government Publishing Office, 2010). The revised regulations resulted in caloric, salt, sugar, and fat limits on all foods sold in schools and more opportunities to consume fruits, vegetables, lean proteins, low-fat milk, and whole grains (Office of the Federal Register, 2012). Changes were made to align with the *2010 Dietary Guidelines for Americans* and nutritional requirements necessary for the appropriate age groups. Standards for lunch were implemented in the 2012-13 school year, and the standards for breakfast were implemented the following school year (2013-14). Additionally, as a part of the HHFKA, the "Smart Snacks in School" standards, which deal with all competitive foods sold during school, went into effect during the 2014-2015 school year (USDA, 2015c). Tables 2.1, 2.2, and 2.3 below summarize the specific changes made to the NSLP and SBP regarding all food groups, sodium, calories, and fat for grades K through 12.

Table 2.1 Comparison of Previous and Current NSLP Regulations under Final Rule *Nutrition Standards in the National School Lunch and Breakfast Programs* (USDA, 2012).

National School Lunch Program Meal Pattern		
Food Group	**Previous Requirements K-12**	**Current Requirements K-12** (as of 7/1/12)
Fruit and Vegetables	½ - ¾ cup of fruit and vegetables combined per day	¾ - 1 cup of vegetables plus ½ -1 cup of fruit per day Note: Students are allowed to select ½ cup fruit or vegetable under OVS.
Vegetables	No specifications as to type of vegetable subgroup	Weekly requirement for: • dark green • red/orange • beans/peas (legumes) • starchy • other (as defined in 2010 Dietary Guidelines)
Meat/Meat Alternate (M/MA)	1.5 – 2 oz eq. (daily minimum)	Daily minimum and weekly ranges: Grades K-5: 1 oz eq. min. daily (8-10 oz weekly) Grades 6-8 : 1 oz eq. min. daily (9-10 oz weekly) Grades 9-12 : 2 oz eq. min. daily (10-12 oz weekly)
Grains	8 servings per week (minimum of 1 serving per day)	Daily minimum and weekly ranges: Grades K-5: 1 oz eq. min. daily (8-9 oz weekly) Grades 6-8 : 1 oz eq. min. daily (8-10 oz weekly) Grades 9-12 : 2 oz eq. min. daily (10-12 oz weekly)
Whole Grains	Encouraged	At least half of the grains must be whole grain-rich beginning July 1, 2012. Beginning July 1, 2014, all grains must be whole grain rich.
Milk	1 cup Variety of fat contents allowed; flavor not restricted	1 cup Must be fat-free(unflavored/flavored) or 1% low fat (unflavored)

Table 2.2 Comparison of Previous and Current SBP Regulations under Final Rule *Nutrition Standards in the National School Lunch and Breakfast Programs* (USDA, 2012).

School Breakfast Program Meal Pattern		
Food Group	**Previous Requirements K-12**	**Current Requirements K-12** (as of 7/1/12)
Fruit	½ cup per day (vegetable substitution allowed)	1 cup per day (vegetable substitution allowed) Note: Quantity required SY 2014-15. Students are allowed to select ½ cup of fruit under OVS.
Grains and Meat/Meat Alternate (M/MA)	2 grains, or 2 meat/meat alternates, or 1 of each per day	Daily min. and weekly ranges for grains: Grades K-5: 1 oz eq. min. daily (7-10 oz weekly) Grades 6-8 : 1 oz eq. min. daily (8-10 oz weekly) Grades 9-12 : 1 oz eq. min. daily (9-10 oz weekly) Note: Quantity required SY 2013-14. Schools may substitute M/MA for grains after the minimum daily grains requirement is met.
Whole Grains	Encouraged	At least half of the grains must be whole grain-rich beginning July 1, 2013. Beginning July 1, 2014, all grains must be whole grain rich.
Milk	1 cup Variety of fat contents allowed; flavor not restricted	1 cup Must be fat-free (unflavored/flavored) or 1% low fat (unflavored)

Table 2.1 Comparison of Previous and Current Nutrient Regulations under Final Rule *Nutrition Standards in the National School Lunch and Breakfast Programs* (USDA, 2012).

Previous Nutrient Standards	Current Standards K-12 (as of 7/1/12)		
Sodium Reduce, no set targets	**Target I: SY 2014-15** Lunch ≤1230mg (K-5); ≤1360mg (6-8); ≤1420mg (9-12) Breakfast ≤540mg (K-5); ≤600mg (6-8); ≤640mg (9-12	**Target 2: SY 2017-18** Lunch ≤935mg (K-5) ≤1035mg (6-8); ≤1080mg (9-12) Breakfast ≤485mg (K-5); ≤535mg (6-8); ≤570mg (9-12	**Final target: 2022-23** Lunch ≤640mg (K-5); ≤710mg (6-8); ≤740mg (9-12) Breakfast ≤430mg (K-5); ≤470mg (6-8); ≤500mg (9-12)
Calories (min. only) *Traditional Menu Planning* Lunch: 633 (grades K-3) 785 (grades 4-12) 825 (optional grades 7-12) Breakfast: 554 (grades K-12) *Enhanced Menu Planning* Lunch: 664 (grades K-6) 825 (grades 7-12) 633 (optional grades K-3) Breakfast: 554 (grades K-12) 774 (optional grades 7-12) *Nutrient Based Menu Planning* Lunch: 664 (grades K-6) 825 (grades 7-12) 633 (optional grades K-3) Breakfast: 554 (grades K-12) 618 (optional grades 7-12)	**Calorie Ranges (min. & max.)** *Only food-based menu planning allowed* Lunch: 550-650 (grades K-5) 600-700 (grades 6-8) 750-850 (grades 9-12) Breakfast: 350-500 (grades K-5) 400-550 (grades 6-8) 450-600 (grades 9-12)		
Saturated Fat <10% of total calories	**Saturated Fat** <10% of total calories		
Trans Fat: no limit	**New specification:** zero grams per serving (nutrition label)		

Reports released by the USDA reflect that changes to foods sold in schools as a result of the HHFKA 2010 have had a positive impact on the diets of children and adolescents nationwide without substantially hindering breakfast and lunch participation. According to a fact sheet released by the USDA, some of these positive impacts include more students eating breakfast at school; students liking the healthier meals, even though there were complaints initially; students consuming more fruits and vegetables; and less food waste (USDA, 2014b; 2015d). In regards to revenue and school/student participation, the USDA reported that school lunch revenue increased; student participation increased in certain areas of the U.S. including Los Angeles, California, Dallas, Texas, and some of Florida; and school participation reportedly increased as a result of the Community Eligibility Provision (CEP) under the HHFKA.

From January 2011 to January 2014, a longitudinal study conducted by Johnson, Podrabsky, Rocha, & Otten (2016) examined nutritional quality of foods selected by students and student participation rates before and after implementation of HHFKA. During the allotted time period, around 1.7 million school meals were examined in 3 middle schools and 3 high schools in an urban school district in Washington State, where 54% of students were eligible for free or reduced-priced meals. After comparing mean monthly values of mean adequacy ratios of 6 nutrients (calcium, vitamin C, vitamin A, iron, fiber, and protein), energy density, and participation before and after implementation, it was found that nutritional quality significantly increased, energy density significantly decreased, and participation was not significantly affected.

Although studies report either no impact or a positive impact on student participation nationwide, it is worth noting that closer examination of NSLP and SBP national and state participation tables for FY 2011 through FY 2015 show contradictory trends (USDA, 2016b). For example, national SBP participation from FY 2011 to FY 2015 increased steadily from 12 million to 14 million, but NSLP participation dropped from 31.8 million to 30.5 million with a slight increase between FY 2014 and FY 2015. In regards to Oklahoma's participation, NSLP

participation decreased from 452 million to 438 million (3.1% decrease) between FY 2011 and FY 2013; the updated NSLP nutrition standards were implemented July 1, 2012. The current trend shows gradual increases in participation but the rates have not returned to FY 2011 level. Likewise, Oklahoma SBP participation increased from 224 million to 227 million between FY 2011 and 2013 then decreased to 225 million by FY 2015. The period between FY 2013 and 2015 reflect the time period when the updated SBP nutrition standards were implemented (FY 2014). Although participation has decreased in Oklahoma, the Oklahoma State Department of Education Low Income Reports for 2011 and 2015 school years show an increase in statewide enrollment (656,812 in 2011 vs. 680,136 in 2015 – 3.6% increase) and students eligible for free and reduced price meals (400,135 in 2011 vs. 416,545 in 2015 – 4.1% increase) (Oklahoma State Department of Education, 2016). Thus, magnifying the number of students that are not eating at school, especially those that may benefit more than others.

Challenges of Complying with New School Food Standards

The available data and report findings reflect conflicting evidence related to the impact of the HHFKA on students' diets and participation rates. At the same time, many school food authorities (SFA) report challenges in implementing the new standards. The Pew Charitable Trusts and the Robert Wood Johnson Foundation, collaborators in the Kids' Safe and Healthful Foods Project, conducted the first national study to examine equipment, infrastructure and training needs of SFAs in order to meet new standards (The Pew Charitable Trusts, 2016). In their first report of three, they identified the main barriers that SFAs face as limitations of existing kitchen equipment and infrastructure, and lack of proper food service staff training and skills (Urahn et al., 2013a). Ninety-four percent of SFAs expected to be able to meet the new standards by the end of the 2012-2013 school year, and 90% had made or expected to make at least one

change in meal production approach such as more scratch cooking or buying more ready-to-eat foods from vendors. However, although the majority of SFAs expected to meet new standards, 91% reported facing one or more challenges with the top two as buying appropriate foods and the need to train staff. Additionally, one-third needed new equipment, and one-quarter needed infrastructure upgrades. SFAs with inadequate equipment reported having to make do with some type of inefficient process, or workaround, that in the end was considered expensive, inefficient, and unsustainable. Examples of workarounds include:

- Manually chopping and slicing fruits and vegetables because slicers and sectionizers were unavailable.
- Storing fruits and vegetables in off-site locations and transporting them daily.
- Keeping fruits and vegetables in temporary storage containers such as milk crates and small coolers, or increasing the frequency of food delivery to avoid having to store fruits and vegetables.
- Preparing lunches in shifts due to inadequate preparation and/or meal service space. (Urahn et al., 2013a, p. 11)

Consequently, the major conclusion was that SFAs could be meeting new standards more efficiently and effectively if they had the necessary equipment and/or infrastructure and if their staff was trained appropriately.

The Pew Charitable Trusts and Robert Wood Johnson Foundation followed the above report with two additional reports that further examined the two main barriers. According to the findings of the second report, which examined kitchen equipment and infrastructure needs, 88% of school food authorities needed equipment in order to meet new standards, 42% reported having a budget to purchase needed equipment but less than half believed it was enough to cover costs, and 55% reported needing infrastructure changes in one or more schools in order to meet new

standards (Urahn et al., 2013b). Figure 2.3 below illustrates the top needs reported by school food authorities regarding kitchen equipment and infrastructure in order to meet new standards.

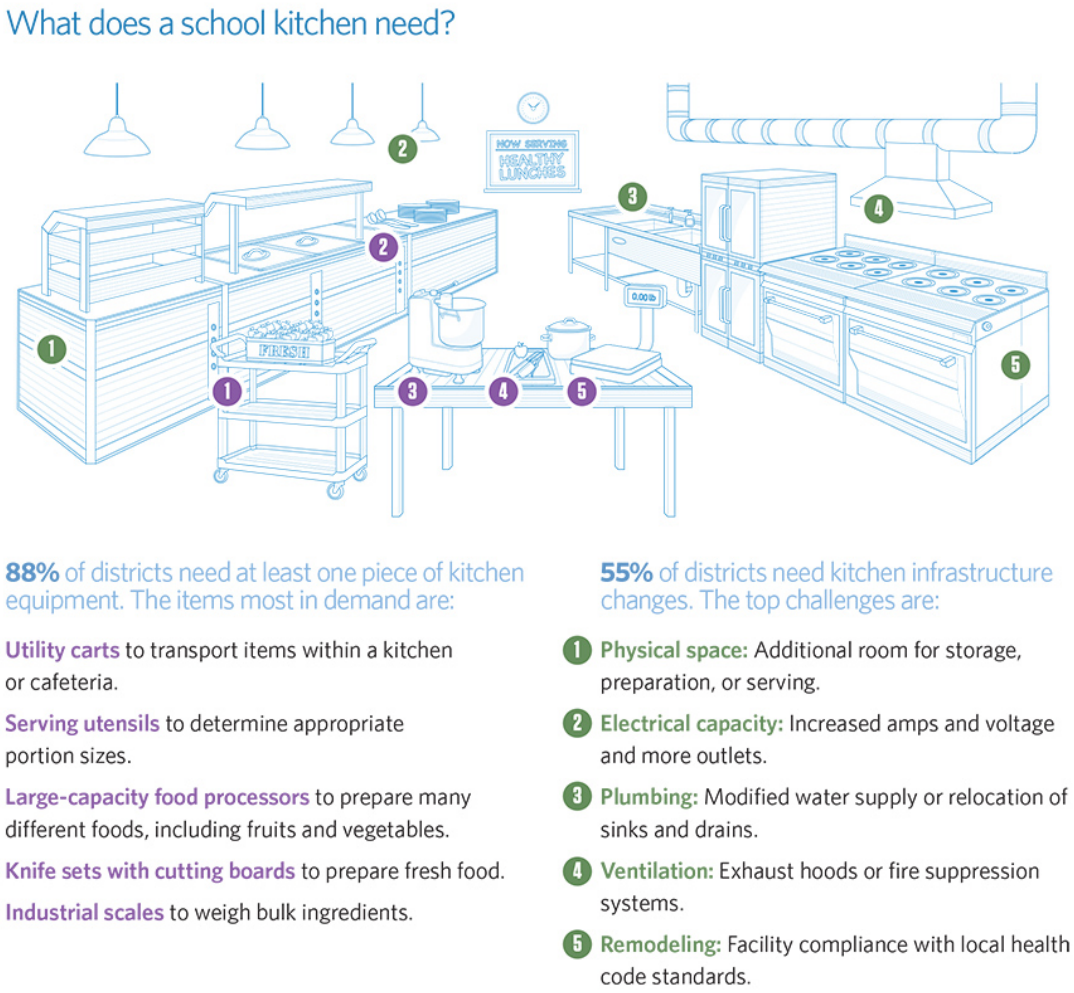

Figure 2.3 Top kitchen equipment and infrastructure needs in order for schools to effectively and efficiently implement new standards (The Pew Charitable Trusts, 2015).

In their third report regarding staff development and training needs, the Pew Charitable Trusts and Robert Wood Johnson Foundation found that the most common training school nutrition professionals receive is on-the-job, and only 29% of SFAs and 7% of food service managers reported having bachelor's degrees in food-related studies (Urahn et al., 2015).

Furthermore, the top training need reported by all school nutrition personnel in order to meet new standards was to understand compliance with the new meal pattern and nutrient requirements, and the top training needs reported by kitchen/cafeteria managers and cooks/front-line servers included nutrition training, cooking skills, and food safety training. Finally, results showed that only 37% of SFAs have budgets for staff development and training, and of that percentage, about two thirds do not believe it is enough to meet all of their training needs.

In efforts to address these challenges found by the Kids' Safe and Healthful Foods Project, the USDA has administered grants for school nutrition professional training and kitchen equipment. Also, most recently the USDA launched an initiative called *Team Up for School Nutrition Success* to aid schools that still face challenges. In FY 2013, $5.6 million in grants was awarded nationwide to provide training and technical assistance for school nutrition professionals, and in April of 2014, USDA announced $25 million in grants to aid schools in purchasing the equipment they need to successfully implement the new standards (USDA, 2014b; 2014a). Furthermore, upon passage of the Professional Standards Final Rule in early 2015, another provision of HHFKA, USDA announced the availability of up to $4 million in grants for states to develop and implement trainings in order to meet these new professional standards (USDA, 2015a). Notably, the new professional standards established a minimum, annual amount of education and training hours for all school nutrition employees who manage and operate NSLP and SBP depending on the job position held (Office of the Federal Register, 2015; USDA, 2016e). For example, for the 2015-16 school year, all directors need at least eight hours annually, and beginning with the 2016-17 school year, this position will require at least 12 hours. All managers need at least six hours for 2015-16 school year and at least 10 hours thereafter. All other staff working at least 20 hours/week need at least four hours for 2015-16 and six hours thereafter. This continuing education requirement ensures they possess the knowledge and skills needed to carry out their job duties and responsibilities in the most efficient manner possible.

Finally, also announced in early 2015 by the USDA, was the nationwide expansion of the *Team Up for School Nutrition Success* initiative, which allows for schools still struggling with implementation of new standards to pair up with another school that is successfully implementing the new standards as a peer mentor program (USDA, 2015b; Institute of Child Nutrition, 2016). Aspects covered by the program include menu planning, financial management, procurement, and strategies to reduce plate waste. Thus, even though schools nationwide face major challenges as they work to implement new standards, USDA has continued to provide aid so that schools are able to successfully meet new standards with financial stability. While these programs are greatly needed, they do not provide the hands-on cooking skills that kitchen/cafeteria managers and cooks/front-line servers reported as a top training need (Urahn, 2015). To address the need, the Pew Charitable Trusts recommended that third-party trainers, such as chefs, be contracted to administer training and technical assistance.

Chef-based Culinary Training for School Nutrition Professionals

There is a limited, but growing, amount of research that has analyzed the effectiveness and/or attempted to identify best practices for school nutrition professional trainings. Recently, Stephens & Byker Shanks (2015) conducted a systematic review of grades K-12 school food service staff training interventions to identify best practices and areas for future research. Between January 1990 and February 2014, only 17 articles describing 14 interventions met inclusion criteria. Nine articles described comprehensive school health interventions that included some component of food staff training, six studies examined school food service and food environment interventions, and only two evaluated a school food service staff training program. Of all of the studies identified, only two involved a chef working alongside the school nutrition professionals; these studies will be discussed below. In their concluding statements, the authors

called for further research to identify best practices regarding training for school nutrition professionals as they are responsible for not only providing nutritionally sound meals but also palatability and acceptability of meals to students. Notably, Stephens & Byker Shanks (2015) stated, "Training must address not just basic culinary skills and job duties, but empower school food service professionals with nutrition and policy knowledge to answer the 'why' questions regarding school meal requirements" (p. 832).

The first chef-involved study identified in the systematic review mentioned above was an evaluation of a two-year study called Chef Initiative that took place between 2007 and 2009 in two Boston middle schools (Cohen et al., 2012). The goal of the program was to enhance the dietary quality and palatability of foods served in the schools via a chef to develop recipes, plan menus, and train existing cafeteria staff. The chef worked with the staff two to three days/week at each school during the two-year period and trainings included scratch cooking techniques and recommendations to meet nutrition goals. Results of a plate waste study showed Chef Initiative schools provided healthier meals and percent of foods consumed was similar to the control schools.

The second article was an overview of the New York City Department of Education's efforts over a decade (2001-2011) to improve the appeal and nutritional quality of school food (Perlman et al., 2012). An executive chef and a team of seven support chefs was brought in during 2004 to develop appropriate menu items for all schools, even ones that might be limited to heat-and-serve. Regional chefs (one for each NYC borough) worked with schools to enhance visual appeal of food, increase staff efficiency, and adhere to standardized recipes. There were no outcomes reported as the article highlighted efforts, recommendations, and resources, however the authors did mention that NYC was able to implement these changes while reducing its budget deficit.

Similar to the Boston study above, another study was conducted in Massachusetts during the 2011-2012 school year to evaluate the short- and long-term effects of chef-enhanced meals and choice architecture on healthier school food selection and consumption (Cohen et al., 2015). Professional chefs were hired to collaborate with schools two to three days/week throughout the 2011-2012 school year for recipe development to increase palatability and teach the cafeteria staff necessary culinary skills. After three months of exposure, plate waste study results showed a significant increase in vegetable selection in chef schools compared to controls schools. After seven months of exposure, both fruit selection and consumption significantly increased as well as vegetable selection and consumption. The authors concluded this study reaffirmed use of a chef intervention which focused on school food quality, palatability, and variety to effectively increase selection and consumption of fruits and vegetables long-term.

More recently, evaluation of a chef-based training for school nutrition professionals called "Cooking with a Chef" in South Carolina was reported at a poster session for the annual Academy of Nutrition and Dietetics Conference (Condrasky, Sharp, & Carter, 2014). The two-day workshop was led by a professional chef to boost school nutrition professionals' skills and confidence to prepare healthier options, in particular fruits, vegetables, and seasonings. Short-term evaluation showed an increase in confidence regarding steaming, sautéing, and roasting. Further, significant increases in confidence using herbs and spices, and an increase in knowledge of cooking terms and techniques was also reported. Long-term behaviors were not reported.

Finally, in a 2016 issue of *School Nutrition* magazine, access to chef-based culinary training was encouraged through corporate chefs, state agencies, and enterprising partners (Casselbury, 2016). One foodservice expert discussed was *Cook for America*, specifically their program *Lunch Teachers* Culinary Boot Camp. Training was five days and provided school nutrition professionals with comprehensive culinary training including culinary math, time management, knife skills, menu planning, and cooking techniques (Cook for America, 2011).

Overall, the goal of the training was to build skills, confidence, awareness, motivation, and self-respect among participants, however, studies evaluating these boot camps could not be found. Overall, the above studies illustrate the success as well as the need for more chef-based culinary trainings for SNPs, and the need for evaluation of these trainings to better understand and establish best practices.

Community Readiness Model

Interventions are most successful when based on behavior change theories. The Community Readiness Model was developed by the Tri-Ethnic Center for Prevention Research (2014) at Colorado State University, and it is similar to the Transtheoretical Model of Change. However, the major difference between the two models is that Transtheoretical Model of Change assesses the readiness of an individual, whereas the Community Readiness Model assesses the readiness of a community or group of people. Key informants representing the group of people are interviewed or participate in focus groups using questions related to 5 dimensions. The dimensions include 1) knowledge of efforts; 2) leadership; 3) community climate; 4) knowledge of the issue; and 5) resources. Responses are scored using a standard anchored rating scale with 1 reflecting the lowest stage and 9 the highest stage. Dimension scores are averaged and result in an overall readiness score. Figure 2.4 below illustrates the core concepts of the Community Readiness Model. Community readiness can fall within one of nine stages: 1) no awareness, 2) denial, 3) vague awareness, 4) preplanning, 5) preparation, 6) initiation, 7) stabilization, 8) confirmation/expansion, and 9) high level of community ownership. To move a group to the next stage, the dimensions with the lower scores are addressed in the intervention.

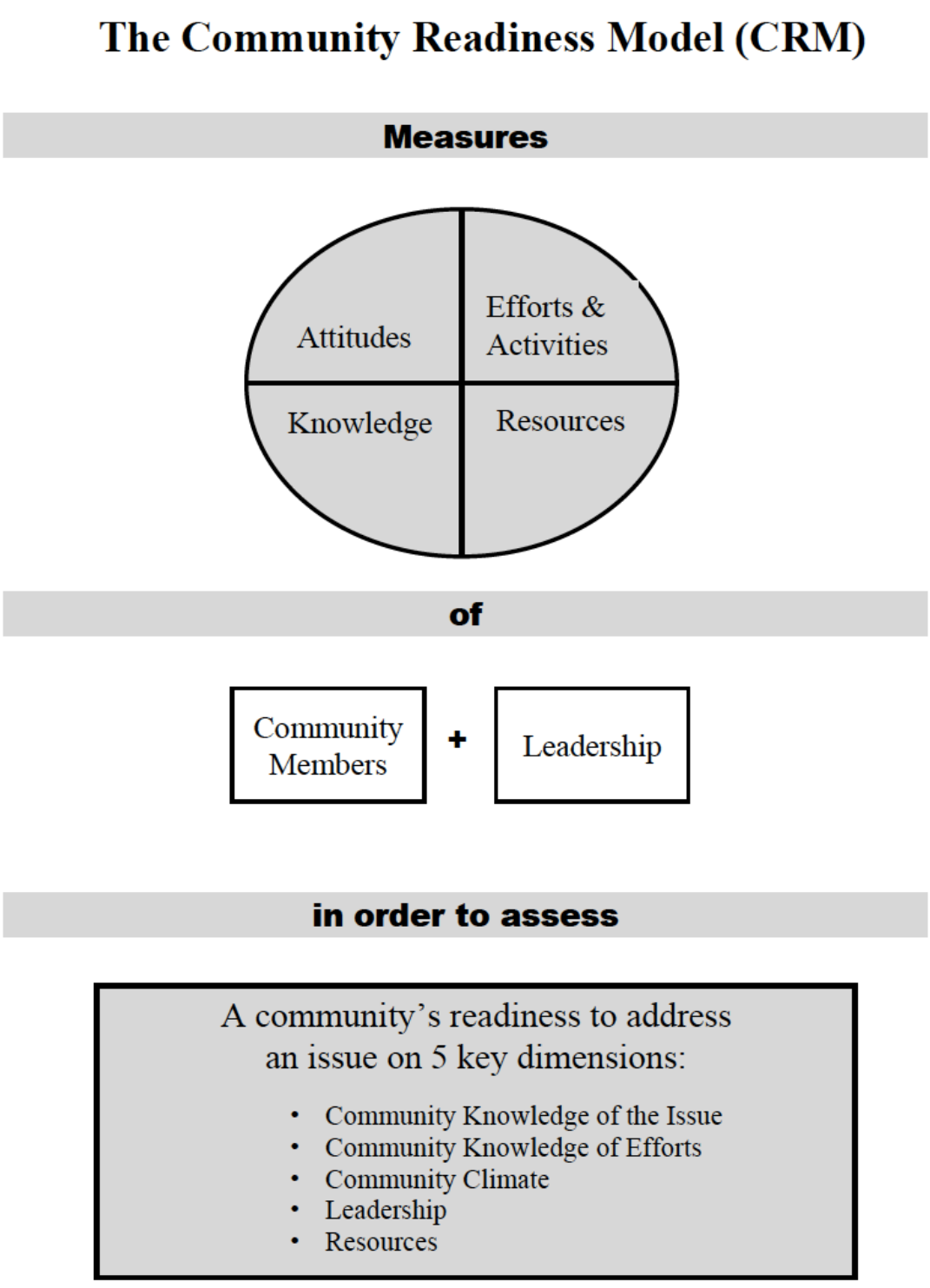

Figure 2.4 The Community Readiness Model (Tri-Ethnic Center for Prevention Research, 2014).

Cooking for Kids: Culinary Training for School Nutrition Professionals

Cooking for Kids is a low- to no-cost, hands-on culinary training program developed by a partnership of the Oklahoma State University Department of Nutritional Sciences and School of Hotel and Restaurant Administration and the Oklahoma State Department of Education for school nutrition professionals in the state of Oklahoma (Cooking for Kids, 2016a). The target audience for the program is school nutrition professionals including head cooks, kitchen managers, and child nutrition directors or supervisors. Goals of the program include increased use of scratch cooking methods, increased student participation, and improved stakeholder perception of school nutrition. Findings from a community readiness assessment provided guidance in developing the program. The training curriculum was developed from findings of this assessment conducted with six pilot schools in Spring 2014 to identify Oklahoma school nutrition professionals' (i.e. the community/group of people) willingness and preparedness to prepare meals using more scratch cooking practices (Blevins, 2015). Other guidance was provided by reports released by The Pew Charitable Trusts (Urahn et al., 2013a; 2015). Funding for *Cooking for Kids* is provided by the Oklahoma State Department of Education Child Nutrition Services through the USDA Food and Nutrition Services.

The baseline readiness assessment revealed the schools had a vague awareness of the need to make changes to the school nutrition program (Blevins, 2015). Specifically, the school nutrition professionals were not aware of efforts aimed to make changes and reported few resources essential for making the change. The resources included lack of skills, time, expertise and leadership, and general support from teachers and parents. Further, while they were willing to make changes, they were doing so because it was required instead of doing so because of an awareness of the association between nutrition and students' academic and health outcomes. Additional concerns were that students may not be accepting of the new menus and that the efforts of the school nutrition professionals were not valued by teachers and parents, both of

which might result in low participation rates. These factors reflect the Community Readiness dimensions of "knowledge of efforts", "resources", and "community climate." The model posits that to move a group of people toward an action the dimensions with lower readiness scores should be addressed. Therefore, the information was used to guide development of the *Cooking for Kids* skill development curriculum that was pilot tested in the six school schools in Summer 2014. After completion of the pilot programs a follow-up readiness assessment was conducted, resulting in progress in readiness to the stage described as "preparation."

The skill development training was launched statewide in Summer 2015. Training objectives are provided in Appendix A for the two-level training program. Chefs with industry experience were trained by the *Cooking for Kids* partners to familiarize them with school nutrition programs and to deliver the curriculum consistently across training sites to participants. Further, upon completion of the training, participants received 12 hours of continuing education credit for each level completed, which could be put towards annual continuing education/training requirements put forth by the Professional Standards Final Rule (Office of the Federal Register, 2015; USDA, 2016e). A pre- and post-training questionnaire was administered on the first and last day of the training to evaluate change in eight knowledge areas including nutrition, food preparation methods, food safety, use of standardized recipes, time management, food flavoring, taste testing, and marketing strategies. Significant improvements in knowledge were observed in all areas (Birsner & Hildebrand, 2016). Methods and results for the evaluation of skill development training on school nutrition professionals' knowledge and skill efficacy can be viewed in Appendix B.

Social Cognitive Theory

Social Cognitive Theory (SCT), initially known as Social Learning Theory, is a behavior change model that was developed by Albert Bandura in 1986 (Bandura, 1989; Davidson Films, 2003). In this theory, self-development, adaption, and change occur through an interplay of personal, behavioral, and environmental influences in a relationship Bandura called triadic reciprocal causation, or reciprocal determinism. For example, personal characteristics such as knowledge, beliefs, and values can affect an individual's behavior, which in turn elicits certain social reactions from the environment that are used as feedback to behavior. Further, social interactions within the environment such as instruction, modeling, and persuasion can change personal characteristics, and behavior can change personal abilities such as when individuals use performance feedback to increase skills.

Self-efficacy and outcome expectations play pivotal roles in the regulation of the structure described above (Bandura, 1998; Davidson Films, 2003). Self-efficacy is known as a "person's belief in their ability to produce desired results by their own actions," and one's efficacy beliefs influence his or her cognitive, motivational, emotional and decisional states. Bandura states the four ways to develop a strong sense of self-efficacy include mastery experiences, social modeling, social persuasion, and the ability to read personal physical and emotional states in order to achieve goals. Additionally, outcome expectations about the effects of different behaviors also influence behavior change. People are more likely to engage in an activity with which they believe they are capable of doing and they see their involvement as leading to positive, valued outcomes. Thus, the Community Readiness Model was used to identify stage appropriate strategies for *Cooking for Kids* training, and the SCT was used to design the training so as to elicit behavior change by providing an environment that increased knowledge and skills and positively impacted beliefs and values of participants.

Summary

In summary, the national rate of childhood obesity has more than tripled since 1980, and it has remained stable for the last 10 years (The State of Obesity, 2016). The school environment can play a considerable role on children's diets and development of food behaviors because children consume up to 50% of their daily calories at school (Story et al., 2006; Levi et al., 2015). Thus, the Institute of Medicine (now known as the Health and Medicine Division) recommends schools be a focal point in obesity prevention (IOM, 2012). Passage of the Healthy, Hunger-Free Kids Act 2010 has made major impacts on all foods sold in school, however, many schools continue to face challenges regarding skilled staff and infrastructure needed to successfully reach the 2012 nutrition standards (United States Government Publishing Office, 2010; Office of the Federal Register, 2012; Urahn et al., 2013a; Urahn et al., 2013b; Urahn et al., 2015). With regards to culinary skills needed by the school nutrition professionals, The Pew Charitable Trusts recommended third-party trainers, such as chefs, administer trainings. However, there is limited, but growing, research evaluating the efficacy of such trainings to transform gained knowledge and skills into best practices in the school nutrition food preparation setting.

The *Cooking for Kids* program was developed to provide low- to no-cost, chef-based culinary training to Oklahoma SNPs and is funded by the Oklahoma State Department of Education Child Nutrition Services (Cooking for Kids, 2016a). The Community Readiness assessments with six pilot schools were used to guide development of an evidence-based, multi-phase curriculum while concepts of the Social Cognitive Theory were used to further enhance and elicit behavior change. Additionally, *Cooking for Kids* provided participants with 12 hours of continuing education credits for each level completed. These continuing education credits allow the participants to meet the annual, federal professional training standards for SNPs, which is another provision of the HHFKA (Office of the Federal Register, 2015; USDA, 2016e). *Cooking for Kids* was implemented statewide Summer 2015. Preliminary evaluation immediately

following the program indicated significant improvements in SNPs' knowledge. However, the training program has not been evaluated to test its efficacy to impact SNPs' beliefs related to school meals and the transfer of knowledge gained into work-place practice.

CHAPTER III

METHODOLOGY

Participants

Participants for this study included a range of Oklahoma school nutrition professionals (cooks, head cooks, kitchen managers, and child nutrition directors or supervisors) working in school districts that participated in federally funded Child Nutrition Programs (i.e. National School Lunch Program and School Breakfast Program). In Spring 2015, an email list provided by the Oklahoma State Department of Education was used to recruit Oklahoma school nutrition professionals to enroll in Levels 1 and 2 of *Cooking for Kids: Culinary Training for School Nutrition Professionals*. Participation in the training was volunteer-based and every participant signed a consent form before starting the training or completing questionnaires. Only those who attended both levels of training and submitted a valid email for a 6-month follow-up survey were included in this study.

Description of Intervention

The 2-level, 4-day *Cooking for Kids* Regional Training was offered during four weeks in June and July, 2015, at six different sites throughout Oklahoma. Table 3.1 below

summarizes dates and locations of the training. Figure 3.1 below illustrates training locations in relation to the state of Oklahoma. Training consisted of Level 1 on Monday and Tuesday, and Level 2 on Wednesday and Thursday. Chefs, trained to deliver the curriculum and familiar with school nutrition programs, conducted the training sessions. The *Cooking for Kids* partners conducted the chefs' training in May, 2015. Concepts covered during Level 1 skill development included nutrition, food safety, knife skills, kitchen skills, vegetable cookery, whole grain cookery, and recipe and menu development with hands-on application in the on-site kitchen. Concepts covered during Level 2 skill development included taste training, professionalism (of self, food, menu, and lunchroom), marketing, flavor training, use of standardized recipes, and mise en place (i.e. time management). Detailed daily agendas of the trainings are provided in Appendix C.

Table 3.1 Dates and locations of 2015 *Cooking for Kids* Regional Training.

Cooking for Kids Regional Training Summer 2015				
Date*	Location			
June 15-18	Francis-Tuttle Oklahoma City, OK	Tri-Country Tech Bartlesville, OK	Indian Capitol Career Tech Muskogee, OK	Union Public Schools, 7th and 8th Grade Center Tulsa, OK
June 22-25	Francis-Tuttle Oklahoma City, OK	Western Plains Career Tech Burns Flat, OK	Union Public Schools Tulsa, OK	
July 13-16	Autry Career Tech Enid, OK	Tri-County Career Tech Bartlesville, OK	Indian Capitol Career Tech Muskogee, OK	Francis-Tuttle Oklahoma City, OK
July 20-23	Autry Career Tech Enid, OK	Western Plains Career Tech Burns Flat, OK	Union Public Schools, 7th and 8th Grade Center Tulsa, OK	Francis-Tuttle Oklahoma City, OK

***Level 1 is the first 2 days and Level 2 is the second 2 days.**

Figure 3.1 Locations of 2015 *Cooking for Kids* Regional Training in relation to the state of Oklahoma (Oklahoma State Tourism and Recreation Department, 2016)

Data Collection Tools

On day 1 of Level 1 training, all participants were given the *Cooking for Kids School Meal and Food Preparation Pre-Training Questionnaire* to complete prior to beginning training. The 27-item questionnaire included five demographic items; 12 items that addressed pride and beliefs related to school meals; one item addressing extent of scratch cooking; six items addressing practices; and three items addressing availability of resources. The practice items had 3- to 5-point ordinal response options with an additional response for the respondent to use if they were not knowledgeable of the practice depending on the question. The belief and resource items had 5-point Likert scale response options ranging from strongly agree to strongly disagree including a response for respondents to use if they did not know. The item regarding pride was similar to the belief items but a neutral response replaced the "I do not know" option. Appendix D provides a copy of the pre-training questionnaire. At the conclusion of the 2015 *Cooking for Kids*

Regional Trainings, pre-training questionnaire responses were entered into Qualtrics survey software (2015) by two graduate research assistants. Additionally, on day 1 of Level 1 training, participants provided an email address if they agreed to receive a 6-month follow-up survey. The *Cooking for Kids School Meal and Food Preparation Post-Training Questionnaire* was distributed electronically in December, 2015, via Qualtrics to participants that completed both levels and for whom a valid email address was provided. To maximize response rate, participants were sent an email one week prior to distribution of the survey alerting them that they would be receiving a survey in the next week. Further, two reminder emails were sent in 1-week intervals after the survey was distributed to encourage participants to complete the survey if they had not already. Appendix E provides a copy of the post-training questionnaire. Added questions included those to guide ongoing program improvement.

The study protocol was reviewed and processed as exempt by the Oklahoma State University Institutional Review Board. Notification is provided in Appendix F.

Coding

Pre- and post-training responses were exported from Qualtrics to SPSS (IBM SPSS Statistics; Version 20; Copyright© 2011) and then transformed and re-coded. Most of the demographic questions remained unchanged as some were string variables or respondents had the opportunity to select more than one response. When manually entering total number of years worked, half years were rounded down (i.e. six months was recorded as zero years). An additional variable was created to collapse county responses into four general regions of Oklahoma (i.e. 1 = Northwestern, 2 = Northeastern, 3 = Southwestern, 4 = Southeastern). Practice and belief questions were coded in ascending order toward the hypothesized direction of change. For the frequency use questions (mise en place, *Smarter Lunchrooms*, taste-testing), the "I do not

know" or "do not use" responses were coded as "0." In contrast, for all the belief questions, "I do not know" was coded as a neutral option similar to "neither agree or disagree" and analyzed with an independent samples t-test, and then it was coded as "0" and analyzed using Pearson's chi-square (crosstabs) similar to the practice questions. This was done, in part, due to lack of agreement between researchers to if the reason for providing the "I do not know" option was for the purpose of a neutral option or an option more negative than "Strongly disagree."

Following preliminary analysis, response options for two questions were collapsed into fewer categories. The chi-square results for scratch cooking practices and taste-testing practices initially violated the "minimum expected cell frequency" assumption. Final coding for the scratch cooking question was as follows: 1 = Some days of the week: 2 days or less; 2 = Most days of the week: 3 to 4 days; 3 = Always; 5 days a week. Final coding for the taste-testing question was as follows: 0 = We do not use taste-testing, 1 = Only when we are trying a new food item, 2 = Once or twice a year, and 3 = at least monthly. Next, zero respondents selected "I do not know" for all the belief questions except the last three regarding availability of resources, so the response was dropped from coding for those questions and the codes for "Agree" and "Strongly agree" were shifted down to fill the space. The final decision to analyze the resource items using Pearson's chi-square instead of independent samples t-test prompted the recoding of "I do not know" from a neutral response to "0." As a categorical variable, "I do not know" would not be weighed as better or worse than the other options, and significance would be analyzed by response frequencies versus mean responses, which can be influenced by outliers. A detailed codebook can be viewed in Appendix G.

Statistical Analysis

Responses for pre- and post-training questionnaires were not matched for analysis. Frequency statistics were used to describe the demographic characteristics of survey respondents. These included job position, number of years employed in Child Nutrition Programs, geographic region of Oklahoma represented, school grade level served, and site of meal preparation. Pearson's chi-square (crosstabs) was used to assess statistical differences in the proportion of responses between pre- and post-training for job position, county representation, and meal preparation. Independent samples t-test was used to assess difference in years worked. Additionally, Pearson's chi-square (crosstabs) was used to assess statistical differences in the proportion of responses between pre- and post-training for the scratch cooking, mise en place, *Smarter Lunchrooms*, taste-testing, and resource items. Independent samples t-test was used to assess differences in response means for the menu planning questions and the remaining 12 pride and belief items.

CHAPTER IV

FINDINGS

Data reported in this section were obtained from pre-training and 6-months post-training questionnaires completed by School Nutrition Professionals (SNPs) who participated in Level 1 and Level 2 of a *Cooking for Kids* Regional Training during Summer 2015. The aim was to measure changes in culinary practices and beliefs/attitudes related to school meals. All of the tables discussed in this chapter include valid percentages, which take into account missing values.

Response Rate

Two hundred and ninety-one SNPs completed at least Level 1 of the *Cooking for Kids* Skill Development Training during Summer 2015. Of these, 192 (66%) completed the paper copy of the pre-training questionnaire on day 1 of Level 1.

One hundred thirty-five SNPs attending the Summer 2015 training met inclusion criteria for analysis. Of these, 82 (60.7%) 6-months post-training questionnaires were completed via Qualtrics. Participants at the Enid locations did not receive pre-training questionnaires due to clerical error; thus, 6-months post-training questionnaires were not emailed to them.

Demographics

SNPs who completed pre- and 6-months post-training questionnaires reported having worked in Child Nutrition programs a similar number of years (10.7 ± 8.7 years and 12.1 ± 7.9 years respectively; $p = 0.228$). The reported number of years worked at both time periods ranged from six months/one year to 35 years. At both time periods the majority of SNPs reported serving food for more than one grade level, and the majority of meals were prepared at the same site as served (95.7% pre and 94.7% 6-months post; $p = 0.748$). At both pre- and 6-months post training, the highest proportion of SNPs were from Northeastern Oklahoma (58.5% and 34.2%, respectively). However, the distribution of respondents was more even across geographic areas at 6-months post-training compared to pre-training ($p = 0.004$). Overall, 34 and 33 of the 77 counties in Oklahoma (44% and 43% respectively) were represented at pre- and 6-months post-training. In contrast, there was a significant difference in reported job position between pre- and 6-months post-training respondents. The largest proportion of respondents at pre-training were cooks (35.6%) compared to 36.8% reporting Child Nutrition Directors/Supervisors at 6-months post-training ($p = 0.023$). However, at both the time periods the majority of respondents reported having kitchen level responsibilities (i.e., manager, head cook and cook; 73.8% pre and 55.3% 6-months post) compared to administrative responsibilities (i.e., director or supervisor; 18.8% pre and 36.8% 6-months post). Demographic information is summarized in Table 4.1.

Table 4.1 Demographic information for pre- and 6-months post-training questionnaire respondents.

Demographic Information	Pre-Training N (%)	6-Months Post-Training N (%)	*p*-value[a]
Job position			
Child Nutrition Director or Supervisor	36 (18.8%)	28 (36.8%)	
Kitchen manager	44 (23.0%)	15 (19.7%)	
Head cook	29 (15.2%)	11 (14.5%)	0.023
Cook	68 (35.6%)	16 (21.1%)	
Other	14 (7.3%)	6 (7.9%)	
Total	191 (100.0%)	76 (100.0%)	
Counties in Oklahoma represented			
Northwestern Region	24 (13.2%)	19 (25.0%)	
Northeastern Region	107 (58.8%)	26 (34.2%)	
Southwestern Region	18 (9.9%)	11 (14.5%)	0.004
Southeastern Region	33 (18.1%)	20 (26.3%)	
Total	182 (100.0%)	76 (100.0%)	
Grade level of school where SNP worked[b]			
Elementary	144 (75.0%)	60 (73.2%)	
Middle school/junior high	116 (60.4%)	50 (61.0%)	
High School	111 (57.8%)	50 (61.0%)	
Site of meal preparation			
On-site	177 (95.7%)	71 (94.7%)	
Off-site	8 (4.3%)	4 (5.3%)	0.748[c]
Total	185 (100.0%)	75 (100.0%)	

[a]Significance was set at $p < 0.05$.
[b]Total does not equal 100% because respondents marked all that applied.
[c]1 cell (25.0%) had an expected cell count less than 5.

Culinary Practices

At both pre- and 6-months post-training, the largest proportion of respondents reported offering entrees that were prepared using scratch or almost-scratch methods 3-4 days per week (47.5% and 65.8% respectively), reflecting an increase. In contrast, those reporting always using scratch methods dropped from 24.0% at pre-training to 6.6% at 6-months post-training. This resulted in a significant difference between the proportion of pre- and 6-months post-training responses pertaining to frequency of scratch cooking practices ($p = 0.002$). However, the conflicting response trends make findings inconclusive. Table 4.2 summarizes findings for scratch-cooking use.

Table 4.2 Frequency of made from scratch or almost-scratch entrees (Hypothesis #1).

Pre/Post N (%)	Some days of the week: 2 days or less	Most days of the week: 3-4 days	Always: 5 days/week	Total	χ^2 value (p-value)[a]
Pre	52 (28.4%)	87 (47.5%)	44 (24.0%)	183 (100.0%)	12.1 (0.002)
Post	21 (27.6%)	50 (65.8%)	5 (6.6%)	76 (100.0%)	

[a]Significance level set at $p < 0.05$.

Additionally, there were no changes in the menu planning practices as measured by number of entrees offered ($p = 0.995$), number of vegetables offered ($p = 0.876$) and number of fruits offered ($p = 0.396$). Average response for both pre- and 6-months post-training was 1-2 entrée options, 2 vegetable options, and 1-2 fruit options. The percentage of respondents that reported serving 2 or more choices of vegetables was 78.6% pre vs. 86.3% 6-months post. The same trend was seen with 2 or more choices of fruit (60.9% pre vs. 63.1% 6-months post). Further investigation using Pearson's chi-square showed no significant difference in percent response choice. Table 4.3 summarizes findings for menu planning practices.

Table 4.3 Frequency of menu planning practices (Hypotheses #2 - #4).

Question Content	Pre/Post	N	Response Choice (%)	Mean (SD)	*p*-value[a] for t-test
Number of entrée choices offered	**Pre**	189	1 choice (54.5%) 2 choices (29.1%) 3+ choices (16.4%)	1.6 (0.7)	0.995
	Post	76	1 choice (59.2%) 2 choices (19.7%) 3+ choices (21.1%)	1.6 (0.8)	
Number of vegetable choices offered	**Pre**	192	1 choice (21.4%) 2 choices (50.5%) 3+ choices (28.1%)	2.1 (0.7)	0.876
	Post	73	1 choice (13.7%) 2 choices (64.4%) 3+ choices (21.9%)	2.1 (0.6)	
Number of fruit choices offered	**Pre**	192	1 choice (39.1%) 2 choices (41.1%) 3+ choices (19.8%)	1.8 (0.7)	0.396
	Post	76	1 choice (36.8%) 2 choices (36.8%) 3+ choices (26.3%)	1.9 (0.8)	

[a]Significance level was set at $p < 0.05$.

There was a significant increase in the proportion of SNPs who reported knowledge and use of mise en place at post-training compared to pre-training ($p < 0.0$). The majority of responses at pre-training (68.2%) were "I do not know about mise en place." At 6-months post-training, none of the respondents reported not knowing about mise en place and the majority (64.7%) reported using mise en place "most of the time (3-4 days/wk)" or "always (5 days/wk)." Table 4.4 summarizes findings for use of mise en place.

Table 4.4 Frequency of mise en place practices (Hypothesis #5).

Pre/Post N (%)	Do not know about mise en place	Never use	Use it sometimes: 1-2 days/wk	Use it most of the time: 3-4 days/wk	Use it always: 5 days/wk	Total	χ^2 value (p-value)[a]
Pre	118 (68.2%)	8 (4.6%)	6 (3.5%)	19 (11.0%)	22 (12.7%)	173 (100.0%)	101.1 (< 0.0)
Post	0 (0.0%)	9 (12.0%)	17 (22.7%)	23 (30.7%)	26 (34.7%)	75 (100.0%)	

[a]Significance level set at $p < 0.05$.

Additionally, there was a significant increase in the knowledge of and use of *Smarter Lunchrooms* practices ($p < 0.0$). Most notable, at pre-training 53.5% of SNPs reported not knowing about *Smarter Lunchrooms*, compared to only 12.2% at 6-months post-training. Likewise, the proportion of SNPs who reported using *Smarter Lunchroom* practices "sometimes" or "most of the time" increased from pre- to 6-months post-training (7.6% to 23.0% and 16.8% to 39.2%, respectively). Table 4.5 summarizes findings for use of *Smarter Lunchrooms* practices.

Table 4.5 Frequency of *Smarter Lunchrooms* practices (Hypothesis #6).

Pre/Post N (%)	Do not know about *Smarter Lunchrooms*	Never use	Use it sometimes (1-2 days/wk)	Use it most of the time (3-4 days/wk)	Use it always (5 days/wk)	Total	χ^2 value (*p*-value)[a]
Pre	99 (53.5%)	5 (2.7%)	14 (7.6%)	31 (16.8%)	36 (19.5%)	185 (100.0%)	45.9[b] (< 0.0)
Post	9 (12.2%)	5 (6.8%)	17 (23.0%)	29 (39.2%)	14 (18.9%)	74 (100.0%)	

[a]Significance level set at $p < 0.05$.
[b]1 cell (10.0%) had an expected cell count less than 5.

Finally, there was no significant difference in use of taste-testing practices ($p = 0.179$). Participants at pre- and 6-months post-training primarily reported not using taste-testing or only when they were trying a new food item. Table 4.6 summarizes findings for use of taste-testing.

Table 4.6 Frequency of taste-testing (Hypothesis #7).

Pre/Post N (%)	Do not use	Only when trying new food item	Once or twice a year	At least monthly	Total	χ^2 value (*p*-value)[a]
Pre	106 (57.3%)	45 (24.3%)	16 (8.6%)	18 (9.7%)	185 (100.0%)	4.9 (0.179)
Post	35 (46.1%)	26 (34.2%)	10 (13.2%)	5 (6.6%)	76 (100.0%)	

[a]Significance level set at $p < 0.05$.

SNPs' Attitudes and Beliefs Toward School Meals

At both pre and post time periods, the majority of SNPs agreed that they were proud of the meals prepared and served by their school with no significant difference between time periods ($p = 0.801$). The data are presented in Table 4.7.

Table 4.7 SNPs' pride in the meals they serve (Hypothesis #8).

Pre/Post	N	Mean[a] (SD)	*p*-value[b]
Pre	190	4.3 (0.8)	0.801
Post	76	4.2 (0.7)	

[a]Response code: 1 = Strongly Disagree, 2 = Disagree, 3 = Neither Agree nor Disagree, 4 = Agree, 5 = Strongly Agree.
[b]Significance level set at $p < 0.05$.

The responding SNPs had stronger agreement with the statement "I think the foods we serve in the cafeteria taste good" at 6-months post-training compared to pre-training ($p = 0.049$). In contrast, while there was agreement at pre- and 6-months post-training that "foods we serve in the cafeteria are healthy (low in fat, salt, and added sugar and high in fiber)," there was no statistically significant change between the two time periods ($p = 0.111$). Table 4.8 summarizes SNPs' beliefs regarding food served.

Table 4.8 SNPs' beliefs regarding taste and healthiness of meals served (Hypotheses #9 - #10).

Question Content	Pre/Post	N	Mean[a] (SD)	*p*-value[b]
Believe the food served tastes good	**Pre**	191	3.2 (0.5)	0.049
	Post	76	3.4 (0.6)	
Believe the food served is healthy	**Pre**	190	3.3 (0.5)	0.111
	Post	75	3.4 (0.5)	

[a]Response code: 1 = Strongly Disagree; 2 = Disagree; 3 = Agree; 4 = Strongly agree.
[b]Significance level set at $p < 0.05$.

SNPs' Perception of Students' Attitudes Toward School Meals

At pre- and 6-months post-training, the SNPs agreed with the statement that "students at our school think the foods served in the cafeteria taste good" with no significant difference between time periods ($p = 0.131$). Likewise, SNPs agreed with the statement "students at our

school think the foods served in the cafeteria are healthy (low in fat, salt, and added sugar and high in fiber)" with no significant difference between the two time periods ($p = 0.287$). Table 4.9 summarizes for SNPs' perception of students' attitudes toward school meals.

Table 4.9 SNPs' perceived thoughts of students (Hypotheses #11 - #12).

Question Content	Pre/Post	N	Mean[a] (SD)	*p*-value[b]
Students think the food served tastes good	**Pre**	188	2.9 (0.5)	0.131
	Post	76	3.1 (0.6)	
Students think the food served is healthy	**Pre**	188	3.0 (0.4)	0.287
	Post	76	3.1 (0.5)	

[a]Response code: 1 = Strongly Disagree; 2 = Disagree; 3 = Agree; 4 = Strongly agree.
[b]Significance level set at $p < 0.05$.

SNPs' Perception of Teachers, Administrators and Staffs' Attitudes Toward School Meals

The responding SNPs were in stronger agreement with the statement "The teachers, administrators, and staff think the foods served in the cafeteria taste good" at 6-months post compared to pre ($p = 0.005$). Responding SNPs also reported stronger agreement with "The teachers, administrators, and staff think the foods served in the cafeteria are healthy (low in fat, salt, and added sugar and high in fiber)" at 6-months post-training compared to pre-training ($p = 0.040$). Table 4.10 summarizes SNPs' perceptions of teachers, administrators, and staffs' attitudes toward school meals.

Table 4.10 SNPs' perceived thoughts of teachers, administrators, and staff (Hypotheses #13 - #14).

Question Content	Pre/Post	N	Mean[a] (SD)	*p*-value[b]
Teachers, administrators, and staff think the food served tastes good	**Pre**	188	3.0 (0.6)	0.005
	Post	76	3.2 (0.5)	
Teachers, administrators, and staff think the food served is healthy	**Pre**	189	3.1 (0.4)	0.040
	Post	75	3.2 (0.5)	

[a]Response code: 1 = Strongly Disagree; 2 = Disagree; 3 = Agree; 4 = Strongly agree.
[b]Significance level set at $p < 0.05$.

SNPs' Perception of Parents' Attitudes Toward School Meals

Compared to pre-training, responding SNPs at 6-months post-training reported stronger agreement with the statement "The parents of students attending our school think that the foods served in the cafeteria taste good" ($p = 0.046$). However, although responding SNPs at both time periods agreed that the parents of the students thought the foods served in the cafeteria were healthy (low in fat, salt, and added sugar and high in fiber), there was no significant difference ($p = 0.737$). Table 4.11 summarizes SNPs' perceptions of parents' attitudes toward school meals.

Table 4.11 SNP perceived thoughts of parents of students (Hypotheses #15 - #16).

Question Content	Pre/Post	N	Mean[a] (SD)	*p*-value[b]
Parents of students think the food served tastes good	**Pre**	190	2.9 (0.4)	0.046
	Post	76	3.1 (0.5)	
Parents of students think the food served is healthy	**Pre**	189	3.1 (0.4)	0.737
	Post	75	3.2 (0.5)	

[a]Response code: 1 = Strongly Disagree; 2 = Disagree; 3 = Agree; 4 = Strongly agree.
[b]Significance level set at $p < 0.05$.

SNPs' Beliefs Concerning the Effects Food Served has on Students' Health and Academic Performance

At 6-months post-training, responding SNPs reported stronger agreement that the foods kids eat at school makes a difference in their health ($p = 0.001$) compared to pre-training responses. Additionally, at 6-months post-training SNPs reported stronger agreement with the statement "What kids eat at school makes a difference in how well they learn at school" ($p = 0.001$) as well as "What kids eat at school makes a difference in their behavior while at school" ($p = 0.001$) compared to pre-training. Table 4.12 summarizes SNP beliefs concerning the impact foods served has on students.

Table 4.12 SNP beliefs regarding effects foods served has on health and academic performance (Hypotheses #17 - #19).

Question Content	Pre/Post	N	Mean[a] (SD)	*p*-value[b]
What kids eat at school makes a difference in their health	**Pre**	187	3.0 (0.7)	0.001
	Post	76	3.3 (0.6)	
What kids eat at school makes a difference in how well they learn at school	**Pre**	188	3.2 (0.5)	0.001
	Post	76	3.5 (0.5)	
What kids eat at school makes a difference in their behavior while at school	**Pre**	189	3.1 (0.6)	0.001
	Post	76	3.4 (0.6)	

[a]Response code: 1 = Strongly Disagree; 2 = Disagree; 3 = Agree; 4 = Strongly agree.
[b]Significance level set at $p < 0.05$.

SNPs' Beliefs Concerning Availability of Resources

A majority of responding SNPs at both pre and 6-months post either agreed or strongly agreed (54.5% and 53.9% respectively) that the staff in their kitchen had enough time to prepare meals using more scratch-cooking with no significant difference between the two time periods ($p = 0.45$). Likewise, the majority of SNPs at pre- and 6-months post-training agreed or strongly agreed they had the needed equipment for almost scratch or scratch cooking (73.9% and 65.8% respectively; $p = 0.355$). Although there was a significant shift in SNPs' beliefs regarding skills needed to prepare more made-from-scratch meals ($p = 0.011$) with the biggest change in those that agreed (pre 73.8% and post 57.9%), it is unclear which direction those responses changed as "disagree" and "strongly agree" also increased at 6-months post-training. Overall, 80.2% and 75.0% responded with agree or strongly agree at pre- and 6-months post-training regarding skills needed. Table 4.12 summarizes SNPs' beliefs regarding resources.

Table 4.13 Beliefs regarding availability of resources (Hypotheses #20 - #22).

Question Content	Pre/Post	Do not know	Strongly disagree	Disagree	Agree	Strongly agree	Total	χ^2 value (p-value)[a]
Staff have enough time to prepare more made-from-scratch meals	**Pre**	8 (4.2%)	20 (10.6%)	58 (30.7%)	92 (48.7%)	11 (5.8%)	189 (100.0%)	3.7[b] (0.451)
	Post	1 (1.3%)	10 (13.2%)	24 (31.6%)	33 (43.4%)	8 (10.5%)	76 (100.0%)	
Kitchen has the equipment needed to prepare more made-from-scratch meals	**Pre**	4 (2.1%)	14 (7.4%)	31 (16.5%)	120 (63.8%)	19 (10.1%)	188 (100.0%)	4.4[c] (0.355)
	Post	0 (0.0%)	8 (10.5%)	18 (23.7%)	42 (55.3%)	8 (10.5%)	76 (100.0%)	
Cooks have the needed skills to prepare more made-from-scratch meals	**Pre**	6 (3.2%)	6 (3.2%)	25 (13.4%)	138 (73.8%)	12 (6.4%)	187 (100.0%)	13.0[d] (0.011)
	Post	0 (0.0%)	3 (3.9%)	16 (21.1%)	44 (57.9%)	13 (17.1%)	76 (100.0%)	

[a]Significance level set at $p < 0.05$.
[b]1 cell (10.0%) had an expected cell count less than 5.
[c]2 cells (20.0%) had an expected cell count less than 5.
[d]3 cells (30.0%) had an expected cell count less than 5.

CHAPTER V

DISCUSSION AND CONCLUSION

The purpose of this project was to evaluate the mid-term outcomes of the *Cooking for Kids* regional skill development workshops on the beliefs and practices of participating school nutrition professionals in the state of Oklahoma. Prior research on chef-based skill development workshops have mostly focused on increasing culinary skills of SNPs to better equip them with the ability to make healthier foods from scratch with confidence (Cohen et al., 2012; Perlman et al., 2012; Condrasky et al., 2014; Casselbury, 2016). However, the primary outcome variable evaluated in these studies was change in plate waste.

This evaluation of culinary skill development was unique in that it aimed to determine if the knowledge gained from the training was being transferred into practice in the school kitchen and affecting work practices (Birsner & Hildebrand, 2016). Other objectives addressed the impact of the training on SNPs' beliefs related to the school meals and their perceptions of how school nutrition stakeholders (i.e., school faculty, students, parents) perceived school meals. These outcomes were relevant considering the findings of a community readiness assessment that was previously conducted with Oklahoma SNPs. Findings of the assessment were that perceived lack of skills, time, leadership and public support to make culinary changes to the school nutrition program were hindering progress (Blevins, 2015). In order to advance to a higher score along the community readiness spectrum, it was necessary to address these perceived challenges, or

barriers, to change (Tri-Ethnic Center for Prevention Research, 2014).

Bandura's Social Cognitive Theory (SCT) states behavior change is an interplay of an individual's personal, behavioral, and environmental influences (Bandura, 1989; Davidson Films, 2003). Specific to the *Cooking for Kids* skill development training, personal characteristics, such as knowledge, beliefs, and values affect the individual's behavior, which then elicits social reactions from the environment (i.e. stakeholders) that are used as feedback for behavior. Further, social interactions within the environment, such as instruction and modeling (i.e. skill development training) can change personal characteristics. Self-efficacy and outcome expectations also play important roles as regulators of this reciprocal determinism (Bandura, 1998). An individual is more likely to engage in an activity, or behavior, if they believe they are capable (i.e. possess the necessary skills) of doing so, and that their involvement in the activity will elicit positive, valued outcomes (i.e. positive responses from stakeholders and positive impacts on student health and academic performance). Bandura states four ways to influence self-efficacy, but the most effective is mastery experiences, or experience in overcoming obstacles. Thus, *Cooking for Kids* sought to address the specific challenges reported by Oklahoma SNPs in the community readiness assessment, and increase use of needed culinary practices by targeting knowledge, skills, beliefs, and values of the SNPs.

Discussion

This 6-month post training evaluation revealed that SNPs were transferring knowledge gained during the culinary skill development training into workplace practice. An increase in use of mise en place was to be expected as demonstration of proper food preparation set-up and knife skills were followed by student practice and application (i.e. cooking in on-site kitchen) during the training. Further, evaluation immediately following the training showed a significant increase

in knowledge of mise en place (Birsner & Hildebrand, 2016). This concept of mastery experiences is one of the four ways discussed by Bandura to build self-efficacy in order to elicit behavior change (Bandura, 1998; Davidson Films, 2003). Further, a study conducted in 2000 analyzing a community-based diabetes education program for adults utilizing SCT found similar results (Chapman-Novakofski & Karduck, 2005). The education program included group sessions focused on menu planning with cooking demonstrations. Among the findings were significant improvements in participants' knowledge, health beliefs, cooking skills, and confidence to change their diets and prepare healthful meals. Thus, illustrating that successful behavior change is the result of not just improved knowledge, but improved knowledge combined with increased self-efficacy via supervised hands-on application (i.e. mastery experience). This helps to explain the SNPs actual use of the knowledge and skills gained during skill development training in food preparation practices.

Another area of improvement was use of *Smarter Lunchrooms* practices that focus on choice architecture such as presentation of food on the serving line and in the serving area and verbally prompting students to select foods, as well as posters made available by commodity groups (Cornell Center for Behavior Economics in Child Nutrition Programs, 2016). Especially notable is the large decrease (77% change) from pre- to 6-months post-training in the number of SNPs who reported they did not know about *Smarter Lunchrooms*. This finding is consistent with Birsner & Hildebrand's (2016) evaluation of knowledge gain related to marketing as a result of *Cooking for Kids* skill development training. Further, the percentage of SNPs who reported using *Smarter Lunchroom* practices in the school cafeteria almost doubled from pre- to 6-months post-training (43.9% and 81.1% post). These changes are logical in that *Smarter Lunchroom* practices generally are no or low-cost and make use of resources the kitchen and cafeteria staffs have available, thus not requiring decision making or purchases at the administrative and supervisory levels (Cornell Center for Behavior Economics, 2016).

Findings of the present study indicate high proportions of SNPs who reported beliefs that they have the needed resources to offer more made-from-scratch entrees, which is supportive of the high proportion who reported offering made-from-scratch entrees 3 or more days a week. However, insignificant results for the number of made-from-scratch entrées and vegetables and fruits offered reflects a limitation of kitchen level staff to make significant changes to the menus. This limitation may be because changes at this level need to come from the management level, or those who plan menus and procure food items. There was a significant difference in the reported use of scratch cooking with SNPs, but contrasting response trends made findings inconclusive. There was an 18.3% increase in use of scratch cooking 3-4 days/week and subsequent 17.4% decrease in use 5 days/week. It is possible that despite being given definitions and examples for different variations of food preparation techniques (i.e. convenience, minimal preparation, almost scratch, made from scratch), participants were still not sure what constituted scratch cooking until going through the training.

However, at both pre- and 6-months post-training, a little over 70% reported offering scratch or almost-scratch entrees being 3 or more days per week (71.5% pre and 72.4% post). Similarly, there were inconclusive and non-significant findings from pre- to 6-months post-training pertaining to SNPs' beliefs that they had the needed resources (i.e., time, equipment, skills) to make more made-from-scratch meals. Nevertheless, at both time periods the majority reported having enough time (54.5% pre and 53.9% post), the needed equipment (73.9% pre and 65.8% post) and skills (70.2% pre and 75.0% post) to prepare more made-from-scratch meals. This reported perception in availability of resources is in contrast to other research reporting that time and equipment may be hindering schools' ability to meet the updated school nutrition standards (Urahn et al., 2013a; Urahn et al., 2013b; The Pew Charitable Trusts, 2015; Blevins, 2015).

A major goal of the Healthy Hunger Free Kids Act 2010 is to increase the opportunities students have to select and consume fruits and vegetables. One way to do this is to offer multiple choices. CDC reported 79.4% schools nationwide offered 2 or more vegetables and 78.0% offered 2 or more fruits each day for lunch in 2014 (Merlo et al., 2015). In this study, at 6-months post-training the majority of SNPs reported their kitchen sites were offering 2 or more vegetable choices (86.3%) and 2 or more fruit choices (63.1%) daily.

Although use of *Smarter Lunchrooms* significantly increased, changes in the use of taste-testing was not significantly different at 6-months post-training. However, it should be noted that the response trends reflected a shift from a decrease in "no use" to increases in "only when trying new food items" and "once or twice a year." As mentioned above with menu planning practices, the lack of significance may be a result of respondents not being in a position to alter menu plans or procurement in order to increase opportunities for taste-testing.

Almost three-quarters of the SNPs reported they were proud of the meals served at their school, and there was no significant change from pre- to 6-months post-training. This finding was somewhat expected as SNPs attending the summer skill development training verbally expressed pride in their job; they just did not feel valued by parents and school staff. In contrast, there was a significant improvement in SNPs beliefs that the food they serve tastes good and has an impact on student health and academic performance. This finding is of particular importance as the pilot study schools reported making changes to school meals because of new regulations rather than because of an awareness between nutrition and student health outcomes (Blevins, 2015). There was no significant difference in SNPs belief that the food they serve is healthy, but pre- and post-training responses showed agreement with the statement ($M = 3.26$ pre and $M = 3.37$ post; 3 = agree, 4 = strongly agree).

One of the goals of *Cooking for Kids* was to improve stakeholders' perceptions of school nutrition since the pilot study found that SNPs felt devalued by school staff and parents, and they feared the students would not be accepting of the new meal regulations (Cooking for Kids, 2016a; Blevins, 2015). As discussed previously, SCT explains that outcome expectations influence behavior change. With regards to the SNPs attending *Cooking for Kids*, they are more likely to support and make the necessary changes to school meals if they feel that their work is valued and that the cost, or effort, of making a change will make a positive difference. The present study found significant improvements in SNPs beliefs that school staff thought the food tasted good and was healthy as well as belief that parents of students thought the food tasted good. However, there were not significant improvements in SNPs' beliefs that students thought the food served tasted good or was healthy, or the belief that parents thought the food served was healthy. Lack of improvement in perception of student beliefs could coincide with the lack of significant improvement in use of taste-testing. Recent studies examining student acceptance of new food served as a result of Healthy, Hunger-Free Kids Act 2010 show resistance at first but significant improvement in food selection over time (Welker, Lott, & Story, 2016). The more students are exposed to and try new foods, the more they will begin to like and accept them. With changes to student beliefs will come changes to parents' beliefs. Further, when the chefs begin visiting qualifying schools as a part of phase 2 of *Cooking for Kids*, they will be able to help SNPs initiate parent outreach at pre-existing school functions such as Back to School nights or parent-teacher conferences. Table 5.1 below summarizes the present study's null hypotheses with corresponding interpretation of results.

5.1 Null hypotheses with corresponding interpretation of results.

Null Hypothesis	Interpretation of Results
Null Hypothesis #1: There will be no change in the frequency of participants' scratch cooking practices associated with effectively and efficiently implementing 2012 USDA school nutrition standards as a result of the *Cooking for Kids* Regional Training compared to before the training.	Rejected the null hypothesis
Null Hypothesis #2: There will be no change in the reported number of entrée choices offered to better align with 2012 USDA school nutrition standards as a result of the *Cooking for Kids* Regional Training compared to before the training.	Failed to reject the null hypothesis
Null Hypothesis #3: There will be no change in the reported number of vegetable choices offered to better align with 2012 USDA school nutrition standards as a result of the *Cooking for Kids* Regional Training compared to before the training.	Failed to reject the null hypothesis
Null Hypothesis #4: There will be no change in the reported number of fruit choices offered to better align with 2012 USDA school nutrition standards as a result of the *Cooking for Kids* Regional Training compared to before the training.	Failed to reject the null hypothesis
Null Hypothesis #5: There will be no change in the frequency of participants' use of mise en place practices associated with effectively and efficiently implementing 2012 USDA school nutrition standards as a result of the *Cooking for Kids* Regional Training compared to before the training.	Rejected the null hypothesis
Null Hypothesis #6: There will be no change in the frequency of participants' use of *Smarter Lunchrooms* practices to encourage students to select healthier foods and help them be more receptive of the 2012 USDA school nutrition standards as a result of the *Cooking for Kids* Regional Training compared to before the training.	Rejected the null hypothesis
Null Hypothesis #7: There will be no change in the frequency of taste-testing practices to aid students in trying new foods and being more receptive of the 2012 USDA school nutrition standards as a result of the *Cooking for Kids* Regional Training compared to before the training.	Failed to reject the null hypothesis
Null Hypothesis #8: There will be no change in reported pride of the school nutrition professionals regarding the meals they prepare and serve to students as a result of the *Cooking for Kids* Regional Training compared to before the training.	Failed to reject the null hypothesis

Null Hypothesis #9: There will be no change in participants' beliefs regarding the taste of meals served as a result of the *Cooking for Kids* Regional Training compared to before the training.	Rejected the null hypothesis
Null Hypothesis #10: There will be no change in participants' beliefs regarding the healthiness of meals served as a result of the *Cooking for Kids* Regional Training compared to before the training.	Failed to reject the null hypothesis
Null Hypothesis #11: There will be no change in participants' beliefs pertaining to perceived thoughts of the students regarding the taste of meals served as a result of the *Cooking for Kids* Regional Training compared to before the training.	Failed to reject the null hypothesis
Null Hypothesis #12: There will be no change in participants' beliefs pertaining to perceived thoughts of the students regarding the healthiness of meals served as a result of the *Cooking for Kids* Regional Training compared to before the training.	Failed to reject the null hypothesis
Null Hypothesis #13: There will be no change in participants' beliefs pertaining to perceived thoughts of the teachers, administrators, and staff regarding the taste of meals served as a result of the *Cooking for Kids* Regional Training compared to before the trainings.	Rejected the null hypothesis
Null Hypothesis #14: There will be no change in participants' beliefs pertaining to perceived thoughts of the teachers, administrators, and staff regarding the healthiness of meals served as a result of the *Cooking for Kids* Regional Training compared to before the trainings.	Rejected the null hypothesis
Null Hypothesis #15: There will be no change in participants' beliefs pertaining to perceived thoughts of the parents of students regarding the taste of meals served as a result of the *Cooking for Kids* Regional Training compared to before the training.	Rejected the null hypothesis
Null Hypothesis #16: There will be no change in participants' beliefs pertaining to perceived thoughts of the parents of students regarding the healthiness of meals served as a result of the *Cooking for Kids* Regional Training compared to before the training.	Failed to reject the null hypothesis
Null Hypothesis #17: There will be no change in participants' beliefs pertaining to the effects meals served can have on students' health as a result of the *Cooking for Kids* Regional Training compared to before the training.	Rejected the null hypothesis

Null Hypothesis #18: There will be no change in participants' beliefs pertaining to the effects meals served can have on how well students learn while at school as a result of the *Cooking for Kids* Regional Training compared to before the training.	Rejected the null hypothesis
Null Hypothesis #19: There will be no change in participants' beliefs pertaining to the effects meals served can have on students' behavior while at school as a result of the *Cooking for Kids* Regional Training compared to before the training.	Rejected the null hypothesis
Null Hypothesis #20: There will be no change in the perceptions of participants related to availability of time needed to effectively and efficiently implement 2012 USDA school nutrition standards as a result of the *Cooking for Kids* Regional Training compared to before the training.	Failed to reject the null hypothesis
Null Hypothesis #21: There will be no change in the perceptions of participants related to availability of equipment needed to effectively and efficiently implement 2012 USDA school nutrition standards as a result of the *Cooking for Kids* Regional Training compared to before the training.	Failed to reject the null hypothesis
Null Hypothesis #22: There will be no change in the perceptions of participants related to availability of skills needed to effectively and efficiently implement 2012 USDA school nutrition standards as a result of the *Cooking for Kids* Regional Training compared to before the training.	Rejected the null hypothesis

Limitations

Limitations of this study include both pre- and 6-months post-response rate, survey tool used, and method of obtaining emails from participants for administration of 6-months post-training questionnaires. First, the Enid site did not receive the pre-questionnaire, so post-questionnaires were not sent to those participants (approximately 25 SNPs). Overall, response rates for both pre- and 6-months post-training were over 50% (66.7% and 60%), but higher response rates (i.e. 75-80%) might have resulted in more significant findings and better measures of the program's impact on SNPs practices and beliefs. Second, respondents were not consistent in answering all the questionnaire items, creating lower response rates for some questions

compared to others. It is unknown if respondents did not understand the question despite definitions being provided where appropriate, or if they did not have an opinion related to the question. However, neutral options were provided for most questions. The survey tool was not tested prior to implementation of the *Cooking for Kids* Regional Trainings, so additional testing of item wording and response options may be appropriate. Another approach for consideration is use of a retrospective pre/post survey tool. Program evaluators have used this method and found it obtains more complete data sets for stronger evaluation of effects (Pratt et al., 2000; Raidl et al., 2004).

Additionally, some questions had unexplained trends in which pre-questionnaire responses were more positive than post-questionnaire responses. This pre-test overestimation is often due to a lack of understanding of question content, which consequently can also be the reason for the intervention. Put another way, the participants do not know what they do not know until going through the training. However, it results in an underestimation at post-test as the individual's frame of reference changes after participating in the program, and this is referred to as response shift bias (Pratt et al., 2000). It is possible, this was the case with the question regarding the belief that kitchen staff have the necessary skills to make more made from scratch meals as evidenced by a more positive response at pre-training versus post-training. SNPs might have thought they had the needed skills, but after attending the training, they realized they did not have the right skills to work efficiently. A similar response trend was seen with the question regarding frequency of serving made from scratch or almost scratch entrees despite providing definitions of what constitutes scratch cooking. Therefore, use of retrospective pre/post survey tools allows respondents to answer the questions within context of the program's effects on their behaviors and provides a better measure of program impacts for the researchers.

Third, the emails used to distribute the electronic 6-months post-training questionnaire were obtained in handwriting making some of them hard to read. This resulted in a high number

of failed email attempts and subsequent deletion (approximately 71 emails) when sending out 6-months post-training emails. Because pre- and post-training surveys were not matched, it was not possible to omit pre-training responses for the deleted emails from analysis. Additionally, some participants wrote down the same email for multiple individuals making it unlikely that the post-questionnaire would reach all of the participants listed. Finally, some of the older participants may have an email by requirement but forget to check it regularly. However, it should be noted that the reason for the email was explained to participants at the training, and they were told to expect a follow-up questionnaire in December sent to the email they wrote down. Additionally, as mentioned in the methods section, multiple emails were sent in order to maximize response rate.

Conclusion and Implication

Based on the findings of this study, *Cooking for Kids*, a chef-based culinary skill development training for school nutrition professionals, significantly improved reported use of mise en place and *Smarter Lunchrooms* practices as well as SNPs' personal and perceived thoughts of key stakeholders regarding their role in child nutrition. *Cooking for Kids* was beneficial in helping school nutrition professionals of Oklahoma better implement the new school meal regulations by equipping participants with the needed skills to do so efficiently and effectively.

Including all levels of SNP in the *Cooking for Kids* training encourages unity among school nutrition program staff members, and it creates a setting in which those with administrative responsibilities are given the opportunity to experience the challenges of kitchen-level responsibilities. However, non-significant findings suggest that an additional training specifically targeting administrative decision makers (i.e. child nutrition directors or supervisors) to address menu planning and procurement may be needed to optimize scratch cooking methods,

menu variety, and choices. With regards to the limitations discussed previously, use of a single pre/post retrospective survey tool distributed 6-months post-training might result in more complete data sets and better evaluations of self-reported behavior change. Further, for the purpose of evaluation, unique emails should be obtained from each participant when they register to attend the training.

In conclusion, this study's findings contribute to the limited, yet growing, literature evaluating the efficacy of chef-based culinary training programs for SNPs. These results help strengthen the proposition that chefs play an important role in equipping SNPs with the knowledge and skills needed to efficiently prepare healthy, tasteful meals as well as increasing the value of school nutrition's role in student health and academic performance by SNPs and key stakeholders.

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APPENDICES

Appendix A

Cooking for Kids Skill Development Level 1 and Level 2 Learning Objectives

COOKING for KIDS

Level 1

Culinary Training for School Nutrition Professionals

Learning Outcomes

By the end of the training, participants should be able to:

1. Nutrition
   - 1.1 Explain how nutrition recommendations influence school meal patterns.
   - 1.2 Identify the five vegetable subgroups and which vegetables meet those subgroups.
   - 1.3 Explain how cooking method can affect the nutritional value of a food.
   - 1.4 Explain what a whole grain is and identify food items that meet that definition.
   - 1.5 Identify methods for replacing sodium in recipes.

2. Food Safety
   - 2.1 Identify USDA indicated produce items that require additional food safety practices.
   - 2.2 Explain the three basic steps to properly handling fresh produce.
   - 2.3 Explain how to limit cross-contamination.
   - 2.4 Demonstrate proper kitchen safety techniques.

3. Knife Skills
   - 3.1 Execute a medium dice, julienne, chiffonade and mince.
   - 3.2 Explain the difference between sharpening and honing a knife.
   - 3.3 Explain the importance of using sharp knives.

4. Kitchen Skills
   - 4.1 Read and execute a standardized recipe.
   - 4.2 Explain the concept of "Mise en Place."
   - 4.3 Incorporate herbs and spices into recipes.
   - 4.4 Execute a standardized recipe for a salad dressing.

5. Vegetable Cookery
   - 5.1 Explain the difference between roasting, braising, sautéing and steaming.
   - 5.2 Execute a cold kitchen recipe using vegetables.
   - 5.3 Execute a recipe requiring roasting, sautéing or steaming vegetables.
   - 5.4 Explain how to season a recipe while limiting salt and sugar.

6. Whole Grain Cookery
   - 6.1 Explain "al dente" as it relates to pasta.
   - 6.2 Execute a standardized recipe using whole grains.

7. Recipe and Menu Development
   - 7.1 Identify three resources for additional recipes.

Learning Outcomes

1. **Sensory Training**
   - 1.1 Identify the five tastes that contribute to flavors and sensory experience.
   - 1.2 Describe how texture, aroma and flavor affect food consumption.
   - 1.3 Explain the difference between a food aversion, taboo and preference.
   - 1.4 Explain the importance of understanding the aesthetic influence of food.

2. **Presentation**
   - 2.1 Identify the similarities and differences between restaurants and school nutrition facilities.
   - 2.2 Explain the connection between chefs and child nutrition professionals.
   - 2.3 Explain the importance of a well-written menu.
   - 2.4 Identify the quality factors that make up a professional lunchroom.

3. **Marketing Your Program**
   - 3.1 Identify key strategies for focusing on fruit and vegetable consumption
   - 3.2 Identify key strategies for increasing reimbursable meals and participation with behavioral economics
   - 3.3 Recognize the additional resources and opportunities available to improve program structure.
   - 3.4 Explain the importance of conducting taste-training activities within a program.
   - 3.5 Identify key components to hosting a successful taste training activity.
   - 3.6 Explain and demonstrate creative methods for conducting a tasting within a program.

4. **Professionalism**
   - 4.1 Adopt and practice the qualities of a child nutrition professional.
   - 4.2 Identify the behavioral qualities of a service professional.
   - 4.3 Explain why a professional uniform is important.
   - 4.4 Read and identify with child nutrition professionals code.

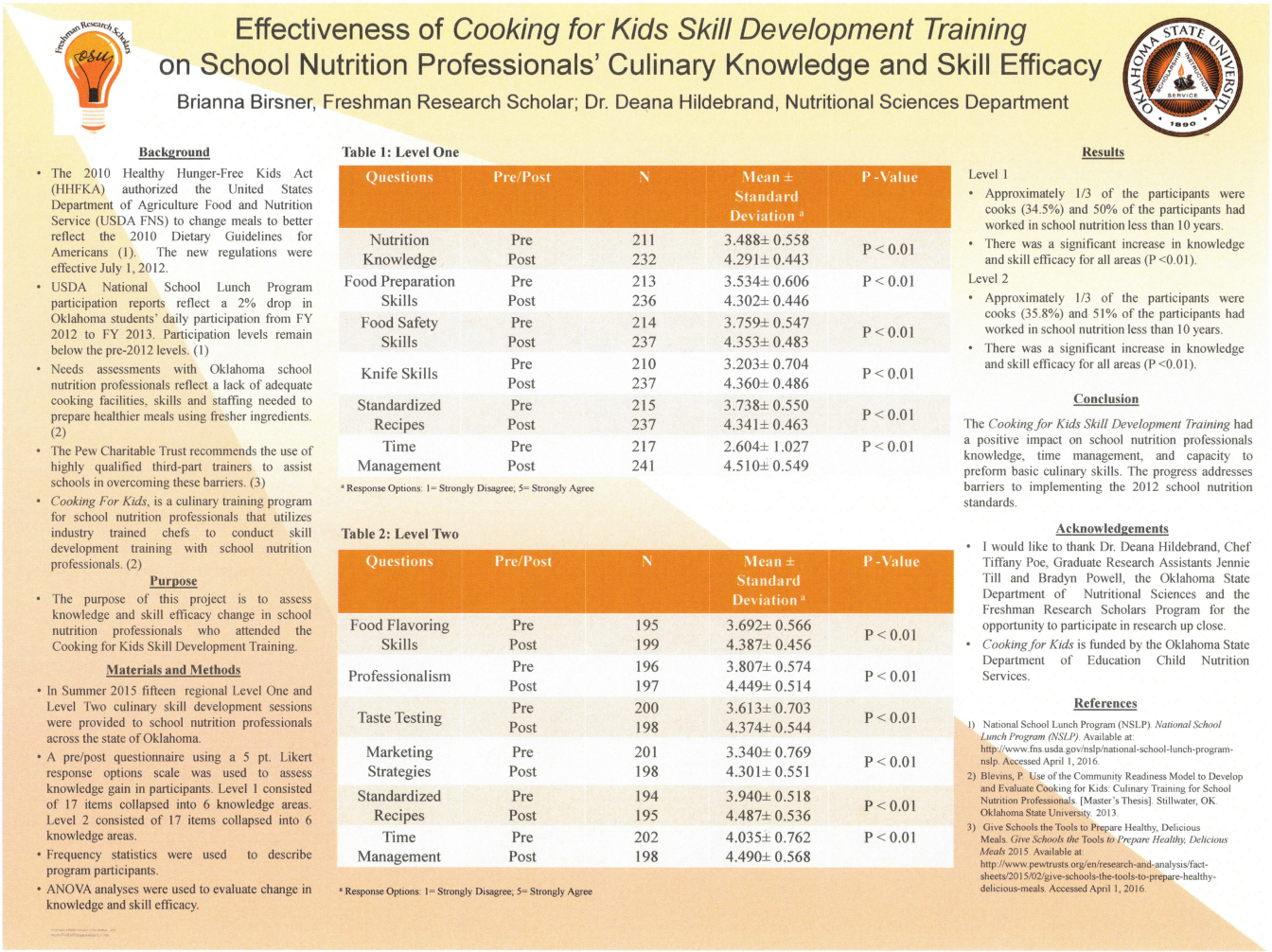
5. **Flavor Training**
   - 5.1 Recognize the basic principles of smell and taste.
   - 5.2 Recognize a variety of herbs, spices, oils, vinegars and other flavorings.
   - 5.3 Demonstrate how to use flavoring ingredients to create, enhance or alter the natural flavors of a dish.
   - 5.4 Identify and appropriately apply the different uses of herbs, spices and condiments.

6. **Culinary Math**
   - 6.1 Identify the parts of a standardized recipe.
   - 6.2 Identify and apply simple kitchen measurement abbreviations.
   - 6.3 Recognize simple liquid and dry measurement devices.

7. **Mise en Place**
   - 7.1 Identify and demonstrate the definition and components of mise en place practices.
   - 7.2 Demonstrate proper timeline activities and practices.
   - 7.3 Explain the importance of utilizing advanced mise en place strategies in the kitchen.

Appendix B

Cooking for Kids Skill Development Training on Culinary Knowledge and Skill Efficacy



Effectiveness of *Cooking for Kids Skill Development Training* on School Nutrition Professionals' Culinary Knowledge and Skill Efficacy

Brianna Birsner, Freshman Research Scholar; Dr. Deana Hildebrand, Nutritional Sciences Department

Background

- The 2010 Healthy Hunger-Free Kids Act (HHFKA) authorized the United States Department of Agriculture Food and Nutrition Service (USDA FNS) to change meals to better reflect the 2010 Dietary Guidelines for Americans (1). The new regulations were effective July 1, 2012.
- USDA National School Lunch Program participation reports reflect a 2% drop in Oklahoma students' daily participation from FY 2012 to FY 2013. Participation levels remain below the pre-2012 levels. (1)
- Needs assessments with Oklahoma school nutrition professionals reflect a lack of adequate cooking facilities, skills and staffing needed to prepare healthier meals using fresher ingredients. (2)
- The Pew Charitable Trust recommends the use of highly qualified third-part trainers to assist schools in overcoming these barriers. (3)
- *Cooking For Kids*, is a culinary training program for school nutrition professionals that utilizes industry trained chefs to conduct skill development training with school nutrition professionals. (2)

Purpose

- The purpose of this project is to assess knowledge and skill efficacy change in school nutrition professionals who attended the Cooking for Kids Skill Development Training.

Materials and Methods

- In Summer 2015 fifteen regional Level One and Level Two culinary skill development sessions were provided to school nutrition professionals across the state of Oklahoma.
- A pre/post questionnaire using a 5 pt. Likert response options scale was used to assess knowledge gain in participants. Level 1 consisted of 17 items collapsed into 6 knowledge areas. Level 2 consisted of 17 items collapsed into 6 knowledge areas.
- Frequency statistics were used to describe program participants.
- ANOVA analyses were used to evaluate change in knowledge and skill efficacy.

Table 1: Level One

Questions	Pre/Post	N	Mean ± Standard Deviation [a]	P-Value
Nutrition Knowledge	Pre	211	3.488± 0.558	P < 0.01
	Post	232	4.291± 0.443	
Food Preparation Skills	Pre	213	3.534± 0.606	P < 0.01
	Post	236	4.302± 0.446	
Food Safety Skills	Pre	214	3.759± 0.547	P < 0.01
	Post	237	4.353± 0.483	
Knife Skills	Pre	210	3.203± 0.704	P < 0.01
	Post	237	4.360± 0.486	
Standardized Recipes	Pre	215	3.738± 0.550	P < 0.01
	Post	237	4.341± 0.463	
Time Management	Pre	217	2.604± 1.027	P < 0.01
	Post	241	4.510± 0.549	

[a] Response Options: 1= Strongly Disagree; 5= Strongly Agree

Table 2: Level Two

Questions	Pre/Post	N	Mean ± Standard Deviation [a]	P-Value
Food Flavoring Skills	Pre	195	3.692± 0.566	P < 0.01
	Post	199	4.387± 0.456	
Professionalism	Pre	196	3.807± 0.574	P < 0.01
	Post	197	4.449± 0.514	
Taste Testing	Pre	200	3.613± 0.703	P < 0.01
	Post	198	4.374± 0.544	
Marketing Strategies	Pre	201	3.340± 0.769	P < 0.01
	Post	198	4.301± 0.551	
Standardized Recipes	Pre	194	3.940± 0.518	P < 0.01
	Post	195	4.487± 0.536	
Time Management	Pre	202	4.035± 0.762	P < 0.01
	Post	198	4.490± 0.568	

[a] Response Options: 1= Strongly Disagree; 5= Strongly Agree

Results

Level 1

- Approximately 1/3 of the participants were cooks (34.5%) and 50% of the participants had worked in school nutrition less than 10 years.
- There was a significant increase in knowledge and skill efficacy for all areas (P <0.01).

Level 2

- Approximately 1/3 of the participants were cooks (35.8%) and 51% of the participants had worked in school nutrition less than 10 years.
- There was a significant increase in knowledge and skill efficacy for all areas (P <0.01).

Conclusion

The *Cooking for Kids Skill Development Training* had a positive impact on school nutrition professionals knowledge, time management, and capacity to preform basic culinary skills. The progress addresses barriers to implementing the 2012 school nutrition standards.

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Appendix C

Cooking for Kids Skill Development Level 1 and Level 2 Daily Agendas

COOKING for KIDS

Level 1

Culinary Training for School Nutrition Professionals

LEVEL 1 SKILL DEVELOPMENT, DAY 1

8:30 AM	**Welcome, Announcements and Introductions**
8:40 AM	**Understanding the School Meal Pattern** Review of Meal Pattern Regulations
9:40 AM	**Break**
9:50 AM	**Fruit and Veggie 101: A Guided Tasting of the Vegetable Subgroups** Red/Orange: Sweet Potatoes, Winter Squash Green: Lettuces beyond Romaine, Kale and Collards Beans/Legumes: Black Beans, Chickpeas Other: Beets **Vegetable Match Up Game**
10:20 AM	**Food Safety for Fresh Prep** Tomatoes, Melons and Salad Greens
10:50 AM	**Break**
11:00 AM	**Basic Knife Skills** Dice - sweet potatoes, carrots and onion Batonnet - bell peppers and carrots Julienne - bell peppers and carrots Chiffonade - salad greens Mince - garlic and herbs
12:00 PM	**Mise En Place**
12:30 PM	**Lunch Break**
1:30 PM	**Knife Tray Competition** Participants compete to see who can most quickly and accurately preform a series of knife cuts.
2:00 PM	**Break**
2:10 PM	**Cold Recipes and Tasting** Group 1: Side Garden Salad, Fat-Free Ranch and Apple Vinaigrette Group 2: Kale Salad Group 3: Black Bean Hummus and Veggie Dippers
3:10 PM	**Recap and Looking Ahead**
3:20 PM	**Announcements & Dismiss**

LEVEL 1 SKILL DEVELOPMENT, DAY 2

8:30 AM	**Introduction to Grains**
9:00 AM	**Using Herbs & Spices in Cooking**
9:20 AM	**Break**
9:30 AM	**Basic Vegetable Cookery** Steaming, Roasting, Braising, Sautéing
10:00 AM	**Cooking Whole Grains**
10:30 AM	**Cooked Recipes** Group 1: Apples and Chickpea Hash Group 2: Collard Greens Stir-Fry Group 3: Lentil and Brown Rice Salad Group 4: Roasted Root Vegetables Group 5: Sauteed Kale and Quinoa Medley
11:30 AM	**Cooked Recipe Tasting, Discussion and Lunch**
12:00 PM	**Break**
12:15 PM	**Thinking about Recipes: Resources**
12:45 PM	**Market Basket Competition** 30 minutes to think, 1 hour to cook and 30 minutes to present and taste Groups of 2-3 Create vegetable recipes using vegetables/grains/ingredients available Must write down ALL ingredients used and amounts
2:45 PM	**Putting it all together**
3:15 PM	**Evaluation**
3:25 PM	**Certificate Presentation & Closing**

LEVEL 2 SKILL DEVELOPMENT, DAY 1: MARKETING YOUR PROGRAM

8:30 AM	**Wake Up Your Senses: Learning to Taste**
9:30 AM	**Eat with Your Eyes: A Presentation On Presentation**
10:15 AM	**BREAK**
10:30 AM	**Smarter Lunchrooms**
11:45 AM	**LUNCH**
12:45 PM	**Marketing Your Program**
2:00 PM	**Professionalism as a Marketing Tool**
2:30 PM	**BREAK**
2:45 PM	**It's All About Flavor** **Trick My Rice: Building and Using Flavor Profiles** **Flavor Stations**
3:45 PM	**Recap, Announcements and Dismiss**

LEVEL 2 SKILL DEVELOPMENT, DAY 2: PUTTING IT ALL TOGETHER

8:30 AM	**Culinary Math: Introduction to the Basics**
9:30 AM	**Mise en What?**
10:15 AM	**BREAK**
10:30 AM	**Putting It into Practice as a Team: Mise En Place Activity**
11:00 AM	**In the Kitchen: Cooking Together** Baja Fish Tacos Vegetarian Chili Beef Stir-fry with Spicy Asian Sauce and Brown Steamed Rice
12:30 PM	**LUNCH**
1:45 PM	**Recap of Both Skill Development Levels** **Mini Knife Skills Assessment** **Mini Knowledge Assessment**
3:00 PM	**Questions for Chefs and One-on-One Time**
3:30 PM	**Certificate Presentation and Closing**

Appendix D

Cooking for Kids School Meal and Food Preparation Pre-Training Questionnaire

Default Question Block

COOKING for KIDS

Culinary Training for School Nutrition Professionals

School Meal and Food Preparation Pre-Training Questionnaire

You are receiving this questionnaire because you have enrolled in Cooking for Kids: Culinary Training for School Nutrition Professionals in June or July 2015.

Program evaluators are asking that you complete the questionnaire prior to beginning the training and approximately 6 months after the training (around December 2015). Completion of the survey should take no more than 10 minutes.

Responses will provide useful information on how school nutrition professionals used the training to change school menu planning and food preparation practices.

Your participation is volunatary. Your responses are confidential and will not be shared with anyone at your school. Neither your name or school will be used in evaluation reports. Your email address will not be shared or provided to anyone.

By clicking the forward arrow you are consenting to participate and acknowledging you are 18 years or older.

If you have questions please contact the evaluator using the contact information below.

Deana Hildebrand, PhD, RD, SNS
Department of Nutritional Sciences
Oklahoma State University, Stillwater, OK 74078
Deana.hildebrand@okstate.edu
405-744-5059

If you have questions about your rights as a research volunteer, you may contact:

Hugh Crethar
IRB Chair,
223 Scott Hall, Stillwater, OK 74078,
irb@okstate.edu
405-744-3377

Please select the training session that you are scheduled to attend. If you are attending two different locations for Level 1 and Level 2, please mark both locations.

- [ ] Autry Career Tech, Enid, July 13-16
- [ ] Autry Career Tech, Enid, July 20-13
- [ ] Francis Tuttle Career Tech, OKC, June 15-18
- [ ] Francis Tuttle Career Tech, OKC June 22-25
- [ ] Francis Tuttle Career Tech, OKC, July 13-16
- [ ] Francis Tuttle Career Tech, OKC, July 20-23
- [ ] Indian Capitol Career Tech, Muskogee, June 15-18
- [ ] Indian Capitol Career Tech, Muskogee, July 13-16
- [ ] Tri-County Career Tech, Bartlesville, June 15-18
- [ ] Tri-County Career Tech, Bartlesville, July 13-16
- [ ] Union Public Schools, Tulsa, June 15-18
- [ ] Union Public Schools, Tulsa, June 22-25
- [ ] Union Public Schools, Tulsa, July 20-23
- [ ] Western Plains Career Tech, Burns Flat, June 22-25
- [ ] Western Plains Career Tech, Burns Flat, July 20-23

What is your position in the school cafeteria kitchen? If you serve in two positions, please mark the one that takes most of your time.

- ○ Child Nutrition Director or Supervisor
- ○ Kitchen manager
- ○ Head cook
- ○ Cook
- ○ Other. Please describe _____

How many total years have you worked in a Child Nutrition Program? This includes the years you have worked in your current and other schools.

In what county is the school where you work?

What is the grade level of the school site where you work? Choose all that apply.

- [ ] Elementary
- [ ] Middle school/junior high
- [ ] High School

Where are meals prepared at your school?

- On-site. We have a kitchen and prepare meals.
- Off-site at a central kitchen. Our district has one or more production kitchen(s) where foods are prepared and then shipped to individual school sites to be served.

How many days each week does your kitchen prepare made from scratch or almost scratch entrees?

- Convenience means the foods are fully processed and only require heating and serving. Examples include heat-n-serve macaroni and cheese and premade bean and cheese burrito.

- Minimal preparation means assembly of ingredients that are highly processed. Examples include premade meatloaf with rehydrated mashed potatoes and chili dogs made with hot dogs and school-made chili.

- Almost scratch means some of the ingredients are raw and some mixing, cooking and preparation is involved. An example is chicken teriyaki made with precooked and sauced chicken strips, fresh rice and fresh vegetables.

- Made from scratch means the ingredients are raw or close-to-raw, including unseasoned, pre-cooked meat. An example is chicken fajitas made with chicken strips, tortillas and fresh vegetables.

- Always: 5 days per week
- Most days of the week: 3 to 4 days.
- Some days of the week: 1 to 2 days.
- Never

How many entrée choices does your school offer students each day?

- 1 choice
- 2 choices
- 3 or more choices

How many vegetable choices does your school offer students each day?

- 1 choice
- 2 choices
- 3 or more choices

How many fruit choices does your school offer students each day?

- 1 choice
- 2 choices
- 3 or more choices

I am proud of the meals we prepare and serve to students.

- Strongly agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

The following questions are about how you do your work in the school cafeteria.

I use mise-en-place to organize my work in the school kitchen.

- Never
- Sometimes: 1 to 2 days per week
- Most of the time: 3 to 4 day per week
- Always: 5 days per week
- I do not know about mise-en-place

We use Smarter Lunchroom practices to encourage students to select a healthy meal.

- Never
- Sometimes: 1 to 2 days per week
- Most of the time: 3 to 4 days per week
- Always: 5 days per week
- I do not know about Smarter Lunchroom practices

We use taste-testing in our school to help students choose healthy foods.

- One time per year
- One time each semester
- Monthly
- Weekly
- Only when we are trying a new food item
- We do not use taste-testing with students

The following statements are about the foods served in your school cafeteria. Please mark how strongly you agree or disagree with each statement.

I think the foods we serve in the cafeteria taste good.

- Strongly agree
- Agree
- Disagree
- Strongly disagree
- I do not know

The students at our school think the foods served in the cafeteria taste good.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

The teachers, administrators and staff think the foods served in the cafeteria taste good.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

The parents of students attending our school think that the foods served in the cafeteria taste good.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

I think the foods we serve in the cafeteria are healthy (low in fat, salt and added sugar and high in fiber).

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

The students at our school think the foods served in the cafeteria are healthy (low in fat, salt and added sugar and high in fiber).

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

The teachers, administrators and staff think the foods served in the cafeteria are healthy (low in fat, salt and added sugar and high in fiber).

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

The parents of students attending our school think the foods served in the cafeteria are healthy (low in fat, salt and added sugar and high in fiber).

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

What keeps the people in your school kitchen from preparing healthier and tasty foods?

Please mark how strongly you agree or disagree with the following statements about what kids eat.

What kids eat at school makes a difference in their health.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

What kids eat at school makes a difference in how well they learn at school.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

What kids eat at school makes a difference in their behavior while at school.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

The following statements are about resources needed to prepare meals using more scratch-cooking. Please mark how strongly you agree or disagree.

The staff in our kitchen have enough time to prepare meals using more scratch-cooking and less processed foods.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

We have the equipment we need in our kitchen to prepare meals using more scratch-cooking and less processed foods.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

The staff (cooks) in our kitchen have the needed skills to prepare meals that include more scratch-cooking and less processed (pre-prepared) foods.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

Thank you for your time to complete the questionnaire. The information you have shared will be useful in evaluating and monitoring the *Cooking for Kids: Culinary Training for Oklahoma School Nutrition Professionals* program.

Appendix E

Cooking for Kids School Meal and Preparation Post-Training Questionnaire

Default Question Block

COOKING for KIDS
Culinary Training for School Nutrition Professionals

School Meal and Food Preparation Post-Training Questionnaire

You are receiving this questionnaire because you attended a Cooking for Kids: Culinary Training for School Nutrition Professionals in June or July 2015. Completion of the questionnaire should take no more than 10 minutes.

Responses will provide useful information on how school nutrition professionals used the training to change school menu planning and food preparation practices.

Your participation is volunatary. Your responses are confidential and will not be shared with anyone at your school. Neither your name or school will be used in evaluation reports. Your email address will not be shared or provided to anyone.

By clicking the forward arrow you are consenting to participate and acknowledging you are 18 years or older.

If you have questions please contact the evaluator using the contact information below.

Deana Hildebrand, PhD, RD, SNS
Department of Nutritional Sciences
Oklahoma State University, Stillwater, OK 74078
Deana.hildebrand@okstate.edu
405-744-5059

If you have questions about your rights as a research volunteer, you may contact:

Hugh Crethar,
IRB Chair,
223 Scott Hall, Stillwater, OK 74078,
irb@okstate.edu
405-744-3377

Please select the training session and date that you attended. If you attended two different sites please select both.

- [ ] Autry Career Tech, Enid, July 13-16
- [ ] Autry Career Tech, Enid, July 20-13
- [ ] Francis Tuttle Career Tech, OKC, June 15-18
- [ ] Francis Tuttle Career Tech, OKC June 22-25
- [ ] Francis Tuttle Career Tech, OKC, July 13-16
- [ ] Francis Tuttle Career Tech, OKC, July 20-23
- [ ] Indian Capitol Career Tech, Muskogee, June 15-18
- [ ] Indian Capitol Career Tech, Muskogee, July 13-16
- [ ] Tri-County Career Tech, Bartlesville, June 15-18
- [ ] Tri-County Career Tech, Bartlesville, July 13-16
- [ ] Union Public Schools, Tulsa, June 15-18
- [ ] Union Public Schools, Tulsa, June 22-25
- [ ] Union Public Schools, Tulsa, July 20-23
- [ ] Western Plains Career Tech, Burns Flat, June 22-25
- [ ] Western Plains Career Tech, Burns Flat, July 20-23

What is your position in the school cafeteria kitchen? If you serve in two positions, please mark the one that takes most of your time.

- ○ Child Nutrition Director or Supervisor
- ○ Kitchen manager
- ○ Head cook
- ○ Cook
- ○ Other. Please describe _____

How many total years have you worked in a Child Nutrition Program? This includes the years you have worked in your current and other schools.

Please select the county in which your school is located.

What is the grade level of the school site where you work? Choose all that apply.

- [ ] Elementary
- [ ] Middle school/junior high
- [ ] High School

Where are meals prepared at your school site?

- ○ On-site. We have a kitchen and prepare meals.
- ○ Off-site at a central kitchen. Our district has one or more production kitchen(s) where foods are prepared and then shipped to individual school sites to be served.

How many days each week does your kitchen prepare made from scratch or almost scratch entrees?

- Convenience means the foods are fully processed and only require heating and serving. Examples include heat-n-serve macaroni and cheese and premade bean and cheese burrito.

- Minimal preparation means assembly of ingredients that are highly processed. Examples include premade meatloaf with rehydrated mashed potatoes and chili dogs made with hot dogs and school-made chili.

- Almost scratch means some of the ingredients are raw and some mixing, cooking and preparation is involved. An example is chicken teriyaki made with precooked and sauced chicken strips, fresh rice and fresh vegetables.

- Made from scratch means the ingredients are raw or close-to-raw, including unseasoned, pre-cooked meat. An example is chicken fajitas made with chicken strips, tortillas and fresh vegetables.

- ○ Always: 5 days per week
- ○ Most days of the week: 3 to 4 days.
- ○ Some days of the week: 1 to 2 days.
- ○ Never

How many entrée choices does your school offer students each day?

- ○ 1 choice
- ○ 2 choices
- ○ 3 or more choices

How many vegetable choices does your school offer students each day?

- ○ 1 choice
- ○ 2 choices
- ○ 3 or more choices

How many fruit choices does your school offer students each day?

- 1 choice
- 2 choices
- 3 or more choices

I am proud of the meals we prepare and serve to students.

- Strongly agree
- Agree
- Neither Agree nor Disagree
- Disagree
- Strongly Disagree

The following questions are about how you do your work in the school cafeteria.

I use mise-en-place to organize my work in the school kitchen.

- Never
- Sometimes: 1 to 2 days per week
- Most of the time: 3 to 4 day per week
- Always: 5 days per week
- I do not know about mise-en-place

We use Smarter Lunchroom practices to encourage students to select a healthy meal.

- Never
- Sometimes: 1 to 2 days per week
- Most of the time: 3 to 4 days per week
- Always: 5 days per week
- I do not know about Smarter Lunchroom practices

We use taste-testing in our school to help students choose healthy foods.

- One time per year
- One time each semester
- Monthly
- Weekly
- Only when we are trying a new food item
- We do not use taste-testing with students

The following statements are about the foods served in your school cafeteria. Please mark how strongly you

agree or disagree with each statement.

I think the foods we serve in the cafeteria taste good.

- Strongly agree
- Agree
- Disagree
- Strongly disagree
- I do not know

The students at our school think the foods served in the cafeteria taste good.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

The teachers, administrators and staff think the foods served in the cafeteria taste good.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

The parents of students attending our school think that the foods served in the cafeteria taste good.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

I think the foods we serve in the cafeteria are healthy (low in fat, salt and added sugar and high in fiber).

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

The students at our school think the foods served in the cafeteria are healthy (low in fat, salt and added sugar and high in fiber).

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

The teachers, administrators and staff think the foods served in the cafeteria are healthy (low in fat, salt and added sugar and high in fiber).

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

The parents of students attending our school think the foods served in the cafeteria are healthy (low in fat, salt and added sugar and high in fiber).

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

What keeps the people in your school kitchen from preparing healthier and tasty foods?

Please mark how strongly you agree or disagree with the following statements about what kids eat.

What kids eat at school makes a difference in their health.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

What kids eat at school makes a difference in how well they learn at school.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

What kids eat at school makes a difference in their behavior while at school.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

The following statements are about resources needed to prepare meals using more scratch-cooking. Please mark how strongly you agree or disagree.

The staff in our kitchen have enough time to prepare meals using more scratch-cooking and less processed foods.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

We have the equipment we need in our kitchen to prepare meals using more scratch-cooking and less processed foods.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

The staff (cooks) in our kitchen have the needed skills to prepare meals that include more scratch-cooking and less processed (pre-prepared) foods.

- Strongly Agree
- Agree
- Disagree
- Strongly disagree
- I do not know

Which part of *Cooking for Kids* was most useful to you or your staff?

What are your suggestions for improving *Cooking for Kids*?

Thank you for your time to complete the questionnaire. The information you have shared will be useful in evaluating and monitoring the *Cooking for Kids: Culinary Training for Oklahoma School Nutrition Professionals* program.

Appendix F

IRB Approval

Oklahoma State University Institutional Review Board

Date:	Tuesday, June 09, 2015
IRB Application No	HE1536
Proposal Title:	Evaluation of cooking for kids: Culinary training for Oklahoma School Nutrition Professionals: Impact on culinary knowledge, skills, food preparation practices and attitudes toward school meals
Reviewed and Processed as:	Exempt

Status Recommended by Reviewer(s): Approved Protocol Expires: 6/8/2018

Principal Investigator(s):

Deana Hildebrand	Barbara J. Brown	Gena Wollenberg
315 HES	301 HES	1015 E Franklin
Stillwater, OK 74078	Stillwater, OK 74078	Stillwater, OK 74075

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in section 45 CFR 46.

☒ The final versions of any printed recruitment, consent and assent documents bearing the IRB approval stamp are attached to this letter. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1.Conduct this study exactly as it has been approved. Any modifications to the research protocol must be submitted with the appropriate signatures for IRB approval. Protocol modifications requiring approval may include changes to the title, PI advisor, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms
2.Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3.Report any adverse events to the IRB Chair promptly. Adverse events are those which are unanticipated and impact the subjects during the course of the research; and
4.Notify the IRB office in writing when your research project is complete.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact Dawnett Watkins 219 Scott Hall (phone: 405-744-5700, dawnett.watkins@okstate.edu).

Sincerely,

Hugh Crethar, Chair
Institutional Review Board

Appendix G

Codebook for *Cooking for Kids* Pre- and Post-Training Questionnaires Analysis

Cooking for Kids Skill Development Training Analysis

Codebook

Full Variable Name	SPSS Variable Name	Coding Instructions
Pre- or post-training questionnaire	Time	1 = Pre, 2 = Post
What is your position in the school cafeteria?	Q1	1 = Child Nutrition Director or Supervisor, 2 = Kitchen manager, 3 = Head cook, 4 = Cook, 5 = Other. Please describe
What is your position in the school cafeteria? Other	Q1_Text	Other position
How many total years have you working a Child Nutrition Program?	Q2	Number of years worked

In what county is the school where you work?	Q3	1 = Adair, 2 = Alfalfa, 3 = Atoka, 4 = Beaver, 5 = Beckham, 6 = Blaine, 7 = Bryan, 8 = Caddo, 9 = Canadian, 10 = Carter, 11 = Cherokee, 12 = Choctaw, 13 = Cimarron, 14 = Cleveland, 15 = Coal, 16 = Comanche, 17 = Cotton, 18 = Craig, 19 = Creek, 20 = Custer, 21 = Delaware, 22 = Dewey, 23 = Ellis, 24 = Garfield, 25 = Garvin, 26 = Grady, 27 = Grant, 28 = Greer, 29 = Harmon, 30 = Harper, 31 = Haskell, 32 = Hughes, 33 = Jackson, 34 = Jefferson, 35 = Johnston, 36 = Kay County, 37 = Kingfisher, 38 = Kiowa, 39 = Latimer, 40 = Le Flore, 41 = Lincoln, 42 = Logan, 43 = Love, 44 = Major, 45 = Marshall, 46 = Mayes, 47 = McClain, 48 = McCurtain, 49 = McIntosh, 50 = Murray, 51 = Muskogee, 52 = Noble, 53 = Nowata, 54 = Okfuskee, 55 = Oklahoma, 56 = Okmulgee, 57 = Osage, 58 = Ottawa, 59 = Pawnee, 60 = Payne, 61 = Pittsburg, 62 = Pontotoc, 63 = Pottawatomie, 64 = Pushmataha, 65 = Roger Mills, 66 = Rogers, 67 = Seminole, 68 = Sequoyah, 69 = Stephens, 70 = Texas, 71 = Tillman, 72 = Tulsa, 73 = Wagoner, 74 = Washington, 75 = Washita, 76 = Woods, 77 = Woodward
Region in Oklahoma where county is located	Geographic_Reg	1 = Northwestern Oklahoma, 2 = Northeastern Oklahoma, 3 = Southwestern Oklahoma, 4 = Southeastern Oklahoma
What is the grade level of the school site where you work? Choose all that apply - Elementary	Q38_1	If selected, there is a 1 in the space; nothing in the space if not selected

What is the grade level of the school site where you work? Choose all that apply - Middle school/junior high	Q38_2	If selected, there is a 1 in the space; nothing in the space if not selected
What is the grade level of the school site where you work? Choose all that apply - High school	Q38_3	If selected, there is a 1 in the space; nothing in the space if not selected
Where are meals prepared at your school?	Q4	1 = On-site, 2 = Off-site at a central kitchen
How many days each week does your kitchen prepare made from scratch or almost scratch entrees?	Q34	1 = Never, 2 = Some days of the week: 1 to 2 days, 3 = Most days of the week: 3 to 4 days, 4 = Always: 5 days a week
How many entrée choices does you school offer students each day?	Q41	1 = 1 choice, 2 = 2 choices, 3 = 3 or more choices
How many vegetable choices does you school offer students each day?	Q37	1 = 1 choice, 2 = 2 choices, 3 = 3 or more choices
How many fruit choices does you school offer students each day?	Q36	1 = 1 choice, 2 = 2 choices, 3 = 3 or more choices
I am proud of the meals we prepare and serve to students	Q37.0	1 = Strongly disagree, 2 = Disagree, 3 = Neither agree or disagree, 4 = Agree, 5 = Strongly Agree
I use mise-en-place to organize my work in the school kitchen	Q10	0 = I do not know about mise-en-place, 1 = Never, 2 = Sometimes: 1 to 2 days per week, 3 = Most of the time: 3 to 4 days per week, 4 = Always: 5 days per week

We use Smarter Lunchroom practices to encourage students to select a healthy meal	Q42	0 = I do not know about Smarter Lunchroom practices, 1 = Never, 2 = Sometimes: 1 to 2 days per week, 3 = Most of the time: 3 to 4 days per week, 4 = Always: 5 days per week
We use taste-testing in our school to help students choose healthy foods	Q39	0 = We do not use taste-testing with students, 1 = Only when we are trying a new food item, 2 = One time per year, 3 = One time each semester, 4 = monthly, 5 = Weekly
I think the foods we serve in the cafeteria taste good	Q12	1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree
The students at our school think the foods served in the cafeteria taste good	Q13	1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree
The teachers, administrators and staff think the foods served in the cafeteria taste good	Q14	1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree
The parents of students attending out school think that the foods served in the cafeteria taste good	Q15	1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree
I think the foods we serve in the cafeteria are healthy (low in fat, salt and added sugar and high in fiber)	Q16	1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree
The students at our school think the foods served in the cafeteria are healthy (low in fat, salt and added sugar and high in fiber)	Q17	1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree

The teachers, administrators and staff think the foods served in the cafeteria are healthy (low in fat, salt and added sugar and high in fiber)	Q18	1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree
The parents of students attending out school think that the foods served in the cafeteria are healthy (low in fat, salt, and added sugar and high in fiber)	Q19	1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree
What kids eat at school makes a difference in their health	Q21	1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree
What kids eat at school makes a difference in how well they learn at school	Q23	1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree
What kids eat at school makes a difference in their behavior while at school	Q24	1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree
The staff in our kitchen have enough time to prepare meals using more scratch-cooking and less processed foods	Q30	0 = I do not know, 1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree
We have the equipment we need in our kitchen to prepare meals using more scratch-cooking and less processed foods	Q42.0	0 = I do not know, 1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree

The staff (cooks) in our kitchen have the needed skills to prepare meals that include more scratch-cooking and less processed (pre-prepared) foods	Q31	0 = I do not know, 1 = Strongly disagree, 2 = Disagree, 3 = Agree, 4 = Strongly agree
Collapsed responses of taste-test question	TasteTest	Recoded Q39 into 0 → 0 = we do not use taste-testing, 1 → 1 = Only when trying a new food item, 2 – 3 → 2 = Once or twice a year, 4 – 5 → 3 = At least monthly
Collapsed responses of scratch cooking question	ScratchCook	Recoded Q34 into 1 – 2 → 1 = Some days of the week: 2 days or less; 3 → 2 = Most days of the week: 3 to 4 days; 4 → 3 = Always: 5 days per week

VITA

Jennie Marie Till

Candidate for the Degree of

Master of Science

Thesis: *COOKING FOR KIDS: CULINARY TRAINING FOR SCHOOL NUTRITION PROFESSIONALS* POSITIVELY AFFECTS SCHOOL NUTRITION PROFESSIONALS' CULINARY PRACTICES AND BELIEFS

Major Field: Nutritional Sciences

Biographical:

Education:

Completed the requirements for the Master of Science in Nutritional Sciences at Oklahoma State University, Stillwater, Oklahoma in August, 2017.

Completed the requirements for the Bachelor of Science in Nutritional Sciences at Oklahoma State University, Stillwater, Oklahoma in May, 2015.

Experience:

Presented at the Oklahoma Academy of Nutrition and Dietetics Spring Convention Student Poster Session in April, 2017

Accepted for presentation at the Society for Nutrition Education and Behavior 50th Annual Conference Poster Session in July, 2017

Professional Memberships:

The Academy of Nutrition and Dietetics and The Oklahoma Academy of Nutrition and Dietetics