

The Pennsylvania State University

The Graduate School

Department of Nutritional Sciences

**DEVELOPMENT AND EVALUATION OF LESSONS AND
PSYCHOMETRIC TOOLS FOR PEER-LED NUTRITION EDUCATION
INTERVENTIONS IN CHILDHOOD AND ADOLESCENCE**

A Dissertation in

Nutritional Sciences

by

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ABSTRACT

The prevalence of childhood obesity in the United States (U.S.) is clinically and financially concerning. Most prevention strategies utilize socioecological models to design interventions that contextualize obesity-related risk behaviors. Behavior change models, such as the Social Cognitive Theory (SCT), are often used to characterize the pathways by which changes occur within these socioecological frameworks. SCT proposes that individual- and environmental-level variables within different socioecological contexts mediate changes in actual behaviors.

Peer-led nutrition education is one novel prevention strategy utilized to modify behaviors through increases in individual-level mediators, such as social support and social norms related to living a healthy lifestyle. Limited studies have used peer-based intervention strategies to reduce risky eating behaviors in adolescence. Peer-led culinary nutrition education serves as one innovative avenue for teaching youth how to apply nutrition education to experiment with foods. There has been a demand to resurrect culinary nutrition education programs for school-aged children, because lack of culinary skills has been associated with poorer dietary habits. Future research needs to test the effectiveness of peer-led approaches to culinary nutrition education on behavior change among children and adolescents.

This research project was conducted to develop and evaluate the feasibility of designing three culinary nutrition education lessons that effectively impact SCT mediators of behavior change among adolescents. This project also sought to validate a SCT tool for adolescents and parents that may be used to assess changes in SCT

mediators among adolescents and their parents in future peer-led nutrition education lessons aimed at implementing the *Dietary Guidelines for Americans, 2010*. The validated lessons and psychometric tools will be used in a future peer-led nutrition education program to understand if novel peer-led programs can modify obesity-related risk behaviors in adolescence.

In the first part of this research project, culinary nutrition education lessons were pilot tested in two studies. In the first pilot study, early adolescent youth (ages 11-14 years) were recruited to participate in a 2-hour *Family Menu Planning* lesson. In the second pilot study, youth were recruited to participate in two, 2-hour mechanical and perceptual culinary skills lessons, *Culinary Skills* and *Culinary Skills In Action*. In both pilot studies, participants were asked to participate in each 2-hour lesson, followed by a 1-hour focus group. Content validity analyses were conducted to assess internal validity prior to pilot testing. Process evaluation tools were used to measure feasibility of conducting the lessons in an after-school setting. Focus groups captured data for assessments of formative outcomes and self-reported behavior change mediators.

Eight adolescent females participated in the pilot testing of all three lessons. Participants were all Caucasian and either enrolled in the sixth or seventh grades. Content validity analyses revealed that all three lessons were valid for achieving key lesson objectives. Process analyses from the pilot studies indicated that it was feasible to deliver each lesson to early adolescent children in an after-school setting. Observers from the research team rated that students were highly engaged in all three lessons and that most learning objective tasks were executed “well” by the instructor. All tasks rated as

“not completed well” by observers in the *Culinary Skills* and *Culinary Skills In Action* lessons were related to time constraints.

Formative data from focus groups revealed that students were highly satisfied with all three lessons. Most participants would have been more satisfied, if the lessons would have had more visual learning aids, hands-on activities and opportunities for participants to teach their peers. All three lessons impacted self-reported heightened self-efficacy, social support and outcome expectations related to both family menu planning and mechanical and perceptual culinary concepts. In summary, results from the first part of this research project suggest that it is feasible to deliver culinary skills lessons that effectively impact mediators of behavior change in early adolescent youth. These results warrant the use of these lessons in a future peer-led culinary nutrition education program for adolescents.

The second part of this research involved validating the effectiveness of SCT tools for assessing changes in SCT mediators among adolescents and their parents. Early adolescent children, between the ages of 11-14 years, and their parents were recruited to participate in a pilot study for instrument testing. Parents-child dyads were asked to complete SCT questionnaires at two time points within one week. Time 1 responses were used to assess the internal consistency of scales for each SCT mediator on the parent and adolescent questionnaires. Scales with Cronbach's α values ≥ 0.70 were considered internally consistent. For all scales with Cronbach's $\alpha > 0.70$, item-total analyses were used to remove individual items from scales, if item deletion resulted in higher α values. Test-retest reliability analyses between Time 1 and Time 2 were conducted for each SCT mediator with Spearman correlations.

A total of 42 parent-child dyads completed SCT questionnaires at Time 1, and 36 pairs completed questionnaires at Time 2. Youth had a mean±SD age of 12.3±0.6 years and were enrolled in the seventh grade. A majority of participants were female (n=31, 73.8%) and Caucasian (n=32, 76.2%). The mean±SD age of parents was 48.3±5.1. Parents were mostly female (n=30, 71.4%) and Caucasian (n=29, 69.0%), had either a 4-year college degree (n=21, 50.0%) or master's degree (n=12, 28.6%) and possessed mid-high household incomes (n=32, 76.2%).

Cronbach's α coefficient for most scales on both the adolescent and parent SCT questionnaires were ≥ 0.70 , suggesting internal consistency of questionnaires. Self-regulation related to Balancing calories to manage weight had low-to-moderate internal consistency for both the parent and adolescent SCT questionnaires. Item-deletion analysis revealed that dropping items related to more restrictive weight management behaviors increased the internal consistency of both questionnaires. Test-retest reliability analysis revealed that both instruments possessed high internal reliability between study time points. Time 1 and time 2 responses were highly correlated, with correlation coefficients ranging from 0.40 to 0.97 for both questionnaires. Results from the second part of this research suggest that the SCT tools may be useful for assessing changes in SCT mediators among adolescents and their parents who participate in a future peer-led culinary nutrition education program, aimed at promoting the *Dietary Guidelines for Americans, 2010*.

In summary, it is feasible to deliver culinary nutrition education lessons that effectively impact SCT mediators among early adolescent youth. Furthermore, the SCT instruments may be useful for assessing changes in SCT mediators over time in future

nutrition education programs. Future use of these lessons in a peer-led format may provide a developmentally relevant strategy for teaching youth the basic skills they need to select, handle and prepare food in the current food environment. Childhood obesity prevention relies on these innovative education efforts to address the multiple influences that promote risky obesity-related behaviors.

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CHAPTER 1
INTRODUCTION

Study Rationale

In the past 30 years, the rate of obesity among school-aged children in the United States (U.S.) has more than tripled (1). Data from the 2009-2010 National Health and Nutrition Examination Survey (2) estimate that 17% of children and adolescents, ages 2 to 19 years, are obese (2). Childhood obesity warrants informed efforts at prevention, because the development of obesity early in life has been associated with persistence of obesity and increased risk for obesity-related co-morbidities in adulthood. In a prospective cohort study, Wright and colleagues (3) determined that body mass index (BMI) in childhood showed a significant association with both obesity and disease risk at age 50 years. Analyses illustrated that adults who had been above the 90th percentile for BMI between 9 to 13 years of age were anywhere between five to nine times more likely to be obese at age 50 years (3). Furthermore, data revealed that BMI between 9 to 13 years of age was significantly associated with metabolic and cardiovascular risk factors at age 50 years (3). In 2010, Gordon-Larsen and colleagues (4) used data from the National Longitudinal Study of Adolescent Health to explore longitudinal trends in the U.S. from adolescence to the third decade of life. Data documented that obesity prevalence increased from 13% in 1996 (i.e., in adolescence) to 36% in 2008 (i.e., in adulthood), and 99% of adolescents who were obese in 1996, remained obese as adults in 2008 (4). Significantly, obesity prevalence doubled from adolescence to the early 20s and then doubled again between the late 20s and early 30s (4). Results from this study suggest a clear pattern of obesity persistence from adolescence to adulthood.

Childhood obesity also represents a large economic burden. In 2002, Wang and colleagues (5) quantified the economic burden of obesity among 6- to 12-year-olds, using

data from the National Hospital Discharge Survey (NHDS). Analyses from 1979-1981 and 1997-1999 illustrated that the percentage of children and adolescents who were discharged from hospitals who had obesity-related diseases incrementally increased over time (5). Hospital discharges of diabetes doubled from 1.4 to 2.4%, obesity and gallbladder diseases tripled from 0.4 to 1.1% and 0.2 to 0.6%, respectively, and sleep apnea increased fivefold from 0.1 to 0.8% (5). Furthermore, corresponding obesity-associated annual hospital costs increased from \$35 to \$127 million in this 18-year interval, an estimate that represented approximately 1.7% of total hospital costs in 1997-1999 (5). Monheit and colleagues (6) used similar analyses in 2009, to explore health expenditures among obese adolescents. Using data from the Medical Expenditure Panel Survey (MEPS), researchers found that overweight adolescent females incurred an average of \$790 more in annual weight- and mental health-related expenditures than normal-weight females (6). In 2009, Trasande and colleagues (7) supported these figures by using the MEPS to quantify the magnitude of health care utilization and expenditures among overweight and obese children (ages 6 to 19 years). Data revealed that obese children had \$194 higher outpatient visit expenditures, \$114 higher prescription drug expenditures and \$12 higher emergency room expenditures (7). Extrapolating these data to the entire U.S. population, researchers found that increased childhood BMI was associated with an annual \$14.1 billion increase in prescription drug, emergency room and outpatient visit costs (7).

The increased prevalence of childhood obesity remains a complex phenomenon attributable to a range of specified and unspecified influences. The 2010 Dietary Guidelines Advisory Committee (DGAC) and the 2008 Physical Activity Guidelines

Advisory Committee (PAGAC) devoted their comprehensive reports to examining the role of eating and physical activity patterns as primary risk factors for obesity among school-aged children (8,9). The 2010 DGAC report indicated that school-aged children (ages 9 to 13 years) with the lowest (5th percentile) usual intakes of solid fats and added sugars and refined grains still consumed more than the maximum limit per day (8). In contrast, a majority of children with the highest (95th percentile) usual intakes of fruits, vegetables, whole grains and non-fat dairy products failed to consume daily recommended amounts (8). Furthermore, the 2008 PAGAC compiled data from the 2005 Youth Risk Behavior Surveillance (YRBS) report and determined that 9.6% of school-aged children nationally did not participate in the recommended 60 minutes of moderate- to vigorous-intensity physical activity per day (9). Updated data from the 2011 YRBSS revealed that the percentage of inactive youth has increased over time, whereby 13.8% of students had not participated in at least 60 minutes of daily physical activity (10).

Despite continuous efforts to reduce childhood obesity, unwaveringly high rates of childhood obesity warrant informed and innovative prevention strategies. Recent research efforts have focused on modifying obesity risk factors through various socioecological approaches. Ecological frameworks guide intervention efforts by focusing on the multiple influences over what people eat across different contexts (11). For example, the Ecological Systems Theory (EST) for childhood obesity proposes that child weight gain is a function of the bidirectional interaction between child, familial and societal characteristics (12). According to this model, familial characteristics, such as parental diet and physical activity habits, nutrition knowledge and child feeding practices, as well as societal factors, including food and physical activity availability and

accessibility, interact to influence development of childhood obesity risk factors. Furthermore, the impact that these risk factors have on the development of obesity is moderated by child characteristics such as age, gender and susceptibility to weight gain. The EST serves as a framework for interventions, because this model provides a contextual lens for understanding how and why children become obese over time and how risk factors may be reduced by manipulating individual, familial or societal characteristics. Behavior change is assessed within these frameworks by use of models, such as the Social Cognitive Theory (SCT) (13). SCT predicts that behaviors are a function of the reciprocal interaction between personal and environmental variables that are captured within ecological frameworks. Therefore, the current research intended to design nutrition education lessons grounded in the SCT and to develop survey instruments to test changes in SCT variables following nutrition education.

The multiple predictors contained in socioecological models of childhood obesity can be used to inform the mode of program delivery and the content of intervention programs. Future research may reduce the risk of childhood obesity by testing programs that have been designed to impact one or multiple variables of obesity-related behavior change. Peer education is one innovative mode of intervention delivery that is grounded in socioecological models of childhood obesity. Story et al. (11) argue that interactions with peers in the social environment strongly impact food choices through a variety of mediators, such as role modeling, social support and social norms. Peer education is an intervention strategy that is used in many areas of public health to transform peer interactions and to promote positive behavior changes. Peer-led programs have been used in HIV intervention (14-16), sex education (17-19), cigarette smoking prevention (20-22)

and cessation (23-25), breastfeeding promotion (26-28) and adult nutrition education (29-31). These programs train a person or group to communicate health-promoting messages to peers within the same group. Peer influences are a logical target for obesity interventions in school-aged children, because peer relationships become salient in childhood and adolescence as young people spend more time with their peers in various social and educational contexts (32). However, peer education has not been widely used as a strategy to moderate obesity-related risk behaviors in childhood and adolescence. Therefore, the current research sought to reduce the risk of childhood obesity by designing nutrition education lessons for peer-led interventions.

Another useful strategy for reducing the incidence of childhood obesity is to develop innovative education programs, such as peer-based programs, with content that addresses key socioecological predictors of obesity-related behavior change. Specifically, it has been argued that cooking skills warrant continued attention as an individual-level factor that impacts child development of obesity-related risk behaviors. In recent literature, scholars have noted a significant decline in child cooking skills over time (33-35). Drastic changes in domestic cooking practices have led to decreased transference of basic cooking skills from parents to youth (35,36). Some argue that this emerging inability to prepare meals at home is predictive of poor dietary habits, contributing to childhood obesity (34). Scientific, policy and government communities have made the plea to revive culinary skills among youth as a means of increasing children's familiarity and preference for nutrient-dense foods (37), which may thus in turn increase the accessibility and availability of healthy foods in current obesogenic environments (38).

Cooking skills have yet to be operationally defined in existing literature because they are conceptually complex (33). Cooking skills have best been defined as a range of mental and physical skills combined with hands-on experiences (33). Among this collection of skills includes mechanical, perceptual and planning skills related to cooking (35). Mechanical skills include those associated with actions performed to foods in the kitchen (i.e., cutting, baking, steaming, etc.), whereas perceptual skills relate to the cognitive abilities required to measure foods, adapt recipes and judge when foods have been cooked properly (35). Planning skills are distinct from both mechanical and perceptual tasks because they do not involve direct manipulation of foods, but rather involve the organization of foods to create meals. Though stakeholders agree on the need to teach youth how to cook, few researchers have designed and tested culinary skills education programs. Therefore, the current research intended to design and test a culinary skills education lesson that focuses on teaching youth the mechanical, perceptual and planning skills needed to create nutritionally adequate meals for future peer-led nutrition education interventions.

Study Aims and Hypotheses

The current research aimed to reduce the risk of childhood obesity by developing and testing novel deliveries of nutrition education that were grounded in socioecological models of obesity-related behavior change. The first objective was to review the literature on peer-based approaches to nutrition education and culinary nutrition education programs (Chapter II). The second objective was to apply key principles from the review of literature to design and test the validity and feasibility of a culinary nutrition education program with children and adolescents (Chapters III-IV). The culinary skills program

aimed to teach family menu planning skills (Chapter III) as well as mechanical and perceptual culinary skills (Chapter IV). The third objective of the current research was to test the validity and reliability of survey instruments that were intended to measure components of Social Cognitive Theory in relation to behavior change around dietary patterns and physical activity in parents and adolescents (Chapter V). Finally, a summary and directions for future research have been provided (Chapter VI).

The first hypothesis was that the family menu planning lesson would be internally valid. The second hypothesis was that it would be feasible to deliver a culinary nutrition education lesson related to family menu planning skills to early adolescent youth in an after-school setting. It was next expected was that delivery of the family menu planning lesson would positively impact self-reported mediators of behavior change among early adolescents, including self-efficacy, social support and outcome expectations related to planning healthy family meals. The fourth hypothesis was that two mechanical and perceptual culinary skills lesson would possess internal validity. The fifth hypothesis was that it would be feasible to deliver two culinary nutrition education lessons related to mechanical and perceptual culinary skills to early adolescent students in an after school-setting. It was also expected that delivery of two mechanical and perceptual culinary skills lessons would positively influence self-reported mediators of behaviors among youth, such as self-efficacy, social support and outcome expectations related to cutting, cooking and eating fruits and vegetables. The final hypothesis was that questionnaires grounded in the SCT would be valid and reliable instruments for assessing obesity-related behavior change among parents and early adolescent youth.

Within this dissertation, Chapter II contains a literature review which provides an overview of peer-based nutrition education approaches to obesity prevention and a summary of existing peer nutrition education programs in childhood and adolescence. Chapter II also discusses limitations and areas for future research to enhance the sustainability and effectiveness of peer nutrition education programs for school-aged children. Furthermore, Chapter II presents the importance of improving culinary skills to reduce the risk of childhood obesity and provides a summary of current culinary nutrition education programs for youth. Finally, Chapter II discusses the utility of using peer-led education modes to deliver more effective culinary nutrition education programs in childhood and adolescence. Chapter III describes program development of the family menu planning lesson and an evaluation of the family menu planning lesson including content validity, feasibility and pilot testing assessments. Chapter IV describes program development of two mechanical and perceptual culinary skills lessons. Chapter IV also includes content validity, feasibility and pilot testing evaluations of two culinary nutrition lessons. Chapter V describes the development of behavior change questionnaires and presents the results of testing the internal validity and reliability of these instruments with early adolescent youth and their parents. Finally, Chapter VI summarizes results of this research project, discusses strengths and limitations of the study design and proposes ideas for future research. Supporting documents used in the execution of this research project are contained in Appendix A and B. Collectively, results of this body of work may be used to fill scientific gaps in knowledge related to development and validation of peer-based approaches to nutrition education for the purpose of behavior change aimed at lowering childhood obesity.

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CHAPTER 2
LITERATURE REVIEW

Parts to be submitted to the *Journal of the Academy of Nutrition and Dietetics*

Peer Nutrition Education and Adolescent Development

Adolescence is recognized as a period of transformation, whereby youth experience rapid changes in physiological, psychological and emotional development (1). Most notably, adolescents are faced with the psychological task of forming an identity that is independent from their parents (2). Many researchers argue that identity formation is a social process, such that youth develop a cohesive sense of self based on the different pieces of themselves they discover through social interactions (2-5). Peer relationships ultimately lead to identity formation, because the personal interests, values, goals and commitments that youth develop (6) are strongly impacted by the beliefs of similar peers (7). These relationships become more complex over time as adolescents purposefully select friends due to their emerging sensitivity to the consequences of what different relations mean for their status within the broader social network (8).

Social prestige emerges as a key predictor of behaviors, because adolescents negotiate how their behaviors will ultimately impact their social status. Importantly, social status plays a large role in the development of risky health behaviors. Adolescents are more likely than adults to engage in risky behaviors such as unprotected sex, hazardous driving and heavy drinking (9), and these behaviors are maximized when adolescents are in the presence of peers (10). As sensation-seeking regions of the brain evolve, adolescents find emotional rewards from gaining peer approval of high-risk behaviors (11). Engaging in risky behaviors thus serves as a way to retain uniformity in a peer group and avoid social rejection (12).

Due to the prominent role that peers play in the adoption of risky behaviors, peer education has been widely used as a strategy for addressing these emerging behaviors

across a range of public health disciplines. Recent literature suggests that peers also play a powerful role in the development and maintenance of risky eating behaviors in childhood and adolescence (13-15), though peer education strategies have not been used as consistently to address food-related health behaviors. Some may argue that peer education programs have been adopted more slowly in the field of nutrition, because dietary habits have not traditionally been categorized as primary risk behaviors in adolescence. However, dietary behaviors are gaining more consideration as an important risky behavior in youth, as evidence in the 2011 National Youth Risk Behavior Survey (YRBS) which highlights unhealthy eating behaviors as one of six priority health-risk behaviors contributing to death, disability and social problems among youth in the United States (U.S.) (16).

Pathways of Behavior Change in Peer Nutrition Education Interventions

Limited studies show that peer education can effectively modify the behavioral patterns that place children and adolescents at risk for developing obesity. Peer nutrition education strategies are effective because young people share many similarities, which foster relatability and also increase the likelihood that they will adopt behaviors of their peers (17). These similarities arise from the selection of friends with similar characteristics and also from the observation that friends grow more similar over time as they reciprocally influence one another (8). The importance of peers as agents for behavior change are supported by behavior change models such as the Social Cognitive Theory (SCT) (18). SCT has been used widely as a theoretical framework for structuring peer nutrition education interventions (19). SCT employs the unique concept of reciprocal determinism, whereby behavior is a function of the reciprocal interaction of

psychosocial and environmental factors (20). Within this interactive framework, SCT identifies the concepts of knowledge, skills, self-efficacy, social norms, social support and modeling as some of the primary psychosocial factors that influence behaviors.

Peers effectively initiate behavior change in these models through the process of observational learning, whereby adolescents learn new skills from observing peers perform these tasks. Observational learning raises self-efficacy because observing a peer perform a task successfully increases an individual's belief that he or she can perform this task equally well (21). Social norms and social support generated by peers in social networks are also robustly influential at modifying behaviors. Salvy et al. (22) argue that youth develop normative beliefs about nutrition based on the nutrition-related behaviors of peers in their social network. More specifically, youth adopt certain behaviors that conform with peer behaviors as a means of solidifying their position within the social network. Within these networks, a unique source of social support serves as a means to increase self-efficacy and positive outcome expectations. Youth are more likely to sustain healthy behaviors when peers empower them to feel confident performing tasks and to further believe that positive health outcomes will result from successfully performing such tasks.

In recent literature, peer influence within the context of a 'social network' has been associated with childhood obesity (15,23). Maximova et al. (24) found that youth who affiliated with social networks comprised of overweight individuals were more likely to underestimate their weight and develop skewed perceptions of what it means to be normal weight status. Other research has found that social networks may also lead youth to develop inaccurate perceptions of eating behaviors, whereby overweight youth

have greater energy intake in the presence of overweight peers compared to leaner peers in the social network (13). Impression management research also conveys that eating behaviors are associated with social capital in social networks, such that adolescents consume certain foods to seek acceptance among peers (14). One study found that adolescent males tended to consume more energy-dense snacks with the expectation of maintaining a higher social status among peers (25). Furthermore, youth reported that eating healthy foods conflicted with their social standing among peers (25). In normative frameworks of adolescent eating behaviors, peer norms have been shown to serve as a powerful indicator of the quantity of food that should be consumed. Youth seek to avoid the social stigma of excessive eating by matching the amount of food consumed by their peers. Therefore, social norms impact food intake by helping youth to determine a socially acceptable amount of food to consume (14).

Summary of Peer Nutrition Education Interventions In Child and Adolescence

There is evidence to suggest that peer relations are associated with childhood obesity. Peer nutrition education programs are thus strategic approaches to childhood obesity prevention, because they are designed to use this social influence to change the behaviors that place youth at risk for developing obesity. Though peer nutrition education is not a novel obesity prevention strategy, few studies have evaluated the impact of peer-led nutrition education on obesogenic behaviors in adolescence. These studies show that peer nutrition education programs are moderately effective at modifying the behaviors that place children and adolescents at risk for obesity. However, there is a need for an evaluation of the existing literature regarding peer nutrition education approaches to obesity prevention in youth. This section provides a summary and evaluation of the

design principles of school-based peer nutrition education programs and their impact on dietary intake, anthropometrics and psychosocial outcomes.

Methods

A systematic literature search was conducted for articles published in the online PubMed, PsychInfo and ERIC databases. Various combinations of the following key words were entered as search terms: “peer,” “peer-led,” “paraprofessional,” “Expanded Food and Nutrition Education Program,” “nutrition education,” “dietary behaviors” and “children.” Peer nutrition education was operationally defined as an intervention where educators and students shared something that created an “affinity between them” (26, p. 564) (i.e., age or life experiences), which was then used to facilitate the voluntary adoption of positive nutrition-related behaviors (19). Articles published in English from January 1977, through March 2013, were included if they evaluated the impact of peer nutrition education interventions on nutrition-related outcomes including dietary intake, physical assessments or behavioral change outcomes. A summary of the systematic search and review process is illustrated in Figure 2-1.

An initial literature search resulted in a total of 662 articles, of which 571 were excluded for being unrelated to peer nutrition education programs. Ninety-one peer nutrition education articles were then evaluated for their delivery of peer-led nutrition programs to children and adolescents (ages 2 to 19 years). Based on this inclusion criterion, a total of 60 articles were excluded for delivering peer nutrition education interventions to adults by adults. Articles were then included if the nutrition education was delivered by children and adolescents. Eleven articles were excluded for enlisting adults to teach nutrition programs to youth. Of the remaining 20 articles, a total of five

articles were excluded for exclusively assessing non-nutrition related outcomes. A total of 15 studies met inclusion criteria. These studies are summarized in Table 2-1.

Summary of Studies

These 15 studies used peer nutrition education strategies to accomplish a range of health goals related to the prevention of obesity and obesity-related comorbidities among children and adolescents. These studies were all conducted in a school-based setting (Kindergarten through twelfth grade), and thus, integrated the peer nutrition education programs into school curricula. Most studies were interested in modifying eating behaviors (27-39), while some studies focused more specifically on changing intentions to eat healthy (40,41) and attitudes, knowledge or behaviors related to intake of healthy foods (40,41), fat (31-34,36), fruits and vegetables (31,32,36,38,49), sugar-sweetened beverages (37,39) or sodium (34). Two studies were solely interested in examining students' perceptions of being peer educators (33,35), and six studies completed process evaluations of the peer nutrition education programs (28,30,31,35,40,41). All studies used a similar framework for the intervention design, including a peer selection procedure, peer training modules and a specified intervention plan outlining peer responsibilities. However, these studies uniquely differed in the intervention methodology used to execute these characteristic design elements. The following sections summarize methods used in these studies in order to consolidate existing strategies for implementing peer nutrition education interventions. The existing methodologic choices investigators may reference when planning peer nutrition education interventions are illustrated in Figure 2-2.

Peer educator selection

Studies varied in the types of students selected as educators and in methods used to recruit these peer educators. In most studies, the types of students chosen varied as a function of age. Three studies matched peer educators with same-age classmates (28,32,37). Perry et al. (28) evaluated the use of ninth graders to teach fellow ninth graders a 10-session heart disease prevention curriculum about healthy eating and physical activity patterns. The Slice of Life program recruited a team of five peer educators to promote decreases in saturated fat and sodium intake, increases in complex carbohydrates and increases in aerobic physical activity in a group of 25 to 30 fellow classmates. Birnbaum and colleagues (32) evaluated the use of seventh graders to teach other seventh graders a 10-week nutrition curriculum to prevent future cancer risk. The peer-led condition of the Teens Eating for Energy and Nutrition at School (TEENS) study involved the use of five to six peer educators to promote increases in fruit and vegetable intake and decreases in fat intake among a group of four to five classmates of the same age. Finally, DeBar et al. (37) trained sixth graders to lead a health communication campaign for all sixth grade students about making healthy food and beverage choices over five school semesters as part of the HEALTHY program.

Several studies selected older students to serve as peer educators for younger students (27,29,31,34,36,38,40,41). Stock et al. (27) trained fourth through seventh grade students to be peer educators for Kindergarten through third grade students. Older students were paired with younger students to teach 21, weekly healthy living lessons throughout the school year regarding nutrition, physical activity and healthy body image. Foster and colleagues (29) examined the impact of training eighth graders to be peer educators for obese students in second through fifth grades. The 12-week program

consisted of peer-led counseling and social support given by eighth graders to groups of three to four students regarding positive changes in eating and exercise patterns. Forneris et al. (31) evaluated the use of high school students to teach health and life skills to sixth graders in the Goals for Health (GFH) intervention. GFH was a 12-session curriculum designed for high school students to promote increases in self-efficacy, knowledge and positive eating behaviors among sixth graders. Cohen et al. (34) trained high school students in ninth through twelfth grade to teach nutrition lessons to students in fifth grade. The nutrition curriculum consisted of four, 45-minute classroom sessions taught by a group of four to five older peers to 30 younger students about healthy food choices, food labels and unhealthy eating habits.

Jones et al. (36) trained 18 fourth grade students to deliver the Youth Can! program in their fifth grade year to groups of fourth and fifth grade students. Fifth graders were paired with research and school staff to co-lead nutrition education lessons in two rural schools. In the LIFT+ program, Wilson et al. (38) trained high school students to teach seventh graders eight, 1-hour workshops about the risks of tobacco use and the benefits of eating fruits and vegetables. Seventh grade students taught by peer educators were then given the opportunity to serve as peer educators for sixth graders in the following academic year in a condensed version of the LIFT+ program. Smith and colleagues (40) paired high school students with third and fourth graders to deliver an after-school health curriculum promoting healthy dietary habits. In the Just For Kids! program, one high school student taught two, third and fourth grade students for 50 minutes followed by a 10-minute group activity led by all peer educators to all intervention students. Finally, Bergmann et al. (41) invited a group of 40 high school

students from a performing arts group to create and deliver nutrition-related performances for Kindergarten through sixth grade students. Peer educators were asked to give three performances to different elementary schools. After each performance, the high school students were then asked to visit Kindergarten through sixth grade classrooms to facilitate discussions about behavior change.

Interestingly, three school-wide peer nutrition interventions selected peers to be educators with no particular age strategy (30,33,37). Agron and colleagues (30) trained high school students in ninth through twelfth grade to be peer educators for the entire student body. The Food on the Run (FOR) program was a 9-month program that consisted of five to seven peer-led, school-based and community activities that served to create awareness, educate students and institute environmental and policy changes in the school. The average grade level of peer educators was tenth grade, suggesting that younger, same-aged or older peers could have delivered nutrition education to students. Similarly, Hamdan et al. (33) selected high school students to lead school-wide promotional activities as part of the Trying Alternative Cafeteria Options in Schools (TACOS) study. These activities were aimed at encouraging awareness and purchasing of lower-fat foods in á la carte or vending machine lines. Similarly, Bogart et al. (37) trained seventh grade students to advocate healthy eating behaviors for all students in the school cafeteria, though activities were targeted for seventh grade students. These activities involved distributing healthy food samples and educational bookmarks during the school lunch period.

Another key design consideration was how students were selected to be peer educators after a peer group was targeted. In two studies, peer educators were elected on

the basis of favorable ratings from classmates (28,32). Students were asked to elect peer educators by writing down the names of male and female classmates whom they respected, admired, emulated and believed would be good teachers. Students receiving the most votes in both studies were then invited to serve as peer educators for the class. In other studies, peer educators were selected based on recommendations from school staff (29,31). Principals and teachers elected well-liked and responsible students to be peer educators (29,36,40), and school administrators chose peer educators on the basis of their academic performance, leadership qualities and extracurricular activities (31). Furthermore, several studies relied on recruiting peer educators through student volunteering (30,33,34,37-39,41). Students volunteered to lead promotions as part of an extracurricular activity, internship, class project or club (33,37-48,41), while students from another study volunteered to participate as peer educators from a pre-existing peer counselor program (34). As an alternative strategy, two school-wide peer nutrition education interventions required students to serve as peer educators as part of the classroom curriculum (27,33).

Peer educator training

Peer educator training is necessary for introducing the nutrition curriculum to students and giving them an opportunity to practice their lessons and leadership skills. Many studies trained peer educators before the intervention only (29,30,32,34,36-38,40,41), while other studies trained students both before and throughout the intervention (24,25,28,39). In some studies, peer educators were given nutrition education and trained how to deliver specific components of the program curriculum (29,30,32,34). Foster et al. (29) trained students before the intervention in three, 1-hour

sessions to weigh the younger students, check their lunches for nutritious foods and to counsel the children on eating and exercising. Agron and colleagues (30) also trained peer educators for nine weeks before the intervention with structured materials provided to the school by the FOR program. Peer educators were taught basic principles of nutrition and physical activity and learned strategies for creating environmental and policy changes within the school. Peer educators in the TEENS study attended a full-day training session before the intervention that introduced the 10-week nutrition curriculum, outlined the specific peer educator duties and gave the students opportunities to rehearse each peer-led activity (32). Cohen and colleagues (34) facilitated a 4-day training session for peer educators in the summer before the intervention. Students were trained for two days on how to be helpers and for another two days on the specific curriculum that they would deliver. Peer educators were then given the opportunity to rehearse each component of the curriculum with other peer educators and with a group of younger students. The peer educators were also given a 2-hour refresher course before the intervention. In the SNaX program, peer educators were trained how to deliver various health advocacy activities for one week during a 5-week club (36). Seventh graders were taught how to distribute healthy samples to classmates in the school and practiced distributing bookmarks with nutrition education messages.

Peer educators in other studies were given less structured instructions about how to execute curricula and more general guidance about teamwork, skill building and responsibility (36,38,40,41). Jones et al. (36) trained peer educators in a 6-week summer program that consisted of 45-minute lessons about team building, skill development and advocacy. Peer educators developed strategic plans for improving the school food

environment that they implemented as fifth grade peer educators the following year. In a briefer training program, high school students in the LIFT+ program were given a 1-day skill-building training by research staff (38). Smith et al. (40) taught peer educators the principles of how to work together, motivate student mentees and handle mentoring responsibilities in 6-hour training session conducted over two days. Though students were also given some curriculum delivery training, this training was not described in detail. Finally, Bergmann and colleagues (41) also gave high school students less structured training about how to deliver an effective nutrition education performance. Performing arts students were given guidance from two nutrition professionals about how to develop positive nutrition messages.

Other studies either trained students during sessions throughout the intervention (27,28,31,40) or used no particular training program (33). Stock et al. (27) used intervention teachers to educate peer educators in 45-minute healthy living lessons once per week during the 21-week intervention. Perry and colleagues (28) trained peer educators in three sessions before and throughout the Slice of Life intervention. During training sessions, peer educators were introduced to the program, learned about their specific duties and rehearsed each of their assigned activities. Forneris et al. (31) had GFH staff use a leader manual to train peer educators in a 2-day training session before the intervention. Peer educators also received a 30-minute booster session once per week for the entire 12-week intervention. Furthermore, peer educators received feedback regarding their execution from project staff members after each session. Similarly, peer educators in the HEALTHY program were given a 1-hour initial training session outlining tasks, skills and procedures, in addition to a 30-minute weekly training session

specific to each weekly intervention activity being delivered (39). Hamdan and colleagues (33) completed the only study that did not use a specific training program for peer educators. Students were merely given a set of promotional activities from TACOS staff to use as a guide for planning and implementing school-wide promotions.

Peer educator responsibilities

Studies differed in types and amounts of responsibilities given to peer educators. Many studies gave peer educators more structured lesson plans (27-29,31,32,34,36-38,40), while others gave them the freedom to design their own curricula (30,33,39,41). Two studies employed peer educators to deliver curricula designed to reduce disease risk (35,38). Cohen et al. (35) gave peer educators the responsibility of leading nutrition sessions about choosing low-fat/low-sodium foods and reading food labels to prevent cardiovascular disease. Similarly, Wilson et al. (38) trained peer educators to deliver eight, 1-hour workshops focusing on the disease implications of tobacco use and the health benefits of fruit and vegetable consumption (38).

Several studies employed peer educators to design and implement nutrition-related activities (27,31,32,37). Stock et al. (27) enlisted peer educators to teach younger students strategies for overcoming barriers to healthy eating in weekly 30-minute lessons. Peer educators delivered these one-on-one sessions using a variety of techniques including presentations, games and art activities. Each peer educator and student buddy pair also spent two, 30-minute physical activity sessions together twice per week. Story et al. (32) also gave peer educators freedom to design and implement nutrition activities. The TEENS program gave peer educators less responsibility than other peer nutrition education interventions, whereby students were trained to help teachers deliver a

classroom nutrition curriculum (32). Peer educators helped guide small groups of students through preparations and tastings of fruit and vegetable snacks. They also led “Station-to-Station Food Facts” where students were asked to look for fat in food options such as, pizza, chips and fast food. The GFH program also employed peer educators to lead taste-testing activities with healthy foods. Peer educators taught middle school students with a leader manual that outlined weekly lessons involving tasting healthy foods, goal-setting for a healthy future and learning about high-fiber/low-fat foods (31). Finally, peer educators in the SNaX program were also trained to implement hands-on nutrition activities (37). Peer educators learned to implement healthy taste-testings and role-playing activities in the school cafeteria.

Other studies employed peer educators to deliver programs aimed at modifying specific psychosocial mediators of health-related behavior change (28,29,36,40). Perry and colleagues (28) designed peer educator responsibilities to have a direct impact on the social environment and social norms related to healthy eating. Peer educators took part in creating videos that illustrated the social pressures to eat unhealthy foods and the strategies for overcoming these pressures. In a more direct role, the peer educators provided factual nutrition information in small group discussions and activities following the videotapes. In 1985, Foster and colleagues (29) trained peer educators to serve as counselors in weekly meetings with students to modify behaviors and attitudes related to living a healthy lifestyle. Peer educators were also asked to examine the lunchboxes of obese students three times per week and reward children with stickers if they omitted non-nutritious foods and/or included at least one nutrient-dense food. Furthermore, peer

educators were also taught to weigh children weekly and reward them with stickers for weight losses of a half-pound or more.

Jones et al. (36) trained peer educators to co-lead 12 nutrition education lessons from the CATCH fourth grade curriculum. Lessons were selected to improve self-efficacy related to making healthy food choices and to set goals related to improving dietary behaviors. Peer educators were assigned to one of two intervention schools that dictated their responsibilities. Peer educators in school 1 implemented a fruit and vegetable snack stand and advocated for low-fat dairy choices, whereas peer educators in school 2 campaigned for greater access to the school salad bar and for the incorporation of whole pieces of fruit in school lunches. In the Just For Kids! program, peer educators were paired with a third or fourth grade student to deliver eight weeks of nutrition education lessons for one hour each week (40). Lessons aimed to address the importance of healthy eating and sought to modify student behaviors through reinforcement, goal setting, self-monitoring and planning techniques.

In other studies, peer educators were given a framework to design their own nutrition programs (30,33,39,41). Peer educators in the FOR program were given the freedom to create school-wide activities aimed at increasing awareness and educating students about healthy living (30). Activities involved working with foodservice staff to increase healthy food options, instituting school-wide healthy food taste tests and promoting healthy living in lunchtime demonstrations. Peer educators were given the chance to tailor these activities based on the unique needs of the high school. Similarly, the TACOS program gave peer educators examples of school-wide promotions to deliver (33). These activities included media campaigns, taste testings, raffle events and poster

contests, among other activities. Peer educators were then given creative independence to design, plan and implement activities. Peer educators in the HEALTHY program were also given freedom to disseminate photographs, artwork and videos as part of a nutrition campaign for fellow seventh grade students (39). DeBar et al. (39) trained peer educators to lead several campaign activities, while also giving peer educators the creativity to design their own campaign materials. Bergmann and colleagues (41) gave peer educators the most freedom to design their own program, whereby performing arts students were asked to independently develop a 20-minute nutrition education performance with unstructured guidance from nutrition professionals.

Summary of Outcomes

Studies examined a wide range of behavioral, attitudinal, anthropometric and process evaluation outcomes. Nine studies were interested in the impact of the peer nutrition education intervention on students (27-29,31,34,36,38,40,41), and six studies examined the peer educators themselves (27,30,32,33,37,39). Furthermore, six studies captured data on the peer nutrition education intervention process (28,31,35,37,39,41). The following sections summarize student, peer educator and process evaluation outcomes. For purposes of this summary, many peer-led interventions were compared to control schools where no nutrition curriculum was delivered, unless otherwise noted. Collectively, results of these studies illustrate that school-based peer nutrition education programs are feasible and can promote positive changes related to nutrition. Figure 2-3 represents the various outcome measures investigators may consider when evaluating peer nutrition education interventions.

Student outcomes

Anthropometrics

Obesity risk is often determined by collecting anthropometric measurements including body weight and height [for body mass index (BMI) calculations], waist circumference, heart rate and blood pressure. Three studies examined the impact of a peer nutrition education intervention on these indicators of obesity (27,29,40). Stock et al. (28) reported that BMI, body weight and heart rate were not significantly different between the intervention and control groups following the 21-week intervention (28). However, students in the peer-led group had a significantly smaller increase in systolic blood pressure compared to control students (28). Foster and colleagues (29) reported that a 12-week intervention resulted in a significant weight loss difference between intervention and control groups, whereby obese children in the peer-led group lost an average of 0.15 kg compared to normal-weight control students who gained an average of 1.3 kg. When evaluating average weight loss in terms of mean change in BMI percentile, program children experienced a 5.3% decrease in the percentage overweight compared to control children who showed a 0.3% increase in the percentage overweight. Students in the intervention maintained a 3.6% reduction in the percentage overweight compared to control students during an 18-week follow-up (29). Smith et al. (40) also found that a 10-week intervention led to significant post-intervention decreases in BMI percentiles among intervention students compared to control group students who received a structured after-school program focused on improving general health behaviors. Students receiving the peer-led nutrition education program experienced a mean 0.38% decrease in BMI percentile, while control students showed a mean 0.07% increase in BMI percentile.

Dietary intake behaviors

Several studies also explored dietary intake behaviors (27-29,31,36,38). Two studies assessed general consumption of healthy foods (27,29). The Healthy Buddies program assessed self-reported healthy-living behaviors with the Healthy Living Questionnaire (27). Healthy living scores revealed that females in the peer-led group experienced a significant increase in healthy eating compared to females in the control group. Foster et al. (29) reported that students in the peer-led group significantly decreased their intake of non-nutritious foods over the 12-week intervention; however, the decrease was not significant at the 18-week follow-up. Three studies assessed self-reported fat intake (28,31,36). Perry and colleagues (28) reported that girls in the peer-led group significantly increased their choices of heart healthy foods (i.e., low in fat, sodium and sugar) and were significantly more likely to check the sodium and fat content on food labels in comparison to a control group who received standard adult-led health classes. Similarly, Forneris and colleagues (31) reported that students in the peer-led group significantly decreased fat intake one year after the 12-week intervention, although these improvements were not significant at the 2-year follow-up. Jones et al. (36) found that a reduction in both total energy intake and percentage of energy from fat varied based on the intervention school. Students in school 2 reported a significant post-intervention reduction in their energy intake and percentage of energy from fat in comparison to control school students who were taught by adult leaders. On the other hand, students in school 1 did not report a significant decrease in post-intervention energy intake and percentage of energy from fat compared to control students. Students in school 2 self-reported an approximate 118 kcal reduction in energy intake and an approximate 3.9% decrease in energy from fat following the intervention (36).

Wilson et al. (38) asked students to report daily fruit and vegetable servings. Students in the peer-led LIFT+ program reported eating significantly more fruit and vegetable servings at both post-intervention and 1-year follow-up time points than control students who received a traditional, adult-led health education curriculum. Intervention students reported eating a mean of 3.19 fruit and vegetable servings per day post-intervention compared to only 2.90 fruit and vegetable servings per day reported by control students. At the 1-year follow-up, intervention students reported a mean of 3.02 fruit and vegetable servings per day compared to only 2.69 fruit and vegetable servings per day reported by control students.

Psychosocial mediators of behavior change

Behavioral change theories often serve as the basis for understanding dietary habits. A large number of studies evaluated the mediating variables in these conceptual models as outcomes. Four studies assessed nutrition-related knowledge and/or attitudes (27,31,38,40). Stock et al. (27) measured general health knowledge and attitudes with the Healthy Living Questionnaire. These investigators reported that students in the peer education group showed significantly greater increases in health knowledge and health attitudes compared to control students. Forneris and colleagues (31) assessed students' knowledge regarding fat and fiber using a 14-item knowledge test that asked students to choose foods lowest or highest in fat and fiber content. Students in the intervention group had significantly greater fat and fiber knowledge than control students. Knowledge scores remained significantly different than controls for one year following the intervention, and then reverted to values similar to control students two years after the intervention.

Wilson et al. (38) assessed knowledge of daily fruit and vegetable recommendations. Knowledge of fruit and vegetable guidelines was assessed by reporting the percentage of students who correctly identified the recommendation of five or more daily servings of fruits and vegetables. A significantly higher percentage of students in the LIFT+ program (75%) compared to control students enrolled in the adult-led nutrition education program (54%) correctly identified fruit and vegetable recommendations after the intervention. However, the percentage of intervention students reporting knowledge of recommendations decreased at the 1-year follow-up. Smith and colleagues (40) also measured self-reported nutrition knowledge and attitudes toward healthy eating. Nutrition knowledge was assessed using a 15-item food choice questionnaire developed for the Just For Kids! curriculum. The investigators found that students in the peer-led group had a significant increase in post-intervention nutrition knowledge compared to control students who received a structured after school program. More than 50% of the intervention students showed an increase in post-intervention nutrition knowledge, compared to only about 23% of children in the control group. Health attitudes were measured by scoring students from 1 to 5 based on their completion of a statement [“I think for me, eating healthfully in the next week would be...” (40, p. 20)] with six different responses ranging from (e.g., “bad/good” to “fun/boring”). Intervention students reported a significant increase in self-reported attitudes toward healthy eating compared to control students, whereby intervention students experienced a 0.82 increase in attitude scores compared to a 0.93 decrease among control students.

Other studies also examined self-efficacy to eat healthy (31,38,40). Forneris et al. (31) measured self-efficacy to eat low-fat foods, fruits and vegetables and perceived

tastes of healthy foods. Self-efficacy was measured by asking students to respond to a statement [“I am sure I can eat at least five fruits and vegetables per day” (31, p. 59)], using a 5-point Likert scale of agreement. The intervention group had significantly greater increases in self-efficacy to eat low-fat foods, fruits and vegetables compared to control students, although self-efficacy decreased to values similar to control students two years after the intervention. Perceived taste ratings were measured by asking students to respond to a statement [“I think low-fat foods taste good” (31, p. 59)], using a 5-point Likert scale of agreement. Taste perceptions of low-fat foods and vegetables were not significantly different for students in the peer-led versus control condition.

In contrast to these results, two studies found that students enrolled in peer-led programs did not show significant increases in self-efficacy in comparison to control students (38,40). Wilson et al. (38) explored self-efficacy to eat more fruits and vegetables. Confidence in the ability to eat fruits and vegetables was assessed by asking students to respond to a question [“How confident are you that you could eat more fruits and vegetables each day? (38, p. 151)], using a 5-point Likert scale of agreement. The investigators found that there was not a significant difference in the percentage of students in the LIFT+ program who felt confident eating more fruits and vegetables in comparison to control students receiving an adult-led nutrition education program. Similarly, Smith and colleagues (40) found that self-efficacy for eating healthy did not increase for intervention students. Self-efficacy for eating healthy was assessed by asking students to respond to a statement [“I feel I will be good at...” (40, p. 20)] for each of four target foods. Students in the peer-led group did not report statistically significant

increases in self-efficacy to eat healthy compared to control students receiving a standard after-school program.

Several other studies assessed self-concept, awareness, behavioral intentions, perceived support, and skills as indicators of health status (26,28,34,40,41). Foster and colleagues (26) reported that students in the peer-led group had a significantly greater improvement in self-concept from baseline to post-intervention than control students. Improvements in self-concept were maintained at the 18-week follow-up. In the Slice of Life program, females in the intervention group self-reported a significant increase in their awareness of healthy eating habits compared to females in the control group (28). Awareness was quantified by reports of girls paying more attention to sodium and fat content, eating fresh vegetables and consuming a balanced diet. Cohen and colleagues (34) measured nutrition-related behavioral capabilities. Students in the peer-led intervention reported significant improvements in behavioral capabilities one year following the intervention in comparison to control students who received the adult-led version of the nutrition curriculum. Furthermore, Smith et al. (40) measured perceived autonomy support for eating healthy using a 6-item scale. Students in the intervention group did not report a significant post-intervention increase in the amount of perceived support to eat healthy in comparison to control students.

Finally, two studies examined intentions to eat healthy foods (40,41) and reported mixed results. Smith and colleagues (40) measured behavioral intention to eat healthy using a 12-item questionnaire measuring intentions to eat at least one fruit daily, healthy foods at lunch, healthy foods at dinner and to eat breakfast. Students in the intervention group did not show a significant increase in their self-reported behavioral intentions to

eat healthy after the intervention in comparison to control students. On the other hand, Bergmann et al. (41) measured intentions to make dietary changes using a close-ended question asking students if they planned on making changes. Qualitative data from these informal group discussions with students revealed that 66% of students planned on making changes after seeing the nutrition education performance. Most students reported that they planned on either cutting back on junk food or eating more fruits or vegetables to change their dietary behaviors.

Peer educator outcomes

Peer education promotes health behavior changes by providing social support and changing social norms. These adjustments in the social environment can positively impact peer educators because the social support given to participating students is often reciprocated. Therefore, studies measured various peer educator outcomes to assess the effectiveness of the peer-led nutrition education interventions.

Anthropometrics

Two studies assessed anthropometric changes among peer educators (27,39). Stock and colleagues (27) examined physical outcomes among peer educators compared to same-aged classmates in control schools. Investigators reported that there was a significantly smaller increase in body weight and BMI among peer educators in comparison to same-aged classmates who were not peer educators. Similarly, DeBar et al. (39) measured change in BMI percentile and waist circumference among peer educators in comparison to students who did not participate as peer educators in nutrition education campaigns. Upon assessing mean changes in BMI percentile from baseline to post-intervention, results revealed that a significantly lower proportion of peer educators

were obese after the intervention (21%) compared to students who were not peer educators (27%). However, the investigators did not find any significant changes in waist circumference upon comparing peer educators and non-peer educators.

Dietary intake behaviors

Few studies assessed changes in dietary intake among peer educators (32,37,39). Two studies assessed self-reported fruit and vegetable intake (32,39), while one study measured self-reported sugar-sweetened beverage consumption (37). Birnbaum et al. (32) examined usual food choices and consumption of fruit and vegetables among peer educators. Peer educators experienced a significant increase in daily fruit and vegetable consumption following the 10-session TEENS curriculum. Peer educators self-reported a full serving increase in daily fruit and vegetable consumption in comparison to only a half-serving increase experienced by students who received adult-led nutrition education. Furthermore, peer educators self-reported the greatest increase in their tendency to choose low-fat foods. DeBar and colleagues (39) also measured fruit and vegetable consumption among peer educators delivering school nutrition campaigns and found conflicting results. Peer educators did not self-report a significant post-intervention increase in daily servings of fruits and vegetables when compared to control students who did not participate in school campaigns. Furthermore, the investigators did not see a significant difference in self-reported daily intake of sugar-sweetened beverages compared to control students after the intervention. Bogart et al. (37) also measured self-reported intake of soda, sports drinks and fruit drinks among both intervention students and peer educators and found negative results. Results illustrated that students and peer

educators did not experience significant decreases in self-reported beverage intake in comparison to control students who did not participate in the peer educator program.

Psychosocial mediators of behavior change

Several studies measured psychosocial mediators of behavior change among peer educators, including knowledge, attitudes and perceptions related to nutrition (27,30,33,37). Stock and colleagues (27) compared baseline and post-intervention scores on the Healthy Living Questionnaire for peer educators in comparison to same-aged classmates in control schools. Results revealed that peer educators reported a significant increase in self-reported health behavior and attitude scores compared to same-aged classmates. In the FOR program, peer educators also completed a pre- and post-intervention survey containing 42 questions related to nutrition (30). The investigators found that peer educators showed a significant increase in nutrition knowledge, attitudes towards nutrition and an increase in healthy eating behaviors following the 9-month intervention.

Hamdan et al. (33) asked peer educators to complete a survey developed to assess their perceptions of eating behaviors, attitudes and social norms related to low-fat foods. Peer educators also reported on the perceived benefits and experiences gained from being involved in the TACOS program. The investigators assessed perceptions of highly-involved students who volunteered to be peer educators and less-involved students who were required to participate as part of their classroom curriculum. Highly-involved students had significantly different perceptions of eating behaviors, attitudes, social norms, student involvement and experiences related to the TACOS program compared to less-involved students. Highly-involved students were more likely than less-involved

students to perceive that the promotional activities helped them recognize (89% vs. 61%) and eat low-fat foods (68% vs. 27%), changed the way they chose foods (79% vs. 33%), improved their attitudes towards low-fat foods (98% vs. 44%) and fruits and vegetables (89% vs. 50%) and helped them gain new skills (96% vs. 53%). Furthermore, highly-involved students were more likely than less-involved students to believe that the promotional activities increased students' consumption of low-fat foods (98% vs. 54%). Finally, Bogart et al. (37) also assessed self-reported attitudes toward the school cafeteria by asking both intervention students and peer educators to respond to a statement [“I believe eating in the cafeteria is...” (37, p. 199)], using a 7-point scale. Students and peer educators showed a significant increase in their attitudes toward the cafeteria in comparison to students who did not participate in the SNaX program.

Process evaluation outcomes

Several studies examined process evaluation outcomes to capture the feasibility and success of interventions (28,30,31,35,37,39,41). Process evaluation outcomes included mostly qualitative data that assessed perceptions of peer educators, students and teachers regarding the effectiveness of the intervention. Two studies assessed student and peer educator satisfaction with the peer-led nutrition education programs (28,41). The Slice of Life program conducted a process evaluation with three sets of questionnaires that were administered to peer educators and students (28). In the peer educator responses, females enjoyed being peer educators significantly more than males did. Furthermore, females were significantly more likely than males to report that they changed their eating habits as a result of being peer educators (83% versus 45%) (28). Students in the intervention reported that they enjoyed having peer educators teach the

program and that peer educators were adequately trained for their tasks. Although, female students believed that peer educators were significantly more effective at leading small discussions and encouraging participation than male students did (28). The students also agreed that the peer election procedures were fair, whereby 79% of the females and 71% of the males said that they would have elected the same students as peer educators (28). Similar to these evaluations, Bergmann et al. (41) used informal classroom interviews to collect qualitative data about participants' experiences as audience members of the peer-led nutrition education performances. Results revealed that all three performances were highly enjoyed by students, whereby 73% of children said that they "really liked" (41, p. 140) the performances.

Other studies completed process evaluations (30,31,35,37,39). Agron and colleagues (30) collected data on the implementation of the program components by administering a post-intervention survey to all FOR site coordinators. Staff members reported that an average of six lessons were taught, lessons lasted an average of approximately 55 minutes, peer educator training lasted a mean of nine weeks and that a mean of 20 hours were spent on activities outside the training protocol. Similarly, Forneris et al. (31) assessed implementation quality by measuring the student leader ratio, accessibility to students, number of groups in each classroom, length of the workshops, disruptions of the curriculum schedule and personnel support. These measures were used to categorize quality into four levels, including no program (control school), low, medium and high implementation. Based on these criteria, 26% of schools were at high implementation (n=6), 17% were at medium implementation (n=4), 9% were at low implementation (n=2) and 48% had no program (n=11). Analyses revealed that

participants in the high and medium implementation groups significantly increased their knowledge of fat and fiber more than the control group from baseline to the 2-year follow-up. Moreover, program participants in the low implementation group had significantly lower knowledge of fat and fiber than the control groups at the 2-year follow-up.

In another analysis of the TEENS intervention, Story et al. (35) assessed participation, dose and fidelity by asking peer educators, teachers and students receiving the intervention to complete a post-intervention evaluation survey. Peer educators completed a 16-item evaluation form that assessed their perceptions of being a peer educator. Survey data revealed that 90% of students enjoyed being peer educators and believed that they were effective in this role. Furthermore, 85% reported that they had learned more about healthy eating, and 65% thought that they had eaten healthier because they were a peer educator. The student evaluations included a questionnaire that asked them to assess the TEENS curriculum and comment on the helpfulness of the peer educators. The investigators found that 58% of students receiving the TEENS curriculum believed that their peer educators were helpful. Teachers completed checklists after each peer-led session which rated whether activities were completed and how well they were executed. More than one-third of the teachers reported that peer educators led their assigned activities well, and 93% of the teachers rated their peer educators as either useful or very useful. Trained evaluators assessed fidelity by direct observation of peer-led classrooms. The observations were captured four times throughout the curriculum using a standardized instrument with 24 items. The evaluators observed that 94% of the

peer educators led the session activities, and 78% of peer educators successfully kept their groups on task.

Bogart et al. (37) examined the reach of peer educator activities in the school. The researchers assessed reach by asking peer educators to report who they spoke to about health promotion. Results revealed that most peer educators (96%) talked to at least one other person about healthy eating. Furthermore, approximately half of peer educators expanded their messages to a wide range of people including friends, other students, parents, other family members, teachers and others. Similarly, DeBar and colleagues (39) assessed the reach of peer educator influence in the school. Focus group data revealed that 90% of students reported knowing one or more peer educator at their school and more than 60% of students believed that these peer educators helped them make healthy lifestyle choices. DeBar et al. (39) also completed dose analyses to assess relationships between involvement in program activities and improved physical and behavioral outcomes. The investigators summed the total number of semesters that each student participated in program activities to find that dosage did not significantly impact outcomes.

In summary, moderate positive-quality evidence supports that school-based peer nutrition education programs promote healthy eating as well as improve attitudes, self-efficacy and perceptions related to a healthy lifestyle in students and peer educators (See quality evaluation checklist, Appendix A). Process evaluations also reveal that peer-led interventions are feasible in a school-based context. Although there is much formative work that needs to be done before peer-led nutrition programs can be sustained in schools, researchers and nutrition practitioners should not abandon peer nutrition

education. Peer relations can influence orientation to different tastes, styles and appearances (7) and susceptibility to these influences significantly increases through middle adolescence (6). These peer influences are often self-sustaining because affiliations with similar individuals encourage behavioral continuity over time (42). Peer relationships may be a key to reducing the risk of obesity in childhood, adolescence and even adulthood, and thus future research should be dedicated to improving this experimental approach to obesity prevention.

Future Research and Gaps in Knowledge

An unresolved question in the scientific literature is how peer nutrition education programs can be used widely as a childhood obesity prevention strategy. Therefore, this section summarizes the limitations of current peer nutrition education programs and gaps in knowledge related to future research. Registered dietitians and nutrition professionals working in school-based or community settings may benefit from this insight into how to better implement more sustainable and effective peer-led nutrition education interventions.

Intervention Limitations

Various elements of existing intervention designs limit the widespread usefulness and long-term efficacy of peer-led nutrition education programs. Importantly, several studies compared peer-led interventions to either control schools where no nutrition education intervention took place (27,29,30,32), or to no control schools at all (30,33,41). While the studies reported modest benefits of peer nutrition education, the use of these study designs limits the conclusions investigators can draw about the effectiveness of peer-led nutrition education programs compared to standard adult-led nutrition programs

in schools. Data from the 1996 U.S. Department of Education Survey Report indicated that 99% of public schools offered nutrition somewhere within the curriculum and 70% integrated it within the total curriculum (43). School-based nutrition education efforts have remained constant over time as obesity has become more prevalent in younger populations. Therefore, studies could benefit from comparing peer- and teacher-led nutrition education approaches, because results may give schools important insights into how to improve their existing school nutrition programs.

A characteristic feature of most studies included in this review is the use of self-report tools to measure psychosocial and behavioral outcomes. Asking youth to self-report nutrition-related information is problematic in peer-led nutrition education programs, because completing questionnaires in the presence of peer educators can lead to social desirability bias. In many studies, peer educators were selected for these roles because they were well-liked by both fellow classmates and school staff (28,29,31,32,36,39,40). Youth may respond to questionnaires in a manner that will be viewed favorably by their peer educators in order to feel mutually liked and accepted. Furthermore, Brown et al. (8) argue that adolescents are sensitive to how relationships contribute to their social status within a broader peer system. Youth may thus seek to report data in a similar manner as their peer educators as a means of upholding a leadership status. Therefore, the positive changes in psychosocial mediators and behaviors reported in these studies may be inflated due to the power of social influence in these learning contexts.

Despite some positive findings, most studies reported only modest changes in various nutrition-related outcomes. Some studies suggested that most robust behavioral

and psychosocial changes can only be achieved when the school environment supports the positive changes (30-32). These environmental changes include increasing healthful food options in the school cafeteria, implementing parent workshops to translate changes from school to home and lending expert and social support to peer leaders and participants as they engage in nutrition interventions. In terms of family environment, the ecological model of childhood obesity predicts that parenting styles and family characteristics contribute to excess adiposity in childhood (20). For example, family food environments are associated with consumption patterns of school-aged children (44) and family communication styles are related to child body weight status (45-47). Only four studies incorporated a parent component into their peer-led nutrition education interventions (30,32,34,38). Although one of these studies found that parents significantly increased the likelihood that intervention students would feel confident consuming fruits and vegetables (38), all other studies found that parent involvement did not have a significant influence on nutrition-related outcomes among children (29,32,34). These results are in contrast to multiple studies showing that parent involvement is critical to promoting health behavior changes in childhood obesity prevention programs (48-50). Incorporating a well-defined family component into future studies may better define the role of parents in mediating and reinforcing behavior change among children in peer-led nutrition education programs.

Promoting environmental change requires collaboration with a variety of skilled adults within the school. For example, increasing the number of healthy foods in the lunch program requires a close partnership with foodservice staff. Many studies argued that having trained staff is important for the success of an intervention, though most

studies do not provide opportunities for peer educators to interact with these experts. Peer educators require continued support from teachers and intervention staff who give educators consistent feedback and guidance regarding their efforts. This reinforcement is critical to maintaining the quality implementation of the nutrition education programs. A lack of expert support can diminish peer educator efforts, whereby Story et al. (35) noted that almost 50% of peer educators thought it was hard to keep their groups on task and 40% reported difficulty in getting their groups organized.

Peer educators also require social support from fellow classmates because social norms are an important mediator of behavior change (35). Children and adolescents are particularly receptive to what adopting peers' behaviors and attitudes mean for their acceptance and group affiliation. Story and colleagues (35) reported that 63% of peer educators believed that their friends thought it was "cool" to be a peer educator in the TEENS program. Similarly, Hamdan et al. (33) noted that 65% of highly-involved peer educators believed that their friends thought it was acceptable to be a part of the TACOS program. In order to promote positive behavioral changes in the peer educators themselves, it is important for peer educators to receive validation from their fellow students that being a peer educator is socially acceptable. Studies in this review are limited in the ways in which they directly manipulate social norms to promote behavior changes among the peer educators. Studies that incorporate ways in which peer educators can receive feedback from fellow classmates throughout the intervention may serve to promote greater behavior changes among peer educators.

Another common limitation cited in the literature is the failure of studies to evaluate long-term maintenance of behavior changes in peer education programs.

Program sustainability in school-based contexts is dependent upon consistent results that illustrate long-term benefits of these interventions. Most of the studies do not follow up with either the peer educators or the study participants to determine if behavioral changes have persisted over time. The lack of maintenance data limits the use of peer-led nutrition education in schools, because school administrators are looking for resourceful and sustainable nutrition programs. Only three studies assessed long-term maintenance, and these studies reported conflicting results (29,31,38).

Foster et al. (29) found that obese children in a peer-led intervention had a 3.6% reduction in their percentage overweight, improvements in self-concept and increases in fruit use during an 18-week follow-up. Forneris and colleagues (31) assessed self-efficacy to eat healthy, taste perception of low-fat foods, fruits, and vegetables, fat and fiber knowledge and fat and fiber intake at one and two years following the intervention. The investigators found that self-efficacy, fat/fiber knowledge and fat intake improved at the one-year follow-up and decreased to levels of the control group at the two-year follow-up. Wilson et al. (38) found that fruit and vegetable intake was significantly higher among intervention students in comparison to control students during a 1-year follow-up. However, the investigators did not find significant increases in knowledge and self-efficacy related to meeting fruit and vegetable recommendations at the 1-year time follow-up. Many studies indicate that a continued intervention, reinforcement and/or opportunities to practice skills need to be established to achieve long-term maintenance. However, more data are needed to determine if and how long behavior changes persist over time.

Gaps In Knowledge and Future Research

The literature evaluated used a wide range of methods to design the peer-led interventions. A major gap in knowledge is how future researchers and practitioners should design interventions when the existing methodology is both varied and unstandardized. In general, future research should focus on developing the formative aspects of peer nutrition education interventions. One design element that is extremely variable is the selection of peer educators. There are a host of unanswered questions in the literature, such as which students will serve as the best peer educators and how does election into these roles impact peer delivery of the intervention and peer educator outcomes. Future research needs to compare different methods for peer election to determine which strategy selects peers who promote the greatest behavior change. One unique strategy could be to give all students the chance to be a peer educator. The literature consistently reports that students received some benefit from being peer educators. Therefore, an intervention that gives all students the chance to serve as the peer educators may result in even greater behavior changes when the peer educators shift to the student role. Furthermore, it would be useful for future research to collect qualitative data regarding peer educator perceptions of the peer election process itself. This information would be important for determining if one particular election method gives peer educators greater confidence to deliver the interventions and to change their own behaviors.

The training protocol for peer educators varied in both frequency and duration in these studies. Collectively, all of the studies agree that peer educator training is an essential aspect of peer-led interventions. Some studies suggest that more consistent peer educator training is necessary to give educators the confidence, skills and knowledge to

deliver interventions effectively. In support of this point, Story et al. (35) reported that 46% of peer educators believed that more training would have helped them lead their groups. Future research needs to address the question of training dose or how much training peer educators need to feel confident delivering program curricula. Many studies argue that all peer educators should be taught general nutrition principles by teachers with expert nutrition knowledge. Future research needs to explore this idea by training teachers and peer educators in basic nutrition knowledge in addition to any training specific for the intervention curriculum. Furthermore, future research needs to determine if these standardized training methods can be incorporated into schools following the intervention. Training can be expensive and relies on teachers who are dedicated to putting un-paid time into being trained and supporting peer educators. Once a standardized training protocol is established, the next step for translating peer-led interventions into school-wide nutrition programs is to collect qualitative data from teachers and school administrators regarding the feasibility of training teachers and peer educators with current resources.

Peer education programs are often cited as being advantageous because they are cost effective. Peer education interventions are seen as a strategic use of resources because the people delivering the information are both accessible and require little compensation for their efforts. However, there are no peer nutrition education studies that have completed cost-benefit analyses. Given the cost of time, effort, and finances required to develop curricula and train both teachers and peer leaders, future research needs to address the cost effectiveness of peer nutrition education programs in schools. Resources are always an obstacle that schools must overcome in order to incorporate new

programs in the school curriculum. Understanding the cost-benefit ratio is particularly important for schools in lower socio-economic regions where students have poorer eating and physical activity habits. Future research should focus on optimizing costs to encourage the sustainability and widespread use of peer-led nutrition programs in schools.

Peer nutrition education approaches are often developed by the use of SCT as a theoretical framework for structuring interventions. For some studies, the investigators did not see changes in hypothesized psychosocial mediators based on the behavior changes that occurred. One gap in knowledge related to peer nutrition education is understanding the mechanism by which behavior change occurs. To date, there are no peer nutrition education studies that utilize pathway analyses to assess behavior change mechanisms. Future research needs to assess mediator pathways in order to guide researchers in the design of peer-led programs that promote sizeable behavior changes. Furthermore, many studies are interested in the impact of peer nutrition education interventions on the peer educators themselves. However, limited studies assess the psychosocial mediators of change among peer educators. As peer education is grounded in a theory based on reciprocity, it is critical to understand how students bidirectionally impact their educators through these mediators. Although SCT has been used widely as a framework for peer education interventions, a closer look at the pathways of change may lead researchers to investigate alternative behavioral change models for peer nutrition education interventions.

Although peer education has been used as a strategy to prevent multiple risky behaviors, such as unsafe sexual practices (51-56) and tobacco use (57-62) in

adolescence, limited studies have used peer nutrition education to modify risky eating behaviors. There is a unique opportunity for future research to improve peer-led approaches to nutrition education by gaining methodological insight from widely used peer education programs used to prevent other risky behaviors in adolescence. For example, Ebreo et al. (51) compared several outcomes experienced by peer educators in school-based HIV prevention programs to make future recommendations for the selection and training of peer educators. Results revealed that the selection of effective peer educators is dependent on levels of interest among peer educators and peer involvement in the election process. Students who are motivated to be leaders for altruistic reasons will be the most effective educators. Importantly, classmates should be involved in the selection process because peer educators will only be effective if their peers view them as credible. Students who engage in at-risk behaviors will be ineffective peer educators because they are viewed as contradictory figures among peers. Results also uncovered recommendations for future training of peer educators. Peer educator training must consist of longer sessions and provide students with both a good working knowledge of the program curriculum and a clear idea of their role as a leader. Furthermore, training will only be effective if adult experts and peer educators are trained together to share lesson responsibilities. Black and colleagues (63) also reported recommendations for peer-led education programs from a meta-analysis of 120 adolescent drug prevention programs in the US. Analyses provided further insight into how to effectively train peer educators. Black et al. (63) found that training programs must be comprehensive and involve workshops, experiential activities and training manuals. Peer educators must be given accurate information about lesson concepts and behavioral skills to resist pressure

to engage in risky behaviors themselves. Adults should educate peer educators about the consequences of problem behaviors and give them time to practice listening, communication, problem-solving and decision-making skills.

Finally, current peer nutrition education programs have been limited to training youth how to teach basic nutrition knowledge to their peers. Many researchers argue that nutrition knowledge is solely ineffective unless paired with hands-on learning. Nutrition education has the potential to be most effective when youth are given the opportunity to apply basic nutrition principles to actual experiences with foods. Culinary skills education serves as a way to teach youth how to apply nutrition fundamentals to direct experiences with nutritious foods, though no culinary skills education programs have utilized peer-led approaches to nutrition education. Future interventions need to design peer-led nutrition education programs to train peer educators how to teach more hands-on experiences. Peer-led culinary nutrition education programs may lead to greater behavior change among peer educators and students as they are able to apply more abstract nutrition concepts to make healthier eating decisions.

In summary, future research needs to standardize intervention methodologies, evaluate cost-benefit ratios and identify mechanisms influencing behavior change in peer nutrition education programs. Researchers also need to assess meta-analyses from peer education programs in other public health disciplines. Designing peer nutrition education programs with key insights from other public health prevention programs serves as a way to acknowledge nutrition-related behaviors as priority risk behaviors that emerge alongside other deviant behaviors in adolescence. Furthermore, application of principles from multi-level peer-led health promotion programs from other public health disciplines

may have given dietetic professionals direction for effectively addressing risky dietary behaviors related to obesity in youth. Peer nutrition education programs may also be elevated with the design of programs that teach youth how to apply nutrition principles to real-world eating behaviors. Peer-led culinary skills education serves as one way to teach both peer-educators and students how to apply nutrition education to manipulate and consume nutritious foods. Future research needs to assess the importance of culinary skills in nutrition education and determine the potential for using peer-led approaches to teach culinary skills.

Transitions In Culinary Skills

Over the past decade there has been a demand to resurrect formal culinary skills education in childhood and adolescence. The universal plea to revive culinary skills education has been largely provoked by what many policy makers, scientists and nutrition professionals are referring to as a societal decline in culinary skills (64-66). Many argue that this “de-skilling” (64, p.14) is more of a transition in culinary skills (65) that has been accompanied by large socio-demographic shifts. As family dynamics have evolved with greater non-traditional family structures, movement of women into the workforce and increased time pressures, there is a growing presence of consumers in the marketplace with a different value equation for making food choice decisions. While health, taste and convenience are all still predictive of food choices (67), convenience and cost are weighted with more value than ever before. Scratch cooking is no longer the norm in consumers’ kitchens, such that those who provide meals for their families use a combination of raw and convenience items (66). Dramatic shifts in domestic cooking practices have led to a decreased transference of basic cooking skills from parents to

youth (66,68). Family cooking has become a means to an end rather than a means for social connectedness, cultural expression and life enhancement (64). As youth gain more autonomy in their transition to young adulthood, they become less prepared to complete essential food-related tasks (69). Some believe that this emerging inability to prepare meals in the home is predictive of poor dietary habits, contributing to childhood obesity (65).

Role of Culinary Skills Education in Childhood Obesity Prevention Interventions

The launch of First Lady Michelle Obama's "Let's Move!" campaign in 2010, spurred a very public and universal call for informed efforts to solve childhood obesity within one generation. Following the launch of this initiative, a Presidential Memorandum was signed to create the first ever Task Force on Childhood Obesity. The Task Force Report (70) outlined 70 specific strategies to reduce childhood obesity by 5% by 2030. This report included an actionable recommendation to improve the accessibility of healthy, affordable foods (70). In response, other key stakeholders noted that accessibility of food would increase by teaching skills necessary to select, handle and prepare healthy foods (71). Therefore, this political agenda has generated a prominent invitation for culinary skills education as a means to accomplish these 2030 health goals. The *Dietary Guidelines for Americans, 2010*, support this call to action by encouraging the development of strategies to "empower individuals and families with improved nutrition literacy, gardening, and cooking skills to heighten their enjoyment of preparing and consuming healthy foods" (72, p. 58).

Academics resonated with this political call and generated an important push for culinary skills education in public and private schools. For example, Lichtenstein and

Ludwig (71) advocated for the integration of cooking skills into secondary education curriculum. They suggested that if society could not rely on parents to teach children how to prepare nutritious meals within the current obesogenic food environment that children must be taught in school how to feed themselves and their families. Lichtenstein and Ludwig (71) boldly stated that a culinary education curriculum could be “among the best investments society could make” (71, p. 1858). Condrasky and Hegler (65) concurred with the need to develop culinary skills education programs for youth. They argued that extension-based culinary nutrition programs could promote long-term healthy by giving individuals the knowledge and analytical skills needed to create nutritionally adequate meals (63). Food, nutrition and dietetics professionals have been encouraged to teach youth how to apply nutrition principles through cooking. Peregrin (73) stated that an emphasis on ‘home economics’ education would give registered dietitians an opportunity to be influential leaders in delivering culinary skills education to youths. Food, nutrition and dietetics professionals may expand their reach in school systems by fostering partnerships with family and consumer sciences teachers, school food service directors, principals and school board leaders and administrators.

While the call for culinary skills education in youth has come from a variety of stakeholders, it is important to clearly evaluate and understand why food, nutrition and dietetics professionals should invest time, energy and resources in culinary skills education programs for youth. One consideration is that experts argue that teaching youth how to cook can prevent childhood obesity (65,70,71). Culinary knowledge and skills when used to prepare home meals has been associated with increased intakes of fruits and vegetables (74-77), whole grains (76,77), fiber (74), folate (74), vitamin A (74) and

calcium (76,77). However, there is a lack of scientific evidence documenting and explaining pathways by which culinary competency leads to sustainable dietary changes, and subsequently, how such dietary changes lower childhood obesity. Figure 2-4 proposes a causal model for culinary skills education and childhood obesity prevention. Combining culinary skills with nutrition education may enhance cooking-related factors that may be reinforced through application in school, at home and in restaurants to solidify long-term, health-promoting behaviors associated with childhood obesity prevention. This and other theoretical models should be tested to fill scientific gaps (identified in Figure 2-4) in the understanding of culinary skills education and childhood obesity prevention.

Another consideration is that culinary skills education offers a unique opportunity for experiential learning (78). Hands-on culinary skills education may foster nutrition-related behavior change by enabling youth to apply abstract nutrition concepts to concrete experiences with foods (65,78-80). Figure 2-5 displays one example of how culinary skills education may give youth an opportunity to gain knowledge through experience as modeled by Kolb's learning cycle (81). The educational impact of culinary skills is maximized as students move from observational to experiential learning stages and as a variety of learners (identified in Figure 2-5) engage in culinary concepts (82). Teaching youth how to cook may lead to the ultimate application of dietary recommendations, because youth gain critical-thinking skills and technical proficiencies to implement dietary guidelines. Nutrition knowledge alone appears incomplete without experiential learning via interactions with food.

Another justification is that acquisition of culinary skills as a strategy for childhood obesity prevention is consistent with socioecological models of obesity (20,83). Socioecological models provide frameworks for understanding obesogenic behaviors. These models guide intervention and research efforts by characterizing multiple influences that impact behaviors across personal, social, physical and macro-level environments (83). Within these frameworks, constant interactions between and among factors across different contexts ultimately shape behaviors. Pathways of change among and between these different contexts are supported by behavior change models, including SCT (18). This theory proposes that behavior change is mediated through personal and environmental variables that reciprocally interact (84). Interventions that target interactions between the individual and environment, including culinary skills, support positive behavior changes, such as making healthier food choices and implementing preparation methods (66).

Culinary skills fit within models of childhood obesity as an individual-level factor, impacting eating behaviors through direct interaction with mediators of behavior change, including availability and accessibility. In previous studies, visibility, accessibility, structure and availability of food at home were shown to influence consumption patterns (85). A decline in cooking skills can lead to low home availability and accessibility of nutrient-dense foods, because individuals are bound by culinary ineptitude and lack of cooking confidence to choose and consume convenience foods with rudimentary preparation methods. In support of this point, Larsen et al. (86) found that individuals prepared less formal home meals, due to a lack of knowledge of use of raw ingredients. Cooking knowledge is valuable, because it helps individuals select and

apply appropriate cooking methods to create healthier meals. Increasing culinary skills through changes in individual-level variables (e.g., cooking self-efficacy and positive outcome expectations of cooking), serve to increase the capacity of the home environment to support positive changes in eating behaviors.

Other individual-level factors directly shape dietary behaviors in culinary skills education interventions. For example, Liquori et al. (79) documented that direct and repeated experiences with known foods impacted children's acceptance and preference patterns. In culinary skills education programs, a child's exposure to healthy foods may be maximized through the experience of viewing, smelling, handling and tasting foods. Increased exposure to a greater availability of healthy foods may lead to increased acceptance (79), which may ultimately shape dietary intake as youth gain the motivation and behavioral capacity to choose and consume healthy foods (87). Cooking attitudes may predict the maintenance of positive behavior changes (66). As youth gain cooking skills and knowledge, their positive attitudes towards cooking also may increase, because they may develop positive outcome expectations and a sense of accomplishment from successfully creating meals (66). Culinary skills education interventions appear to be a logical target for obesity prevention in youth, because such skills impact both individual and environmental determinants of behavior. The ability to deliver culinary skills education programs in youth must be evaluated to assess the impact on childhood obesity prevention.

Summary of Culinary Skills Education Programs For Youth

Limited studies have tested the effectiveness of culinary skills interventions at modifying obesity-related risk behaviors in youth. An informal literature review resulted

in a total of 17 publications pertaining to culinary skills interventions in childhood and adolescence (ages 2 to 19 years) (75,79,88-102). Many of these studies delivered intervention programs exclusively for youth between the ages of 3-15 years (75,79,88-90,94-96,98,102), while six studies included parents or adults as active members in the interventions (91-93,97,99,100). Although most studies designed culinary skills education programs for obesity prevention among all demographics, six studies targeted youth and adults from low socioeconomic status, disadvantaged or high-risk communities (75,79,97,99,100,102). Program content was relatively consistent between studies, such that most programs included some form of general nutrition education, hands-on cooking class, taste testing and/or family meal planning activity. The hands-on cooking classes focused on a variety of key cooking skills including, preparation skills (75,88,90,91,94,100,101), food safety skills (75,94,99,102) ingredient (75,90,91,101,102) and utensil usage (99,102) and knife skills (90).

Studies assessed a variety of behavioral (75,79,88-92,95), psychosocial (79,88,90,92,93,95-98), process evaluation (75,79,94,98-101) and anthropometric outcomes (89). From a process evaluation perspective, most studies found that culinary skills education programs are feasible in both home and school contexts. One study demonstrated that all elements of program design including establishing project partners, recruiting participants and educators and implementing culinary programs into academic curricula was feasible (75). Culinary skills education programs also effectively captured the interest and excitement of participants, whereby youth and adults in many studies were highly satisfied with the programs (98-100). More specifically, program participants enjoyed tasting new foods (98-100) and participating in hands-on cooking activities

(100). Interviews also revealed that parents were supportive of their child's involvement in culinary skills education programs and perceived positive changes in their children after the programs (99,100).

Anthropometric outcomes used to characterize obesity were modest. One study found that culinary skills education interventions led to significant reductions in diastolic blood pressure and BMI percentage (89). Behavioral changes reported in these intervention programs were also minimal and often contradictory. Several studies examined changes in dietary intake. Some studies found self-reported increases in post-intervention fruit and vegetable intake (91,95,100) and pre-post changes in dietary fiber intake among program participants (89), while three other studies reported no changes in dietary habits among intervention participants (79,92,97). Changes in cooking behaviors were consistently significant across most studies. Many studies found self-reported positive changes in preparation skills (92,102), food safety behaviors (91) and general cooking skills (90,99,100). Studies found significant changes in some behavior change mediators and not others, which may support the modest changes in actual behaviors. Many studies saw significant changes in cooking knowledge (79,90,94,95,102), cooking self-efficacy (79,100), preferences for fruits and vegetables (79,88,96), perceived cooking abilities (90), behavioral intentions (90), and awareness (95,100), while other studies found no significant changes in cooking self-efficacy (90,92), expectancies (90) and attitudes towards cooking (79,90).

Although data on culinary skills education interventions in youth are limited, evidence does exist to support the feasibility of programs and ability to promote positive changes in cooking behaviors, psychosocial mediators and physical outcomes related to

obesity. However, study limitations question the degree to which culinary skills education has been delivered. Ten of the studies reviewed did not employ the use of a control group (75,90,91,93,94,95,97,99,101,102). Therefore, it is difficult to draw overarching conclusions about the significant impact and reach of culinary skills education programs in youth. Another key limitation is the lack of follow-up data that studies report on the changes in obesity-related outcomes over time. Only two studies enlisted a follow-up assessment with participants, neither of which included follow-up data in their results summary. Therefore, it is unclear whether if and for how long behavior changes resulting from culinary skills education persist over time. Furthermore, most studies did not include parents in the culinary skills programs with their children (75,79,88-90,94-98,102). Within the socio-ecological model of childhood obesity, parents play a key role in modifying behavior change mediators in the home environment. Parents are the primary gatekeepers for what food is available in the home and also serve as social models to teach and support cooking skills in the home. Modest behavior changes may thus be associated with failures to transfer positive changes into the home environment.

Beyond the design limitations of these culinary education programs, a big gap related to the effectiveness of culinary education interventions is simply a lack of published data. Many studies describe outcome measures that are either never reported or are summarized in other unpublished manuscripts. Furthermore, a number of intervention studies used as primary references for culinary skills education programs are published abstracts that have not yet been produced into peer-reviewed publications (93,95-98). Therefore, there is a limited understanding of how well culinary skills education

programs in youth have been executed, because studies have not effectively evaluated these education frameworks. These key limitations provide a window of opportunity to improve efforts for modifying obesity-related risk behaviors through culinary skills education interventions.

Importance of Peers in Culinary Skills Education Interventions

Scientific literature demonstrates that food, nutrition and dietetics professionals have the tools for executing culinary skills education interventions in youth. Perhaps, however, future programs need more influential educators to transform behaviors. Interventions summarized in this chapter have used both individual and collaborative approaches to deliver culinary skills education. Many studies assigned a single educator with a specific expertise, such as chefs (95,98), family consumer sciences teachers (100), extension specialists (91) and trained adult educators (90,92,96-98,101,102), to deliver the culinary skills education. On the other hand, other studies employed a team of experts to deliver different aspects of the lessons. These collaborative educator forces have included a range of different individuals including, a nutritionist and chef pair (99), a nutritionist and master gardener pair (89), a team of teachers, parents, and college nutrition students (79), a group of chefs, college students, and teacher volunteers (75) and a team of dietitians, chefs, and supermarket staff (93). The intrinsic difference between these approaches is the use of either one or multiple social role models. Social modeling mediates behavior change, as individuals observe behaviors of others to form beliefs and attitudes about their own (17). Potentially, culinary skills education interventions are minimally effective, because food, nutrition and dietetics professionals underestimate the value of using one of the most influential role models as the educator—the peer.

To date, no published culinary skills education interventions in youth have used same-aged peer educators to deliver programs. Although, some current culinary skills education interventions acknowledge the importance of peers. Liquori et al. (79) posited that food preferences were enhanced through experiences with foods in a positive social affective context. Liquori et al. (79) further suggested that peer interactions in cooking lessons created this positive social environment. Preparing and eating foods with friends may increase youths' familiarity with healthy foods and increase the likelihood of food acceptance and enhanced food preference (79). Cooking in the presence of peers may create a positive learning environment, because youth may enjoy experimenting in the kitchen with friends (98). To create this positive social affective context, several culinary skills education interventions have delivered small group activities for students to interact more closely with their peers (79,89,90,102). Peer educators may serve to create the ultimate positive social environment, as youth are given the opportunity to interact with peers in knowledge acquisition and experimental stages of learning culinary concepts.

Cooking with peers also teaches students how to work together. Lukas and Cunningham-Sabo (96) found that teachers believed that cooking programs encouraged students to treat each other with respect and to hone social skills involved in teamwork. Similarly, Dougherty and Silver (99) reported that skill-building sessions generated camaraderie among students, as they encountered challenges and milestones together. Using peer educators may increase the likelihood that youths will master abstract cooking concepts, as youth grasp ideas in socially acceptable and relatable ways. As a broader socioecological influence, learning how to work together in the kitchen has positive implications for the home environment. Youth may use newly gained team-building skills

to encourage their siblings to work together in meal preparation. Lichtenstein and Ludwig (71) argue that the family meal has become the exception not the rule in many US households. Thus, the fulfillment youth receive from working together to prepare food may be influential in transforming the concept of the family meal.

Peers directly impact intake of nutrient-dense foods by others through development of normative behaviors in cooking classes. Salvy et al. (17) demonstrated that people used eating behaviors of others as an indication of how to eat appropriately. Normative eating behaviors are particularly pertinent to current culinary skills education programs, many of which include food tastings in their curricula (79,92,96,98). Tasting healthy foods becomes ‘the norm’, as youth observe peers trying new foods. Peers also influence healthy consumption through impression management (17), a model that predicts individual behavior based on control of impressions formed by others. Consuming certain types of foods associated with social status may be carried out to convey good impressions among peers (17). As peer educators engage in trying new foods during tastings, youth may be more motivated to try these foods in an attempt to uphold a similar leadership status as that of their peer educators. Foods tasted in these lessons take on greater social meaning, perhaps serving to improve dietary behaviors while also strengthening the social network. Future interventions may be more effective at producing positive behavior changes when youth are empowered to teach culinary skills information to their fellow peers.

A scientifically grounded moral panic has been created, from which food, nutrition and dietetics professionals have been called upon to teach youth how to cook amid the current obesogenic food environment. Existing efforts to promote culinary skills

education programs have been promising, yet goals of childhood obesity prevention rely on continued, innovative and informed efforts. Evidence connecting culinary skills education interventions to childhood obesity prevention is needed. A grand opportunity exists to improve culinary skills education programs. Training motivated youth to serve as peer educators is one approach. Peer education is a bold method to culinary skills education, because it places the responsibility of teaching basic cooking skills in the hands of youth who have less experience than any other generation at selecting and preparing healthy foods and meals. Peer-led culinary skills education may be an effective strategy for answering the call to build a scientific argument for culinary skills education, as youth educators may be the most socially relevant agents for change. Peer-led culinary skills education programs may provide evidence for understanding the relationship between culinary applications and changes in dietary behaviors. Peer-led culinary skills education programs may have the longest-lasting impact on behavior change, because such programs may more optimally cater to the adolescent need for health-related information from socially relevant peers compared to adults. Culinary skills education may be most effective when the learning starts with youths and spreads throughout the social network.

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Figure 2-1. Summary of the systematic search and review process for peer nutrition education programs in childhood and adolescence.

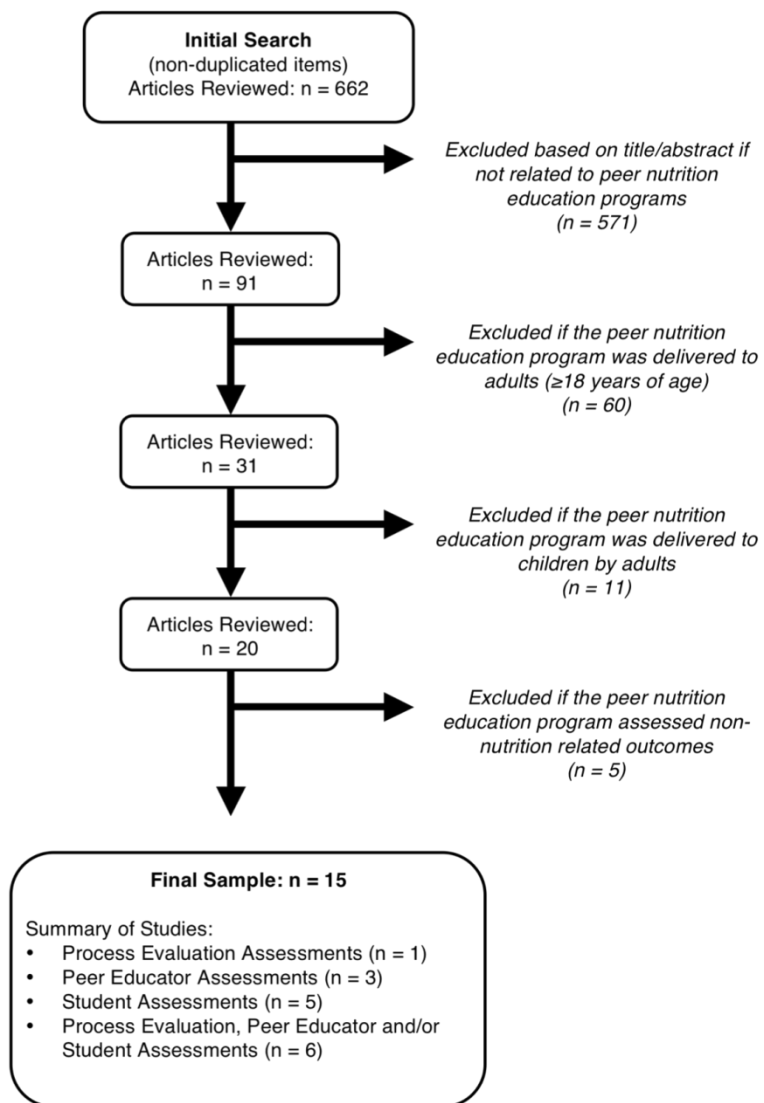


Table 2-1. Summary of study characteristics, outcome measures and results.

	Stock et al., 2007 (27)	Perry et al., 1987 (28)
Participants (n)	Students Intervention: K-3rd grade male/female students (100) Control: K-3rd grade male/female students (61)	Students Intervention: 9th grade male/female students (173) Control: 9th grade male/female students (97)
	Peer Educators Intervention: 4th-7th grade male/female students (128) Control: 4th-7th grade male/female students (71)❖	Peer Educators Intervention: 9th grade male/female students (29-35)◆
Study Design (duration) + Program Description	Pre-post, intervention/control (21 weeks, 2-3 hours/week)	Pre-post, intervention/control (10 sessions)
	Healthy Buddies Program: <ul style="list-style-type: none"> Peer educators taught younger students about 3 components of healthy living (PA[§], eating and body image) and the challenges to living a healthy life Peer educators gave buddies a 30-min. lesson/week Buddy pairs spent 30-min. in PA twice a week Students in control schools received no nutrition curriculum 	Slice of Life Program: <ul style="list-style-type: none"> Students watched healthy lifestyle videos, analyzed eating and PA habits, prepared healthy snacks and engaged in PA Students watched peer-led trigger tapes to learn how to avoid social pressures to eat unhealthy Students interviewed fellow students, teachers and food providers to identify environmental influences on healthy living Students in control schools received no nutrition curriculum
Outcome Measures + Measurement Tools	1. Anthropometrics: height (cm), weight (kg), BP [¶] (mm Hg) and heart rate (beats/min) <ul style="list-style-type: none"> Portable Stadiometer (height/weight) Dinamap Pro300 (BP/heart rate) 2. Health knowledge, behaviors and attitudes <ul style="list-style-type: none"> Healthy Living Questionnaire 3. Healthy body image, self-esteem and social responsibility <ul style="list-style-type: none"> Figural Rating Scale (body image) Harter Self-Competence Scales (self-esteem) Children's Eating Attitude Test (social responsibility) <ul style="list-style-type: none"> All outcome measures for students and peer educators 	1. Self-reported behavior, knowledge, intentions and skills related to heart-healthy eating <ul style="list-style-type: none"> 16-page survey 2. Process evaluation: student and peer educator perceptions of the peer-led intervention <ul style="list-style-type: none"> Three sets of questionnaires <ul style="list-style-type: none"> 1. Outcome measures for students 2. Outcome measures for students and peer educators
	Student Results	<ul style="list-style-type: none"> PE[§] group had significantly greater increases in height and significantly lower increases in BP PE group had no significant improvements in BMI or weight PE group had significant increases in health attitudes and knowledge PE group had no significant improvements in body image, self-esteem and social responsibility PE students were compared to control students who received no nutrition curriculum
Peer Educator + Process Evaluation Results	Peer Educator: <ul style="list-style-type: none"> Peer educators had smaller increases in BMI and body weight Peer educators had no significant increases in health attitudes, behaviors and knowledge Peer educators had no significant improvements in body image, self-esteem and social responsibility Peer educators had no significant improvements in BP Peer educators were compared to control students who were not peer leaders 	Process Evaluation: <ul style="list-style-type: none"> Girls enjoyed being a part of the PE group significantly more than the boys Girls changed their eating habits during the program significantly more than boys Girls liked having the University staff the program more than boys There was no difference observed between the scores boys and girls gave for having peer leaders teach the program There was no difference observed between the percentage of boys and girls who agreed that the peer election was fair Students reported that their peer leaders were adequately trained and that they would have elected the same peer leaders Girls believed the peer educators were more skilled than the boys did

■ Sample size data unavailable.

❖ 4-7th graders in control school did not participate as peer leaders.

◆ Data unavailable. The (n) is estimated based on investigator information.

§ Studies used same peer-led program with different outcomes.

¶ PA = physical activity; [§]FV = fruits and vegetables; [¶]LF = low-fat.

¶ BP = blood pressure; [§]PE = peer-led intervention

Table 2-1. Summary of study characteristics, outcome measures and results.
(continued)

	Foster et al., 1985 (29)	Agron et al., 2002 (30)
Participants (n)	Students Intervention: 2nd-5th grade male/female students (48) Control: 2nd-5th grade male/female students (41)	Students Intervention: 9th-12th grade male/female students ■
	Peer Educators Intervention: 2nd-5th grade male/female students (48) Control: 2nd-5th grade male/female students (41)	Peer Educators Intervention: 9th-12th grade male/female students (220)
Study Design (duration) + Program Description	Pre-post-follow-up, intervention/control (12 weeks, 3 sessions/week + 18-week follow-up)	Pre-post, intervention/no control (9-month school year)
	<ul style="list-style-type: none"> Peer counselors met with students 3 times a week before school for 15 min. to review behavioral techniques related to record keeping, stimulus control, eating speed, lifestyle activities and attitude change Peer counselors checked lunches, weighed children and gave rewards for healthy eating and weight losses Students attended one 15 min. exercise class per week Students in control schools received no nutrition curriculum 	FOR program: <ul style="list-style-type: none"> Peer advocates implemented 5 to 7 school-based and community activities that involved increasing awareness of healthy options in the cafeteria, instituting school-wide taste tests and diving lunch demonstrations
Outcome Measures + Measurement Tools	<ol style="list-style-type: none"> Anthropometrics: height (cm), weight (kg), and percentage overweight (%) Self-concept Number of "red" (non-nutritious/high-calorie) and "green" (nutritious/low-calorie) choices <ul style="list-style-type: none"> Measurement tools were not specified All outcome measures for students 	<ol style="list-style-type: none"> Knowledge, attitudes, and behaviors related to nutrition <ul style="list-style-type: none"> 42-item, close-ended questionnaire Program implementation <ul style="list-style-type: none"> Survey measuring number of lessons taught, time and number of weeks spent per lesson, number of weeks spent on training, time spent on the program per week and number of hours spent outside of training <ul style="list-style-type: none"> 1. Outcome measures for students 2. Outcome measures for FOR staff
Student Results	<ul style="list-style-type: none"> PE^o students lost significantly more weight and showed a significant decrease in their percentage overweight at the post-intervention time point PE students gained significantly more weight at the 18-week follow-up PE students showed a significant reduction in their percentage overweight at the 18-week follow-up PE students showed a significantly greater improvement in self-concept at post-intervention and 18-week follow-up time points PE students had a significant increase in fruit use at post-intervention and 18-week time points PE students had a significant decrease in the use of non-nutritious foods at the post-intervention time point PE students were compared to control students who received no nutrition curriculum 	
Peer Educator + Process Evaluation Results		Peer Educator: <ul style="list-style-type: none"> Peer advocates showed a significant increase in knowledge and positive attitudes related to nutrition Peer advocates showed a significant increase in healthy eating behaviors
		Process Evaluation: <ul style="list-style-type: none"> An average of 6 lessons were taught The total time spent on lessons was 55.25 min. Peer advocate training lasted 9 weeks The total time spent on activities outside of training was 20 hours

■ Sample size data unavailable.

◇ 4-7th graders in control school did not participate as peer leaders.

◆ Data unavailable. The (n) is estimated based on investigator information.

*Studies used same peer-led program with different outcomes.

^aPA = physical activity; ^bFV = fruits and vegetables; ^cL = low-fat;

^dBP = blood pressure; ^ePE = peer-led intervention

Table 2-1. Summary of study characteristics, outcome measures and results.
(continued)

	Forneris et al., 2010 (31)	Birnbaum et al., 2002 (32)*
Participants (n)	Students	Students
	Intervention: 6th grade male/female students (663) Control: 6th grade male/female students ■	Intervention: 7th grade male/female students (677) Control: 7th grade male/female students (1,755)
	Peer Educators	Peer Educators
	Intervention: 9th-12th grade male/female students (144)	Intervention: 7th grade male/female students (226)
Study Design (duration) + Program Description	Pre-post-follow-up, intervention/control (12 week, 1/week + 1-year and 2-year follow-up)	Pre-post, intervention/control (10 sessions)
	GFH program: <ul style="list-style-type: none"> Peer educators gave goal-setting lessons to students on a weekly basis involving tasting healthy snacks, thinking about healthy futures and learning about increasing fiber and reducing fat intake Students in control schools received no nutrition curriculum 	TEENS program: <ul style="list-style-type: none"> Peer educators helped teachers deliver classroom sessions that involved watching nutrition videos, tasting and preparing FV/LF snacks and identifying LF foods Students in the control group were exposed to an environment intervention that consisted of tasting FV/LF foods and experiencing increased exposure to healthy snacks in à la carte lines and vending machines
Outcome Measures + Measurement Tools	<ol style="list-style-type: none"> Self-efficacy to eat healthy <ul style="list-style-type: none"> Two self-efficacy items (self efficacy for eating LF[‡] foods and for eating more FV[§]) Perceived taste of LF foods <ul style="list-style-type: none"> Two perceived taste items Fat and fiber knowledge <ul style="list-style-type: none"> 14-item knowledge test Fat, fiber, and FV intake <ul style="list-style-type: none"> 35-item food frequency questionnaire (FFQ) Quality of program implementation <ul style="list-style-type: none"> Assessed by student/leader ratio, student accessibility, number of groups in each class, length of the workshops, disruptions of the schedule and personnel support <ul style="list-style-type: none"> 1-4. Outcome measures for students 5. Outcome measures for GFH staff 	<ol style="list-style-type: none"> Usual FV intake <ul style="list-style-type: none"> Behavioral Risk Factor Surveillance System Usual food choices <ul style="list-style-type: none"> Scale presenting students with nine pairs of foods asking them to identify which they would choose to eat Psychosocial mediators of behavior change: outcome expectations, valuation, barriers to healthy eating, subjective norms, intentions and current behaviors <ul style="list-style-type: none"> 35-items based on the Theory of Planned Behavior <ul style="list-style-type: none"> All outcome measures for peer educators
	Student Results	<ul style="list-style-type: none"> PE[¶] students had a significant increase in their self-efficacy to eat healthy at post-intervention and 2-year follow-up time points PE students had no significant increases in their taste perceptions of LF foods PE students had significantly greater fat and fiber knowledge at post-intervention and 1-year follow-up time points PE students had no significant increase in fat and fiber knowledge at the 2-year follow-up PE students had no significant differences in fat or fiber FFQ scores post-intervention PE students had no significant increases FV intake <ul style="list-style-type: none"> PE students were compared to school students received no nutrition curriculum
Peer Educator + Process Evaluation Results	Process Evaluation:	Peer Educator:
	<ul style="list-style-type: none"> Fat and fiber knowledge significantly increased after the intervention for PE students in both the medium and high implementation schools Fat and fiber knowledge significantly decreased 2-years after the intervention for students in the low implementation schools 	<ul style="list-style-type: none"> Peer leaders showed a significant increase in FV consumption Peer leaders reported a half-serving increase in fruits and a 0.4-serving increase in vegetables Peer leaders showed a significant increase in their tendency to choose LF foods There were no significant differences in psychosocial mediators

■ Sample size data unavailable.

◇ 4-7th graders in control school did not participate as peer leaders.

◆ Data unavailable. The (n) is estimated based on investigator information.

*Studies used same peer-led program with different outcomes.

[§]PA = physical activity; [§]FV = fruits and vegetables; [‡]LF = low-fat;

[¶]BP = blood pressure; [¶]PE = peer-led intervention

Table 2-1. Summary of study characteristics, outcome measures and results.
(continued)

	Hamdan et al., 2005 (33)	Cohen et al., 1989 (34)
Participants (n)	Students	Students
	Intervention: 9th-12th grade male/female students [■]	Intervention: 5th grade male/female students (233)
Study Design (duration) + Program Description	Peer Educators	Peer Educators
	Intervention: 9th-12th grade male/female students (397) Post-survey, intervention/no control (duration not reported)	Intervention: 9th-12th grade male/female students (76) Pre-post, intervention/no control (four 45-minute sessions)
Outcome Measures + Measurement Tools	TACOS program: • Peer leaders involved in planning, implementing and evaluating school-wide promotional activities to increase awareness and purchase of LF [†] snacks in á la carte and vending machines	• Peer leaders taught a nutrition curriculum aimed at increasing ability to choose a LF/low-salt diet • Students were given practice choosing LF/low-salt foods for lunch, selecting healthy meals from fast food venues, reading labels, defending their food preferences for healthy foods and pledging to change eating habits
Student Results	1. Perceptions of eating behaviors, attitudes, and social norms related to LF foods • Survey 2. Perceived benefits and experiences gained from being involved in the TACOS program • Survey • All outcome measures for peer educators	1. Behavioral capabilities/knowledge of skills • Survey • 1. Outcome measures for students
Peer Educator + Process Evaluation Results	Peer Educator: • A high percentage of peer leaders reported that the intervention helped them recognize LF foods • A high percentage of peer leaders reported that the intervention increased student awareness of LF foods • A high percentage of peer leaders perceived that more students purchased and ate LF foods • Highly involved students were significantly more likely than less involved students to report that the intervention changed the way they choose foods, gave them the chance to try LF foods and FV [‡] , encouraged them to eat more FV, improved their attitudes toward LF foods and helped them gain new skills • A high percentage of peer leaders perceived that student involvement in promotional activities benefited the TACOS program	• Students in the PE [§] group significantly increased their behavioral capabilities related to choosing a LF/low-salt diet • PE students were compared to control school students who received no nutrition curriculum

[■] Sample size data unavailable.

[◆] 4-7th graders in control school did not participate as peer leaders.

[♦] Data unavailable. The (n) is estimated based on investigator information.

^{*} Studies used same peer-led program with different outcomes.

[†] PA = physical activity; [‡] FV = fruits and vegetables; [†] LF = low-fat;

[§] PE = peer-lead intervention

Table 2-1. Summary of study characteristics, outcome measures and results.
(continued)

	Story et al., 2002 (35)*	Jones et al., 2011 (36)
Participants (n)	Peer Educators	Students
	Intervention: 9th-12th grade male/female students (226)	Intervention School 1: 4th-5th grade male/female students (22) Intervention School 2: 4th-5th grade male/female students (33) Control: 4th-5th grade male/female students (49) Peer Educators Intervention School 1: 4th grade male/female students (9) Intervention School 2: 4th grade male/female students (9)
Study Design (duration) + Program Description	Post-survey, intervention/no control (10 sessions) • Same TEENS program as Birnbaum et al.	Pre-post, intervention/control (twelve 1-hour sessions) Youth Can! program: • Peer leaders co-taught 12 nutrition and PA ^a education lessons from the Coordinated Approach to Child Health (CATCH) with adult teachers • Lessons focused on improving self-efficacy related to healthy food choices and PA and goal setting related to improving dietary behaviors
Outcome Measures + Measurement Tools	1. Process evaluation Measures: a. Peer leader training: Peer leader attendance at training sessions b. Peer leader feedback: Evaluation form containing 16 attitudinal and behavioral statements assessing perceptions of being a peer leader c. Student feedback: Evaluation form assessing student perceptions of the TEENS program and helpfulness of the peer leaders d. Classroom observations: Direct observation of classroom sessions using a 24-item instrument e. Teacher ratings: Checklist form asking what activities were taught and how well peer leaders performed specific activities f. Teacher interviews: Interviews assessing teachers perceptions of the curriculum, effectiveness of peer leaders and responsiveness of the students • 1a-b. Outcome measures for peer educators • 1c. Outcome measures for students • 1d. Outcome measures for TEENS staff • 1e-f. Outcome measures for teachers	1. Dietary intake of nutrients and food • 24-hour dietary recall 2. Perception of food environment • 15-item survey 3. Self-efficacy related to food selection • 21-item survey 4. Perceived benefits • 7-item survey 5. Social desirability • 5-item Hays short form
Student Results		• Students in the School 1 PE ^a group showed a significant half-serving increase in their fruit servings • Students in the School 1 PE ^a group had no significant improvements in energy intake, fat intake, low-fat milk servings or vegetable servings • Students in the School 2 PE ^a group self-reported significant reductions in energy intake, fat intake, fruit servings and vegetable servings • Students in the School 2 PE ^a group had no significant improvements in low-fat milk servings • PE students were compared to control school students who received the same 12 nutrition educations taught by adult educators
Peer Educator + Process Evaluation Results	Process Evaluation: • Almost 90% of peer leaders reported that they enjoyed being a peer leader • 63% of peer leaders said that their friends thought it was cool to be a peer leader • 77% of peer leaders said that they would recommend being a peer leader to their friends • 80% of peer leaders said they would like to be peer leaders again • 18% of peer leaders wished that they had not been peer leaders • 85% of peer leaders thought they had learned more about healthy eating by being a peer leader and 64% thought they ate more healthy • 94% of peer leaders led the session activities and 78% kept their group on task • Peer leaders did their tasks 71% of the time • Teachers reported that most peer leaders conducted the activities as trained • More than one-third of teachers reported that peer leaders had done their assigned tasks well • 93% of teachers said the peer leaders were useful or very useful	

■ Sample size data unavailable.

◆ 4-7th graders in control school did not participate as peer leaders.

♦ Data unavailable. The (n) is estimated based on investigator information.

*Studies used same peer-led program with different outcomes.

^aPA = physical activity; ^bFV = fruits and vegetables; ^cLF = low-fat;

^bBP = blood pressure; ^aPE = peer-led intervention

Table 2-1. Summary of study characteristics, outcome measures and results.
(continued)

	Bogart et al., 2011 (37)	Wilson et al., 2011 (38)
Participants (n)	Students Intervention: 7th grade male/female students (425) Control: 7th grade male/female students ■	Students Intervention: 7th grade male/female students (576) Control: 7th grade male/female students (543)
	Peer Educators Intervention: 7th grade male/female students (140)	Peer Educators Intervention: High school students ■
Study Design (duration) + Program Description	Pre-post, intervention/control (5 weeks, 1/week)	Pre-post-follow-up, intervention/control (eight 1-hour sessions, 1-year follow-up)
	SNaX program: • Peer leaders participated in 5-week club for 1 week to learn how to distribute healthy foods in the cafeteria and bookmarks with health promotion messages • Peer leaders learned how to promote messages related to beverages, FV ² and the benefits of cafeteria food	LIFT+ program: • Peer leaders delivered workshops related to tobacco prevention and the benefits of eating FV • Most workshops included a parent component where students were asked to complete an activity with their parents
Outcome Measures + Measurement Tools	1. Cafeteria attitudes • 7-item survey 2. Beverage consumption • Survey 3. Peer advocacy reach • Survey 4. Cafeteria patterns (daily percentages of students who selected fruits and healthier foods) • Cafeteria records	1. FV intake • Single question asking how many daily FV are eaten 2. Knowledge of FV intake • Single question asking how many daily FV servings are recommended 3. Interest in following FV recommendations • 5-point Likert Scale 5. Confidence in following FV recommendations • 5-point Likert Scale 6. Closeness to parents • 5-item scale 7. Parents' opinions on the importance of following FV recommendations • 5-point Likert Scale 8. Family and friends' 5-a-day FV recommendation • Summated number of parents/friends consuming at least five servings of FV per day
	Student Results	(Student results were analyzed with PE ² results)
Peer Educator + Process Evaluation Results	Peer Educator + Intervention Students: • Students and PE ² had significant changes in their attitudes towards the cafeteria • Students and PE ² significantly reduced their intake of sports and fruit drinks • Students and PE ² significantly increased their servings of fruits • Significantly more students and PE ² were served a healthy meal in the cafeteria • PE and students were compared to control school students who did not participate in the SNaX program	<ul style="list-style-type: none"> Students in the PE group reported eating significantly more daily FV servings at post-test and 1-year follow-up time points Students in the PE group reported eating significantly more fruit servings at the post-test time point only Students in the PE group reported eating significantly more vegetable servings at the post-test time point only White students in the PE group reported eating significantly more vegetable servings at the post-test and 1-year follow-up time points A significantly higher percentage of students in the PE group correctly identified daily FV recommendations at the post-test time point only Students in the PE group did not report being greater interest or confidence in following daily FV recommendations at both post-test and 1-year follow-up time points Students in the PE group were significantly more likely to feel confident following daily FV recommendations when their parents and friends ate at least 5 daily FV servings Family and friends did not significantly impact outcomes for students in the PE group <p>• PE students were compared to control school students who received the LIFT+ program delivered by adult educators</p>
	Process Evaluation: • 96% of PE talked to at least one person about healthy eating • 50% of PE talked to a wide range of people including friends, other students, parents, other family members, teachers and other individuals	

■ Sample size data unavailable.

◇ 4-7th graders in control school did not participate as peer leaders.

◆ Data unavailable. The (n) is estimated based on investigator information.

*Studies used same peer-led program with different outcomes.

^aPA = physical activity; ^bFV = fruits and vegetables; ^cLF = low-fat;

^dBP = blood pressure; ^ePE = peer-led intervention

*Studies used same peer-led program with different outcomes.

^aPA = physical activity; ^bFV = fruits and vegetables; ^cLF = low-fat;

^dBP = blood pressure; ^ePE = peer-led intervention

	Bergmann et al., 2010 (41)
Participants (n)	Students Intervention: Kindergarten-6th grade male/female students (800)
	Peer Educators Intervention: High school students (40)
Study Design (duration) + Program Description	Post-questionnaire, intervention/no control (Three 20-minute performances)
	<ul style="list-style-type: none"> Peer educators from a performing arts group designed and delivered a nutrition education performance at three different elementary schools Peer educators taught students about eating FV² intake and physical activity with acting, songs, dancing, FV costumes and cartoon animations and making healthy lifestyle choices
Outcome Measures + Measurement Tools	1. Program enjoyment • Close-ended questions 2. Intention to change eating behaviors • Close-ended questions
	<ul style="list-style-type: none"> Approximately 66% of students reported that they planned on making changes, 20% of students said they might make a change and 13% did not plan on making changes Cutting back on junk food and eating more healthy foods such as FV were the most common changes students planned on making to their eating behaviors
Peer Educator + Process Evaluation Results	Process Evaluation: • More than 73% of students really liked the performances, 24% of students sort of liked the performances and 3% of the students did not like the performances

■ Sample size data unavailable.

◇ 4-7th graders in control school did not participate as peer leaders.

◆ Data unavailable. The (n) is estimated based on investigator information.

*Studies used same peer-led program with different outcomes.

^aPA = physical activity; ^bFV = fruits and vegetables; ^cLF = low-fat;

^dBP = blood pressure; ^ePE = peer-led intervention

Figure 2-2. Summary of considerations for implementing peer nutrition education interventions.

Planning Alternatives for Peer Educators

1. Targeting Peer Educators:

- a. Age match peer educators and participants
- b. Choose older students to teach younger participants
- c. Recruit a group of peer educators from various age groups to teach participants of various age groups

2. Selecting Peer Educators:

- a. Use classroom elections to select peer educators
- b. Allow students to volunteer for peer educator positions
- c. Ask faculty, staff, or school administrators to select students who have the potential to be good peer leaders

3. Training Peer Educators:

- a. Pre-intervention training sessions ranging from a minimum of 1-4 days to a maximum of 9 weeks
- b. Training weekly throughout the intervention
- c. Pre-intervention training and weekly refresher training

4. Outlining Peer Educator Responsibilities:

- a. Give peer educators structured lesson plans with the intervention curriculum outlined in a peer educator manual
- b. Ask peer educators to aid teachers in small discussions, activities, or demonstrations
- c. Provide a framework for peer educators to design, plan and implement their own intervention activities

Figure 2-3. Summary of considerations for evaluating peer nutrition education interventions.

<u>Potential Outcome Measures</u>
1. Student Participant/Peer Educator Outcomes:
a. Physical assessments (body mass index, body weight, heart rate, waist circumference and blood pressure)
b. Dietary intake (fruits, vegetables, fat, fiber, and sugar-sweetened beverages)
c. Behavioral change mediators (self-efficacy, knowledge, attitudes, intentions, skills, awareness, perceptions, social norms and social support)
2. Process Evaluation Outcomes:
a. Peer educator perceptions of their leader skills, the leader experience and the impact of the educator position on their eating and physical activity patterns
b. Student evaluations of helpfulness of peer educators, intervention efficacy and fairness of peer election procedures
c. Teaching ratings of peer educator execution and usefulness of the peer educator
d. Trained evaluator observations of peer educators competence in the classroom with a standardized instrument
e. Dosage and Implementation quality measuring student/leader ratio, accessibility to students, number of groups in each classroom, length of workshops and disruptions of the curriculum schedule and personnel support
f. Reach of peer educator activities in schools

Figure 2-4. Gaps in knowledge related to the impact of culinary skills education on childhood obesity prevention.

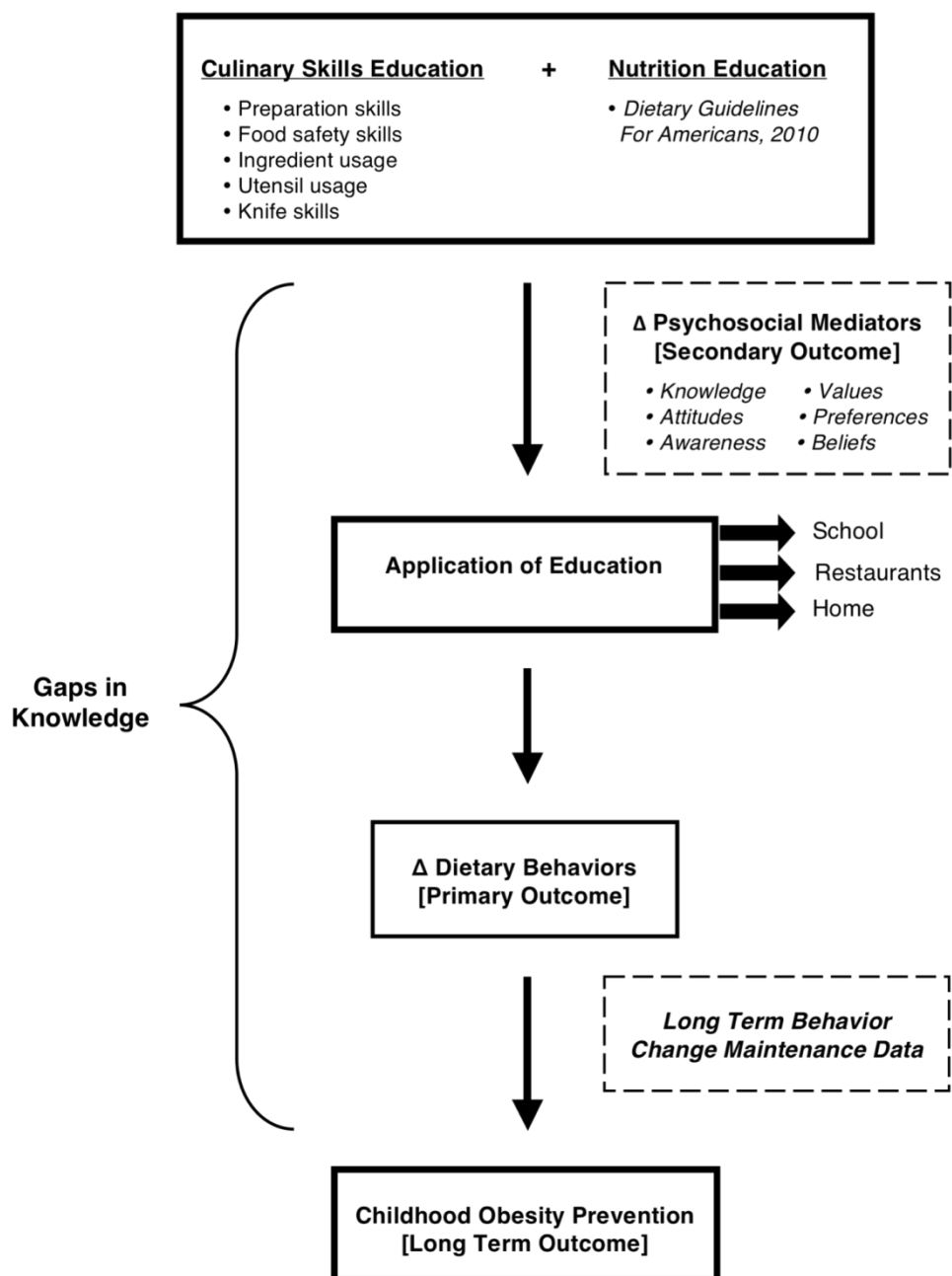
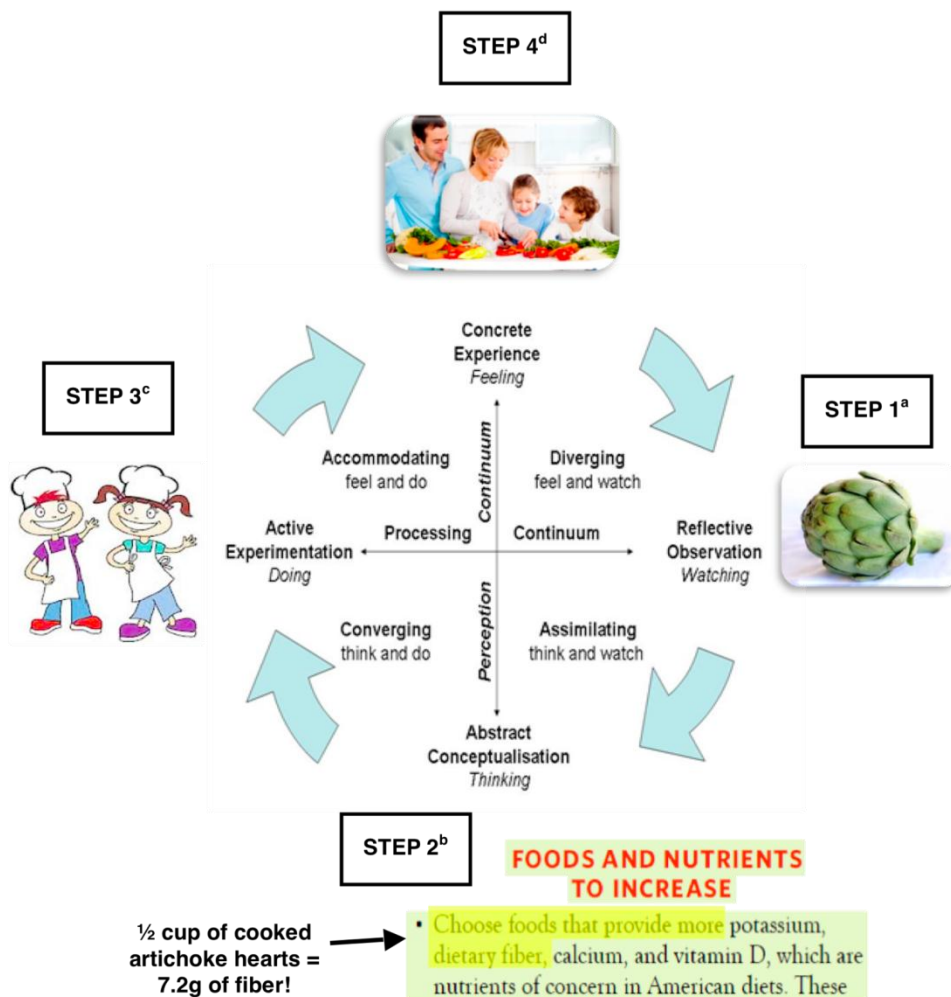


Figure 2-5. Model of culinary skills education as a process for Kolb's cycle of experiential learning.



Note. Kolb's Learning Cycle image retrieved from: <http://www.nwlink.com/~donclark/hrd/styles/kolb.html>

^aImage for Step 1 retrieved from: <http://www.simplyrecipes.com>

^bImage for Step 2 retrieved from: <http://www.cnpp.usda.gov/Publications/DietaryGuidelines/2010/PolicyDoc/PolicyDoc.pdf>

^cImage for Step 3 retrieved from: <http://www.kcmetromoms.com>

^dImage for Step 4 retrieved from: <http://www.mynewplace.com>

CHAPTER 3

**DEVELOPMENT AND EVALUATION OF A FAMILY MENU PLANNING
LESSON FOR EARLY ADOLESCENT CHILDREN**

To be submitted to the *Journal of Nutrition Education and Behavior*

ABSTRACT

Background Increasing family menu planning skills may promote positive dietary changes and thus reduce the risk of obesity in childhood and adolescence.

Objective The first objective of this pilot study was to examine the feasibility of delivering a 2-hour *Family Menu Planning* lesson to early adolescent youth. The second objective was to evaluate the effectiveness of the lesson at positively impacting mediators of behavior change, including self-reported self-efficacy, social support and outcome expectations.

Description A 2-hour interactive educational session, developed for 11-14 year-olds, was pilot tested with eight females. The five objectives of the lesson included: (1) using dietary recommendations to plan family meals; (2) creating weekly family meal schedules; (3) planning healthy meals away-from-home; (4) planning quick healthy meals, and (5) building cost-effective healthy shopping lists.

Evaluation Content validity of the lesson was completed. Process evaluation tools were used to assess feasibility of the lesson. Focus groups were also conducted following the pilot test for formative evaluation and assessment of self-reported mediators of behavior change.

Data analyses Comments and ratings from content experts were reviewed for common themes. Demographic data collected from the pilot study were analyzed for descriptive statistics. Audiotapes and field notes from the focus group were transcribed verbatim and identified for recurring trends.

Results The *Family Menu Planning* lesson was internally valid. It was feasible to deliver this lesson to a group of young adolescent females in an after-school setting. Participants

were highly satisfied with the lesson, and self-efficacy, social support and outcome expectations related to family menu planning were self-rated as high by these adolescents, after participating in the lesson.

Conclusions The *Family Menu Planning* lesson positively impacted mediators of behavior change in early adolescent youth. Increasing skills and knowledge related to planning family meals may be effectively performed in a 2-hour session.

INTRODUCTION

The frequency of family meals has declined over time (1-3). Some argue that the family dinner is becoming “the exception rather than the rule” (4, p. 1857). Significantly, children and adolescents are consuming more than one-third of their total calories from meals and snacks prepared away from the home (4). Many believe that a decline in family meals contributes to the childhood obesity epidemic, because frequency of family meals has been associated with dietary quality among youth (1,2,5). Studies with youth have shown that eating frequent family meals is associated with greater intake of healthy foods and nutrients (1-3,5,6), more positive dietary attitudes and less unhealthy eating behaviors (7,8). Adolescent participation in family meals has been associated with greater intake of grains, fruits and vegetables and lower intakes of fried foods and soft drinks (9). Furthermore, family meal participation has been associated with greater self-reported intake of vitamins A, C, E, B6, and folate, calcium and iron (7). Given the health implications of this decline in family meals, it is important to understand what factors contribute to this trend.

Eto et al. (10) determined that the perceived difficulty of making time for family meals was associated with lower frequency of dinner and breakfast meals in a group of fifth through seventh grade youth. The researchers concluded that planning family meals may be an effective strategy for decreasing time constraint barriers and thus increasing the frequency of family meals (10). In support of this point, others argue that meal planning is critical to scheduling regular family meals (11-13). Importantly, meal planning contributes to the overall continuity of family meal rituals (11-13). These stable

eating environments have been shown to improve overall child well-being and provide a structured home environment that supports health behavior change (14).

Planning skills are included in the broader category of culinary skills as preliminary food and meal preparation tasks that require thinking through the process of food selection and preparation. A key component of this process is making a budgeted shopping list, based on meals scheduled for an amount of time (15). Planning skills also occur in advance of grocery shopping to determine the types of foods that are already available in the home and to determine the foods and ingredients that need to be purchased to prepare meals that meet dietary preferences and health needs of household members (15). Planning skills require critical thinking, mental flexibility and creativity when applied to developing nutritious and pleasing family meals in the context of a household budget. Combining general nutrition knowledge with analytical skills may be essential to promoting healthy eating behaviors in the home environment (16).

Within socioecological models of childhood obesity (17,18), family menu planning skills are an individual-level factor that may interact with environmental variables in the home to promote dietary behavior changes. Behavior changes are supported in these frameworks by models, such as the Social Cognitive Theory (SCT), which dictate that behavior change is mediated by the reciprocal interaction of personal and environmental variables (19). An increase in family menu planning skills, due to improvements in self-efficacy, outcome expectations and attitudes related to planning, may increase the availability of healthy foods in the home environment as youth are empowered to purchase healthy foods to incorporate into weekly meals. Thus, improving personal variables related to family meal planning may be a strategic target for childhood

obesity interventions. Although, there is a gap in knowledge related to how family menu planning skills and knowledge impact mediators of behavior change.

Limited studies have assessed the effectiveness of delivering a family menu planning education lesson to promote obesity-related behavior change in youth (20-22). Two studies assessed changes in dietary intake (21,22), whereas another study examined self-reported changes in knowledge and self-efficacy related to meal planning (20). No other studies have explored the impact of family menu planning education on behavior change mediators. The purpose of the current study was to develop and evaluate the effectiveness of a family menu planning lesson, grounded in the SCT, at impacting individual-level behavior change mediators in early adolescent children. It was hypothesized that the *Family Menu Planning* lesson would be internally valid. Moreover, it was hypothesized that it would be feasible to deliver a 2-hour family menu planning lesson to early adolescents in an after-school setting. It was expected that the *Family Menu Planning* lesson would positively impact self-efficacy, social support and outcome expectations related to family menu planning.

METHODS

Program Development

Lesson Objectives

The *Family Menu Planning* lesson is a 2-hour lesson designed for sixth and seventh grade students (ages 11 to 14 years). The lesson objectives were developed based on a literature review of culinary nutrition education programs that included a family menu planning component. An initial review resulted in a total of 18 publications related to culinary nutrition education programs for youth (ages 2 to 19 years) (15,20-36). Only

four studies were further reviewed as they included a family menu planning objective in their culinary program (15,20-22). Fordyce-Voorham (15) interviewed 51 nutrition experts to identify essential food tasks for skill-based healthful eating programs in secondary schools. Results revealed that learning how to schedule meals for the week and create cost-effective grocery shopping lists were critical to learning how to plan family meals. Furthermore, family meal planning based on food groups or dietary guidelines emerged as an important aspect of meal planning skills. In support of this point, Dougherty and Silver (20) combined the expertise of a chef and nutritionist team to design a 5-session culinary nutrition program for 8- to 12-year-old youth that included a lesson on planning for incorporation of all food groups into recipes. Students in the Culinary Foundation Program were also given a 15-minute nutrition lesson on the MyPyramid guidelines to serve as the basis for understanding how to plan meals with food group recommendations (20).

In the Squire's Quest! Program, Cullen et al. (21) introduced the concept of planning with dietary recommendations as fruit and vegetable goal-setting. The 10-session cooking program instructed children in Kindergarten through sixth grade how to select goals to prepare fruit and vegetable recipes at home and away from the home. Students were taught how to plan a shopping list to meet their recipe preparation goals at home and were given fast food selection tips for meeting goals in places away from the home. Finally, Fulkerson et al. (22) tested the effectiveness of the Healthy Home Offerings via the Mealtime Environment (HOME) program for increasing the quality of foods at family meals. The 3-month program included sessions for children and parents

on how to overcome time barriers to preparing family meals by planning quick healthy meals.

Based on this limited body of literature, the following five lesson objectives emerged as being fundamental to instructing youth how to plan family meals:

1. Use dietary recommendations to plan family meals (15,20,21);
2. Create weekly family meal schedules (15);
3. Plan healthy meals away-from-home (21);
4. Plan quick healthy meals (22), and
5. Build cost-effective healthy shopping lists (15,21).

Learning Objectives, Discussions, Activities and Handouts

Nutrition materials and circulars related to family meal planning were reviewed from seven cooperative extension programs (37-46) to gain insight into how to accomplish the five overall lesson objectives. Common concepts were identified among the program materials and summarized in Table 3-1 to inform the development of learning objectives and program materials for the *Family Menu Planning* lesson.

Discussion 1: Menu Planning With MyPlate (20 minutes) was developed to achieve the first lesson objective. This discussion instructs young adolescents on how to plan healthy plates for every meal with the USDA MyPlate principles for each good food group. The first learning objective is that individuals should be able to explain the following four principles for building healthy meals: (1) Make half of plates fruits and vegetables; (2) Make at least half of grains whole grains; (3) Vary protein food choices, and (4) Choose fat-free or low-fat milk and milk products. The second learning objective is that early adolescents should be able to identify healthy choices among each food group that follow

the USDA MyPlate principles. To accomplish this learning objective, individuals are given a *MyPlate Principles* handout that outlines strategies for choosing foods to meet the principles for building a healthy plate. *Activity 1: Build Your Plate* (15 minutes) is distributed following the discussion to further aid youth in naming healthy food choices in each food group by asking them to use markers to draw healthy foods from each food group on paper plates for a breakfast, lunch and dinner meal.

Discussion 2: Family Menu Planning (30 minutes) encompasses three main sections to address the second, third and fourth lesson objectives, respectively. In the first section, early adolescents learn how to create family meal schedules. The *Family Schedules Handout* accompanies this discussion by providing an example of a completed family meal schedule. At the end of this first discussion section, individuals should be able to write out weekly family activities and identify days of the week that are free for preparing meals together as a family. *Activity 2: Write Your Family Schedule* (10 minutes) facilitates the mastery of these learning objectives by asking early adolescents to practice writing a weekly meal schedule for their families.

The second session discusses strategies for working together with family to plan quick healthy meals. The first learning objective is that early adolescents should be able to identify family meal tasks outlined in the *Family Food Tasks Handout*. Individuals should also be able to describe the following three quick cooking tips detailed on the *Quick Cooking Tips* handout: (1) Build healthy plates with leftovers; (2) Cook with healthier versions of convenience foods, and (3) Make double portions of meals. The third section of this discussion instructs early adolescents how to plan to eat healthy away from the home. At this end of this discussion, individuals should be able to explain the

following five eating away from the home tips outlined in the *Healthy Eating Outside The Home Handout*: (1) Ask for nutrition facts and ingredient information; (2) Order water or fat-free/low milk to drink instead of sugar-sweetened beverages; (3) Ask for fruits and vegetables as side dishes; (4) Ask if any or all foods in the meal can be prepared without empty calories, and (5) Watch portion sizes. Following the second discussion, *Activity 3: Planning For Family Fitness* (25 minutes) was developed to give youth simple station exercises that could be completed again at home with their families. Although this activity is unrelated to the overall lesson objectives, the inclusion of a physical fitness activity in a nutrition education lesson is consistent with other national nutrition education programs (47-49).

Discussion 3: Family Shopping Lists and Budgeting (30 minutes) addresses the fifth lesson objective. This discussion teaches youth four steps to create a cost-effective family shopping list by determining how much food to purchase so that every family member meets dietary recommendations for each food group and by narrowing down a grocery list based on home food inventories and store sales. At the end of the lesson individuals should be able to describe how to complete the following steps outlined on the *Steps To Creating A Family Shopping List* handout: (1) Calculate weekly portions of each food group for an entire family; (2) Create a shopping list of healthy choices from each food group, and (3) Revise shopping list based on home food inventory and weekly store sales.

Evaluative Approach

The *Family Menu Planning* lesson was evaluated by several methods. Content validity analyses were used to assess internal validity prior to pilot testing the lesson with early adolescent youth. Process evaluation tools were used to measure the feasibility of

pilot testing the lesson in an after-school setting. Focus groups were conducted following the pilot test to capture qualitative data for formative evaluations and assessments of self-reported behavior change mediators.

Content Validity

Assessment of content validity was completed in accordance with standard methods (50,51). Eight experts reviewed the *Family Menu Planning* lesson for content validity. Reviewers were provided with a full description of the aims and objectives of the *Family Menu Planning* lesson, a copy of all related written materials and a description of the target audience. Content experts were provided with written instructions by which to conduct their reviews. Each reviewer was asked to comment on the overall impression of the lesson, areas facilitating or preventing knowledge and skill development in and understanding of family menu planning and age-appropriateness of materials. Reviewers were directed to identify areas for improvement. Content experts were asked to indicate the overall relevance of the lesson to family menu planning (1=not very relevant to 5=very relevant) and the ability of each activity to achieve overall learning objectives (1=low/no ability to 5=high ability). Content experts completed independent reviews and were not informed of the ratings or comments of fellow reviewers.

Pilot Testing

Youth, ages 11 to 14 years, were recruited to pilot test the *Family Menu Planning* lesson. Subjects were recruited through word-of-mouth among middle schools, youth organizations, cooperative extension programs and faith-based institutions. All interested subjects were eligible to participate if they were currently enrolled in the sixth or seventh

grades. Participants and their parents were briefed on the study. Parents provided written informed consent, and children provided written informed assent before participating in the pilot test. Participants were asked to provide basic information about age, race/ethnicity, gender and school location on a demographic questionnaire. Participants engaged in the *Family Menu Planning* lesson for two hours, followed by a 1-hour focus group. Participants were compensated with a \$10 grocery store gift card upon completion of the lesson and focus group. This study was approved by the Institutional Review Board for Research Involving Human Subjects at The Pennsylvania State University (University Park, PA, US).

Process Evaluation

A process evaluation checklist was developed to assess dose, reach and fidelity of the piloted lesson. Investigators used the checklist to document key elements of the process by which the lesson was delivered. Dose was assessed by identifying the total number of individuals who attended the lesson, the total amount of time taken to set-up the lesson and the total time taken to deliver each lesson discussion and activity. Reach was assessed by measuring the total number of individuals who attended the full 2-hour lesson. Fidelity was characterized by asking the process evaluation observer to identify whether each lesson task was completed well or not completed well, to rate how engaged individuals were in the lesson on a scale of 1-5 and to document any challenges faced during the lesson. The process evaluation was adapted from other formative evaluation studies (52,53).

Focus Group

A 1-hour focus group was conducted according to standard procedures (54). The focus group team consisted of a moderator and two recorders. The moderator led the discussion with open-ended questions, and the recorders audiotaped the discussion and took field notes. Participants were encouraged to speak until all viewpoints were stated and probing questions were used to clarify any ambiguity in participants' responses. Questions were designed to understand participants' perceptions of the *Family Menu Planning* lesson and were informed based on previous studies examining individuals' perceptions of nutrition education lessons designed to promote health behavior change (55,56). Focus group discussions were organized to determine participants' reactions to the lesson as well as their opinions about the level of difficulty and duration of the lesson components.

Formative evaluation questions were developed to collect data on how to improve the lesson for future nutrition education programs. Furthermore, behavior change questions assessed self-reported self-efficacy, social support and outcome expectations. To assess self-efficacy, participants were asked to rate their confidence level on a scale of 1-10 in performing various lesson tasks related to the overall learning objectives. Participants were also asked to explain why they chose a particular confidence rating. Self-efficacy was also measured by asking participants to respond to open-ended questions about the difficulty of the lesson activities. Social support was measured by asking participants to comment on what their friends would think about the lesson. To understand outcome expectations, participants were asked open-ended questions about what they liked learning about in the lesson. Table 3-2 lists the focus group questions and probes and identifies corresponding formative and SCT outcomes for each question.

Data analyses

Comments and ratings from content experts were reviewed for common themes. Demographic data collected from the pilot test study were analyzed for descriptive statistics, using the Statistical Package for the Social Sciences (version 20.0 for Mac, 2011, IBM Corp, Armonk, NY, US). Audiotapes and field notes from the focus group were transcribed verbatim. Study investigators independently reviewed these transcripts and field notes to identify recurring trends and patterns in the focus group session (11). Data from this review were coded and sorted using the focus group discussions as an organizational guide (12). Researchers met as a group to determine emerging themes by identifying the most frequent responses by three or more focus group participants (12). Study investigators reviewed the summary of emerging themes to arrive at a consensus for the final content and organization of data (12). For the formative outcomes, a descriptive summary and table were generated using the most frequent and dominant responses. Furthermore, themes from the transcripts were assessed to capture qualitative data related to each SCT mediator.

RESULTS

Content Validity

Six registered dietitians, one chef and one nutrition educator reviewed the *Family Menu Planning* lesson for content validity. Expertise of these individuals included university (n=3), extension (n=1) and public health (n=1) nutrition education, governmental regulation and federal policy implementation (n=1), culinary skills (n=1) and food industry and commodity group research, education and development (n=1). Overall, reviewers determined that the *Family Menu Planning* lesson was comprehensive,

informative, accurate, clear and comprehensible for the target audience and likely to be effective. The overall relevancy of the lesson to family menu planning was rated as 4.06 ± 0.75 (somewhat relevant). The ability of each activity to achieve the five learning objectives was rated as 4.56 ± 0.10 (*Build Your Plate*; some to high ability), 3.75 ± 1.43 (*Create Your Family Schedule*; neutral to some ability), 3.00 ± 1.98 (*Physical Activity*; neutral ability) and 3.33 ± 1.23 (*Create Your Family's Shopping List*; neutral to some ability). Based on reviewers' comments and ratings, specific components of the lesson that were identified as being complex and resulting in neutral ratings were modified before pilot testing. While the physical activity component was rated as "neutral," no changes were made to this activity, because the activity was not part of the overall lesson objectives. Reviewers commented that the value of this activity, as part of the overall lesson, was to incorporate physical activities into learning about an overall healthy lifestyle. Inclusion of this activity was deemed consistent with the broader program goal of planning to make healthy choices.

Pilot Testing

Eight participants completed the *Family Menu Planning* lesson pilot study. Participants had a mean \pm SD age of 11.8 ± 0.8 years and were enrolled in either the sixth or seventh grade. All participants were female and Caucasian. All eight females who completed the pilot study participated in the focus group session, following the pilot study. Process evaluation analyses from the pilot test study as well as formative and behavior change outcomes from focus group session are summarized in the sections below.

Process Evaluation

Dose

A total of eight early adolescents attended the *Family Menu Planning* lesson or two less than expected based on recruitment. The investigators set aside 30 minutes to set-up the lesson room and organize the lesson handouts, visual aids and physical activity equipment. The total lesson set-up time was overestimated, whereby it only took the research team of three investigators, 15 minutes to prepare for the lesson. The lesson took less time than was expected to deliver. The lesson was expected to last two hours and only took one hour and 41 minutes to deliver. In general, most of the lesson discussions took less time than expected to deliver and all lesson activities took more time than expected to execute. *Discussions 1* and *2* took less than half the total time to deliver compared to expected, and *Discussion 3* took half the total time to deliver compared to expected. Although, *Discussion 3* took double the total time to deliver when compared to *Discussions 1 and 2*. *Activity 1* was completed in the expected time, whereas *Activities 2* and *3* took about five minutes more to execute than expected. A summary of the process measures can be found in Table 3-3.

Reach

The total number of individuals who attended the full 2-hour lesson was seven. Due to a scheduling conflict, one individual attended the last hour of the lesson and also joined the focus group following the lesson.

Fidelity

An observer from the research team subjectively rated whether various lesson tasks were either completed “Well” or “Not completed well” by the lesson instructor. The observer documented that all lesson tasks were completed “Well” (Table 3-4). The

observer also rated, on a scale of 1 (Not engaged at all) to 5 (Very engaged), how engaged individuals were in the lesson. The observer reported an engagement score of 5, thus documenting that all individuals were “Very engaged” in the lesson (Table 3-5). Space was also provided on the process evaluation form to document any challenges that were faced during the lesson. During the *Menu Planning With MyPlate* discussion, the observer noted that females were not clear on the distinction between refined grains and whole grains. The observer also reported that females struggled during the *Creating A Family Schedule* activity, because they either did not know what their family’s activities were or they believed that they had no free days to prepare meals with their families. The observer also documented that individuals digressed during this activity by wanting to share their entire schedule instead of just the free days they were asked to report.

The observer recorded that before the *Planning For Family Fitness* activity, the lesson leader did not take time to discuss the importance of participating in physical activities with family. The observer also noted that the jumping rope activity was not executed well, because the ceilings were too low to accommodate the length of the jump ropes. The observer also captured that stretching was not executed well by individuals. The observer noted that the *Create A Family Shopping List* activity was difficult for many females, whereby individuals repeatedly asked for more time to complete the activity.

Focus Group

Formative Outcomes

Information collected from the focus group is summarized in Table 3-6 and serves as process recommendations for modifying each lesson component based on common

likes and dislikes as well as challenges faced during the lesson. The following sections describe formative data used to generate these recommendations.

Overall Lesson Perceptions

When asked to self-report, on a scale from 1 (low) to 10 (high), the mean \pm SD level of enjoyment with the lesson was 8.1 \pm 0.8, with a range from 7.0 to 9.0. Most participants indicated that they enjoyed applying nutrition principles, engaging in physical activity and sharing their opinions in group discussions. For example, one participant stated, “I learned how to make a good food plate for myself and that’s healthy.” Although all participants were “highly satisfied” with the overall lesson, most participants indicated that they would have been more satisfied, if there would have been additional visual aids and hands-on activities. All reported “liking” the length of the lesson, but most participants reported a desire to spend more time doing activities rather than discussing information. Most participants responded that the lesson was age-appropriate. Participants self-reported feeling comfortable with the level of math required for activities. Many participants perceived that the *Build MyPlate* activity was too rudimentary.

Lesson Handouts

Although most participants reported that the lesson handouts were “helpful,” some females shared that there were too many handouts. One participant’s statement—“I there’s too many papers right now and we didn’t really go through all of them.”—supports this point. All participants indicated that they would have preferred to learn the handout concepts on the white board, because they were self-reported visual learners. One participant stated, “You need something visual, like, some people forget what you

say automatically and then they can just read if it happens.” Furthermore, some participants reported wanting the opportunity to write on the board so that they could feel like the teacher. For example, one participant said, “You get to feel a little bit like the teacher and kinda teach the class like about something that you understood differently than they did.” Although participants reported the desire for fewer handouts, some believed that handouts would be useful for completing activities at home with family. One participant stated, “I think the handouts are good because like if, what if you went home and you wanted to do this for, like, your family and you forgot some of the things that you needed to do they [handouts] would be helpful.” Many participants reported that the *Create Your Family Shopping List* handout would be useful to take home.

Menu Planning With MyPlate

All participants reported “liking” the *Build MyPlate* activity, and most participants shared that they enjoyed drawing with markers and making their own interpretations of a healthy plate. One participant stated, “We got to describe it our way.” Individuals who disliked the activity most commonly reported that they had already completed a similar activity at school and that the activity was too easy. Most participants perceived that they would have preferred to learn more about how to put foods together rather than to just understand where individual foods go on the plate. Most participants reported frustration with not understanding how to apply the MyPlate principles to avoid ‘junk’ foods on their plates. One participant stated, “I know that all of these foods are healthy, and like, every time I see junk food, I’m just like drawn to it.” Many females recommended that a future activity should focus on how to put healthy foods together to make a meal and to choose tastier healthy foods instead of junk foods for their plates.

Family Menu Planning

Most participants expressed satisfaction with the *Creating A Family Schedule* activity, because they liked writing down their weekly activities. One participant stated, “I liked it because like you got to actually see what was on your week and you don’t really notice what times and stuff until you actually write it down.” Participants also noted that they enjoyed seeing what other members in the family were doing during the week. Many participants believed that they needed more time to complete this activity, because it was difficult to think about all the activities going on for their families. Some common difficulties reported by females about this activity were thinking about what everyone in the family was doing for the week and planning for meals when events came up at the last minute. Most participants perceived that the activity would be better, if they were given an example of a completed calendar on the white board and larger calendars to write out their schedules for several weeks in advance. Participants also shared that it would be fun to color code schedules with markers and stickers to label different family events. One participant stated, “Use different colors for different important things. Like say, things for my brother, like he has a blue marker for his stuff. And then for me, I have a red marker for my stuff.”

Planning For Family Fitness

Participants indicated that they enjoyed the physical activity component. One participant commented, “I liked it because we actually got to go jump around and get all our energy out besides just sitting in chairs and talking cause then when we go home we’d be so hyper but now we’re calm now.” Most participants reported that they appreciated that the physical activities were varied and combined with music. Most

participants commented on a dislike for jumping rope and would have rather done a different physical activity. All participants perceived that they received a good workout, though most females expressed a wish for more time devoted to physical activity throughout the lesson. Participants expressed many suggestions for improving the physical activity which all revolved around incorporating a larger variety of activities. Females believed that two more different activities should be added to the physical fitness part of the lesson, including “hopscotch,” “dance moves,” “contests” or balance activities. Many participants reported a desire to stretch more before the physical activity.

Family Shopping Lists and Budgeting

Most participants reported that they enjoyed creating a family shopping list, because they could help contribute more to family meals and see what other family members were eating for the week. However, females expressed uncertainty about completing this activity at home. Most participants perceived that the activity was difficult and expressed interest in having more examples on the white board to help them understand how to create the lists. Many females reported wanting to see an example of an actual shopping list, and some noted that they wanted to see an example of how to complete an actual home food inventory. Participants indicated that they wanted to use their math skills to complete a home food inventory on their own. A majority of females expressed an interest in knowing how to add price information on the shopping lists. One participant stated, “And like we could have seen how much this stuff was worth. So we could have like had a total for the shopping list.”

SCT Outcomes

Common themes that emerged from the focus group were assessed for responses related to selected SCT mediators. The following sections describe the impact of the pilot study on self-reported self-efficacy, social support and outcome expectations related to family menu planning.

Self-Efficacy

Participants were asked to self-report their level of confidence, on a scale of 1 (low) to 10 (high), in performing lesson activities related to the learning objectives. For identifying healthy food choices in each food group that conform to USDA MyPlate principles in the *Build MyPlate* activity, the mean \pm SD confidence level was 9.1 \pm 0.6, with a range of 8.0 to 10.0. Participants perceived high confidence in their ability to build a healthy plate, because they expressed an understanding of the food groups, where foods go on the plate and how many servings of foods to add to the plate. One participant commented, “I know how much of each [food group] I should take, like not loading your plate with all fruits or all vegetables and to make each portion smaller than I usually do.” Many participants also reported feeling confident using the *Build MyPlate* activity handout to complete the activity at home with their siblings. Most participants perceived that they would have self-reported a confidence level of 10, if they would have been given guidance as to how to avoid “junk” food choices.

When asked to report their confidence level, on a scale of 1 (low) to 10 (high), in creating weekly family meal schedules, participants reported a confidence level of 8.4 \pm 1.3, with a range of 7.0 to 10.0. Participants perceived feeling confident that they could create a family schedule so that they would not be planning meals at the last minute. Females also commented that they have confidence in planning meals for later in

the week rather than on a daily basis, because they would be able to successfully identify their free days. Furthermore, all participants perceived a feeling of confidence in using the *Creating A Family Schedule* activity handout to create a family menu schedule at home. Individuals reported that they would have been more confident in their ability to create a family schedule, if they would have had a better understanding of their family member's weekly activities.

When asked to report their average confidence level, on a scale of 1 (low) to 10 (high), in creating a family shopping list, participants reported a confidence level of 7.6 ± 0.6 , with a range of 7.0 to 9.0. Participants perceived high confidence in helping their parents shop for groceries, after this lesson. Females would have felt more confident accomplishing this learning objective, if they would have been given the opportunity to complete the steps for creating a family shopping list on their own. Furthermore, participants would have liked to have more information about how to save costs on their shopping lists. Although, individuals perceived feeling fairly confident in completing the family shopping list steps at home with the help of the *Steps To Creating A Family Shopping List* handout.

Social Support

All participants reported an interest in encouraging their friends to participate in the *Family Menu Planning* lesson, if it were offered again. When asked why, one participant commented, "You could get a lot healthier from doing this and then could teach them some, like ways to exercise and then you could exercise together. And have dinner together which is healthier." All participants perceived that they would have told their friends that the lesson was "cool," because the concept of family menu planning was

not something that they normally talked about in school every day. One participant stated, “We don’t usually get to do stuff like that in school so it’s different and it was just fun.” All participants also reported “liking” sharing their opinions with their friends during the lesson. For example, most participants verbalized that they “enjoyed” sharing the plates they created in the *Build MyPlate* activity with their friends in the group. One participant stated, “I liked that we got to draw our own [plate] in the way that we see it. And then to see that everybody’s was different.” Similarly, most participants reported “liking” of the sharing of their weekly activities with their friends in the group, during the *Creating A Family Schedule* activity. Females reported an interest in helping their friends figure out free days in their schedule, based on a discussion of what shared activities they were doing during the week.

Outcome Expectations

Participants reported several positive outcome expectations related to learning how to build healthy plates with the MyPlate principles. Many females perceived that understanding how to plan healthy plates would help them make better choices on a restaurant menu. More specifically, participants reported looking forward to using the MyPlate principles to choose healthier side options for their meals away from the home. Furthermore, all participants expressed an interest in using their knowledge of building healthy plates to cook more meals and taste new fruits and vegetables. Individuals perceived high expectations that learning how to create family meal schedules would increase the number of healthy meals that they prepare together with their families. Participants also reported that the physical fitness activity would encourage them to participate in different types of physical activities at home with their families. One

participant commented, “And we’re learning different ways to exercise cause we may have only learned certain types of ways.” In general, participants expressed a new expectation that physical activities are multidimensional and may encompass a broad range of movements. Finally, participants perceived positive expectations related to using skills of how to create cost-effective grocery shopping lists to help their parents make a shopping list at home. One participant commented, “I can help my mom make the list more. Like, I could be in charge of the list and she could go find everything.” Individuals expressed excitement in using their knowledge to help their parents find healthier foods for their families.

DISCUSSION

Content validity data were used to develop an internally valid *Family Menu Planning* lesson that successfully achieved the five lesson objectives. Results of this pilot study indicated that it was feasible to deliver a 2-hour family menu planning lesson to early adolescents in an after-school setting. Process evaluations indicated that lesson tasks related to each learning objective were executed well and that participants were highly engaged in the lesson. Furthermore, formative data from the focus group showed that participants were highly satisfied with the lesson. Data collected on SCT mediators revealed that participants perceived high self-efficacy in performing many lesson activities related to overall learning objectives and high social support and positive outcome expectations for applying family menu planning principles to live a healthy lifestyle. Process recommendations provided guidance for adjusting the *Family Menu Planning* lesson to increase participant satisfaction and to more effectively achieve the five lesson objectives in the future.

Formative data revealed that individuals struggled to complete learning objectives related to using dietary recommendations to plan family meals (Lesson Objective #1) and building cost-effective healthy shopping lists (Lesson Objective #5), which suggests that process adjustments should be made prior to using this lesson in future nutrition education programs. In general, participants perceived that they would struggle to build a healthy plate at home because they lacked an understanding of how to combine foods together on a plate and how to replace “junk” foods with healthier alternatives. These results are consistent with those found by Fordyce-Voorham (15), which illustrated that basic nutrition knowledge related to family menu planning needs to highlight how to make healthier foods tastier. A future lesson will provide students with nutrition education that focuses on applications of the MyPlate principles, which is a recommendation supported by other family menu planning lessons (20-22).

Dose analyses indicated that a future *Family Menu Planning* lesson needs to devote more time to describing the principles of how to build a family shopping list in *Discussion 2: Family Shopping Lists and Budgeting*. Individuals wanted time to practice completing the steps to create a cost-effective shopping list. More specifically, the home food inventory step was perceived as conceptually complex for individuals to understand without practice in eliminating weekly portions of foods needed. Food experts in another study similarly reported that checking household food stock is a conceptually difficult task involved in meal planning (15). Fordyce-Voorham found that adolescents struggled to understand how to use current pantry items in versatile ways to build meals (15).

Results of this pilot study also suggest that the *Family Menu Planning* lesson may be effective at positively impacting self-reported self-efficacy, social support and

outcome expectations related to family menu planning. Participants perceived high to moderately high self-efficacy in their abilities to accomplish some learning objectives related to using dietary recommendations to plan family meals (Lesson Objective #1), create weekly family meal schedules (Lesson Objective #2) and build cost-effective healthy shopping lists (Lesson Objective #5). High confidence levels were most evident in the fact that participants said they would build healthy plates, create weekly family meal schedules and develop healthy shopping lists more at home now than they did before the lesson. Fulkerson et al. (22) found similar results in the HOME program, whereby youth who received family menu planning education reported significantly higher self-efficacy in meal preparation skills than children who received no education. Interestingly, the HOME pilot study tested the effectiveness of a 3-month family menu planning program (22), which suggests that offering one family menu planning lesson may be equally as effective as lengthier, resource-laden nutrition education programs.

In general, social support played a large role in participants' perceived adoption of healthy lifestyle behaviors related to planning family meals. Much of the enjoyment individuals reported in the lesson was related to sharing their opinions and beliefs with their friends during the lesson. These results are consistent with viewpoints held by food experts who acknowledge the importance of engaging youth in a peer group because they value each other's opinions (15). All participants expressed an interest in completing some of the lesson activities with their friends because they wanted to support their friends in living a healthy lifestyle. In support of this point, many participants wanted lesson handouts to take home to teach their siblings and friends how to build healthy plates, create weekly family meal schedules and build healthy shopping lists.

Furthermore, participants' perceived social support from family as being an important factor in continuing the healthy habits they learned at home. Dougherty et al. (20) uncovered similar results when they found that children wanted to help their parent's select healthy food in the supermarket after the American Culinary Federation Chef and Child Foundation program. These results suggest that an increase in social support may predict the maintenance of healthy behaviors over time among youth.

Learning about key concepts in family menu planning impacted participants' positive outcome expectations related to living a healthy lifestyle. Participants perceived that the knowledge and skills gained in the lesson would help them lead a healthier lifestyle. Furthermore, females held positive expectations that teaching their families and friends about family menu planning would help them make healthier choices as well. Most notably, being exposed to family menu planning education broadened participants' perspectives on both food and physical activity. For example, individuals felt inspired to cook with healthy foods to practice their knowledge of building a healthy plate. These results are consistent with those found in the Squire's Quest! program, whereby youth set a significantly higher number of goals to prepare meals with fruits and vegetables after the program (21). This program also found that these positive outcome expectations for preparing fruits and vegetables were significantly correlated with fruit and vegetable intake, such that youth with more preparation goals consumed more fruits and vegetables (21). These results indicate that a future family menu planning lesson needs to evaluate changes in actual behaviors in order to understand if mediators of behavior change were impacted enough to modify behaviors.

The current pilot study has several limitations that must be noted. The sample size was small and lacked external validity. Furthermore, process analyses revealed that fewer subjects were recruited than expected and that not all participants completed the entire 2-hour lesson. Sample size limitations are reflective of convenience sampling. Another limitation is the lack of data collected on changes in SCT mediators from pre- to post-test. Participants were only asked open-ended questions related to self-reported self-efficacy, social support and outcome expectations after the lesson was completed. While this is an acceptable method for assessing SCT mediators (after participation in an intervention) change in selected SCT mediators from pre- to post-test is unknown. Finally, focus group data may be skewed, due to social desirability biases that exist in a group context. Participants may have reported inflated self-efficacy ratings in order to conform to the beliefs held by other group members. Therefore, the self-report nature of these data must be considered when assessing the efficacy of the lesson at impacting SCT mediators.

The *Family Menu Planning* lesson will be modified based on formative and process evaluation results of this pilot test. Future research will test the *Family Menu Planning* lesson in a larger group of early adolescent males and females who come from a range of ethnic and economic backgrounds. Future testing of the *Family Menu Planning* lesson will also include assessments of change in SCT mediators, which will be executed by use of a SCT questionnaire that has been validated in the broader research program. The long-term goal of this study is to pilot test the *Family Menu Planning* lesson for future use in a peer-education program where young adolescents will be asked to teach their peers about family menu planning. Therefore, future research will be conducted in

which early adolescent peer educators are trained and deliver the *Family Menu Planning* lesson to their peers.

CONCLUSIONS

In conclusion, it is feasible to deliver the 2-hour *Family Menu Planning* lesson, grounded in SCT, to early adolescents in an after-school context. The *Family Menu Planning* lesson is effective at positively impacting SCT mediators including self-reported self-efficacy, social support and outcome expectations related to family menu planning. The lesson requires some modification to fully achieve learning objectives of building healthy plates with the MyPlate principles and creating family shopping lists.

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Table 3-1: Summary of common concepts identified among nutrition materials from Cooperative Extension programs.

<p>Lesson</p> <p>Objective 1:</p> <p><i>Use dietary recommendations to plan family meals</i></p>	<p>Lesson</p> <p>Objective 2:</p> <p><i>Create weekly family meal schedules</i></p>	<p>Lesson</p> <p>Objective 3:</p> <p><i>Build cost-effective healthy shopping lists</i></p>	<p>Lesson</p> <p>Objective 4:</p> <p><i>Plan healthy meals away-from-home</i></p>	<p>Lesson</p> <p>Objective 5:</p> <p><i>Plan quick healthy meals</i></p>
<ul style="list-style-type: none"> ● Make smart choices from every food group (37-40,42,43) ● Choose a variety of foods from each food group (37,38,40) ● Use MyPlate principles to plan meals (38-40,43) 	<ul style="list-style-type: none"> ● Identify a main meal for the day and plan around that meal (37,40) ● Write out weekly family activities (38-40) ● Identify busy and free days (38-40) 	<ul style="list-style-type: none"> ● Complete home food inventories (37,39-41) ● Accommodate the nutritional needs and preferences of your family (37,39,40,42) ● Create lists based on number of recommended servings from each food group needed for each family member (37,40,41) ● Review ads/coupons to see what items are on sale (37-41) 	<ul style="list-style-type: none"> ● Use MyPlate principles to make healthier choices (44-46) ● Watch portion sizes (44-46) ● Ask for modifications to menu items (44,45) ● Learn to read menu menus to avoid unhealthy choices (44,46) 	<ul style="list-style-type: none"> ● Utilize leftovers (37,40) ● Make double portions of meals (37,39,40) ● Purchase healthy versions of convenience foods (37,40,42) ● Use quick cooking methods (40,42) ● Give each family member a food task (38,40-42) ● Use foods that require minimal preparation/cooking time (40,42)

Table 3-2: Family menu planning pilot test study focus group questions, probes and outcomes.

Questions	Probes	Outcomes
<i>Overall Lesson Feedback</i>		
Did you like the lesson – why or why not?	P1: What did you like about it? P2: What did you not like about it?	<ul style="list-style-type: none"> • Formative • ^aSCT: Outcome expectations
Was the lesson taught at a level that you could understand?	P1: Did you think the lesson was too advanced for you? P2: Did you think the lesson was too easy for you?	<ul style="list-style-type: none"> • Formative • SCT: Self-efficacy
Did you like the lesson handouts – why or why not?	P1: Did the handouts help you learn the lesson concepts? P2: Do you have any suggestions for how to make the handouts better?	<ul style="list-style-type: none"> • Formative
Do you have any general suggestions for how to make the lesson better?	P1: What types of discussions would you like to have? P2: What types of activities would you like to do?	<ul style="list-style-type: none"> • Formative
Would you tell your friends to participate in this lesson if it was offered again?	P1: Would you tell your friends that this lesson was cool? P2: Do you think your friends would think this lesson was cool?	<ul style="list-style-type: none"> • SCT: Social Support
<i>Lesson Discussions/Activities</i>		
Did you like the lesson activity – why or why not?	P1: What did you like about it? P2: What did you not like about it?	<ul style="list-style-type: none"> • Formative • SCT: Outcome expectations
Was the activity too difficult or too easy?	P1: What was too difficult? P2: What was too easy?	<ul style="list-style-type: none"> • Formative • SCT: Self-efficacy
Were the activity instructions on the activity handout clear?	P1: Would you have known what to do for this activity if a teacher did not explain the instructions to you?	<ul style="list-style-type: none"> • Formative
Did you feel like you needed more/less time to complete the activity?	P1: Did you feel like you had enough time to complete the activity so that you were prepared for the group discussion?	<ul style="list-style-type: none"> • Formative

Note. ^aSCT = Social Cognitive Theory

Table 3-3: Summary of dosage results for the *Family Menu Planning* lesson.

Process Measure	Expected	Actual
<i>Number of Lesson Attendees</i>	10	8*
<i>Total Time To Set-Up Lesson</i>	30 min.	15 min.
<i>Total Time To Deliver Lesson</i>	120 min.	101 min.
<i>Total Time To Deliver Discussion 1: Menu Planning MyPlate</i>	20 min.	7 min.
<i>Total Time To Deliver Activity 1: Build Your Plate</i>	15 min.	16 min.
<i>Total Time To Deliver Discussion 2: Family Menu Planning</i>	30 min.	7 min.
<i>Total Time To Deliver Activity 2: Create Your Family Schedule</i>	10 min.	16 min.
<i>Total Time To Deliver Activity 3: Planning For Family Fitness</i>	25 min.	30 min.
<i>Total Time To Deliver Discussion 3: Family Shopping Lists & Budgeting</i>	30 min.	15 min.

Note. *One participant was not in attendance for the full two-hour lesson.

Table 3-4. Summary of fidelity observations of lesson task completion for the *Family Menu Planning* lesson.

Lesson Task	Task Completed Well	Task Not Completed Well
Learning objectives clearly stated	✓	
Clearly described MyPlate principles for building healthy plates	✓	
Build Your Plate activity	✓	
Clearly described family menu planning tips	✓	
Create Your Family Schedule activity	✓	
Warmed up students for physical activity	✓	
Stretched students with ^a ACSM guidelines	✓	
Planning for family fitness activity	✓	
Clearly described how to create a family shopping list	✓	
Clearly described how to revise shopping lists with budgeting techniques	✓	
Clearly described Create Your Family's	✓	

Note. ^aACSM = American College of Sports Medicine

Table 3-5. Fidelity observation of student engagement for the *Family Menu Planning* lesson.

1- Not engaged at all	2 Somewhat unengaged	3- Neither engaged no unengaged	4- Somewhat engaged	5- Very engaged
				✓

Table 3-6. Summary of formative data from the *Family Menu Planning* lesson.

Lesson Element	Likes	Dislikes	Recommendations
Lesson Handouts	<ul style="list-style-type: none"> • Helpful for doing activities at home with siblings • Activity handout instructions were clear 	<ul style="list-style-type: none"> • Too many handouts • Handout concepts not covered in enough detail • Some activities did not need handouts 	<ul style="list-style-type: none"> • Teach handout concepts on the white board • Invite students to write on the white board
Build MyPlate	<ul style="list-style-type: none"> • Drawing with markers • Sharing their plates with the group • Freedom to be artistic 	<ul style="list-style-type: none"> • Do similar activities in school • Activity was too easy 	<ul style="list-style-type: none"> • Learn how to put foods together on the plate • Understand difference between healthy food and junk food on the plate
Creating A Family Schedule	<ul style="list-style-type: none"> • Writing down weekly schedules • Seeing what other family members are doing during the week • Sharing personal schedules with the group • Identifying free days to prepare meals with family 	<ul style="list-style-type: none"> • Not enough time given to complete the activity • Difficult to think about what everyone in the family is doing every week 	<ul style="list-style-type: none"> • Give an example weekly calendar on the white board • Give students bigger calendars to plan meals for weeks in advance • Give students markers/stickers to color code schedules
Planning For Family Fitness	<ul style="list-style-type: none"> • Getting up and moving around instead of just sitting around discussing • Doing different physical fitness activities • Listening to music while doing the activities 	<ul style="list-style-type: none"> • Jumping rope • Freestyle dancing 	<ul style="list-style-type: none"> • Include more activities: <ul style="list-style-type: none"> ⇒ Hopscotch ⇒ Dancing ⇒ Balance Exercises ⇒ Contests ⇒ Abdominal Exercises • Incorporate more warm-up stretches
Creating A Family Shopping List	<ul style="list-style-type: none"> • Learning how to help parents make shopping lists at home • Seeing what family is eating for the week 	<ul style="list-style-type: none"> • Not enough time given to complete math activity • Difficult to complete the home food inventory 	<ul style="list-style-type: none"> • See an example of an actual shopping list • Do an example home food inventory • Understand how to factor cost into shopping lists

CHAPTER 4

**DEVELOPMENT AND EVALUATION OF MECHANICAL AND PERCEPTUAL
CULINARY SKILLS EDUCATION LESSONS FOR
EARLY ADOLESCENT CHILDREN**

To be submitted to the *Journal of Nutrition Education and Behavior*

ABSTRACT

Background Empowering youth with mechanical and perceptual culinary skills may be a logical strategy for childhood obesity prevention.

Objective The first objective was to examine the feasibility of delivering two, 2-hour culinary lessons, *Culinary Skills* and *Culinary Skills In Action*, to early adolescent children. The second objective was to evaluate the effectiveness of the lessons at positively impacting mediators of behavior change, such as self-reported self-efficacy, social support and outcome expectations.

Description A 2-day culinary nutrition education program was pilot tested with eight females. The four objectives of the lessons included: (1) using different cutting methods to cut fruits and vegetables; (2) practicing food safety principles; (3) using different cooking methods to cook fruits and vegetables and (4) executing fruit and vegetable recipes.

Evaluation Content validity experts reviewed the lessons prior to the pilot test study. Process evaluations assessed feasibility of the lessons and provided process recommendations for future lessons. Focus groups were conducted after each lesson to capture formative data and assess self-reported mediators of behavior change.

Data analyses Comments from content experts were reviewed for common themes and expert ratings were averaged. Demographic data were analyzed for descriptive statistics. Focus group audiotapes and field notes were transcribed verbatim and reviewed for recurring trends related to process and behavior change mediator outcomes.

Results The *Culinary Skills* and *Culinary Skills In Action* lessons were internally valid. It was feasible to deliver the 2-day culinary program to a small group of early adolescent females in an after-school context. Participants enjoyed both lessons and expressed interest in cooking with fruits and vegetables at home. Participants reported high self-efficacy, social support and outcome expectations related to mechanical and perceptual culinary skills, after both lessons.

Conclusions The *Culinary Skills* and *Culinary Skills In Action* lessons positively impacted self-reported mediators of behavior change in early adolescent females. A 2-day culinary program may effectively promote changes in obesogenic behaviors over time.

INTRODUCTION

The family food environment has drastically changed over time as families have less time to participate in food preparation (1). The term “cooking from scratch” has evolved from cooking with raw ingredients to cooking with a combination of both raw ingredients and convenience items (2). Cooking in the home has declined, because many families lack knowledge of how to prepare nutritious foods with inexpensive and basic ingredients (3). Consequently, there has been an increase in family purchases of convenient, unhealthy foods away from the home (4,5), which has shown to impact youths’ ability to meet current dietary recommendations (6,7). The family food environment may contribute to adolescent obesity, because lack of culinary competency can lead to both lower availability and accessibility of healthy foods in the home as families do not know what foods to purchase or how to transform these foods into meals.

In several studies, consumption of healthy and unhealthy foods and beverages were significantly predicted by home availability (8-13). More specifically, home food availability predicted sugar sweetened beverage consumption (10) as well as fruit and vegetable intake (11-13) among adolescents. Others have noted that food availability and accessibility along with taste preference are the environmental and individual variables most positively related to consumption patterns in adolescence (14). Availability and accessibility are often determined by “kitchenscapes” (15), or the physical setting and objects within the kitchen that are available to manipulate foods. In previous research, these built environments (15) influenced both food intake and obesity (16,17). A lack of

knowledge in how to use cooking appliances in the kitchen space can negatively impact dietary intake as foods are prepared in less nutritious ways (18).

Some argue that we can improve the home food environment by giving youth the knowledge and skills to select, handle and prepare healthy foods (3,19). The Social Cognitive Theory (SCT) is often used as a model for understanding the pathway by which an individual interacts with the environment to change his or her behaviors (20). Within this model, improving personal variables related to culinary literacy may increase the capacity of the home environment to support positive eating behavior changes. Some argue that hands-on experiences with foods in the kitchen are most effective at transforming behaviors (19,21,22). Culinary nutrition education alone has proven to be ineffective at modifying eating behaviors without direct manipulation and tasting of foods (22). Condrasky and Hegler (19) contend that youth need experiences transforming foods into tasty and nutritious forms in order for them to “see, feel and taste what nutrition is all about” (19, p. 3). These hands-on experiences involve honing knowledge and skills related to mechanical and perceptual cooking tasks (2). Mechanical culinary tasks encompass all essential steps associated with actively manipulating foods in both the preparation (i.e., peeling, slicing, dicing, chopping, marinating) and cooking (i.e., microwaving, baking, sautéing, frying) stages of meal preparation. On the other hand, perceptual tasks are those used to make evaluations during the cooking process, such as making adaptations to recipes and judging when foods are completely cooked (2).

Limited studies have tested the effectiveness of hands-on cooking classes at impacting behavior change among youth (21,23-38). Although several of these studies

found significant changes in self-reported behaviors including dietary intake (25,27,31,36) and cooking tasks (26-28,35,36,38), some studies found only modest changes in psychosocial mediators of behavior change (21,26,28). These contradictory results suggest that there is a gap in knowledge related to the pathway by which increasing mechanical and perceptual culinary skills leads to obesity-related behavior change. The purpose of the current study was to develop and evaluate the effectiveness of two mechanical and perceptual culinary skills lessons, grounded in the SCT, at impacting individual-level behavior change mediators in early adolescent youth. Two lessons were developed to give students culinary nutrition education (*Culinary Skills* lesson) combined with hands-on application of culinary principles (*Culinary Skills In Action* lesson). It was hypothesized that each lesson would be internally valid. It was further hypothesized that it would be feasible to deliver the 2-hour culinary skills lessons to early adolescents in an after-school setting. Furthermore, it was expected that the *Culinary Skills* and *Culinary Skills In Action* lessons would positively impact self-efficacy, social support and outcome expectations related to cooking.

METHODS

Program Development

Lesson Objectives

The 2-day culinary education program consisted of two, 2-hour lessons developed for sixth and seventh grade students (ages 11 to 14 years). The first lesson, *Culinary Skills*, taught participants fundamental concepts about basic mechanical and perceptual culinary skills. The second lesson, *Culinary Skills In Action*, provided participants with

hands-on experiences to practice skills that they learned in the first lesson. The overall lesson objectives for both lessons were developed based on key insights captured from a literature review of culinary nutrition education programs that included a hands-on cooking component. A comprehensive review resulted in a total of 17 publications that formally evaluated hands-on cooking programs for youth (ages 2 to 19 years) (21,23-38). The program intensities ranged from 1 to 36 lessons and lasted anywhere from 5-10 minutes to four hours per lesson. Program content was consistent between studies, whereby most programs included a general nutrition education lesson, hands-on cooking class and a fruit and vegetable tasting. The hands-on cooking classes in each program included one or more of the following learning components: (1) Knife skills (26,37), (2) Food safety principles (21,23,26,27,33,37,38), (3) Cooking skills (21,23-31,33,35,36,38) and (4) Recipe fundamentals (25,29,35,38). Furthermore, a majority of programs taught youth how to perform basic mechanical and perceptual tasks with fruits and vegetables (21,23-31,33,35,36,38).

The knife skills components taught youth how to use different knife types (26,37) and how to perform different cutting methods (26). Food safety principles focused on personal hygiene (21,23,26,27,33,37,38), cross contamination (21,26) and proper food storage (26). All cooking skills sessions taught youth different cooking methodologies and terms, as well as preparation skills with basic cooking equipment and basic ingredients (21,23-31,33,35,36,38). Recipe fundamentals included learning how to read (38) and follow (25,26,29,35) simple healthy recipes.

Based on this literature review, the following four learning objectives were identified as essential elements of teaching youth mechanical and perceptual culinary skills in both culinary lessons:

1. Use different cutting methods to cut fruits and vegetables (26,37);
2. Practice food safety principles (21,23,26,27,33,37,38);
3. Use different cooking methods to cook fruits and vegetables (21,23-31,33,35,36,38), and
4. Execute fruit and vegetable recipes (25,29,35,38).

Learning Objectives, Discussions, Activities and Handouts

Program materials from eight cooperative extension and national nutrition programs (39-46) were reviewed to determine how to accomplish the four learning objectives for both lessons. Common concepts were identified among the program materials and summarized in Table 4-1. These concepts were used to develop the learning objectives and program materials for each lesson.

Culinary Skills

The first lesson discussion, *Discussion 1: Knives 101* (50 minutes), was developed to achieve the first and second lesson objectives. Related to the first lesson objective, this discussion teaches participants fundamental information about how to use knives for cutting fruits and vegetables. The first learning objective is that participants will be able to identify the parts of a knife imaged and described on the *Knives 101* handout. The second learning objective is that participants will be able to properly hold a knife. To achieve this learning objective, participants were given a teacher demonstration

of how to hold a knife while gripping a host food and then practiced holding a knife. Steps of how to hold a knife properly were also described in detail on the *Knives 101* handout for participants to reference when practicing holding knives at home.

The third learning objective is that participants will be able to identify the following three knives used for cutting fruits and vegetables: (1) Chef's knife, (2) Paring knife and (3) Serrated knife. The final learning objective related to the first lesson objective is that participants will be able to describe the following four cutting methods: (1) Slicing, (2) Dicing, (3) Peeling and (4) Juliennening. Participants accomplish this learning objective by observing teacher demonstrations of how to perform each cutting method with different knife types across a range of fruits and vegetables. Participants were given the option to taste each demonstrated fruit and vegetable for consistency with other culinary programs (21,23-38). This portion of *Discussion 1* also addresses the second lesson objective by describing food safety principles associated with cutting fruits and vegetables. The learning objective is that participants will be able to name the key principles of food safety related to personal hygiene and contamination.

Following the first discussion, *Activity 1: Cutting The Rug* (30 minutes) was developed to give participants simple station exercises that could be completed at home with their families. Although this activity is unrelated to the overall lesson objectives, the inclusion of a physical fitness activity in a nutrition education lesson is consistent with other culinary nutrition education programs (40,45). *Discussion 2: Cooking Fruits and Vegetables 101* (35 minutes) was developed to achieve the third and fourth lesson objectives. The lesson addresses the third lesson objective by teaching participants the

fundamentals of cooking with fruits and vegetables. The first learning objective is that participants will be able to describe the following key methods for cooking fruits and vegetables: (1) Steaming, (2) Microwaving, (3) Stir-frying, (4) Sautéing, (5) Simmering, (6) Boiling and (7) Baking. The second learning objective is that participants will be able to identify the main cooking vessels that are used to perform each of the key cooking methods. To achieve these learning objectives, participants were given a *Cooking Methods 101* handout that described each cooking method and their respective cooking vessels. Participants also were shown several teacher demonstrations of cooking various fruits and vegetables with each method.

Embedded in these demonstrations is a discussion of how to follow simple recipe preparation steps for each cooking method to achieve the fourth learning objective. Thus, participants will be able to perform basic preparation steps such as measuring and timing. Participants were given the option of tasting a serving of each demonstrated food to encourage them to try fruits and vegetables cooked in different ways. *Discussion 3: Wrapping It Up* (5 minutes) ensures that all lesson objectives have been accomplished by summarizing the concepts participants learned in the lesson.

Culinary Skills In Action

The second culinary skills lesson is laden with activities rather than discussions in order to achieve overall lesson objectives of applying basic mechanical and perceptual culinary skills with hands-on cooking experiences. The first two activities, *Activity 1: Name That Knife* (10 minutes) and *Activity 2: Knife Skills In Action* (20 minutes), were developed to achieve the first lesson objective. In the first activity, participants engage in

a group game show where they are given descriptions of fruits and vegetables cut in different ways. The first learning objective is that participants will be able to correctly name the knife and cutting method used for every fruit and vegetable described.

Participants are then asked to practice cutting fruits and vegetables described in the game show. The second learning objective is that participants will be able to properly hold a knife. The third learning objective is that participants will be able to perform the following cutting methods with the proper knife type: (1) Julienne with a paring knife, (2) Slice with a serrated knife and (3) Dice with a Chef's knife. *Activity 3: Name That Cooking Method* (10 minutes) was developed to achieve the third lesson objective. In this activity, participants complete a second game show where they are given descriptions of cooking methods. Participants will be able to correctly name the cooking method that matches each description. In general, all learning objectives in these first three activities are accomplished by asking participants to draw upon key concepts they learned about in the first lesson.

The first lesson discussion, *Discussion 1: Following A Recipe* (20 minutes), was created to achieve the fourth lesson objective. In this discussion, participants are taught key steps for properly following a recipe. The first learning objective is that participants will be able to read the following parts of a recipe: (1) Ingredients list, (2) Serving size and (3) Supplies list. To achieve this learning objective, participants are given a *How To Follow A Recipe* handout that pictorially identifies the key parts of a recipe. The second learning objective is that participants will be able to correctly identify the proper cooking utensils and vessels outlined on the recipe. To accomplish this learning objective,

participants are given images of key cooking supplies on the *Cooking Supplies 101* portion of the *How To Follow A Recipe* handout, and are also supplied with key tips in the discussion for how to use these supplies. The third learning objective is that participants will be able to determine how much of each ingredient is required, if a recipe needs to be increased or decreased. Participants are asked to calculate how much of each ingredient is needed on the recipe outlined on the *How To Follow A Recipe* handout, if the recipe is doubled and cut in half, to accomplish this learning objective. To further accomplish all learning objectives in this discussion, participants are shown a teacher demonstration of how to execute key steps for following a USDA fruit recipe (47). Participants are then given the option of trying the completed recipe to encourage them to taste fruits and vegetables in different formats.

Following the first discussion, *Activity 4: Cooking Up Movements* (30 minutes) was developed to give participants simple station exercises that could be completed again at home with their families. The activity is included to remain consistent with the first culinary skills lesson, though the activity is not related to the overall lesson objectives. The final activity, *Activity 5: Cooking With Fruits and Vegetables* (30 minutes), was developed to achieve all lesson objectives. In this activity, participants are separated into groups and given two USDA fruit (48) and vegetable (49) recipes to complete. This activity achieves all lesson objectives, whereby participants will be able to properly follow recipes that require practicing food safety principles, using different knife types and cutting methods and executing different cooking methods.

Evaluative Approach

Several methods were used to evaluate the *Culinary Skills* and *Culinary Skills In Action* lessons. Prior to pilot testing the lessons with early adolescent youth, content validity analyses were used to assess internal validity. Process evaluation tools measured the feasibility of pilot testing the lessons in an after-school setting. Finally, focus groups were conducted following the pilot tests to capture qualitative data for formative evaluations and assessments of self-reported behavior change mediators.

Content Validity

Content validity assessments were completed according to standard methods (50,51). Eight experts reviewed the *Culinary Skills* and *Culinary Skills In Action* lessons for content validity. Full descriptions of aims and objectives of each lesson, copies of all necessary written materials and descriptions of target audiences were provided to content experts. Written instructions for conducting their reviews were distributed to content experts. Reviewers were invited to comment on overall impressions of lessons, areas preventing or facilitating knowledge and skill development for mechanical and perceptual culinary skills and age-appropriateness of lessons. Reviewers were invited to identify areas in the lessons that warranted improvement. Content experts were directed to indicate the overall relevance of lessons to mechanical and perceptual culinary skills (1=not very relevant to 5=very relevant) and the ability of every activity to achieve overall learning objectives (1=low/no ability to 5=high ability). Reviews were independently completed, and content experts were not informed of ratings/comments of other experts.

Pilot Testing

Youth, between the ages 11 to 14 years, were recruited to pilot test the *Culinary Skills* and *Culinary Skills In Action* lessons as part of a 2-day culinary nutrition education program. Participants were recruited through word-of-mouth among middle schools, youth organizations, cooperative extension programs and faith-based institutions. All interested individuals were eligible to participate if they were currently enrolled in the sixth or seventh grades. Participants and their parents were first briefed on the overall objectives of the study. Parents then provided written informed consent, and children provided written informed assent before participating in the pilot study. Participants completed a demographic questionnaire to collect basic information about age, race/ethnicity, gender and school location. Adolescents participated in the *Culinary Skills* lesson for two hours and then a 1-hour focus group on the first program day. On the second program day, participants engaged in the *Culinary Skills In Action* lesson for two hours, followed by a second, 1-hour focus group. Participants were compensated with a \$10 grocery store gift card upon completion of the 2-day culinary program. This study was approved by the Institutional Review Board for Research Involving Human Subjects at The Pennsylvania State University (University Park, PA, US).

Process Evaluation

Investigators used a process evaluation checklist to assess dose, reach and fidelity of the lessons. Dose was analyzed by documenting the total number of individuals who attended each lesson, the total amount of time taken to set-up the lessons and the total time taken to deliver each lesson component. Investigators assessed reach by identifying the total number of adolescents who attended each lesson for the full two hours. Fidelity

was captured by asking the process evaluation observer to determine if each lesson task was completed well or not completed well, to rate how engaged participants were in the lessons on a scale of 1-5 and to document any challenges faced during the lessons. The process evaluation was adapted from other formative evaluation studies (52,53).

Focus Group

A 1-hour focus group was conducted according to standard procedures after each lesson (54). A moderator led the discussions with open-ended questions, and two recorders audiotaped the discussions and took field notes. Participants were encouraged to speak until all opinions were voiced. Probing questions were used to clarify any ambiguous statements. Questions aimed to understand participants' perceptions of the *Culinary Skills* and *Culinary Skills In Action* lessons. Question format was informed based on previous behavior change studies examining individuals' perceptions of nutrition education lessons (55,56). The goals of the focus group discussions were to determine participants' reactions to the lessons and to understand their opinions about the level of difficulty and duration of each lesson component.

Investigators asked formative evaluation questions to collect data on how to improve the lessons for future nutrition education programs. Furthermore, behavior change questions were developed to assess self-reported self-efficacy, social support and outcome expectations related to mechanical and perceptual culinary skills. Self-efficacy was measured by asking participants to rate their confidence level, on a scale of 1-10, in performing various lesson tasks related to the overall learning objectives. Participants were also asked to explain why they chose a particular confidence rating. Self-efficacy

was further assessed by asking participants to comment on the difficulty level of different lesson activities. Social support was measured by asking participants to respond to open-ended questions related to what their friends would think about the lesson. Outcome expectations were measured by asking participants open-ended questions about what they liked learning about in each lesson. Table 4-2 lists the focus group questions and probes and identifies corresponding formative and SCT outcomes for each question for both lesson focus groups.

Data analyses

Comments from content experts were reviewed for common themes and expert ratings were averaged. Demographic data were analyzed for descriptive statistics, using the Statistical Package for the Social Sciences (version 20.0 for Mac, 2011, IBM Corp, Armonk, NY, US). Focus group audiotapes and field notes were transcribed verbatim and reviewed independently by the study investigators to identify recurring trends and patterns (57). Data from this review were coded and sorted using the focus group discussions as an organizational guide (58). Researchers determined emerging themes by identifying the most frequent responses by three or more focus group participants (58). Study investigators reviewed the emerging themes to arrive at a group consensus for the final content and organization of data (58). Descriptive summaries and tables were generated using the most frequent and dominant responses for formative analyses. Furthermore, transcript themes were assessed to summarize qualitative data related to each SCT mediator.

RESULTS

Content Validity

Six registered dietitians, one nutrition educator and one chef reviewed the *Culinary Skills* and *Culinary Skills In Action* lessons for content validity. Individuals represented expertise in university (n=3) and extension (n=1) nutrition education, public health (n=1) nutrition, federal policy promotion and governmental regulation (n=1), culinary skills (n=1) and food industry/commodity group research, development and education (n=1). The overall impressions of reviewers were that these lessons were consistent with culinary competencies and were comprehensive, essential, practical, engaging and based on experiential learning. The combined overall relevancy of the *Culinary Skills* and *Culinary Skills in Action* lessons to developing perceptual and mechanical knowledge and skills for culinary arts was rated as 4.88 ± 0.10 (very relevant). The ability of each activity to meet learning objectives was rated as 4.88 ± 0.10 (high ability) for objective 1 (Use different cutting methods to cut fruits and vegetables), 4.88 ± 0.10 (high ability) for objective 2 (Practice food safety principles), 5.00 ± 0.00 (high ability) for objective 3 (Use different cooking methods to cook fruits and vegetables) and 5.00 ± 0.00 (high ability) for objective 4 (Execute fruit and vegetable recipes). One content expert provided recommendations for eliminating some redundancy in lessons, while maintaining repetition for maximal learning. Points of instructional clarification were provided by two experts. Modifications were implemented in lessons before pilot testing.

Pilot Testing

Eight participants completed the 2-day culinary nutrition education pilot program. Participants had a mean \pm SD age of 11.8 ± 0.8 years, were enrolled in either the sixth or

seventh grade and were all female and Caucasian. All eight females who completed the pilot program participated in the focus group sessions following each lesson. Process evaluation, formative and behavior change data from the pilot testing and focus group sessions are summarized in the sections below.

Process Evaluation

Dose

A total of eight students attended both lessons in the 2-day culinary nutrition education program. The three investigators set aside 30 minutes for each lesson to prepare fruits and vegetables, arrange knife sets and cooking equipment and organize the lesson handouts and physical activity equipment. The total lesson set-up time was accurately estimated, such that it took 29 minutes to set-up the *Culinary Skills* lesson and 30 minutes to set-up *Culinary Skills In Action* lesson. Both lessons were expected to last two hours. The *Culinary Skills* lesson was completed in the expected amount of time (1 hour and 56 minutes), whereas the *Culinary Skills In Action* required much less time to deliver (1 hour and 32 minutes).

In the *Culinary Skills* lesson, all lesson components took less total time to deliver than expected. The discussions took five minutes less time to deliver compared to expected, and the activity took two minutes less time than expected to complete. In general, several *Culinary Skills In Action* lesson activities took less time than expected to execute. *Activities 1 and 3* took approximately half the total time to deliver compared to expected, and *Activity 2* took three minutes less time than expected to execute. The investigators did not execute the physical fitness activity (*Activity 4*), because

participants' had a scheduling conflict that required an earlier end to the lesson than was originally expected. Therefore, the physical activity component was eliminated, because it was not related to the overall lesson objectives. Finally, *Activity 5* took 10 more minutes to deliver than expected. A summary of the process measures for the *Culinary Skills* and *Culinary Skills In Action* lessons can be found in Tables 4-3 and 4-4, respectively.

Reach

A total of eight participants attended the first, 2-hour *Culinary Skills* lesson, compared to only seven participants who attended the second, 2-hour *Culinary Skills In Action* lesson. Due to a scheduling conflict, one individual attended the last hour of the *Culinary Skills In Action* lesson and also joined the focus group discussion following the lesson.

Fidelity

An observer from the research team subjectively rated whether each lesson task was either completed "Well" or "Not completed well" by the lesson instructor. The observer documented that all lesson tasks in the *Culinary Skills* lesson were completed "Well", with the exception of the cooking with fruits and vegetables demonstrations (Table 4-5). The observer noted that this lesson task was "Not completed well," because several demonstrations had to either be modified or eliminated for time purposes. The observer documented that all lesson tasks in the *Culinary Skills In Action* lesson were completed "Well," with the exception of the three tasks related to the physical fitness activity (Table 4-6). These ratings were a function of the fact that *Activity 4: Cooking Up*

Movements was not completed due to time constraints. The observer also rated, on a scale of 1 (Not engaged at all) to 5 (Very engaged), how engaged participants were in the lessons. The observer reported an engagement score of 5 for both lessons (Tables 4-7 and 4-8), thus reporting that all individuals were “Very engaged” in the lessons.

The observer also documented challenges that were faced during the lesson in space provided on the process evaluation form. In general, the observer noted that the kitchen space was not large enough to accommodate all participants during both lessons. The observer reported that it was difficult for all participants to see the *Culinary Skills* lesson cooking demonstrations and to perform knife and cooking tasks safely in both lessons. The observer also noted that the instructor faced challenges during the cooking demonstrations portion of *Discussion 2* in the *Culinary Skills* lesson. The observer reported that participants were not shown how to steam broccoli, because a steamer basket was not available for the demonstration. Furthermore, the observer noted that students were not shown how to stir-fry asparagus, due to time limitations. The observer reported that the prior sautéing bananas demonstration took more time than expected to execute, thus leaving no time to complete the stir-frying demonstration.

Focus Group

Formative Outcomes

Data collected from the *Culinary Skills* and *Culinary Skills In Action* focus groups are summarized in Tables 4-9 and 4-10, respectively. These summaries serve as process recommendations for modifying each lesson component based on common likes and

dislikes as well as challenges faced during each lesson. The following sections describe formative data used to generate these recommendations.

Overall Lesson Perceptions

When asked to self-report, on a scale from 1 (low) to 10 (high), the mean \pm SD level of enjoyment with the *Culinary Skills* lesson was 9.8 \pm 0.4, with a range of 9.5 to 10.0. All participants perceived that they “enjoyed” tasting new fruits and vegetables from the cutting and cooking demonstrations. One participant stated, “I liked getting a different perspective of the foods. Like from a raw carrot to a very sweet carrot.” Furthermore, many participants reported “liking” learning how to hold a knife and food properly, as well as learning about which cooking vessels are used with different cooking methods. All individuals reported “liking” the length of the entire lesson, but most participants expressed a desire to spend more time participating in hands-on activities rather than discussions. Participants reported being dissatisfied with not being able to aid the instructor in the cutting and cooking demonstrations. All participants responded that it would have been “easier” for them to learn the cutting and cooking concepts, if they were given an opportunity to practice these skills. Most participants indicated that they would have been “more satisfied” with the lesson, if more visual aids were used to teach the lesson concepts.

The mean \pm SD level of enjoyment with the *Culinary Skills In Action* lesson was 10.0 \pm 0.0. Most participants indicated that they “enjoyed” testing their culinary knowledge in the team trivia activity and cutting and cooking fruits and vegetables with their friends. Participants reported that they “liked” the hands-on nature of the lesson.

Moreover, all participants indicated that they were “highly satisfied” with the length of the entire lesson, but most participants perceived wanting to spend more time cooking more recipes. Although participants indicated that they “liked” tasting fruits and vegetables, participants expressed a desire to cut and cook with a greater variety of fruits and vegetables.

Lesson Handouts

Although most participants reported that the lesson handouts would be “helpful” to take home to teach their siblings concepts from the lessons, all participants indicated that the handouts were “not needed” during the lessons. Most participants perceived that they could have learned the lesson concepts without the handouts, if visual aids were shown on the white board. Many participants indicated that they “liked” seeing step-by-step instructions on the *Knives 101* handout of how to hold a knife and perform different cutting methods in the *Culinary Skills* lesson. Participants also indicated that it was “useful” to see specific steps for how to read and properly follow a recipe on the *How To Follow A Recipe* in the *Culinary Skills In Action* lesson. Participants perceived that they would refer to this handout at home to help them follow recipes. In general, participants reported that they “enjoyed” seeing a combination of pictures and text on handouts in both lessons. In relation to the *Knives 101* handout, one participant stated, “You got to actually see the knife and it showed you in pictures and words how to peel an orange.” Many participants perceived that they wanted to see more visuals on the *Cooking 101* handout to help them better understand which cooking vessels go with each cooking method in the *Culinary Skills* lesson.

Culinary Skills Lesson Discussions and Activities

How To Hold A Knife

All participants reported “liking” the *How To Hold A Knife* portion of *Discussion*

I. Most participants shared that they enjoyed understanding uses of different parts of knives and handling techniques for different fruits and vegetables. Many individuals indicated that it was “helpful” to learn about knife safety, because many expressed fear about cutting their fingers with knives. One participant’s statement— “I liked learning how to hold the fruit and vegetable so you don’t cut yourself.”—supports this point. Similarly, another participant stated, “I liked learning how to hold the apple down so that you don’t cut off your fingers.” Several participants expressed their desire to practice cutting with the knife rather than just holding it. All participants shared a desire to try holding the knife with a variety of fruits and vegetables that required different hand-holding positions.

Cutting Fruits and Vegetables

All participants expressed a high level of satisfaction with the *Cutting Fruit and Vegetables* portion of *Discussion I*, because they liked tasting the fruits and vegetables in the cutting demonstrations. Participants also indicated that it was “helpful” to see the instructor adjust hand positions with different fruits and vegetables. Some participants expressed dissatisfaction in that they wanted greater opportunity to practice cutting or to aid the instructor in demonstrations. Most participants indicated that it was “difficult” to learn the different cutting methods without visual aids. Many individuals perceived that pictures of fruits and vegetables being cut with different methods would have improved

the discussion. One participant recommended, “You could have like drew a picture of the knife and then wrote the [cutting] method description beside it.”

Cutting The Rug

Participants expressed appreciation for the physical activity component, because they received a “good workout” and enjoyed listening to modern songs, during the physical activity. All participants perceived that the physical activity was given at an appropriate level of difficulty, though many shared that the high knees station was too difficult. Participants also commented that the squats station was difficult, because it required flexibility. Individuals who disliked the physical activity most commonly reported a desire for more stations with different physical activities. Participants recommended stations with activities, such as “jumping obstacles,” “hopscotch,” “kick boxing” and “fitness competitions.”

Cooking Fruits and Vegetables

All participants reported “liking” the *Cooking Fruits and Vegetables* part of *Discussion 2*, because they enjoyed tasting fruits and vegetables cooked in different ways. Furthermore, many participants perceived enjoyment with seeing how shapes and colors of fruits and vegetables transformed after cooking. Individuals who expressed a dislike for this part of the discussion most commonly shared that they had a difficult time identifying which cooking vessels should be used with each cooking method. Many participants expressed that they would have been able to master the concepts, if they were to have aided the instructor in cooking demonstrations. For example, one participant

commented, “I’d remember it more if we actually got to cook it with you guys like, help you put the ingredients in and stuff.”

Culinary Skills In Action Lesson Activities

Name That Knife

Most participants reported that they “enjoyed” the *Name That Knife* activity, because it helped them remember the knife types and cutting methods introduced in the *Culinary Skills* lesson. One participant’s statement—“I liked it because it was kinda like a quick review”—supports this point. Although all participants expressed enjoyment with competing against their friends, most indicated that trivia questions were “too simple.” Participants expressed an interest in being challenged to apply knowledge in new ways with visual stimuli. For example, most participants agreed that a future lesson should show plates of fruits and vegetables and asks them to choose the knife type and cutting method used for each plate.

Knife Skills In Action

All participants expressed satisfaction with the *Knife Skills In Action* activity, because they liked practicing cutting different fruits and vegetables. Participants perceived a desire to spend more time practicing cutting techniques. Individuals who were dissatisfied with the activity most commonly expressed a dislike for wasting fruits and vegetables in the practice activity. Most participants commented on a desire to use the fruits and vegetables at another point in the lesson to create a snack. One participant suggested, “I was thinking we could make like a fruit salad.” Most participants perceived that the activity would be better, if they were given time to practice cutting with more

diverse fruits and vegetables with different types of skins. One participant's comment—"We coulda took like a fruit with a harder surface to try to cut through so we could get practice"—supports this point. Furthermore, participants expressed that practicing with more fruits and vegetables would help them better understand how to adjust their hand positions with different foods. For example, one participant recommended, "We could go from like a cantaloupe to a peach to see the difference."

Name That Cooking Method

All participants reported "liking" the *Name That Cooking Method* activity, because it helped them master their knowledge of different cooking methods. Although participants expressed that they liked working in teams, most reported that the competition aspect of the activity could be improved. All participants perceived that the trivia questions were too easy and not competitive enough. Several participants recommended that a future trivia activity ask questions about which pan should be used with each cooking method. One participant's comment—"You could have actually brought out different types of pans for us to see"—supports this point. Participants also indicated that the team trivia could have been more competitive, if the only the first team to answer a question correctly were to receive points.

Following A Recipe

All participants expressed satisfaction with the *Following A Recipe* discussion, because they liked learning how to read the different parts of a recipe. Participants also noted that they enjoyed being asked to use math skills to determine how much of each ingredient would be needed if recipes were cut in half or doubled. Though participants

indicated that the step-wise nature of the discussion “helped” them learn the concepts, all individuals expressed a desire to see the steps of how to follow a recipe in a bigger visual on the white board. Participants perceived that they enjoyed tasting the fruit recipe from the teacher demonstration, but all individuals indicated a desire to aid the instructor in executing the recipe. Many participants recommended that the instructor call upon different individuals to help complete each step in the recipe. Individuals who were not satisfied with the discussion most commonly expressed that they did not like the taste of the fruit recipe and recommended that a future discussion include a fruit recipe that showcases a greater variety of cooking methods.

Cooking With Fruits and Vegetables

All participants were “highly satisfied” with the *Cooking With Fruits and Vegetables* activity, because they enjoyed completing simple recipes that they could repeat at home. Participants also indicated that they “liked” following a recipe to transform fruits and vegetables into something “more.” All participants expressed a desire to spend more time cooking, whereby most indicated that it would have been “fun” to complete more recipes. Many participants also perceived a desire to try different types of recipes such as beverages, breakfast items and healthy desserts. None of the participants reported dissatisfaction with the activity; however, many had recommendations for making the activity “more fun.” For example, many participants expressed interest in participating in a cooking competition, where each group would make a recipe and judges would vote for the tastiest dish. Others shared that participants

could be broken into smaller groups, with each group making a recipe that would contribute to a full meal then shared with everyone.

SCT Outcomes

Focus group data were evaluated for responses related to selected SCT mediators. The following sections describe the impact of the pilot study on self-reported self-efficacy, social support and outcome expectations related to mechanical and perceptual culinary skills.

Self-Efficacy

Culinary Skills Lesson

Participants were asked to self-report their level of confidence, on a scale of 1 (low) to 10 (high), in performing lesson activities related to the learning objectives. For properly holding a knife in the *How To Hold A Knife* portion of *Discussion 1*, the mean \pm SD confidence level was 9.7 \pm 0.4, with a range of 9.0 to 10.0. Participants reported high confidence in their ability to hold a knife properly, because it was similar to activities that they already complete at home. For example, one participant indicated that it was easier to learn how to hold a knife because “it was kind of like holding a drum stick.” Most participants perceived that they would have self-reported a confidence level of 10, if they would have been given the opportunity to actually cut with the knives. Furthermore, participants indicated that they would have been completely confident in their skills, if they would have been given time to practice holding the knives with fruits and vegetables of different shapes and sizes.

When asked to report their confidence level, on a scale of 1 (low) to 10 (high), in describing different knife types and cutting methods, participants reported a confidence level of 9.7 ± 0.5 , with a range of 9.0 to 10.0. Participants reported high confidence in their ability to identify different knives, because many indicated that they had already learned about these knives in school. Participants reported less confidence in their ability to describe the differences between cutting methods. For example, many participants indicated that it was “confusing” to distinguish between julienning and slicing, because these methods resulted in similar shapes of fruits and vegetables. Most participants expressed that they would have been more confident in their knowledge of cutting methods, if they would have been given visual representations of the differences between methods.

When asked to report their average confidence level, on a scale of 1 (low) to 10 (high), in describing different cooking methods, participants reported a confidence level of 9.5 ± 0.4 , with a range of 9.0 to 10.0. Participants reported high confidence in their knowledge of different cooking methods, because they had previously practiced some of these methods at school and home. Although, many participants reported low confidence in their ability to choose the proper cooking vessels that accompany each method. One participant’s comment—“I think it’s just like sautéing and simmering because they use similar pans, I think that was a little confusing”—supports this point. Many participants expressed that visual aids would have been helpful for understanding which cooking vessels corresponded to each method. One participant recommended, “Maybe like put little sticky notes on the pan to say what pan goes with simmering.” Other participants

indicated a desire to write notes during the lesson to help them remember what cooking vessels should be used with each cooking method.

Culinary Skills In Action Lesson

For correctly identifying knife types and cutting methods in the *Name That Knife* activity, the mean \pm SD confidence level was 10.0 \pm 0.0. Participants reported high confidence in their ability to correctly answer trivia questions, because concepts were taught at a level that they understood in the first *Culinary Skills* lesson. Many participants expressed that the concept of a team trivia game in the second lesson motivated them to learn the concepts in the first lesson. One participant's comment—"I liked it cause it kinda motivated us to like pay attention more"—supports this point. Furthermore, participants perceived high confidence during the trivia game, because the questions were simple.

When asked to report their average confidence level, on a scale of 1 (low) to 10 (high), in practicing different cutting methods with various knife types, participants reported a confidence level of 10.0 \pm 0.0. Participants expressed high confidence in their ability to properly hold different knife types and execute different cutting methods, because they had previously helped their parents cut fruits and vegetables at home. Although participants reported high confidence, all individuals expressed a desire for more one-on-one teacher guidance. Participants conveyed interest in having an instructor provide assistance for fruits and vegetables that were hard to manipulate. For example, many participants indicated that the potatoes were "difficult" to slice as directed due to deformed shapes.

When asked to report their average confidence level, on a scale of 1 (low) to 10 (high), in identifying different cooking methods, participants reported a confidence level of 9.2 ± 0.7 , with a range of 8.0 to 10.0. Participants reported high confidence in their ability to name the cooking method that matched each trivia description, because the questions were not very “complicated” and did not require application of knowledge. Participants expressed less confidence in the second part of the trivia game, because they were confused about the difference between sautéing and stir-frying. All participants expressed a desire to have a more extended discussion in the first *Culinary Skills* lesson about key differences between these two methods. When asked to report their average confidence level, on a scale of 1 (low) to 10 (high), in reading a recipe in the *Following A Recipe* discussion, participants reported a confidence level of 10.0 ± 0.0 . Participants expressed high confidence in their ability to follow a recipe, because they practiced reading recipes in their Family and Consumer Sciences courses at school. All participants expressed high confidence in their ability to use math skills to modify recipes, though some participants noted that it may be “difficult” to halve ingredients on the recipe that are presented as fractions measurements.

When asked to report their average confidence level, on a scale of 1 (low) to 10 (high), in cooking fruits and vegetables, participants reported a confidence level of 9.9 ± 0.2 , with a range of 9.5 to 10.0. Participants expressed high confidence in their cooking abilities, because instructors guided them through the recipes. Several participants reported future concerns about food and kitchen safety, if they were asked to repeat these recipes alone. For example, many individuals expressed a fear of burning

themselves in the kitchen, because they do not know how to properly use kitchen equipment. Other participants reported less confidence in their ability to measure ingredients and suggested that more lesson time be dedicated to practicing measuring skills.

Social Support

All participants expressed an interest in encouraging their friends and siblings to participate in the 2-day culinary nutrition education program, if it were offered again. Participants perceived that the lessons would help their friends lead a healthier lifestyle. One participant's comment—"It will help them later in life to know how to cook healthy in different ways"—supports this point. Many participants also expressed that it would help their friends teach their families about healthy cooking. For example, one participant commented, "It will help my friends with little brothers and sisters so when they babysit for them they can actually cook healthy foods for them." Some participants conveyed an interest in teaching their friends knife and cooking skills, because Family and Consumer Sciences courses were not offered at their friends' schools. More specifically, participants indicated that they would teach their friends knife safety skills so that they would not be "afraid" to cut fruits and vegetables. One participant's comment—"It would help them so they won't chop off their fingers when they go to cut something"—supports this point.

All participants also reported "liking" working with their friends in teams throughout the *Culinary Skills In Action* lesson. For example, all participants expressed that they liked how every member of their cooking team was assigned a different task. One participant's comment—"I liked working with the teams because we each got to do

our own part”—supports this point. Many participants conveyed that they liked how teams were helping each other in the kitchen, and they enjoyed tasting the other teams’ finished recipes. In fact, all participants recommended that each team make a different recipe in future lessons so that they could try a variety of different recipes.

Outcome Expectations

Participants reported many positive outcome expectations related to future intake of fruits and vegetables. All participants expressed that they enjoyed tasting foods in the lessons, because it changed their perceptions of fruits and vegetables. For example, one participant stated, “Like bananas. I really didn’t like them before, but after you cooked them like you did, they were okay.” Another participant commented, “Well I did like carrots before but it made me like carrots more because of what you did to them. Putting them in the microwave made it much more sweeter so I like carrots even more now.”

Furthermore, all participants reported an interest in cooking these fruits and vegetables at home and that they would be “inspired” to try other new fruits and vegetables. One participant’s statement—“I would cook these at home because some of those [methods] made the vegetables more sweeter”—supports this point.

All participants expressed positive expectations related to using skills of how to read recipes to help their parents make family dinners. More specifically, many participants perceived that they could use their knowledge of different cooking methods to create healthy meals for their families when their parents were busy. Many participants expressed a desire to try the lesson recipes at home with their parents and held positive outcome expectations related to their abilities to execute the recipes with different fruits

and vegetables. All individuals reported high expectations that learning how to cook fruits and vegetables in “convenient” ways would increase the amount of fruits and vegetables eaten in the home.

DISCUSSION

Content validity data were used to develop two internally valid culinary skills lessons that successfully accomplished the four lesson objectives. Pilot study results indicated that it was feasible to deliver the 2-day culinary nutrition education program in an after-school setting with early adolescent children. Process evaluations revealed that most lesson tasks related to each learning objective in the *Culinary Skills* and *Culinary Skills In Action* lessons were executed well. Time constraints prohibited the instructor from executing the cooking demonstrations in the first lesson and the physical fitness activity in the second lesson. Process evaluation checklists also suggested that all participants were highly engaged in both lessons. Formative data collected from both focus groups showed that participants were highly satisfied with the lessons. Furthermore, process recommendations provided guidance for modifying the lessons to better accomplish the four lesson objectives. Both lessons effectively impacted SCT mediators, such that participants reported high self-efficacy, social support and outcome expectations related to performing various mechanical and perceptual culinary tasks.

Formative data indicated that individuals struggled to complete learning objectives related to using different methods to cut (Lesson Objective #1) and cook (Lesson Objective #3) fruits and vegetables in the *Culinary Skills* lesson. The most commonly reported difficulty was understanding the difference between cutting and

cooking tasks with similar methodologies. These difficulties are consistent with qualitative research, which has shown that cooking terminology is “intimidating” (2, p. 343) for many prospective cooks. Research reveals that a lack of knowledge of basic cooking terms like, dice and sauté, discourages individuals from cooking at home (60). Further research has shown that failure to understand basic culinary concepts leads to nutritionally inferior meals and is thus a barrier to healthy food choices and consumption (36,61,62).

Data from this pilot study indicates that participants would have reported greater self-efficacy in their mastery of the culinary concepts, if they would have been given more comprehensive experiences with fruits and vegetables in both lessons. Fordyce-Voorham (59) found similar results in focus groups with early adolescent youth who reported that the experiential process of learning is equally important as basic knowledge about essential skills. Participants believed it was important to have the opportunity to practice and repeat cooking tasks for ultimate skill acquisition (59). Other research suggests that hands-on cooking experiences are essential for improving meal practices and eating behaviors (22,37). A future *Culinary Skills* lesson will empower youth with cooking literacy skills combined with hands-on skills application activities, which remains consistent with other validated culinary skills lessons (25,26,35,38).

Formative data also indicated that individuals struggled to complete learning objectives related to executing fruit and vegetable recipes (Lesson Objective #4) in the *Culinary Skills In Action* lesson. Participants believed that they lacked knowledge of how to use cooking appliances safely. These feelings of inadequacy have been captured in

other studies, whereby Byrd-Bredbenner (63) found that a lack of understanding of how to properly use cooking equipment led to a decrease in cooking self-efficacy. Participants in the current pilot study also indicated a lack of self-efficacy in their measurement skills. Previous research has indicated that youth need to be grounded in these skills to decrease the frequency of cooking errors and thus increase overall cooking self-efficacy (63). Measurement skills are important preliminary culinary tasks (38,59) and thus a future *Culinary Skills In Action* lesson needs to devote more lesson time to building these skills.

Social support from peers played a large role in participants' perceived adoption of healthy cooking at home. Participants expressed enjoyment in working with their friends in teams to experiment with fruits and vegetables. These results are consistent with results found by Dougherty et al. (35), which showed that high self-reported enjoyment with culinary lessons was associated with facing challenges and milestones with friends. Similarly, Lukas et al. (34) found that youth enjoyed feeling free to experiment in the kitchen with their friends. Other studies argue that engaging youth in peer groups increases their willingness to try new foods (34,59). These results suggest that enhancing the peer group component in a future 2-day culinary nutrition program may be more effective at producing positive behavior changes.

Interestingly, participants in the pilot study reported a desire to try new fruits and vegetables in different recipes at home. These positive outcome expectations may ultimately lead to increases in fruit and vegetable consumption over time. In support of this point, Fulkerson et al. (28) found that culinary nutrition education led to increases in fruit and vegetable availability and decreases in availability of high fat food among youth

and parents who participated in a 3-month culinary program. Participants in the pilot study also held positive outcome expectations related to the feeling of accomplishment associated with creating meals. These results are consistent with a study by Caraher et al. (64), which found that increasing culinary skills and knowledge leads individuals to feel a sense of achievement related to their ability to cook healthy foods. Many individuals also held positive outcome expectations related to the frequency of cooking at home, whereby several participants reported a desire to try recipes at home with their siblings. Similarly, Dougherty et al. (35) found that children wanted to teach their parents the cooking skills they learned in their culinary lessons. These results suggest that high positive outcome expectations related to cooking may increase the frequency with which youth cook at home with their families.

This pilot study had several limitations that limit the external validity of results. The sample size was small and consisted of a homogeneous group of Caucasian females. Investigators also failed to capture data on the change in SCT mediators from pre- to post-test. Therefore, there is no way of understanding if the 2-day culinary nutrition education program was effective at modifying SCT mediators over time. Qualitative data collected on SCT mediators may also be inflated due to social desirability biases. Participants may have reported heightened positive outcome expectations associated with cooking experiences in order to agree with other positive viewpoints held by peers in the focus groups. Process evaluations also revealed that time constraints in an after-school setting may pose challenges for repeating the 2-day culinary nutrition education lesson with larger groups.

Formative and process evaluation results from the pilot study will be used to modify the *Culinary Skills* and *Culinary Skills In Action* lessons. Future research will test the effectiveness of the 2-day culinary nutrition education program in a larger group of more diverse male and females. Future evaluations of the lessons will include more quantitative measurements of culinary skills and knowledge, including a validated culinary aptitude instrument catered to the concepts taught in the lessons. A future study also will include assessments of changes in SCT mediators with the use of a SCT questionnaire that has been validated as part of this larger research project. Future studies also need to explore changes in fruit and vegetable intake over time to understand if self-reported increases in fruit and vegetables preferences translate into actual consumption. Finally, results from this pilot study revealed that social support played a large role in participants' overall satisfaction with the culinary program. Therefore, future research will be conducted to understand if training youth to deliver the lessons to their peers will foster greater camaraderie and thus result in greater changes in SCT mediators.

CONCLUSIONS

In summary, it is feasible to deliver the *Culinary Skills* and *Culinary Skills In Action* lessons as part of a 2-day culinary nutrition education to early adolescent youth in an after-school setting. The lessons must be modified with process recommendations to achieve learning objectives related to using different cutting and cooking methods. Both lessons were effective at positively impacting SCT mediators such as self-reported self-efficacy, social support and outcome expectations related to mechanical and perceptual

culinary skills. Future studies need to examine the effectiveness of the lessons at promoting positive changes in SCT mediators and obesity-related behaviors over time.

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Table 4-1. Summary of common concepts identified among nutrition materials from Cooperative Extension and National Nutrition Education programs.

Lesson Objective #1: <i>Use different cutting methods to cut fruits and vegetables</i>	Lesson Objective #2: <i>Practice food safety principles</i>	Lesson Objective #3: <i>Use different cooking methods to cook fruits and vegetables</i>	Lesson Objective #4: <i>Execute fruit and vegetable recipes</i>
<ul style="list-style-type: none"> • Practice knife safety (40-42) • Properly hold a knife (41,42) • Cut with basic knife types: <ul style="list-style-type: none"> Chef's (41,42) Paring (41,42) Serrated (41,42) • Use basic cutting methods: <ul style="list-style-type: none"> Dicing (39,41,42) Slicing (41,42) Julienninng (41,42) Peeling (39,40,42) 	<ul style="list-style-type: none"> • Follow personal hygiene principles (39,40) • Properly handle raw and cooked foods (39,40) • Store foods properly (39,40,45) • Wash foods properly (39,40) 	<ul style="list-style-type: none"> • Identify different cooking vessels (39,42,43,44) • Use different cooking appliances (39,40,43) • Taste new fruits and vegetables (40,41,46) • Use basic cooking methods: <ul style="list-style-type: none"> Steaming (43,44) Sautéing (39,43,44) Stir frying (39,44) Boiling (39) Baking (39,44) Microwaving (40,43) 	<ul style="list-style-type: none"> • Measure ingredients (39,46) • Read the parts of a recipe (39,40,46) • Use simple math skills to double or halve recipes (46)

Table 4-2: Mechanical and perceptual culinary skills pilot test study focus group questions, probes and outcomes.

Questions	Probes	Outcomes
Overall Lesson Feedback		
Did you like the lesson – why or why not?	P1: What did you like about it? P2: What did you not like about it?	• Formative • ^a SCT: Outcome Expectations
Was the lesson taught at a level that you could understand?	P1: Did you think the lesson was too advanced for you? P2: Did you think the lesson was too easy for you?	• Formative • SCT: Self-efficacy
Did you like the lesson handouts – why or why not?	P1: Did the handouts help you learn the lesson concepts? P2: Do you have any suggestions for how to make the handouts better?	• Formative
Do you have any general suggestions for how to make the lesson better?	P1: What types of discussions would you like to have? P2: What types of activities would you like to do?	• Formative
Would you tell your friends to participate in this lesson if it was offered again?	P1: Would you tell your friends that this lesson was cool? P2: Do you think your friends would think this lesson was cool?	• SCT: Social Support
Lesson Discussions/Activities		
Did you like the lesson activity – why or why not?	P1: What did you like about it? P2: What did you not like about it?	• Formative • SCT: Outcome Expectations
Was the activity too difficult or too easy?	P1: What was too difficult? P2: What was too easy?	• Formative • SCT: Self-efficacy
Did you feel like you needed more/less time to complete the activity?	P1: Did you feel like you had enough time to complete the activity so that you were prepared for the group discussion?	• Formative

Note. ^aSCT = Social Cognitive Theory

Table 4-3. Summary of dosage results for the *Culinary Skills* lesson.

Process Measure	Expected	Actual
<i>Number of Lesson Attendees</i>	8	8
<i>Total Time To Set-Up Lesson</i>	30 min.	29 min.
<i>Total Time To Deliver Lesson</i>	120 min.	116 min.
<i>Total Time To Deliver Discussion 1: Knives 101</i>	50 min.	45 min.
<i>Total Time To Deliver Activity 1: Cutting The Rug</i>	30 min.	28 min.
<i>Total Time To Deliver Discussion 2: Cooking Fruits & Veggies 101</i>	35 min.	37 min.
<i>Total Time To Deliver Discussion 3: Wrapping It Up</i>	5 min.	2 min.

Table 4-4. Summary of dosage results for the *Culinary Skills In Action* lesson.

Process Measure	Expected	Actual
<i>Number of Lesson Attendees</i>	8	8*
<i>Total Time To Set-Up Lesson</i>	30 min.	30 min.
<i>Total Time To Deliver Lesson</i>	120 min.	92 min.
<i>Total Time To Deliver Lesson Activity 1: Name That Knife</i>	10 min.	4 min.
<i>Total Time To Deliver Activity 2: Knife Skills In Action</i>	20 min.	17 min.
<i>Total Time To Deliver Activity 3: Name That Cooking Method</i>	10 min.	6 min.
<i>Total Time To Deliver Discussion 1: Following A Recipe</i>	20 min.	20 min.
<i>Total Time To Deliver Activity 4: Cooking Up Movements</i>	30 min.	N/A
<i>Total Time To Deliver Activity 5: Cooking With Fruits & Vegetables</i>	35min.	45 min.

Note. *One participant was not in attendance for the full two-hour lesson.

Table 4-5. Summary of fidelity observations of lesson task completion for the *Culinary Skills* lesson.

Lesson Task	Task Completed Well	Task Not Completed Well
Learning objectives clearly stated	✓	
Clearly identified knife parts	✓	
How to hold a knife demonstration	✓	
Can you hold a knife demonstration	✓	
Clearly described SHS principles of knife safety	✓	
Clearly described knife types	✓	
Cutting fruits and vegetables demonstration	✓	
Warmed up students for physical activity	✓	
Stretched students with ^a ACSM guidelines	✓	
Cutting the rug! activity	✓	
Cooled down students with ACSM guidelines	✓	
Clearly described cooking methods	✓	
Cooking with fruits and vegetables demonstrations		✓
Clearly summarized lesson concepts	✓	

Note. ^aACSM = American College of Sports Medicine

Table 4-6. Summary of fidelity observations of lesson task completion for the *Culinary Skills In Action* lesson.

Lesson Task	Task Completed Well	Task Not Completed Well
Learning objectives clearly stated	✓	
Name that knife! activity	✓	
Knife skills in action! activity	✓	
Name that cooking method! activity	✓	
Clearly described steps to follow a recipe	✓	
Following a recipe demonstration	✓	
Warmed up students for physical activity		✓
Stretched students with ACSM guidelines		✓
Cooking up movements activity		✓
Guided students through steps to complete Recipe #1	✓	
Guided students through steps to complete Recipe #2	✓	

Note. ^aACSM = American College of Sports Medicine

1- Not Engaged At all	2 Somewhat unengaged	3- Neither engaged no unengaged	4- Somewhat engaged	5- Very engaged
				✓

1- Not Engaged At all	2 Somewhat unengaged	3- Neither engaged no unengaged	4- Somewhat engaged	5- Very engaged
				✓

Table 4-9. Summary of formative data from the *Culinary Skills* lesson.

Lesson Element	Likes	Dislikes	Recommendations
Lesson Handouts	<ul style="list-style-type: none"> • Helpful for teaching siblings knife and cooking skills • Step-by-step instructions • Combination of text and pictures 	<ul style="list-style-type: none"> • Too many handouts • Cooking methods handouts did not include pictures of cooking vessels 	<ul style="list-style-type: none"> • Teach handout concepts on the white board • Invite students to write on the white board • Show pictures of cooking vessels used with each cooking method
How To Hold A Knife	<ul style="list-style-type: none"> • Learning about different parts of a knife • Learning how to hold a knife differently with different foods • Learning about knife safety principles 	<ul style="list-style-type: none"> • Not given the opportunity to actually cut with the knives 	<ul style="list-style-type: none"> • Practice cutting different fruits and vegetables • Practice holding a greater variety of fruits and vegetables with different knives
Cutting Fruits and Vegetables	<ul style="list-style-type: none"> • Tasting fruit and vegetable demonstrations • Seeing how to adjust hand positions with different fruits and vegetables 	<ul style="list-style-type: none"> • Difficult to learn different cutting methods without visual aids of what different cuts are supposed to look like • Not given the opportunity to practice the different cutting methods 	<ul style="list-style-type: none"> • Show pictures of fruits and vegetables cut with different cutting methods on the white board • Hands-on experiences cutting fruits and vegetables with the different methods <ul style="list-style-type: none"> • Discuss differences between different cutting methods
Cooking Fruits and Vegetables	<ul style="list-style-type: none"> • Tasting fruits and vegetables cooked in different ways • Learning how different cooking methods can transform the taste of fruits and vegetables 	<ul style="list-style-type: none"> • Difficult to identify which cooking vessels should be used with each cooking method • Difficult to remember the definitions of each cooking method without writing concepts down on paper • Not helping the instructor perform the cooking demonstrations 	<ul style="list-style-type: none"> • Put sticky notes on cooking vessels to indicate which cooking method goes with each cooking vessel • Do a drawing activity where a cooking method must be matched with a cooking vessel • Ask for volunteers to aid the instructor in cooking demonstrations
Cutting The Rug	<ul style="list-style-type: none"> • Getting up and moving around instead of sitting for the whole lesson • Receiving a good workout • Listening to songs heard on the radio while doing the activities 	<ul style="list-style-type: none"> • High knees station was too difficult • Activities required too much flexibility 	<ul style="list-style-type: none"> • Include more activities: <ul style="list-style-type: none"> ⇒ Jumping obstacles ⇒ Hopscotch ⇒ Kick boxing exercises ⇒ Competitions

Table 4-10. Summary of formative data from the *Culinary Skills In Action* lesson.

Lesson Element	Likes	Dislikes	Recommendations
Lesson Handouts	<ul style="list-style-type: none"> • Helpful for teaching siblings how to follow recipes • Step-by-step instructions • Taking copies of recipes home to try again 	<ul style="list-style-type: none"> • Examples on the recipes of different fruits and vegetables to use 	<ul style="list-style-type: none"> • Book of healthy fruit and vegetables to take home
Name That Knife	<ul style="list-style-type: none"> • Helpful for reviewing knife types and cutting methods learned in the first lesson • Team competition 	<ul style="list-style-type: none"> • Trivia questions were too easy • No questions with visual stimuli • Team trivia did not last long enough 	<ul style="list-style-type: none"> • Ask questions that require application of knowledge • Show plates of fruits and vegetables and ask students to choose the knife type and cutting method used for each plate • Ask more trivia questions
Knife Skills In Action	<ul style="list-style-type: none"> • Practicing different cutting methods • Refresher teacher demonstration of each method was given before each practice session 	<ul style="list-style-type: none"> • No one-on-one attention given during practice sessions • Fruits and vegetables were wasted after each practicing each cutting method • Did not practice cutting with a diverse range of fruits and vegetables • Not given enough time practicing cutting skills 	<ul style="list-style-type: none"> • Instructor give more one-on-one tutelage • Use fruits and vegetables from cutting exercise to make a meal • Practice cutting fruits and vegetables with different types of skins: <ul style="list-style-type: none"> ⇒ Watermelon ⇒ Cantaloupe ⇒ Mango ⇒ Pineapple ⇒ Peach • Give students ~12 more minutes in the kitchen to practice cutting skills
Name That Cooking Method	<ul style="list-style-type: none"> • Helped master knowledge of cooking methods • Team competition 	<ul style="list-style-type: none"> • Team trivia was not competitive enough • Trivia questions were too easy • Team trivia did not last long enough • No questions with visual stimuli • Difficult to determine the difference between sautéing and stir-frying 	<ul style="list-style-type: none"> • Point allotment is modified so that the first team to answer correctly gets points • Show cooking vessels and ask questions about what cooking vessel goes with each cooking method
Following A Recipe	<ul style="list-style-type: none"> • Learning how to read different parts of a recipe • Using math skills to calculate how many ingredients are needed when recipe serving sizes are modified • Step-by-step instructions 	<ul style="list-style-type: none"> • Not enough visual aids for learning steps to follow a recipe • Not given the opportunity to aid the instructor in making the demonstration recipe • Taste of the finished recipe 	<ul style="list-style-type: none"> • See steps of how to follow a recipe on the white board • Ask for volunteers to aid the instructor in the recipe demonstration • Demonstrate a recipe that showcases a greater variety of cooking methods
Cooking With Fruits and Vegetables	<ul style="list-style-type: none"> • Working in cooking teams • Executing simple recipes that could be done again at home • Feeling of accomplishment from successfully completing recipes • Tasting completed recipes 	<ul style="list-style-type: none"> • Not given enough time to cook • Not given the opportunity to try a variety of recipes • All groups were given the same recipes 	<ul style="list-style-type: none"> • Complete ~3 more recipes with different fruits and vegetables • Complete greater variety of recipes: <ul style="list-style-type: none"> ⇒ Beverage ⇒ Breakfast item ⇒ Healthy dessert • Give each group a different recipe • Have an iron chef competition between groups

CHAPTER 5

**EVALUATION OF PSYCHOMETRIC TOOLS FOR ASSESSING BEHAVIOR
CHANGE MEDIATORS AMONG
EARLY ADOLESCENTS AND THEIR PARENTS**

To be submitted to the *Journal of Nutrition Education and Behavior*

ABSTRACT

Introduction Increasing culinary skills may improve adherence to dietary recommendations and thus lower obesity-related risk behaviors. Instruments that measure mediators of behavior change toward meeting dietary guidelines are needed. Evaluation of an instrument, grounded in the Social Cognitive Theory (SCT), may be useful for understanding if and how adolescents and their parents modify their behaviors following nutrition education programs designed to raise awareness of the principles of the *Dietary Guidelines for Americans, 2010*, including Balancing calories to manage weight, Reducing certain foods and food components, Increasing selected foods and nutrients and Building health eating patterns. The purpose of this study was to assess the internal consistency and reliability of parent and adolescent SCT questionnaires. Validated instruments can be used to evaluate the effectiveness of nutrition education programs at modifying SCT mediators related to following dietary guidelines.

Methods Adolescent/parent pairs were recruited via word-of-mouth to complete questionnaires at two time points within one week. Demographic data were collected at baseline and analyzed for descriptive statistics. Participant responses to questionnaires at Time 1 were used for internal consistency analyses. Item-total assessments were conducted for scales with Cronbach's $\alpha > 0.70$; items were removed from scales, if item deletion produced higher α . Scale items for each SCT mediator (i.e., social/family support, self-efficacy, self-regulation and outcome expectations) were averaged, and test-retest reliability analyses between Time 1 and Time 2 were conducted with Spearman correlations.

Results Forty-two adolescent/parent dyads completed baseline demographic questionnaires. Adolescents were aged 12.3 ± 0.6 y (mean \pm SD), mostly female (n=31, 73.8%) and enrolled in the seventh grade. Parents were aged 48.3 ± 5.1 y, mostly female (n=30, 71.4%), of higher household income (n=32, >\$75,000/y) and of higher educational level (n=37, ≥ 4 -y college degree). Forty-two adolescent/parent pairs completed questionnaires at Time 1, and 36 pairs completed questionnaires at Time 2. Adolescent and parent questionnaires demonstrated high internal consistency, whereby scales for most SCT mediators ranged from 0.81 to 0.98 for adolescents and parents. Deletion of items for self-regulation related to Balancing calories to manage weight in adolescent and parent questionnaires increased the internal consistency of these scales. Test-retest reliability analyses revealed that adolescent and parent questionnaires demonstrated high internal reliability, with correlations ranging from 0.40 to 0.94 in adolescents and from 0.77 to 0.97 in parents, between Time 1 and Time 2.

Conclusion Questionnaires assessing mediators of behavior change are valid and reliable in adolescents and their parents. These instruments can be used to evaluate the effectiveness of nutrition education programs that increase awareness of *Dietary Guidelines for Americans, 2010*, among early adolescents and their parents.

INTRODUCTION

A primary goal of nutrition education approaches to childhood obesity prevention is to provide learning experiences to facilitate the adoption of healthy behaviors (1). Socioecological models of childhood obesity predict that behavior change is a function of changes in personal attributes such as beliefs, expectations, motives and values (1) as well as food and activity environments (2). Behavior change models provide theoretical frameworks for understanding the effectiveness of interventions at promoting positive changes by identifying mediating variables that may be antecedents to changes in behaviors (3). Social Cognitive Theory (SCT) is one model commonly used in the design of nutrition education interventions (3). SCT is effective, because it supports the concept that behavior change is the result of changes in both personal and environmental variables (4). SCT predicts that behavior change is a function of the reciprocal interaction between personal mediators including self-efficacy and outcome expectations as well as environmental mediators such as social and family support.

Several studies have tested the effectiveness of nutrition education interventions designed to promote the principles of the *Dietary Guidelines for Americans* at modifying SCT mediators of behavior change in parents and adolescents (5-12). Studies assessed a range of SCT mediators related to intake of fruits and vegetables (5,6,8-11), whole grains (7) fat (9,10) and healthy foods (12) and engagement in physical activity (9). Some studies showed significant changes in self-efficacy (5,10), outcome expectations (5) and social support (6), while other studies found no significant changes in self-efficacy (6-9,11,12) and social support (8,9,12). These results suggest that current nutrition education

about dietary guidance may only be moderately effective at promoting behavior change. Designing more effective nutrition education programs targeting principles of the *Dietary Guidelines for Americans, 2010*, requires the development of valid and reliable instruments to evaluate behavior change promoted by such nutrition education programs.

The purpose of this study was to evaluate instruments, grounded in SCT, to assess the effectiveness of nutrition education lessons about the principles of the *Dietary Guidelines for Americans, 2010*, at promoting behavior change in early adolescents and their parents. The primary aim of this research was to prepare psychometric tools to assess SCT mediators across a range of obesity-related health behaviors. The objective of this study was to pilot test the questionnaires for internal validity and reliability with early adolescents and their parents. It was hypothesized that the instruments would be valid and reliable tools for assessing behavior change mediators among early adolescent children and their parents.

METHODS

Questionnaires

Behavior change interventions for childhood obesity prevention have sought to modify a range of obesity-related behaviors. The *Dietary Guidelines for Americans, 2010*, outline the following four principles that should be addressed in order to improve overall health and facilitate health behavior change: (1) Balancing calories to manage body weight; (2) Reducing certain foods and food components; (3) Increasing selected foods and nutrients and (4) Building healthy eating patterns (13). These four guiding principles served as the main components related to four key mediators of behavior

change: (1) social/family support (environmental); (2) self-efficacy (personal); (3) self-regulation (personal) and (4) outcome expectations (personal). Thus, the instrument contained a total of 16 scales. One instrument was prepared for adolescents, and one instrument was prepared for adults (i.e., parents).

Questionnaire items were chosen based on a review of validated psychometric instruments used in nutrition education interventions for youth and parents (14-21). Items from published questionnaires were assigned to one SCT mediator, with wording of questions modified as needed by investigators to address each behavior change mediator as related to each guiding principle of the *Dietary Guidelines for Americans, 2010*. Table 4-1 summarizes the validated instruments from which items were extracted and then combined to create four SCT mediators on the adolescent and parent instruments.

The SCT components related to Balancing calories to manage body weight measured perceptions of maintaining energy balance through improved eating and physical activity behaviors for adolescents. For parents, items for this principle assessed parents' perceptions about how they manage their children's energy balance. Questionnaire items for Reducing certain foods and food components measured beliefs about reducing foods high in solid fats and added sugars for adolescents, and the parent instrument assessed perceptions about how parents reduce their children's intakes of solid fats and added sugars. Items related to Increasing selected foods and nutrients measured opinions about increasing intake of nutrient-dense foods for adolescents, and for parents, questions about their perceptions of ability to increase their children's intakes of nutrient-dense foods were included. The Building healthy eating patterns principle assessed

perceptions about selecting foods that fit into a healthy dietary pattern for adolescents, and for parents, items about perceptions of their contributions to their children's selection of healthy foods were included.

Regarding SCT mediators, the social/family support items were extracted from the Project EAT Survey (14,15) and a psychosocial scale measuring fruit, vegetable and dietary fat intake (16). The social/family support scale of the questionnaire included 83 items for adolescents and 81 items for parents. Respondents were asked to identify how often various events happened, using a five-point Likert scale (1 = Never to 5 = Repeatedly). The self-efficacy items were included based on questions related to physical activity (17-19) and healthy food choices (14,20). The self-efficacy scale of the questionnaire included 74 items for adolescents and parents. Participants reported how certain they were about several behaviors, using a five-point Likert scale (1 = I am sure I cannot to 5 = I am sure I can). The self-regulation questions were extracted from questionnaires assessing weight control behaviors (15,21) and perceived behavioral control pertaining to perceptions of the ease/difficulty of being physically active (17). The self-regulation scale of the questionnaire contained 55 items for adolescents and parents. Participants identified how different statements described them, using a five-point Likert scale (1 = Does not describe me to 5 = Describes me completely). The outcome expectation questions were obtained from surveys assessing normative expectations for eating fruits and vegetables (21). The outcome expectation scale of the questionnaire included 115 items for adolescents and parents. Respondents identified the

extent to which they agreed with various statements, using a five-point Likert scale of agreement (1 = Strongly disagree to 5 = Strongly agree).

Initial drafts of the adolescent and parent instruments were reviewed for content, language, reading level and format by one academic professional in the field of research, one graduate student in nutritional sciences, two early adolescent children and one parent. These content experts provided overall agreement with the evaluation items for each guiding principle and SCT mediator. A final version of the questionnaires can be found in Appendix B. Tables 4-2 and 4-3 provide example items and response scales for each questionnaire for adolescents and adults, respectively.

Instrument Testing

Early adolescents (ages 12 to 14 y) and their parents were recruited through word-of-mouth among middle schools, youth organizations, cooperative extension programs and faith-based communities. Adolescent and parent pairs were eligible to participate, if the adolescent was currently enrolled in the sixth or seventh grades. Participants were briefed on the purpose of the study, and before participating in the instrument testing, parents provided written informed consent and adolescents provided written informed assent. Adolescents completed a demographic questionnaire, providing information about age, race/ethnicity, gender and school location. Parents completed a separate demographic questionnaire and provided details about age, race/ethnicity, gender, level of education, household income, employment status and household type. Parents and their children completed the SCT questionnaires on two separate occasions within one week. After receiving directions from an investigator, participants completed the paper-

and-pencil questionnaires on their own. Adolescents and parents were instructed to complete the questionnaires independently of one another. These questionnaires were used for validity and test-retest reliability analyses. This study was approved by the Institutional Review Board for Research Involving Human Subjects at The Pennsylvania State University (University Park, PA, USA).

Data Analyses

All analyses were conducted using the Statistical Package for the Social Sciences (version 20.0 for Mac, 2011, IBM Corp, Armonk, NY, USA). Statistical significance was set at $P < 0.05$. Demographic data were analyzed for descriptive statistics. Cronbach's α was calculated to measure the internal consistency of scales for each SCT mediator. Cronbach's α values ≥ 0.70 were considered acceptable (22). For all scales with Cronbach's $\alpha < 0.70$, item-total analyses were conducted, and individual items were removed from scales, if item deletion resulted in a higher α value. Items within each SCT mediator scale were averaged and test-retest reliability analyses between Time 1 and Time 2 were conducted for each SCT mediator with Spearman correlation.

RESULTS

A total of 42 adolescent/parent pairs completed baseline demographic questionnaires. Of these dyads, 42 completed SCT questionnaires at Time 1 and 36 pairs completed questionnaires at Time 2. Descriptive statistics for the original 42 pairs are shown in Table 4-4. Adolescents had a mean \pm SD age of 12.3 \pm 0.6 y and were enrolled in the seventh grade. More girls ($n=31$, 73.8%) participated than boys ($n=11$, 26.2%) and a majority of these adolescents were Caucasian ($n=32$, 76.2%). The mean \pm SD age of

parents was 48.3 ± 5.1 y. Parents were mostly female ($n=30$, 71.4%), Caucasian ($n=29$, 69.0%) and had either a 4-year college degree ($n=21$, 50.0%) or master's degree ($n=12$, 28.6%). Most parents were working full time ($n=27$, 64.3%), had a mid-high annual household income ($n=32$, 76.2%) and lived in a married couple household ($n=38$, 90.5%).

Adolescent Questionnaire

Internal consistency

Forty-two participant responses from Time 1 were used for internal consistency analyses. Scales for three SCT mediators demonstrated high internal consistency ($\alpha \geq 0.70$) and ranged from 0.81 to 0.98. The social/family support scales had internal consistencies that ranged from 0.82 to 0.92, self-efficacy scales from 0.81 to 0.98 and outcome expectations from 0.92 to 0.96. Self-regulation scales had moderate to high internal consistencies, ranging from 0.66 to 0.95. Self-regulation related to Balancing calories to manage body weight had moderate internal consistency ($\alpha < 0.66$). Item-total analysis revealed that removal of one item ("I often do several physical activities in one day") increased Cronbach's α to 0.70. This item was deleted from the questionnaire before test-retest reliability analyses. Table 4-5 provides a summary of Cronbach's α values for SCT mediator scales.

Test-retest reliability

Reliability was evaluated using responses from 36 participants who completed questionnaires at both Time 1 and Time 2. All scales had significant correlations, ranging from 0.44 to 0.93. Social/family support and self-efficacy scales had moderate to high correlations, ranging from 0.44 to 0.93 and 0.53 to 0.83, respectively. Scales related to

self-regulation had moderate correlations, ranging from 0.44 to 0.53, and outcome expectation scales had high correlations ranging from 0.68 to 0.90. Table 4-5 provides the Spearman correlation coefficients and significance levels for each SCT mediator.

Parent Questionnaire

Internal consistency

Analyses were conducted with 42 participant responses from Time 1. Most scales demonstrated high internal consistency ($\alpha \geq 0.70$), ranging from 0.81 to 0.98. Scales related to social/family support had high internal consistencies, ranging from 0.80 to 0.89. Self-efficacy scales ranged from 0.87 to 0.97, and scales related to outcome expectations ranged from 0.84 to 0.97. Self-regulation scales had low to high internal consistencies, ranging from 0.45 to 0.95. Self-regulation related to Balancing calories to manage body weight was the only scale that demonstrated low internal consistency ($\alpha = 0.45$). Item-total analysis revealed that removal of three items (“I often do several physical activities with my child in one day”; “I often monitor how much food my child has eaten in one day” and “I usually tell other people the number of calories that my child will eat in one day”) increased Cronbach’s α to moderate internal consistency ($\alpha = 0.71$). These items were deleted from the questionnaire before test-retest reliability analyses. Table 4-6 provides a summary of Cronbach’s α values for SCT mediator scales.

Test-retest reliability

Data from 36 participants who responded at Time 1 and Time 2 were used to conduct reliability tests. The parent instrument was highly reliable, whereby all scales had significant correlations, ranging from 0.67 to 0.98. Social/family support scales had

correlations that ranged from 0.70 to 0.88, self-efficacy scales ranged from 0.82 to 0.90 and self-regulation scales ranged from 0.67 to 0.88. Scales related to outcome expectations ranged from 0.83 to 0.98. Table 4-6 provides the Spearman correlation coefficients and significance levels for SCT mediator scales.

DISCUSSION

Results of this study indicate that these questionnaires are valid and reliable psychometric tools for assessing behavior change mediators among adolescents and their parents. The hypothesis was supported and findings were as expected. Because these questionnaires were based on previously validated SCT instruments, results found here were not surprising.

Collectively, the current adolescent and parent questionnaires had internal consistencies within the ranges of those values found for scales from previous instrument testing studies (14-21). In fact, many Cronbach's α values were higher than scale values in previous studies. These results may be due to the fact that current questionnaires combined items with high internal consistencies from multiple studies, which should expectantly make each scale more consistent with each SCT mediator.

Interestingly, self-regulation related to Balancing calories to manage body weight had low to moderate internal consistencies for the adolescent and parent questionnaire. The adolescent questionnaire may have possessed lower internal consistency for this SCT mediator, because one item in the scale was unrelated to an adolescent's ability to set goals and control his/her nutrition and physical activity. This item was more reflective of an adolescent's opinions about daily activities rather than actions taken to monitor these

activities. Lower internal consistency for self-regulation related to Balancing calories to manage body weight on the parent questionnaire may have been indicative of the fact that several items regarding this SCT mediator were taken from scales assessing more restrictive parenting behaviors. For example, items removed from the parent questionnaire were added from the Authoritative Parenting Index scale which assesses authoritative parenting behaviors related to child's nutrition and physical activity (21). Thus, items may have been viewed negatively by respondents as demanding behaviors that lead to restriction rather than supportive actions that encourage self-regulation.

Both the adolescent and parent questionnaires were reliable over time, suggesting that participants would respond consistently to repeated questionnaire items. It is important to note that Spearman correlation coefficients for some scales were nearly perfect, suggesting some introduction of bias. In general, all scales had higher coefficients than those found in previous instrument testing studies (14,19-21). These results may be due to the fact that the current questionnaires contained more scale items than all previous studies combined in order to assess mediators across all four principles *Dietary Guidelines for Americans, 2010*. For example, the outcome expectations scales (81 items) had correlation coefficients ranging from 0.92 to 0.96, whereas the outcome expectation scale used to create the questionnaires (5 items) had a coefficient of 0.47 (21). These results suggest that the length of the current questionnaire may have biased participants to choose the same response item within scales due to respondent fatigue.

This instrument testing had several limitations. Although participants were demographically diverse in terms of age and race, socioeconomic status was skewed

towards higher income families and those with parents of higher educational achievement. Therefore, results of this study provide preliminary evidence that the scales are valid and reliable instruments for highly educated individuals with economic resources. These data may lack external validity, because participants from lower socioeconomic households may possess different beliefs about nutrition and physical activity that are not captured by the scales for these SCT mediators. The length of the questionnaire may have led to respondent fatigue. Both questionnaires contained 16 SCT mediators with item numbers ranging from 10 to 45, and similar wording was used for items across multiple scales. Participants may have responded in a serial fashion to items towards the end of the questionnaire that they deemed as similar to items they saw within earlier scales. Thus, internal consistencies may have been skewed, because participants may not have responded in a fashion true to their beliefs, but rather, in a manner to more quickly complete the questionnaire. Though the sample size was consistent with other studies assessing the validity and reliability of SCT tools (23), future research needs to test these instruments in a larger population of people with a wider range of socioeconomic statuses. The validated questionnaires will be used in future studies assessing the effectiveness of peer-led nutrition education lessons aimed at implementing the *Dietary Guidelines for Americans, 2010*, to modify SCT mediators among early adolescent children and parents to lower childhood obesity. Use of these questionnaires in future research may serve the broader goal of understanding if and how peer nutrition education may reduce the risk of obesity in childhood and adolescence.

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Table 5-1. Summary of items consolidated from validated psychometric tools for each SCT mediator.

SCT Mediator	Source	Example Scale Items
Social/Family Support	1. Neumark-Sztainer et al. (16) 2. Neumark-Sztainer et al. (17) 3. Zabinski et al. (18)	1. “My mother encourages me to eat healthy food” “Many of my friends care about eating healthy food” 4-item scale [1 = not at all to 4 = very much] 2. “How much do you feel you can talk to your mother about your problems?” 5-item scale [1 = not at all to 5 = very much] 3. How often do your friends encourage you to do physical activity? 5-item scale [1 = never to 5 = daily]
Self-Efficacy	1. Neumark-Sztainer (16) 2. Motl et al. (19) 3. Saunders et al. (21) 4. Thompson et al. (22)	1. “If you wanted to, how sure are you that you could eat healthy foods when are...(a) at the mall” 6-item scale [1 = not at all sure to 6 = very sure] 2. “I can be physically active during my free time on most days” 5-item scale [1 = very easy/disagree a lot to 5 = very difficult/agree a lot] 3. “I think I can... be physically active no matter how tired I feel” Yes/No response 4. “At school how sure are you that you can... buy fruit at every lunch?” 3-item scale [0 = I cannot to 2 = very sure I can]
Self-Regulation	1. Neumark-Sztainer et al. (16) 2. Motl et al. (19) 3. Cullen et al. (23)	1. “Have you done any of the following things in order to lose weight or keep from gaining weight during the past year?”...(a) exercise, (b) ate more fruits and vegetables 2. “I believe I have all the things I need to be physically active during my free time on most days” 4-item scale [1 = very easy/agree a lot to 5 = very difficult/disagree a lot] 3. “My mother or primary guardian... she makes plans all my meals” 4-item scale [1 = not like her to 4 = just like her]
Outcome Expectations	1. Cullen et al. (23)	1. “How much do your parents encourage you to eat lunch” 5-item scale [2 = encourages a lot to -2 = discourages a lot]

5-2. Example items and response scales for each SCT mediator in the adolescent SCT instrument.

SCT Mediators	Example	Response Scale
<i>Social/family support</i>		
Balancing calories to manage body weight (22 items)	<p>In the past month my friends and classmates:</p> <ol style="list-style-type: none"> gave me helpful reminders to stick to a healthy lifestyle helped me to set goals about a healthy lifestyle <p>In the past month my parents and siblings:</p> <ol style="list-style-type: none"> told me that every calorie counts told me to pay closer attention to portion sizes 	5-item scale: 1 = Never to 5 = Repeatedly
Reducing certain foods and food components (18 items)	<p>In the past month my friends and classmates gave me helpful reminders to:</p> <ol style="list-style-type: none"> reduce foods with lots of solid fats such as cookies, cakes, pies and donuts reduce foods with lots of sugar such as sweets, candy, candy bars, regular soda and sugar-sweetened beverages <p>In the past month my parents and siblings gave me helpful reminders to:</p> <ol style="list-style-type: none"> reduce foods with lots of cholesterol such as eggs, beef, shrimp and lobster reduce refined grains such as white bread and rolls 	5-item scale: 1 = Never to 5 = Repeatedly
Increasing selected foods and nutrients (18 items)	<p>In the past month, my friends or classmates gave me helpful reminders to:</p> <ol style="list-style-type: none"> eat more vegetables eat more fruits <p>In the past month, my parents and siblings gave me helpful reminders to:</p> <ol style="list-style-type: none"> eat more seafood and fish drink more non-fat milk and eat more non-fat dairy foods 	5-item scale: 1 = Never to 5 = Repeatedly
Building healthy eating patterns (26 items)	<p>In the past month, my friends or classmates gave me helpful reminders to:</p> <ol style="list-style-type: none"> eat 3 meals each day eat out less often eat a vegetarian diet <p>In the past month, my parents and siblings gave me helpful reminders to:</p> <ol style="list-style-type: none"> eat out less often avoid fast-food restaurants eat healthy snacks only when hungry 	5-item scale: 1 = Never to 5 = Repeatedly
<i>Self-efficacy</i>		
Balancing calories to manage body weight (15 items)	<p>On most days, I can:</p> <ol style="list-style-type: none"> be physically active during my free time ask my parents or other adults to do physically active things with me be physically active during my free time even if I could watch TV or play video games instead 	5-item scale: 1 = I am sure I cannot to 5 = I am sure I can
Reducing certain foods and food components (21 items)	<p>On most days, I can:</p> <ol style="list-style-type: none"> reduce the amount of high-fat foods that I eat reduce the amount of high-sugar foods that I eat reduce the amount of high-sodium or high-salt foods that I eat 	5-item scale: 1 = I am sure I cannot to 5 = I am sure I can

5-2. Example items and response scales for each SCT mediator in the adolescent SCT instrument. (continued)

SCT Mediators	Example	Response Scale
<i>Social/family support</i>		
Balancing calories to manage body weight (22 items)	<p>In the past month my friends and classmates:</p> <ol style="list-style-type: none"> 1. gave me helpful reminders to stick to a healthy lifestyle 2. helped me to set goals about a healthy lifestyle <p>In the past month my parents and siblings:</p> <ol style="list-style-type: none"> 1. told me that every calorie counts 2. told me to pay closer attention to portion sizes 	5-item scale: 1 = Never to 5 = Repeatedly
Reducing certain foods and food components (18 items)	<p>In the past month my friends and classmates gave me helpful reminders to:</p> <ol style="list-style-type: none"> 1. reduce foods with lots of solid fats such as cookies, cakes, pies and donuts 2. reduce foods with lots of sugar such as sweets, candy, candy bars, regular soda and sugar-sweetened beverages <p>In the past month my parents and siblings gave me helpful reminders to:</p> <ol style="list-style-type: none"> 1. reduce foods with lots of cholesterol such as eggs, beef, shrimp and lobster 2. reduce refined grains such as white bread and rolls and plain pasta 	5-item scale: 1 = Never to 5 = Repeatedly
Increasing selected foods and nutrients (18 items)	<p>In the past month, my friends or classmates gave me helpful reminders to:</p> <ol style="list-style-type: none"> 1. eat more vegetables 2. eat more fruits <p>In the past month, my parents and siblings gave me helpful reminders to:</p> <ol style="list-style-type: none"> 1. eat more seafood and fish 2. drink more non-fat milk and eat more non-fat dairy foods 	5-item scale: 1 = Never to 5 = Repeatedly
Building healthy eating patterns (26 items)	<p>In the past month, my friends or classmates gave me helpful reminders to:</p> <ol style="list-style-type: none"> 1. eat 3 meals each day 2. eat out less often 3. eat a vegetarian diet <p>In the past month, my parents and siblings gave me helpful reminders to:</p> <ol style="list-style-type: none"> 1. eat out less often 2. avoid fast-food restaurants 3. eat healthy snacks only when hungry 	5-item scale: 1 = Never to 5 = Repeatedly
<i>Self-efficacy</i>		
Balancing calories to manage body weight (15 items)	<p>On most days, I can:</p> <ol style="list-style-type: none"> 1. be physically active during my free time 2. ask my parents or other adults to do physically active things with me 3. be physically active during my free time even if I could watch TV or play video games instead 	5-item scale: 1 = I am sure I cannot to 5 = I am sure I can
Reducing certain foods and food components (21 items)	<p>On most days, I can:</p> <ol style="list-style-type: none"> 1. reduce the amount of high-fat foods that I eat 2. reduce the amount of high-sugar foods that I eat 3. reduce the amount of high-sodium or high-salt foods that I eat 	5-item scale: 1 = I am sure I cannot to 5 = I am sure I can

5-3. Example items and response scales for each SCT mediator in the parent SCT instrument.

SCT Mediators	Example	Response Scale
<i>Social/family support</i>		
Balancing calories to manage body weight (19 items)	<p>In the past month my child:</p> <ol style="list-style-type: none"> gave me helpful reminders to stick to a healthy lifestyle helped me to set goals about a healthy lifestyle <p>In the past month I told my child:</p> <ol style="list-style-type: none"> that every calorie counts to pay closer attention to portion sizes 	5-item scale: 1 = Never to 5 = Repeatedly
Reducing certain foods and food components (18 items)	<p>In the past month my child gave me helpful reminders to:</p> <ol style="list-style-type: none"> reduce foods with lots of solid fats such as cookies, cakes, pies and donuts reduce foods with lots of sugar such as sweets, candy, candy bars, regular soda and sugar-sweetened beverages <p>In the past month I told my child to:</p> <ol style="list-style-type: none"> reduce foods with lots of cholesterol such as eggs, beef, shrimp and lobster reduce refined grains such as white bread and rolls and plain pasta 	5-item scale: 1 = Never to 5 = Repeatedly
Increasing selected foods and nutrients (18 items)	<p>In the past month, my child gave me helpful reminders to:</p> <ol style="list-style-type: none"> eat more vegetables eat more fruits <p>In the past month, I told my child to:</p> <ol style="list-style-type: none"> eat more seafood and fish drink more non-fat milk and eat more non-fat dairy foods 	5-item scale: 1 = Never to 5 = Repeatedly
Building healthy eating patterns (26 items)	<p>In the past month, my child gave me helpful reminders to:</p> <ol style="list-style-type: none"> eat 3 meals each day eat out less often eat a vegetarian diet <p>In the past month, I told my child to:</p> <ol style="list-style-type: none"> eat out less often avoid fast-food restaurants eat healthy snacks only when hungry 	5-item scale: 1 = Never to 5 = Repeatedly
<i>Self-efficacy</i>		
Balancing calories to manage weight (15 items)	<p>On most days, I can:</p> <ol style="list-style-type: none"> be physically active with my child during my free time do physically active things with my child be physically active during my free time with my child even if I could watch TV or play video games instead 	5-item scale: 1 = I am sure I cannot to 5 = I am sure I can
Reducing certain foods and food components (21 items)	<p>On most days, I can:</p> <ol style="list-style-type: none"> reduce the amount of high-fat foods that my child eats reduce the amount of high-sugar foods that my child eats reduce the amount of high-sodium or high-salt foods that my child eats 	5-item scale: 1 = I am sure I cannot to 5 = I am sure I can
Increasing selected foods and nutrients (20 items)	<p>On most days, I can:</p> <ol style="list-style-type: none"> increase the amount of vegetables that my child eats increase the amount of fruits that my child eats increase the amount of whole grains that my child eats 	5-item scale: 1 = I am sure I cannot to 5 = I am sure I can

5-3. Example items and response scales for each SCT mediator in the parent SCT instrument.
(continued)

SCT Mediators	Example	Response Scale
Building healthy eating patterns (18 items)	On most days, I can: 1. prepare 3 meals for my child 2. make my child eat at home or school 3. fix a vegetarian diet for my child	5-item scale: 1 = I am sure I cannot to 5 = I am sure I can
<i>Self-regulation</i>		
Balancing calories to manage weight (10 items)	Please tell us how the following statements describe you... 1. I often set physical activity goals with my child for the day 2. I often plan how much time I will spend in physical activity with my child for the day	5-item scale: 1 = Does not describe me to 5 = Describes me completely
Reducing certain foods and food components (13 items)	I often set a goal or plan for: 1. how many cookies and donuts and how much cake and pie my child will eat for the day 2. how many sweets and candy bars and how much candy, regular soda and sugar-sweetened beverages my child will have for the day 3. how many chips, crackers and salted foods my child	5-item scale: 1 = Does not describe me to 5 = Describes me completely
Increasing selected foods and nutrients (13 items)	I often set a goal or plan for: 1. how many vegetables my child will eat for the day 2. how many fruits my child will eat for the day 3. how many whole grains my child will eat for the day	5-item scale: 1 = Does not describe me to 5 = Describes me completely
Building healthy eating patterns (19 items)	I often set a goal or plan for my child to: 1. eat 3 meals each day 2. eat at home or at school 3. eat a vegetarian diet	5-item scale: 1 = Does not describe me to 5 = Describes me completely
<i>Outcome expectations</i>		
Balancing calories to manage weight (10 items)	If my child is physically active each day, my child will: 1. have more energy 2. change his/her body weight 3. feel happier	5-item scale: 1 = I strongly disagree to 5 = I strongly agree
Reducing certain foods and food components (30 items)	If my child reduces the amount of cookies, cakes, pies and donuts that my child eats each day, my child will: 1. have more energy 2. change my body weight 3. feel happier	5-item scale: 1 = I strongly disagree to 5 = I strongly agree
Increasing selected foods and nutrients (30 items)	If my child increases the amount of vegetables that my child eats each day, my child will: 1. have more energy 2. change my body weight 3. feel happier	5-item scale: 1 = I strongly disagree to 5 = I strongly agree
Building healthy eating patterns (45 items)	If my child eats 3 meals each day, my child will: 1. have more energy 2. change his/her body weight 3. feel happier	5-item scale: 1 = I strongly disagree to 5 = I strongly agree

Table 5-4. Participant characteristics at baseline.

Characteristic	n (%)
Adolescents (n = 42)	
<i>Age</i>	
11	2 (4.8%)
12	25 (59.5%)
13	15 (35.7%)
<i>Sex</i>	
Females	31 (73.8%)
Males	11 (26.2%)
<i>Race</i>	
White	32 (76.2%)
Black	5 (11.9%)
Chinese	5 (11.9%)
Parents (n = 42)	
<i>Age</i>	
37-47	20 (47.6%)
48-58	22 (52.4%)
<i>Sex</i>	
Females	30 (71.4%)
Males	12 (28.5%)
<i>Race</i>	
White	29 (69.0%)
Black	9 (21.4%)
Chinese	4 (9.5%)
<i>Income</i>	
No response	8 (19.0%)
Less than \$15,000/year	1 (2.4%)
\$50,000 - 74,999/year	1 (2.4%)
\$75,000 - 99,999/year	3 (7.1%)
\$100,000 - 149,999/year	6 (14.3%)
\$150,000 - 199,999/year	23 (54.8%)
<i>Education</i>	
High School Graduate	2 (4.8%)
Some College	1 (2.4%)
2-year Associate Degree	2 (4.8%)
4-year College Degree	21 (50.0%)
Some Graduate School	1 (2.4%)
Master's Degree	12 (28.6%)
Doctorate Degree	3 (7.1%)
<i>Work Status</i>	
Full time/Outside Home/For someone else	24 (57.1%)
Less Than full time/Outside Home/For someone	9 (21.4%)
Full time/Inside home/For someone else	2 (4.8%)
Less than full time/Inside home/For someone el	1 (2.4%)
Full time/Inside home/For yourself	1 (2.4%)
Do not work	5 (11.9%)
<i>Household Type</i>	
Married couple	38 (90.5%)
Female household/no husband present	3 (7.1%)
Other	1 (2.4%)
<i>Health Insurance Status</i>	
No health Insurance	2 (4.8%)
Health Insurance	40 (95.2%)
<i>Number of children</i>	
1	13 (30.1%)
2	16 (38.1%)
3	9 (21.4%)
4	3 (7.1%)
5	1 (2.4%)

Table 5-5. Cronbach's alpha values and Spearman correlation values for the adolescent SCT instrument.

SCT Mediators	Cronbach's α	Spearman correlation value (p-value)
	(n = 42)	(n = 36)
Social/family support		
Balancing calories to manage body weight	0.82	0.90 (p < 0.001)
Reducing certain foods and food components	0.92	0.93 (p < 0.001)
Increasing selected foods and nutrients	0.86	0.81 (p < 0.001)
Building healthy eating patterns	0.90	0.44 (p < 0.01)
Self-efficacy		
Balancing calories to manage body weight	0.81	0.53 (p < 0.01)
Reducing certain foods and food components	0.98	0.83 (p < 0.001)
Increasing selected foods and nutrients	0.97	0.76 (p < 0.001)
Building healthy eating patterns	0.92	0.76 (p < 0.001)
Self-regulation		
Balancing calories to manage body weight	0.66	0.53 (p < 0.001)
Reducing certain foods and food components	0.94	0.44 (p < 0.01)
Increasing selected foods and nutrients	0.88	0.47 (p < 0.01)
Building healthy eating patterns	0.95	0.45 (p < 0.01)
Outcome expectations		
Balancing calories to manage body weight	0.95	0.83 (p < 0.001)
Reducing certain foods and food components	0.96	0.90 (p < 0.001)
Increasing selected foods and nutrients	0.92	0.68 (p < 0.001)
Building healthy eating patterns	0.97	0.88 (p < 0.001)

Table 5-6. Cronbach's alpha values and Spearman correlation values for the parent SCT instrument.

SCT Mediators	Cronbach's α	Spearman correlation value (p-value)
	(n = 42)	(n = 36)
Social/family support		
Balancing calories to manage body weight	0.90	0.88 (p < 0.001)
Reducing certain foods and food components	0.89	0.87 (p < 0.001)
Increasing selected foods and nutrients	0.94	0.70 (p < 0.001)
Building healthy eating patterns	0.90	0.79 (p < 0.001)
Self-efficacy		
Balancing calories to manage body weight	0.93	0.90 (p < 0.001)
Certain foods and food components	0.96	0.82 (p < 0.001)
Increasing selected foods and nutrients	0.96	0.95 (p < 0.001)
Building healthy eating patterns	0.92	0.91 (p < 0.001)
Self-regulation		
Balancing calories to manage body weight	0.45	0.67 (p < 0.001)
Reducing certain foods and food components	0.94	0.74 (p < 0.001)
Increasing selected foods and nutrients	0.88	0.88 (p < 0.001)
Building healthy eating patterns	0.95	0.81 (p < 0.001)
Outcome expectations		
Balancing calories to manage body weight	0.81	0.94 (p < 0.001)
Reducing certain foods and food components	0.98	0.87 (p < 0.001)
Increasing selected foods and nutrients	0.92	0.83 (p < 0.001)
Building healthy eating patterns	0.97	0.98 (p < 0.001)

CHAPTER 6

SUMMARY, STRENGTHS, LIMITATIONS AND FUTURE DIRECTIONS

SUMMARY

Childhood obesity has increased over time in the United States (U.S.). Designing innovative and strategic prevention efforts represents a key solution to improving the rate of childhood obesity. Effective interventions design programs are grounded in socioecological models of childhood development to capture the personal and environmental influences that collectively impact obesity-related risk behaviors. These models have been used to adjust the delivery and content of these programs to impact one or multiple variables across several obesogenic contexts.

One developmentally relevant socioecological approach to childhood obesity prevention is to design peer-based nutrition education programs to modify behaviors. Peer-led approaches are effective in adolescence, because youth become highly sensitive to the beliefs and values held by their peers and are thus more likely to adopt similar behaviors over time. Peer education approaches are predicted to moderate individual-level behavior changes through mediators such as social support and social norms. The pathways by which changes occur are captured in behavior change models such as the Social Cognitive Theory (SCT). SCT predicts that increasing social support and social norms related to healthy behaviors may increase an individual's beliefs in their competency to perform these behaviors.

Peer education strategies have been used less widely in the field of nutrition, compared to other public health disciplines. There is an opportunity to elevate peer nutrition education by developing peer-led programs that address key personal and environmental determinants of behavior in adolescence. Many scientific, government and

policy professionals believe that culinary skills programs have the biggest potential for long-term obesity-related behavior changes in adolescence. Culinary nutrition education impacts behavior by providing youth with the skills and knowledge to build a home food environment that facilitates healthy eating behaviors. Thus, designing a peer-led culinary skills program may be an innovative approach to childhood obesity prevention.

Therefore, this research sought to develop and evaluate the effectiveness of culinary nutrition education lessons, grounded in the SCT, for future peer nutrition education interventions in early adolescent youth. Designing effective peer-led nutrition education programs requires the development of valid and reliable tools to evaluate behavior changes related to the principles of the *Dietary Guidelines for Americans, 2010*. Thus, this research also sought to validate psychometric tools for measuring the effectiveness of nutrition education lessons at modifying SCT change mediators related to dietary guidelines among adolescents and parents.

Three, 2-hour culinary nutrition education lessons were first evaluated for validity, feasibility and effectiveness with a group of early adolescent children. The first lesson aimed to teach youth family menu planning skills. It was first hypothesized that the *Family Menu Planning* lesson would be internally valid. The second hypothesis was that it would be feasible to deliver the *Family Menu Planning* lesson to early adolescent youth in an after-school setting. It was next expected that delivery of the *Family Menu Planning* lesson would positively impact self-reported SCT mediators among early adolescents including self-efficacy, social support and outcome expectations related to planning healthy family meals. The second and third lessons were delivered as a 2-day

culinary program that aimed to teach youth mechanical and perceptual culinary skills.

The fourth hypothesis of this research project was that the *Culinary Skills* and *Culinary Skills In Action* lessons would be internally valid. The fifth hypothesis was that it would be feasible to deliver each lesson after school to a group of early adolescent children. It was finally expected that the *Culinary Skills* and *Culinary Skills In Action* lessons would both positively impact self-reported SCT mediators such as self-efficacy, social support and outcome expectations related to mechanical and perceptual culinary skills.

All hypotheses were supported. In relation to the first and fourth hypotheses, content validity analyses revealed that all three lessons were valid tools for achieving key lesson objectives related to family menu planning and mechanical and perceptual culinary skills. Content experts determined that all lessons were comprehensive for the target audience and had either some to high ability to achieve learning objectives. In support of the second and fifth hypotheses, process and formative data from the pilot studies indicated that it was feasible to deliver each lesson to early adolescent children in an after-school context. All three lessons were delivered in the 2-hour time frame and observers from the research team rated that students were highly engaged in all three lessons. The observer rated that all tasks related to learning objectives were executed “well” by the instructor in the *Family Menu Planning* lesson, whereas some tasks in both the *Culinary Skills* and *Culinary Skills In Action* lessons were rated as “not completed well.” Formative data from the focus groups revealed that students were highly satisfied with all three lessons. In general, participants indicated that they would be more satisfied

with future culinary skills lessons if there were more visual learning aids, hands-on activities and opportunities for participants to play the role of a teacher.

The exploratory outcomes related to SCT mediators were also supported by this research project. Participants in all three lessons self-reported heightened self-efficacy, social support and outcome expectations related to both family menu planning and mechanical and perceptual culinary concepts. When asked to report their average confidence level, on a scale of 1 (low) to 10 (high), in performing various lesson tasks related to the learning objectives of each lesson, participants reported high confidence levels ranging from 7.0 to 10.0. In general, participants perceived themselves to be highly confident performing lesson tasks when they were given visual aids and asked to apply concepts in activities. Participants self-reported higher self-efficacy ratings for *Culinary Skills* and *Culinary Skills In Action* lesson tasks in comparison to those tasks in the *Family Menu Planning* lesson. Comparisons of these results suggest that participants were more familiar with the concepts presented in the latter two lessons, because they had participated in similar cooking classes in school. Social support was a consistent contributor to the perceived future engagement in family menu planning and cooking at home. Participants expressed high satisfaction with the lessons when they were given opportunities to work in teams and share ideas with their friends. Finally, participants held many positive outcome expectations related to culinary skills. Importantly, participants perceived that learning how to plan and cook family meals would improve their health both now and in the future.

The research project also tested the validity and reliability of psychometric tools for measuring SCT mediators related to behavior change in dietary and physical activity patterns in parents and adolescents. Thus, the final hypothesis is that the SCT questionnaires would be valid and reliable instruments for assessing obesity-related behavior change in early adolescent children and their parents. The hypothesis in this part of the research project was supported. Both the parent and adolescent SCT questionnaires possessed high internal validity. Cronbach's α coefficients for most scales on both questionnaires were ≥ 0.70 , which indicates that the scale items were internally consistent with their respective SCT mediators. Self-regulation related to Balancing calories to manage body weight had low to moderate internal consistencies across both the parent and adolescent SCT questionnaires. These results may be attributed to the fact that some items included from previously validated questionnaires captured more restrictive management behaviors that were perceived as connotatively negative. Both instruments also possessed high internal reliability between two time points. Data revealed high correlation values between responses ranging from 0.40 to 0.97 for both questionnaires.

The overall findings of this research project demonstrate that it is feasible to deliver three valid culinary nutrition education lessons to early adolescent youth in an after-school setting. Furthermore, exploratory analyses revealed that the three lessons may also effectively impact self-reported SCT mediators related to culinary skills. Finally, the SCT instruments are internally valid and reliable tools for assessing changes in SCT mediators. These tools can be used in future studies assessing the effectiveness of

peer-led nutrition education lessons aimed at teaching the *Dietary Guidelines for Americans, 2010*, to modify SCT mediators among early adolescent children and parents.

STRENGTHS & LIMITATIONS

Strengths of this research project include the design of culinary nutrition education lessons that were grounded in key concepts from other validated programs. More specifically, current culinary nutrition education program achieved lesson objectives that were consistent with other effective programs. This developmental approach is advantageous because it allows for the comparison of results between studies. A large gap in scientific knowledge is related to the relationship between culinary skills and ultimate behavior change. Thus, making comparisons between similar programs provides an opportunity to fill gaps related to the effectiveness of culinary programs at modifying obesity-related outcomes. Similarly, the SCT tools were developed based on previously validated questionnaires. Developing an instrument based on items from multiple instruments may ensure that items are highly consistent with each SCT mediator.

Another strength of the study is the design of a culinary nutrition education program that includes a physical activity component. Research suggests that childhood obesity is a multifaceted problem attributable to a range of influences related to both eating and physical activity patterns. Thus, including a physical activity component engages youth in a learning experience that promotes a lifestyle approach to behavior change. Furthermore, including a physical activity component is consistent with many national nutrition education programs. The consistent framework of these lessons thus

makes it easy to include these lessons in the curricula of other national nutrition education programs.

A final strength of this study is its novelty within the field of nutrition research. The SCT tools assessed mediators of behavior change related to key principles of the *Dietary Guidelines for Americans, 2010*, which is innovative in comparison to many others tools that only assess mediators related to one dietary guidelines principle. These new tools provide a way for future research to assess the effectiveness of nutrition education programs at producing positive behavior changes related to meeting dietary guidelines.

This research project is also novel in its exploration of the associations between culinary nutrition education and changes in obesity-related behaviors. An informal review of the literature pertaining to culinary skills nutrition education revealed that there is a large lack of culinary nutrition education programs for youth that have been formally tested in an intervention. Furthermore, inconclusive results from these studies make it difficult to determine both the efficacy of these programs at promoting maintainable behavior changes and the pathway by which change occurs. Many stakeholders have been called upon to teach youth basic culinary skills as one solution to the childhood obesity epidemic. Thus, the current research project provides data to support the need for culinary skills as one childhood obesity prevention strategy.

The largest limitation of this research study is the non-diverse study population, which is a constraint inherent to convenience sampling techniques. The study participants recruited for the pilot testing of both the lessons and the SCT questionnaires consisted of

mostly Caucasian females from higher socioeconomic backgrounds. Thus, the overall conclusions of this research study lack external validity. For example, the effectiveness of the lessons at impacting SCT mediators and the high reliability of the SCT tools may only be true for highly educated individuals who may be more receptive to nutrition concepts.

It is also difficult to draw overarching conclusions about the efficacy of the piloted culinary skills lessons because results were not compared to a control group of early adolescents who received no culinary nutrition education. The use of this study design limits the conclusions investigators can draw about the significant impact of the culinary skills nutrition education compared to either general nutrition education or no nutrition education. Incorporating a control condition in future pilot tests will help fill gaps in knowledge related to the efficacy, if any, of combining basic nutrition education with culinary nutrition concepts.

The results of this research study may also be skewed due to self-report biases. Adolescence is a developmental period where slight deviations from socially normative behaviors can be ostracizing. Therefore, adolescents enrolled in the pilot tests may have catered their responses in either the focus groups or questionnaires to fit with the beliefs held by their peers. Within the focus groups, youth may have inflated their self-reported ratings of self-efficacy in order to uphold a confident image among their friends. Furthermore, asking youth to complete the SCT questionnaires alongside their peers may have made them highly sensitive to how their peers would respond to the questions. A final limitation is the lack of information collected on the effectiveness of the piloted

lessons on changes in SCT mediators over time as well as the changes in ultimate behaviors. Thus, there is no way of understanding if and for how long behavior changes resulting from the culinary skills education persist over time.

FUTURE DIRECTIONS

This research project represents the first step towards developing a peer-led culinary nutrition education program, grounded in SCT, for early adolescent youth. Prior to evaluating the lessons in a peer-led education format, several validation steps need to be taken. The lessons first need to be modified based on the formative evaluation data to more effectively achieve the overall learning objectives. Furthermore, future studies must pilot test the modified lessons in more diverse populations to validate the efficacy of these nutrition education materials across a range of ethnicities, socioeconomic statuses and genders. The SCT tools must first be validated in a more diverse study population and then used in these future pilot tests to assess behavior change related to dietary guidelines as a result of the culinary skills lessons. Early adolescent youth must then be trained to deliver the validated culinary skills lessons to their fellow peers. Finally, the culinary skills lessons must be adapted to a peer educator format. Focus groups held throughout training sessions with peer educators will provide qualitative feedback to inform the development of peer-led versions of the culinary skills lessons.

In summary, this research project has shown that culinary skills nutrition education may have the potential to impact mediators of behavior change among early adolescent youth. Validated SCT instruments allow researchers to assess changes in key dietary and physical activity behaviors that result from novel nutrition education

programs. The development of an innovative peer-led nutrition education program elevates obesity-related risk behaviors to the level of other risky behaviors that have long since warranted peer-led intervention approaches. A peer-led culinary nutrition education program also has the potential to fill gaps in knowledge related to the relationship between culinary skills and childhood obesity.

APPENDIX A
SCREENING FORMS AND INFORMED CONSENT

Date: October 15, 2012

From: Jodi L. Mathieu, Research Compliance Specialist

To: Sharon M. Nickols-Richardson

Subject: Results of Review of Proposal - Expedited (**IRB #40964**)
Approval Expiration Date: October 14, 2013
“Family menu planning: pilot testing of lesson plans for the PAWS Club study”

The Institutional Review Board (IRB) has reviewed and approved your proposal for use of human participants in your research. By accepting this decision, you agree to obtain prior approval from the IRB for any changes to your study. Unanticipated participant events that are encountered during the conduct of this research must be reported in a timely fashion.

Participants must receive a **copy** of the approved informed consent form to keep for their records.

If signed consent is obtained, the principal investigator is expected to maintain the original signed consent forms along with the IRB research records for this research at least three (3) years after termination of IRB approval. For projects that involve protected health information (PHI) and are regulated by HIPAA, records are to be maintained for six (6) years. The principal investigator must determine and adhere to additional requirements established by the FDA and any outside sponsors.

If this study will extend beyond the above noted approval expiration date, the principal investigator must submit a completed Continuing Progress Report to the Office for Research Protections (ORP) to request renewed approval for this research.

On behalf of the IRB and the University, thank you for your efforts to conduct your research in compliance with the federal regulations that have been established for the protection of human participants.

Please Note: The ORP encourages you to subscribe to the ORP listserv for protocol and research-related information. Send a blank email to: L-ORP-Research-L-subscribe-request@lists.psu.edu

JLM/jlm

cc: John H. Challis
Marilyn A. Corbin
Jill N. Cox
Beth E. Van Horn
Sarah A. Nelson



**Informed Consent Form for Social Science Research
Parent Permission and Child Assent**
The Pennsylvania State University

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The Pennsylvania State University
Institutional Review Board
Office for Research Protections
Approval Date: 10/15/2012 – J. Mathieu
Expiration Date: 10/14/2013 – J. Mathieu

Title of Project: Family menu planning: pilot testing of lesson plans for the PAWS Club study

Principal Investigator: Sharon M. (Shelly) Nickols-Richardson, PhD, RD
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University Park, PA 16802
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Other Investigator(s): Marilyn Corbin, 338 Agricultural Administration Building, mac32@psu.edu;
John Challis, 29 Recreation Building, jhc10@psu.edu;
Jill Cox, 209 Special Services Building, jnc14@psu.edu;
Beth Van Horn, Room 322 Willowbank Building, Holmes Ave., bev1@psu.edu;
Sarah Nelson, 110 Chandlee Laboratory Building, san5034@psu.edu;
Matthew Graziose, 110 Chandlee Laboratory Building, mmg271@psu.edu;
Katelyn Scoular, 110 Chandlee Laboratory Building, kzs191@psu.edu

- 1. Purpose of the Study:** The purpose of this research is to find out if a lesson on family menu planning is helpful in adolescents who are in 6th and 7th grades. Family menu planning is the ability to make choices about meals ahead of time. You will be in a group with about 15 other children of your same age. During the lesson on family menu planning, you will learn about making food choices, your family's daily schedule, ways that your family can help with buying and cooking foods, and planning for grocery shopping and meals. You will fill out activities that ask you about what you know about planning family meals. You will fill out these activities twice. You will be in a focus group with other children of your age where you will be asked several questions about the lesson and to answer these questions as honestly as you can. You do not have to answer all of the questions. Your answers will be used to make the lesson on family menu planning better for other children of your age who are in a future study.
- 2. Procedures to be followed:** You will be asked to attend a meeting with your parent to learn about the family menu planning lesson. At this meeting, you may ask questions and your parent may ask questions, and the study investigators will answer your questions. At the end of this meeting, you will read and sign this Informed Assent Form, and your parent will also sign this Informed Consent Form. This meeting will take about 1 hour of time and will be held in the Chandlee Laboratory Building on The Pennsylvania State University campus.

Next, you will come to the Chandlee Laboratory Building on The Pennsylvania State University campus to be in the lesson on family menu planning. Your parent will not be with you during this lesson. Along with about 15 other children of your age, you will learn about planning healthy meals for your family, your family's schedule, and making a shopping list. This lesson will be about 2 to 3 hours long and will have a teacher who will teach you about family menu planning. You will do about 30 minutes of light exercise, such as stretches, jumping jacks, running in place and dancing. Before and after this lesson, you will fill out some activities. Then, you will be in a focus group for about 1 hour with the other children in the class, where you will be asked questions about the lesson. You will talk about what you liked and did not like about the lesson. This information will be recorded on a tape recorder, and only the investigators of this study will be able to listen to these tapes.

- 3. Discomforts and Risks:** There are no risks in participating in this research beyond those experienced in everyday life. Some of the questions are personal and might cause discomfort.
- 4. Benefits:** The benefits to you include getting information about family menu planning. The benefits to society include that a lesson on family menu planning for children will be available. This information could help to make programs about family menu planning for children in 6th and 7th grade better.
- 5. Duration/Time:** Your participation in this research will take time. The information meeting and signing this form for you and your parent will take about 1 hour of time. The lesson will take about 4 hours of your time on one day. Your

participation in this research will take about 5 hours of time during two days. Being in this study will also require transportation time on your parent's part.

6. **Statement of Confidentiality:** Your participation in this research is confidential. Data (any information that you provide to the investigators) will be stored and secured at Room 324 Chandlee Laboratory Building on The Pennsylvania State University campus in a locked file cabinet. Any information stored on a computer will be on a password-protected computer at The Pennsylvania State University. For any information that you provide to the investigators, a three-digit code number (for example, 001) will be assigned to you and used in place of your name. A master list of these code numbers will be kept in a separate locked file cabinet. The tapes from tape recordings of the focus groups will be stored in a locked file cabinet, and any written information from the tape recordings or focus groups will be kept in a locked file cabinet at The Pennsylvania State University. The recordings will be erased as soon as they are transcribed.

The Pennsylvania State University's Office for Research Protections, the Institutional Review Board and the Office for Human Research Protections in the Department of Health and Human Services may review records related to this research study. In the event of a publication or presentation resulting from the research, no personally identifiable information will be shared. If you want to share your information with other people, such as your friends or parent, this is up to you. However, please do not tell anyone the names of the other people in the study or what they said in the focus group. If your parent wants to tell someone that you are in this study that is up to your parent.

7. **Right to Ask Questions:** Please contact Dr. Shelly Nickols-Richardson at 814-865-5926 with questions, complaints or concerns about this research. You can also call this number if you feel this study has harmed you. If you have any questions, concerns, problems about your rights as a research participant or would like to offer input, please contact The Pennsylvania State University's Office for Research Protections (ORP) at 814-865-1775. The ORP cannot answer questions about research procedures. Questions about research procedures can be answered by the research team.
8. **Payment for participation:** If you participate in this research, you will receive a \$10.00 discount store gift card. You will receive this gift card at the end of the study, and only if you attend that session.
9. **Voluntary Participation:** Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer. Refusal to take part in or withdrawing from this study will involve no penalty or loss of benefits you would receive otherwise. There may be reasons that the investigators remove you from participation in this research. For example, if you are not following the directions of the teacher or are playing around during the lesson or if your behavior is inappropriate during the lesson, you may be removed from the study.

You must be in 6th or 7th grade or be 11 to 14 years of age for you to consent to take part in this research study.

Participant Signature

Date

You must be the parent of the child for whom you are giving permission to participate in this research study. If you agree to have your child take part in this research study and the information outlined above, please sign your name and indicate the date below. You will be given a copy of this consent/assent form for your records.

I give permission for my child, _____, to participate in this research study.

Parent Signature

Date

Person Obtaining Consent

Date

Date: November 16, 2012

From: Jodi L. Mathieu, Research Compliance Specialist

To: Sharon M. Nickols-Richardson

Subject: Research Proposal - Modification (**IRB #41000**)
Approval Expiration Date: October 14, 2013
(Note: This date reflects the anniversary date of the actual submission approval date.)

“Culinary skills: psychometric properties of instruments and pilot testing of lesson plans for the PAWS Club study”

The revision(s) to the above-referenced study has been reviewed and approved by the Institutional Review Board (IRB). You may proceed with your study. Please continue to notify the IRB of any further changes to your study.

COMMENT: Approval of the modification submitted on November 12, 2012 has been granted for the following: (1) addition of flyer and (2) revision to recruitment procedures.

On behalf of the IRB and the University, thank you for your efforts to conduct research in compliance with the federal regulations that have been established for the protection of human participants.

Please Note: The ORP encourages you to subscribe to the ORP listserv for protocol and research-related information. Send a blank email to: L-ORP-Research-L-subscribe-request@lists.psu.edu

JLM/jlm

cc: John H. Challis
Marilyn A. Corbin
Jill N. Cox
Beth E. Van Horn
Sarah A. Nelson



**Informed Consent Form for Social Science Research
Parent Permission and Child Assent
The Pennsylvania State University – Lesson Plans**

ORP OFFICE USE ONLY
DO NOT REMOVE OR MODIFY
IRB# 41000 Doc. #1002
The Pennsylvania State University
Institutional Review Board
Office for Research Protections
Approval Date: 10/15/2012 – J. Mathieu
Expiration Date: 10/14/2013 – J. Mathieu

Title of Project: Culinary skills: psychometric properties of instruments and pilot testing of lesson plans for the PAWS Club study

Principal Investigator: Sharon M. (Shelly) Nickols-Richardson, PhD, RD
110 Chandlee Laboratory Building
University Park, PA 16802
(814) 865-5926; smn13@psu.edu

Other Investigator(s): Marilyn Corbin, 338 Agricultural Administration Building, mac32@psu.edu;
John Challis, 29 Recreation Building, jhc10@psu.edu;
Jill Cox, 209 Special Services Building, jnc14@psu.edu;
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Sarah Nelson, 110 Chandlee Laboratory Building, san5034@psu.edu;
Matthew Graziose, 110 Chandlee Laboratory Building, mng271@psu.edu;
Katelyn Scoular, 110 Chandlee Laboratory Building, kzs191@psu.edu

- 1. Purpose of the Study:** The purpose of this research is to find out if lessons on culinary skills are helpful in adolescents who are in 6th and 7th grades. Culinary skills are the ability to work with and prepare foods for eating. You will be in a group with about 15 other children of your same age. During the first lesson on culinary skills, you will learn about knife safety, choosing the right knife, cutting foods and cooking vegetables and fruits. You will fill out a questionnaire that asks you about your cooking skills and how you feel about your cooking abilities. You will fill out this questionnaire twice. You will be in a focus group with other children of your age where you will be asked several questions about the first lesson and to answer these questions as honestly as you can. You do not have to answer all of the questions. During the second lesson, you will be taught how to use a recipe to prepare a food. You will practice your knife skills and cooking skills. You will fill out a questionnaire that asks you about your cooking skills and how you feel about your cooking abilities. You will fill out this questionnaire twice. You will be in a focus group with other children of your age where you will be asked several questions about the second lesson and to answer these questions as honestly as you can. You do not have to answer all of the questions. Your answers will be used to make the lessons on culinary skills better for other children of your age who are in a future study.
- 2. Procedures to be followed:** You will be asked to attend a meeting with your parent to learn about the culinary skills lessons. At this meeting, you may ask questions and your parent may ask questions, and the study investigators will answer your questions. At the end of this meeting, you will read and sign this Informed Assent Form, and your parent will also sign this Informed Consent Form. This meeting will take about 1 hour of time and will be held in the Chandlee Laboratory Building on The Pennsylvania State University campus.

Next, you will come to the Chandlee Laboratory Building on The Pennsylvania State University campus to be in the first lesson on culinary skills. Your parent will not be with you during this lesson. Along with about 15 other children of your age, you will learn about how to prepare foods for eating. This lesson will be about 2 to 3 hours long and will have a teacher show you how to use a knife safely, how to pick the correct knife for the food that you will cut, and how to cut and cook vegetables and fruits. You will do about 30 minutes of light exercise, such as stretches, jumping jacks, running in place and dancing. Before and after this lesson, you will fill out some questionnaires. Then, you will be in a focus group for about 1 hour with the other children in the class, where you will be asked questions about the lesson. You will talk about what you liked and did not like about the lesson. This information will be recorded on a tape recorder, and only the investigators of this study will be able to listen to these tapes.

Next, you will come to the Chandlee Laboratory Building on The Pennsylvania State University campus to be in the second lesson on culinary skills. Your parent will not be with you during this lesson. Along with about 15 other children of your age, you will learn more about how to prepare foods for eating. This lesson will be about 2 to 3 hours long and will have a teacher show you how to use a recipe to prepare vegetables and fruits for eating. You will do about 30 minutes of light exercise, such as stretches, jumping jacks, running in place or dancing. Before and after this lesson, you will fill out some questionnaires. Then, you will be in a focus group for about 1 hour with the other children in the class, where you will be asked questions about the second lesson. You will talk about what you like and did not like about the lesson. This information will be recorded on a tape recorder, and only the investigators of this study will be able to listen to these tapes.

3. **Discomforts and Risks:** There are no risks in participating in this research beyond those experienced in everyday life. Some of the questions are personal and might cause discomfort.
4. **Benefits:** The benefits to you include getting information about culinary skills and how to prepare vegetables and fruits for eating. You may learn how to pick the correct knife to prepare a food and fix a recipe.

The benefits to society include that lessons on culinary skills for children will be available. This information could help to make programs about culinary skills for children in 6th and 7th grade better.

5. **Duration/Time:** Your participation in this research will take time. The information meeting and signing this form for you and your parent will take about 1 hour of time. Each lesson will take about 4 hours of your time on two different days. Your participation in this research will take about 9 hours of time during about 4 weeks. Being in this study will also require transportation time on your parent's part.
6. **Statement of Confidentiality:** Your participation in this research is confidential. Data (any information that you provide to the investigators) will be stored and secured at Room 324 Chandlee Laboratory Building on The Pennsylvania State University campus in a locked file cabinet. Any information stored on a computer will be on a password-protected computer at The Pennsylvania State University. For any information that you provide to the investigators, a three-digit code number (for example, 001) will be assigned to you and used in place of your name. A master list of these code numbers will be kept in a separate locked file cabinet. The tapes from tape recordings of the focus groups will be stored in a locked file cabinet, and any written information from the tape recordings or focus groups will be kept in a locked file cabinet at The Pennsylvania State University. The recordings will be erased after they are transcribed.

The Pennsylvania State University's Office for Research Protections, the Institutional Review Board and the Office for Human Research Protections in the Department of Health and Human Services may review records related to this research study. In the event of a publication or presentation resulting from the research, no personally identifiable information will be shared. If you want to share your information with other people, such as your friends or parent, this is up to you. However, please do not tell anyone the names of the other people in the study or what they said in the focus group. If your parent wants to tell someone that you are in this study that is up to your parent.

7. **Right to Ask Questions:** Please contact Dr. Shelly Nickols-Richardson at 814-865-5926 with questions, complaints or concerns about this research. You can also call this number if you feel this study has harmed you. If you have any questions, concerns, problems about your rights as a research participant or would like to offer input, please contact The Pennsylvania State University's Office for Research Protections (ORP) at 814-865-1775. The ORP cannot answer questions about research procedures. Questions about research procedures can be answered by the research team.
8. **Payment for participation:** If you participate in this research, you will receive a \$10.00 discount store gift card. You will receive this gift card at the end of the study, and only if you attend that session.

9. **Voluntary Participation:** Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer. Refusal to take part in or withdrawing from this study will involve no penalty or loss of benefits you would receive otherwise. There may be reasons that the investigators remove you from participation in this research. For example, if you are not following the directions of the teacher or are playing around during the lessons or if your behavior is inappropriate during the lessons, you may be removed from the study.

You must be in 6th or 7th grade or be 11 to 14 years of age for you to consent to take part in this research study.

Participant Signature

Date

You must be the parent of the child for whom you are giving permission to participate in this research study. If you agree to have your child take part in this research study and the information outlined above, please sign your name and indicate the date below.

You will be given a copy of this consent/assent form for your records.

I give permission for my child, _____, to participate in this research study.

Parent Signature

Date

Person Obtaining Consent

Date

Date: October 15, 2012

From: Jodi L. Mathieu, Research Compliance Specialist

To: Sharon M. Nickols-Richardson

Subject: Results of Review of Proposal - Expedited (**IRB #40936**)
Approval Expiration Date: October 14, 2013
“Instrument testing of questionnaires for the PAWS Club: Peer-education About Weight Steadiness study”

The Institutional Review Board (IRB) has reviewed and approved your proposal for use of human participants in your research. By accepting this decision, you agree to obtain prior approval from the IRB for any changes to your study. Unanticipated participant events that are encountered during the conduct of this research must be reported in a timely fashion.

Participants must receive a **copy** of the approved informed consent form to keep for their records.

If signed consent is obtained, the principal investigator is expected to maintain the original signed consent forms along with the IRB research records for this research at least three (3) years after termination of IRB approval. For projects that involve protected health information (PHI) and are regulated by HIPAA, records are to be maintained for six (6) years. The principal investigator must determine and adhere to additional requirements established by the FDA and any outside sponsors.

If this study will extend beyond the above noted approval expiration date, the principal investigator must submit a completed Continuing Progress Report to the Office for Research Protections (ORP) to request renewed approval for this research.

On behalf of the IRB and the University, thank you for your efforts to conduct your research in compliance with the federal regulations that have been established for the protection of human participants.

Please Note: The ORP encourages you to subscribe to the ORP listserv for protocol and research-related information. Send a blank email to: L-ORP-Research-L-subscribe-request@lists.psu.edu

JLM/jlm

cc: John H. Challis
Marilyn A. Corbin
Jill N. Cox
Beth E. Van Horn
Sarah A. Nelson



**Informed Consent Form for Social Science Research
Parent Consent**
The Pennsylvania State University

ORP OFFICE USE ONLY
DO NOT REMOVE OR MODIFY
IRB# 40936 Doc. #1001
The Pennsylvania State University
Institutional Review Board
Office for Research Protections
Approval Date: 10/15/2012 – J. Mathieu
Expiration Date: 10/14/2013 – J. Mathieu

Title of Project: Instrument testing of questionnaires for the PAWS Club:
Peer-education About Weight Steadiness study

Principal Investigator: Sharon M. (Shelly) Nickols-Richardson, PhD, RD
110 Chandlee Laboratory Building
University Park, PA 16802
(814) 865-2920; smn13@psu.edu

Other Investigators: Marilyn Corbin, 338 Agricultural Administration Building, mac32@psu.edu;
John Challis, 29 Recreation Building, jhc10@psu.edu;
Jill Cox, 209 Special Services Building, jnc14@psu.edu;
Beth Van Horn, Room 322 Willowbank Building, Holmes Ave., bev1@psu.edu;
Sarah Nelson, 110 Chandlee Laboratory Building, san5034@psu.edu;
Matthew Graziose, 110 Chandlee Laboratory Building, mmg271@psu.edu;
Katelyn Scoular, 110 Chandlee Laboratory Building, kzs191@psu.edu

1. **Purpose of the Study:** The purpose of this research is to see how well questionnaires ask information about nutrition and physical activity in parents of middle school children. The first questionnaire asks you questions about your background, and the second questionnaire asks you about opinions your child's actions and your actions about cooking, physical activity and eating habits, and how you feel about physical activity and food. These questionnaires will be used in a future after-school program for parents and middle school children, called the PAWS Club. The answers that you provide on the questionnaires will be used to see if the right questions are being asked to understand attitudes, values, and beliefs about nutrition and physical activity in parents of middle school children. Your child will answer questionnaires that are about the same as the questionnaires that you fill out.
2. **Procedures to be Followed:** You will be asked to attend a meeting with your child to learn about these questionnaires. At this meeting, you may ask questions, and the study investigators will answer your questions. At the end of this meeting, you will read and sign this Informed Consent Form. The meeting will take about 1 hour of time and will be held in Room 324 Chandlee Laboratory Building on The Pennsylvania State University campus.

On a different day, you will come back to Room 324 Chandlee Laboratory Building on The Pennsylvania State University campus with your same child to fill out two questionnaires. On these questionnaires, you will answer questions about yourself and opinions about your child's actions and your actions about cooking, physical activity and eating habits, and how you feel about physical activity and food. It will take about 1 hour to finish these questionnaires.

Within one week of completing the questionnaires, you will come back to Room 324 Chandlee Laboratory Building on The Pennsylvania State University campus with your same child to fill out the same questionnaires. This will take about 1 hour of your time.

Within two months of completing the questionnaires and if you are asked and agree, you will come back to Room 324 Chandlee Laboratory Building on The Pennsylvania State University campus with your same child to fill out the same questionnaires that may have some new questions on them. This will take about 1 hour of your time.

3. **Discomforts and Risks:** There are no risks to participating in this research beyond those experienced in everyday life. Some of the questions are personal and might cause discomfort.

4. **Benefits:** There are no benefits to you for being in this study. The benefits to other people include the testing of the questionnaires that may be used by other people to look at nutrition and physical activity in middle school children and their parents.
5. **Duration/Time:** This study will take about 4 hours of your time over 2 months.
6. **Statement of Confidentiality:** Your participation in this research is confidential. Data (any information that you provide to the investigators) will be stored and secured at Room 316 Chandlee Laboratory Building on The Pennsylvania State University campus in a locked file cabinet. Any information stored on a computer will be on a password-protected computer at The Pennsylvania State University. For any information that you provide to the investigators, a three-digit code number (for example, 001) will be assigned to you and used in place of your name. A master list of these code numbers will be kept in a separated locked file cabinet. In the event of a publication or presentation resulting from the research, no personally identifiable information will be shared.

The Pennsylvania State University's Office for Research Protections, the Institutional Review Board and the Office for Human Research Protections in the Department of Health and Human Services may review records related to this research study. In the event of a publication or presentation resulting from the research, no personally identifiable information will be shared. If you want to share your information with other people, such as your friends or children, this is up to you.

7. **Right to Ask Questions:** Contact Dr. Shelly Nickols-Richardson at 814-865-5926 with questions, complaints or concerns about this research. You can also call this number if you feel this study has harmed you. If you have any questions, concerns, problems about your rights as a research participant or would like to offer input, please contact The Pennsylvania State University's Office for Research Protections (ORP) at 814-865-1775. The ORP cannot answer questions about research procedures. Questions about research procedures can be answered by the research team.
8. **Voluntary Participation:** Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer. Refusal to take part in or withdrawing from this study will involve no penalty or loss of benefits you would receive otherwise.

You must be 18 years of age or older and a parent of a child in the 6th or 7th grade or the parent of an 11- to 14-year-old child to be in this study. If you agree to take part in this research study and the information outlined above, please sign your name and indicate the date below.

You will be given a copy of this form for your records.

Participant Signature

Date

Person Obtaining Consent

Date



**Informed Consent Form for Social Science Research
Child Assent and Parent Permission**
The Pennsylvania State University

ORP OFFICE USE ONLY
DO NOT REMOVE OR MODIFY
IRB# 40936 Doc. #1002
The Pennsylvania State University
Institutional Review Board
Office for Research Protections
Approval Date: 10/15/2012 – J. Mathieu
Expiration Date: 10/14/2013 – J. Mathieu

Title of Project: Instrument testing of questionnaires for the PAWS Club:
Peer-education About Weight Steadiness study

Principal Investigator: Sharon M. (Shelly) Nickols-Richardson, PhD, RD
110 Chandlee Laboratory Building
University Park, PA 16802
(814) 865-2920; snm13@psu.edu

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Matthew Graziose, 110 Chandlee Laboratory Building, mmg271@psu.edu;
Katelyn Scoular, 110 Chandlee Laboratory Building, kzs191@psu.edu

- 1. Purpose of the Study:** The purpose of this research is to see how well questionnaires ask information about nutrition and physical activity in middle school children and their parent. The first questionnaire asks you questions about your background, and the second questionnaire asks you about opinions on your cooking, your physical activity and eating habits, and how you feel about physical activity and food. These questionnaires will be used in a future after-school program for parents and middle school children, called the PAWS Club. The answers that you provide on the questionnaires will be used to see if the right questions are being asked to understand attitudes, values, and beliefs about nutrition and physical activity in children of your age. Your parents will answer questionnaires that are about the same as the questionnaires that you fill out.
- 2. Procedures to be Followed:** You will be asked to attend a meeting with your parent to learn about these questionnaires. At this meeting, you may ask questions, and the study investigators will answer your questions. At the end of this meeting, you will read and sign this Informed Consent Form with your parent. The meeting will take about 1 hour of time and will be held in Room 324 Chandlee Laboratory Building on The Pennsylvania State University campus.

On a different day, you will come back to Room 324 Chandlee Laboratory Building on The Pennsylvania State University campus with your same parent to fill out two questionnaires. On these questionnaires, you will answer questions about yourself and your ability to cook, your physical activity and eating habits, and how you feel about physical activity and food. It will take about 1 hour to finish these questionnaires.

Within one week of completing the questionnaires, you will come back to Room 324 Chandlee Laboratory Building on The Pennsylvania State University campus with your same parent to fill out the same questionnaires. This will take about 1 hour of your time.

Within two months of completing the questionnaires and if you are asked and agree, you will come back to Room 324 Chandlee Laboratory Building on The Pennsylvania State University campus with your same parent to fill out the same questionnaires that may have some new questions on them. This will take about 1 hour of your time.

- 3. Discomforts and Risks:** There are no risks to participating in this research beyond those experienced in everyday life. Some of the questions are personal and might cause discomfort.

4. **Benefits:** There are no benefits to you for being in this study. The benefits to other people include the testing of the questionnaires that may be used by other people to look at nutrition and physical activity in middle school children and their parents.
5. **Duration/Time:** This study will take about 4 hours of your time over 2 months.
6. **Statement of Confidentiality:** Your participation in this research is confidential. Data (any information that you provide to the investigators) will be stored and secured at Room 316 Chandlee Laboratory Building on The Pennsylvania State University campus in a locked file cabinet. Any information stored on a computer will be on a password-protected computer at The Pennsylvania State University. For any information that you provide to the investigators, a three-digit code number (for example, 001) will be assigned to you and used in place of your name. A master list of these code numbers will be kept in a separated locked file cabinet. In the event of a publication or presentation resulting from the research, no personally identifiable information will be shared.

The Pennsylvania State University's Office for Research Protections, the Institutional Review Board and the Office for Human Research Protections in the Department of Health and Human Services may review records related to this research study. In the event of a publication or presentation resulting from the research, no personally identifiable information will be shared. If you want to share your information with other people, such as your friends or parents, this is up to you.

7. **Right to Ask Questions:** contact Dr. Shelly Nickols-Richardson at 814-865-5926 with questions, complaints or concerns about this research. You can also call this number if you feel this study has harmed you. If you have any questions, concerns, problems about your rights as a research participant or would like to offer input, please contact The Pennsylvania State University's Office for Research Protections (ORP) at 814-865-1775. The ORP cannot answer questions about research procedures. Questions about research procedures can be answered by the research team.
8. **Voluntary Participation:** Your decision to be in this research is voluntary. You can stop at any time. You do not have to answer any questions you do not want to answer. Refusal to take part in or withdrawing from this study will involve no penalty or loss of benefits you would receive otherwise.

You must be in the 6th or 7th grade or be 11 to 14 years of age to agree to be in this study. If you agree to take part in this research study and the information outlined above, please sign your name and indicate the date below.

You and your parent will be given a copy of this form for your records.

Participant Signature

Date

Parent Signature

Date

Person Obtaining Consent

Date

APPENDIX B
PILOT TEST STUDY MATERIALS

Child Demographic Questionnaire

ID Number _____

Date _____

Title of Project: Family menu planning: pilot testing of lesson plans for the PAWS Club study

Directions: For each of the questions below, select the response that best applies to you. Please read each statement carefully before answering.

1. What is your age? _____ years

2. What is your race?

- | | |
|---|--|
| <input type="checkbox"/> White | <input type="checkbox"/> Japanese |
| <input type="checkbox"/> Black, African American | <input type="checkbox"/> Korean |
| <input type="checkbox"/> American Indian or Alaska Native | <input type="checkbox"/> Vietnamese |
| <input type="checkbox"/> Asian Indian | <input type="checkbox"/> Native Hawaiian |
| <input type="checkbox"/> Chinese | <input type="checkbox"/> Guamanian or Chamorro |
| <input type="checkbox"/> Filipino | <input type="checkbox"/> Samoan |
| | <input type="checkbox"/> Other _____ |

3. Are you of Hispanic, Latino, or Spanish origin?

- No, not of Hispanic, Latino, or Spanish origin
 Yes, Mexican, Mexican American, Chicano
 Yes, Puerto Rican
 Yes, Cuban
 Yes, another Hispanic, Latino, or Spanish origin

 4. What is your gender? Boy Girl

5. What grade are you in at school this year?

- 6th
 7th
 Other _____

6. Which school do you attend?

- Park Forest Middle School
 Mount Nittany Middle School
 Other _____

7. What is your home address?

 House number Street name Apt. number

 City State Zip code

Child Demographic Questionnaire

ID Number _____

Date _____

Title of Project: Culinary skills: psychometric properties of instruments and pilot testing of lesson plans for the PAWS Club study

Directions: For each of the questions below, select the response that best applies to you. Please read each statement carefully before answering.

1. What is your age? _____ years

2. What is your race?

- | | |
|---|--|
| <input type="checkbox"/> White | <input type="checkbox"/> Japanese |
| <input type="checkbox"/> Black, African American | <input type="checkbox"/> Korean |
| <input type="checkbox"/> American Indian or Alaska Native | <input type="checkbox"/> Vietnamese |
| <input type="checkbox"/> Asian Indian | <input type="checkbox"/> Native Hawaiian |
| <input type="checkbox"/> Chinese | <input type="checkbox"/> Guamanian or Chamorro |
| <input type="checkbox"/> Filipino | <input type="checkbox"/> Samoan |
| | <input type="checkbox"/> Other _____ |

3. Are you of Hispanic, Latino, or Spanish origin?

- No, not of Hispanic, Latino, or Spanish origin
 Yes, Mexican, Mexican American, Chicano
 Yes, Puerto Rican
 Yes, Cuban
 Yes, another Hispanic, Latino, or Spanish origin

4. What is your gender? Boy Girl

5. What grade are you in at school this year?

- 6th
 7th
 Other _____

6. Which school do you attend?

- Park Forest Middle School
 Mount Nittany Middle School
 Other _____

7. What is your home address?

House number Street name Apt. number

City State Zip code

Adult Demographic Questionnaire

ID Number _____

Date _____

Title of Project: Instrument testing of questionnaire for the PAWS Club: Peer-education About Weight Steadiness study

Directions: For each of the questions below, select the response that best applies to you. Please read each statement carefully before answering.

1. What is your age? _____ years

2. What is your race?

- | | |
|---|--|
| <input type="checkbox"/> White | <input type="checkbox"/> Japanese |
| <input type="checkbox"/> Black, African American | <input type="checkbox"/> Korean |
| <input type="checkbox"/> American Indian or Alaska Native | <input type="checkbox"/> Vietnamese |
| <input type="checkbox"/> Asian Indian | <input type="checkbox"/> Native Hawaiian |
| <input type="checkbox"/> Chinese | <input type="checkbox"/> Guamanian or Chamorro |
| <input type="checkbox"/> Filipino | <input type="checkbox"/> Samoan |
| | <input type="checkbox"/> Other _____ |

3. Are you of Hispanic, Latino, or Spanish origin?

- No, not of Hispanic, Latino, or Spanish origin
- Yes, Mexican, Mexican American, Chicano
- Yes, Puerto Rican
- Yes, Cuban
- Yes, another Hispanic, Latino, or Spanish origin

4. What is your gender? Male Female

5. What is your highest level of education?

- Some High School
- High School Graduate
- Some College
- 2-year Associate Degree / Graduate
- 4-year College Degree / Graduate
- Some Graduate School
- Master's Degree

Doctorate Degree

Other _____

6. What is your home address?

House number Street name Apt. number

City State Zip code

7. What is your total household income range?

- Under \$15,000 per year
- \$15,000 to \$24,999 per year
- \$25,000 to \$34,999 per year
- \$35,000 to \$49,999 per year
- \$50,000 to \$74,999 per year
- \$75,000 to \$99,999 per year
- \$100,000 to \$149,999 per year
- \$150,000 to \$199,999 per year
- \$200,000 or more per year

8. Do any of your children currently participate in the:

- School Breakfast Program, reduced price or free breakfast
- School Lunch Program, reduced price or free lunch

9. Do you currently:

- Work full-time, year-round, outside of the home for someone other than yourself
- Work less than full-time, year-round, outside of the home for someone other than yourself
- Work full-time, year-round, inside of the home for someone other than yourself
- Work less than full-time, year-round, inside of the home for someone other than yourself
- Work full-time, year-round, inside of the home for yourself
- Work less than full-time, year-round, inside of the home for yourself
- Did not work

10. What is your current occupation? _____

11. In what type of family household do you live?

- Married-couple
 Female householder, no husband present
 Male householder, no wife present
Other _____

12. How many children live in your household?

- 0 3 More than 5
 1 4
 2 5

The following questions refer only to your child that is participating in the PAWS Club.

13. What is your child's age? _____ years

14. What is your child's gender? Boy Girl

15. What grade is your child in this year?

- 6th
 7th
Other _____

16. Which school does your child attend?

- Park Forest Middle School
 Mount Nittany Middle School
Other _____

17. Do you have health insurance?

- Yes
 No
 Partial coverage

18. Does your child have any special health concerns, such as food allergies? (Please describe)

Adult SCT Questionnaire

ID Number _____

Date _____

Title of Project: Instrument testing of questionnaires for the PAWS Club: Peer-education About Weight Steadiness Study

For each of the statements listed below, circle the number that best represents your response as it applies to the way you feel about your current eating and physical activity behaviors. Please read each statement carefully before responding.

Balancing Calories to Manage Weight
Social/family support

Please tell us how often the following things happened.

In the past month, my child:

1. gave me helpful reminders to stick to a healthy lifestyle.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
2. helped me to set goals about a healthy lifestyle.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
3. told me that every calorie counts.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
4. told me to pay closer attention to portion sizes.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
5. limited the amount of snacks such as cookies, cakes, pies and donuts that they shared with me.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
6. limited the amount of snacks such as candy, candy bars and regular soda that they shared with me.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
7. counted the number of calories in the foods that they ate.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly

In the past month, I told my child:

8. to stick to a healthy lifestyle.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
9. to set goals about a healthy lifestyle.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
10. that every calorie counts.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
11. to pay closer attention to portion sizes.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
12. to limit the amount of snacks such as cookies, cakes, pies and donuts that my child eats.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
13. to limit the amount of snacks such as candy, candy bars and regular soda that my child eats.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
14. to count the number of calories in the foods that my child eats.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly

In the past month, my child:

1. did a physical activity with me.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
2. offered to do a physical activity with me.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly

3. gave me helpful reminders to be physically active.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
4. invited me to go someplace away from our house to do a physical activity.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
5. went with me someplace away from our house to do a physical activity.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
Self-efficacy						
Please tell us how sure you are about the following statements.						
On most days, I can:						
1. be physically active with my child during my free time.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
2. do physically active things with my child.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
3. be physically active with my child during my free time even if I could watch TV or play video games instead.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
4. be physically active with my child during my free time even if it is very hot or cold outside.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
5. ask my child to be physically active with me during my free time.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
6. be physically active with my child during my free time even at home.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
7. have the coordination I need to be physically active with my child during my free time.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
8. be physically active with my child during my free time no matter how busy my day is.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
9. count the number of calories in the foods and beverages that my child eats.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
10. fix smaller portion sizes of foods for my child.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
11. read a food label for my child and know how many calories are in one portion size of a food that my child eats.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
12. limit the number of cookies, cakes, pies and donuts that my child eats.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
13. limit the amount of candy, candy bars and regular soda that my child has.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
14. give my child foods with fewer calories when others around my child are eating foods with greater calories.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
15. buy foods with fewer calories in them.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	

Self-regulation					
Please tell us how the following statements describe you.					
1. I often set physical activity goals with my child for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
2. I often plan how much time I will spend in physical activity with my child for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
3. I often do several physical activities with my child in one day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
4. If I do not do physical activity on one day with my child, I figure out why I was not able to be physically active.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
5. I usually tell other people that I will be physically active with my child each day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
6. I often set a goal for how many calories my child will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
7. I often plan how much food my child will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
8. I often monitor how much food my child has eaten in one day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
9. If I do not stick to my calorie goal for my child for the day, I figure out why I was not able to do this.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
10. I usually tell other people the number of calories that my child will eat in one day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
Outcome expectations					
Please tell us if you agree with the following statements.					
If my child is physically active each day, my child will:					
1. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
2. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
3. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
4. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
5. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If my child eats healthy foods every day, my child will:					
6. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
7. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
8. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree

9. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
10. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree

Reducing Certain Foods and Food Components

Social/family support

Please tell us how often the following things happened.

In the past month, my child gave me helpful reminders to:

1. reduce foods with lots of solid fats such as cookies, cakes, pies and donuts.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
2. reduce foods with lots of sugar such as sweets, candy, candy bars, regular soda and sugar-sweetened beverages.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
3. reduce foods with lots of sodium such as chips and crackers and salted foods.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
4. reduce foods with lots of saturated fats such as fried potatoes and other fried foods, high-fat beef, ice cream and high-fat dairy foods, salad dressing, and butter and margarine.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
5. reduce foods with lots of cholesterol such as eggs, beef, shrimp and lobster.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
6. reduce refined grains such as white bread and rolls and plain pasta.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly

In the past month, I told my child to:

7. reduce foods with lots of solid fats such as cookies, cakes, pies and donuts.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
8. reduce foods with lots of sugar such as sweets, candy, candy bars, regular soda and sugar-sweetened beverages.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
9. reduce foods with lots of sodium such as chips and crackers and salted foods.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
10. reduce foods with lots of saturated fats such as fried potatoes and other fried foods, high-fat beef, ice cream and high-fat dairy foods, salad dressing, and butter and margarine.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
11. reduce foods with lots of cholesterol such as eggs, beef, shrimp and lobster.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
12. reduce refined grains such as white bread and rolls and plain pasta.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly

In the past month, I:

13. reduced the amount of cookies, cakes, pies and donuts that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
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14. reduced the amount of sweets, candy, candy bars, regular soda and sugar-sweetened beverages that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
15. reduced the amount of chips, crackers and salted foods that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
16. reduced the amount of fried potatoes and other fried foods, high-fat beef, ice cream and high-fat dairy foods, salad dressing, and butter and margarine that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
17. reduced the amount of eggs, beef, shrimp and lobster that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
18. reduced the amount of white bread and rolls and plain pastas that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly

Self-efficacy

Please tell us how sure you are about the following statements.

On most days, I can:

1. reduce the amount of high-fat foods that my child eats.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
2. reduce the amount of high-sugar foods that my child eats.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
3. reduce the amount of high-sodium or high-salt foods that my child eats.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
4. reduce the amount of foods that contain saturated fats that my child eats.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
5. reduce the amount of foods that contain cholesterol that my child eats.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
6. reduce the amount of refined bread and plain pasta that my child eats.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
7. reduce the amount of high-fat foods available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
8. reduce the amount of high-sugar foods available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
9. reduce the amount of high-sodium or high-salt foods available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
10. reduce the amount of foods that contain saturated fats available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
11. reduce the amount of foods that contain cholesterol available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
12. reduce the amount of refined bread and plain pasta available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
13. replace cookies, cakes, pies and donuts with vegetables or fruits for my child.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can

14. replace sweets, candy, candy bars, regular soda and sugar-sweetened beverages with vegetables or fruits for my child.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
15. replace solid fats with oils for my child.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
16. replace high-fat milk and dairy foods with non-fat milk and dairy foods for my child.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
17. replace high-fat meats with low-fat meats or cooked dried beans for my child.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
18. replace fried potatoes with other vegetables for my child.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
19. limit white bread and rolls to 2 or 3 slices for my child.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
20. buy foods with less solid fats and added sugars, sodium or salt, saturated fats and cholesterol.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
21. buy less refined grains and plain pasta.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
Self-regulation					
Please tell us how the following statements describe you.					
I often set a goal or plan for:					
1. how many cookies and donuts and how much cake and pie my child will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
2. how many sweets and candy bars and how much candy, regular soda and sugar-sweetened beverages my child will have for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
3. how many chips, crackers and salted foods my child will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
4. how many fried potatoes and other fried foods and how much high-fat beef, ice cream and high-fat dairy foods, salad dressing, and butter and margarine my child will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
5. how many eggs and how much beef, shrimp and lobster my child will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
6. how much white bread and rolls and plain pasta my child will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
Each day, I usually tell other people that I will have my child:					
7. avoid eating cookies, cakes, pies and donuts.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
8. avoid eating sweets, candy, candy bars, regular soda and sugar-sweetened beverages.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
9. avoid eating chips, crackers and salted	1 Does not	2	3 Somewhat	4	5 Describes me

foods.	describe me		describes me		completely
10. avoid eating fried potatoes and other fried foods, high-fat beef, ice cream and high-fat dairy foods, salad dressing, and butter and margarine.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
11. avoid eating eggs, beef, shrimp and lobster.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
12. avoid eating white bread and rolls and plain pasta.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
13. If I do not meet my goals for my child's food intake, I figure out why I was not able to do this during the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
Outcome expectations					
Please tell us if you agree with the following statements.					
If my child reduces the amount of cookies, cakes, pies and donuts that my child eats each day, my child will:					
1. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
2. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
3. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
4. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
5. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If my child reduces the amount of sweets, candy, candy bars, regular soda and sugar-sweetened beverages that my child has each day, my child will:					
6. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
7. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
8. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
9. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
10. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If my child reduces the amount of chips, crackers and salted foods that my child eats each day, my child will:					
11. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
12. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree

13. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
14. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
15. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If my child reduces the amount of fried potatoes and other fried foods, high-fat beef, ice cream and high-fat dairy foods, salad dressing, and butter and margarine that my child eats each day, my child will:					
16. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
17. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
18. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
19. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
20. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If my child reduces the amount of eggs, beef, shrimp and lobster that my child eats each day, my child will:					
21. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
22. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
23. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
24. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
25. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If my child reduces the amount of white bread and rolls and plain pasta that my child eats each day, my child will:					
26. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
27. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
28. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
29. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
30. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree

Increasing Selected Foods and Nutrients**Social/family support**

Please tell us how often the following things happened.

In the past month, my child gave me helpful reminders to:						
1. eat more vegetables.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
2. eat more fruits.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
3. eat more whole grains.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
4. drink more non-fat milk and eat more non-fat dairy foods.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
5. eat more seafood or fish.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
6. eat more oils.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
In the past month, I told my child to:						
7. eat more vegetables.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
8. eat more fruits.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
9. eat more whole grains.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
10. drink more non-fat milk and eat more non-fat dairy foods.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
11. eat more seafood and fish.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
12. eat more oils.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
In the past month, I:						
13. increased the amount of vegetables that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
14. increased the amount of fruits that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
15. increased the amount of whole grains that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
16. increased the amount of non-fat milk and non-fat dairy foods that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
17. increased the amount of seafood and fish foods that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
18. increased the oils that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
<i>Self-efficacy</i>						
Please tell us how sure you are about the following statements.						
On most days, I can:						
1. increase the amount of vegetables that my child eats.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
2. increase the amount of fruits that my child eats.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
3. increase the amount of whole grains that my child eats.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
4. increase the amount of non-fat milk that I	1 I am sure I cannot	2	3 I am somewhat sure	4	5 I am sure I	

drink and non-fat dairy foods that my child eats.			I can		can
5. increase the amount of seafood and fish that my child eats.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
6. increase the amount of oils that my child eats.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
7. increase the amount of vegetables available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
8. increase the amount of fruits available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
9. increase the amount of whole grains available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
10. increase the amount of non-fat milk and non-fat dairy foods available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
11. increase the amount of seafood and fish available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
12. increase the amount of oils available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
13. replace cookies, cakes, pies and donuts with vegetables or fruits for my child.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
14. replace sweets, candy, candy bars, regular soda and sugar-sweetened beverages with vegetables or fruits for my child.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
15. replace solid fats with oils for my child.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
16. replace high-fat milk and dairy foods with non-fat milk and dairy foods for my child.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
17. replace high-fat meats with seafood and fish for my child.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
18. replace fried potatoes with other vegetables for my child.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
19. have my child eat at least 5 servings of vegetables and fruits.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
20. have my child eat 2 or 3 slices of whole grain breads and rolls or 2 or 3 servings of whole grain cereals or pastas.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
Self-regulation					
Please tell us how the following statements describe you.					
I often set a goal or plan for:					
1. how many vegetables my child will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
2. how many fruits my child will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
3. how many whole grains my child will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely

4. how much non-fat milk my child will drink and non-fat dairy foods I will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
5. how much seafood and fish my child will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
6. how many oils my child will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
Each day, I usually tell other people that I will have my child:					
7. eat vegetables.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
8. eat fruits.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
9. eat whole grains.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
10. eat non-fat milk and non-fat dairy foods.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
11. eat seafood and fish.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
12. eat oils.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
13. If I do not meet my goals for my child's food intake, I figure out why I was not able to do this during the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
Outcome expectations					
Please tell us if you agree with the following statements.					
If my child increases the amount of vegetables that my child eats each day, my child will:					
1. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
2. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
3. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
4. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
5. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If my child increases the amount of fruits that my child eats each day, my child will:					
6. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
7. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
8. feel happier.	1 I strongly	2 I kind of	3 I do not disagree	4 I kind	5 I strongly

	disagree	disagree	or agree	of agree	agree
9. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
10. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If my child increases the amount of whole grains that my child eats each day, my child will:					
11. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
12. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
13. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
14. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
15. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If my child increases the amount of non-fat milk that my child drinks and non-fat dairy foods that my child eats each day, my child will:					
16. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
17. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
18. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
19. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
20. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If my child increases the amount of seafood and fish that my child eats each day, my child will:					
21. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
22. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
23. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
24. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
25. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If my child increases the amount of oils that my child eats each day, my child will:					
26. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
27. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree

28. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
29. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
30. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree

Building Health Eating Patterns

Social/family support

Please tell us how often the following things happened.

In the past month, my child gave me helpful reminders to:

1. eat 3 meals each day.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
2. eat out less often.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
3. eat a vegetarian diet.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
4. avoid fast-food restaurants.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
5. eat healthy snacks only when hungry.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
6. drink more water each day.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
7. eat a healthy breakfast each day.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
8. eat more plant foods such as vegetables, fruits and cooked dried beans rather than animal foods such as beef or pork.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
9. avoid eating while watching television, playing a video game or working at a computer.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly

In the past month, I told my child to:

10. eat 3 meals each day.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
11. eat out less often.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
12. eat a vegetarian diet.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
13. avoid fast-food restaurants.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
14. eat healthy snacks only when hungry.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
15. drink more water each day.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
16. eat a healthy breakfast each day.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
17. eat more plant foods such as vegetables, fruits and cooked dried beans rather than animal foods such as beef or pork.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
18. avoid eating while watching television, playing a video game or working at a computer.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly

In the past month, our family:						
19. ate 3 meals each day more often than usual.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
20. ate away from home less often than usual.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
21. ate a vegetarian diet more often than usual.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
22. avoided fast-food restaurants more often than usual.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
23. skipped breakfast more often than usual.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
24. ate fewer unhealthy snacks than usual.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
25. drank more water and less regular soda or sugar-sweetened beverages more often than usual.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
26. watched television, played video games, or worked at a computer while eating meals less often than usual.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
<i>Self-efficacy</i>						
Please tell us how sure you are about the following statements.						
On most days, I can:						
1. prepare 3 meals for my child.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
2. make my child to eat at home or school.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
3. fix a vegetarian diet for my child.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
4. prevent my child from eating at a fast-food restaurant.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
5. have my child eat healthy snacks only when hungry.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
6. have my child drink more water.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
7. fix a healthy breakfast for my child.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
8. fix more plant foods such as vegetables, fruits and cooked dried beans rather than animal foods such as beef or pork.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
9. prevent my child from watching television, playing a video game or working at a computer while my child is eating a meal or snack.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
On most days, my child can ask me to:						
10. fix 3 meals.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
11. eat at home more often.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
12. fix a vegetarian diet.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
13. not eat at a fast-food restaurant.	1 I am sure I cannot	2	3 I am somewhat sure	4	5 I am sure I	

			I can		can
14. have healthy snacks available around the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
15. not have regular soda or sugar-sweetened beverages around the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
16. fix a healthy breakfast.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
17. fix more plant foods such as vegetables, fruits and cooked dried beans rather than animal foods such as beef or pork.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
18. not watch television, play a video game or work at a computer while the family is eating a meal or snack.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
Self-regulation					
Please tell us how the following statements describe you.					
I often set a goal or plan for my child to:					
1. eat 3 meals each day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
2. eat at home or at school.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
3. eat a vegetarian diet.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
4. not eat at a fast-food restaurant.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
5. eat healthy snacks only when hungry.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
6. drink more water.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
7. eat a healthy breakfast.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
8. eat more plant foods such as vegetables, fruits and cooked dried beans rather than animal foods such as beef or pork.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
9. not watch television, play a video game, or work at a computer while eating a meal or snack.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
Each day, I usually tell other people that I will have my child:					
10. eat 3 meals.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
11. eat at home or school.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
12. eat a vegetarian diet.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
13. avoid eating at a fast-food restaurant.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely

14. eat healthy snacks only when hungry.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
15. drink more water.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
16. eat a healthy breakfast.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
17. eat more plant foods such as vegetables, fruits and cooked dried beans rather than animal foods such as beef or pork.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
18. avoid watching television, playing a video game or working on a computer while eating a meal or snack.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
19. If I do not meet my goals for my child for healthy eating, I figure out why I was not able to do this during the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
Outcome expectations					
Please tell us if you agree with the following statements.					
If my child eats 3 meals each day, my child will:					
1. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
2. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
3. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
4. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
5. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If my child eats at home or at school each day, my child will:					
6. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
7. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
8. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
9. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
10. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree

If my child eats a vegetarian diet each day, my child will:					
11. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
12. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
13. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
14. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
15. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If my child avoids eating at fast-food restaurants each day, my child will:					
16. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
17. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
18. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
19. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
20. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If my child eats healthy snacks only when hungry each day, my child will:					
21. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
22. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
23. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
24. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
25. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If my child drinks more water each day, my child will:					
26. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
27. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
28. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
29. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree

30. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If my child eats a healthy breakfast each day, my child will:					
31. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
32. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
33. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
34. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
35. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If my child eats more plant foods such as vegetables, fruits and cooked dried beans rather than animal foods such as beef or pork each day, my child will:					
36. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
37. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
38. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
39. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
40. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If my child avoids watching television, playing a video game or working at a computer while my child is eating a meal or snack each day, my child will:					
41. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
42. change his/her body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
43. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
44. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
45. have better health when he/she is older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree

Child SCT Questionnaire

ID Number _____

Date _____

Title of Project: Instrument testing of questionnaires for the PAWS Club: Peer-education About Weight Steadiness Study

For each of the statements listed below, circle the number that best represents your response as it applies to the way you currently eat and your current level of physical activity. Please read each statement carefully before responding.

Balancing Calories to Manage Weight

Social/family support

Please tell us how often the following things happened.

In the past month, my friends or classmates:

1. gave me helpful reminders to stick to a healthy lifestyle.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
2. helped me to set goals about a healthy lifestyle.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
3. told me that every calorie counts.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
4. told me to pay closer attention to portion sizes.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
5. limited the amount of snacks such as cookies, cakes, pies and donuts that they shared with me.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
6. limited the amount of snacks such as candy, candy bars and regular soda that they shared with me.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
7. counted the number of calories in the foods that they ate.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly

In the past month, my parents and siblings:

8. gave me helpful reminders to stick to a healthy lifestyle.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
9. helped me to set goals about a healthy lifestyle.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
10. told me that every calorie counts.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
11. told me to pay closer attention to portion sizes.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
12. limited the amount of snacks such as cookies, cakes, pies and donuts that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
13. limited the amount of snacks such as candy, candy bars and regular soda that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly

14. counted the number of calories in the foods that they eat.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
In the past month, my friends and classmates:						
1. did a physical activity with me.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
2. offered to do a physical activity with me.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
3. gave me helpful reminders to be physically active.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
4. invited me to go someplace away from my house to do a physical activity.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
In the past month, my parents and siblings:						
5. did a physical activity with me.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
6. offered to do a physical activity with me.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
7. gave me helpful reminders to be physically active.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
8. took me someplace away from the house to do a physical activity.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
Self-efficacy						
Please tell us how sure you are about the following statements.						
On most days, I can:						
1. be physically active during my free time.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
2. ask my parents or other adults to do physically active things with me.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
3. be physically active during my free time even if I could watch TV or play video games instead.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
4. be physically active during my free time even if it is very hot or cold outside.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
5. ask my best friend to be physically active with me during my free time.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
6. be physically active during my free time even if I have to stay at home.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
7. have the coordination I need to be physically active during my free time.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
8. be physically active during my free time no matter how busy my day is.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
9. count the number of calories in the foods and beverages that I eat.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
10. eat small portion sizes of foods.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
11. read a food label and know how many calories are in one portion size of a food.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
12. limit the number of cookies, cakes, pies and donuts that I eat.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
13. limit the amount of candy, candy bars and	1 I am sure I cannot	2	3 I am somewhat sure	4	5 I am sure I	

regular soda that I have.			I can		can
14. eat foods with fewer calories when others around me are eating foods with greater calories.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
15. ask my parents to buy foods with fewer calories in them.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
Self-regulation					
Please tell us how the following statements describe you.					
1. I often set physical activity goals for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
2. I often plan how much time I will spend in physical activity for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
3. I often do several physical activities in one day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
4. If I do not do physical activity on one day, I figure out why I was not able to be physically active.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
5. I usually tell other people that I will be physically active each day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
6. I often set a goal for how many calories I will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
7. I often plan how much food I will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
8. I often monitor how much food I have eaten in one day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
9. If I do not stick to my calorie goal for the day, I figure out why I was not able to do this.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
10. I usually tell other people the number of calories that I will eat in one day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
Outcome expectations					
Please tell us if you agree with the following statements.					
If I am physically active each day, I will:					
1. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
2. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
3. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
4. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
5. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree

If I eat healthy foods every day, I will:					
6. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
7. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
8. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
9. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
10. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree

Reducing Certain Foods and Food Components

Social/family support

Please tell us how often the following things happened.

In the past month, my friends or classmates gave me helpful reminders to:

1. reduce foods with lots of solid fats such as cookies, cakes, pies and donuts.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
2. reduce foods with lots of sugar such as sweets, candy, candy bars, regular soda and sugar-sweetened beverages.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
3. reduce foods with lots of sodium such as chips and crackers and salted foods.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
4. reduce foods with lots of saturated fats such as fried potatoes and other fried foods, high-fat beef, ice cream and high-fat dairy foods, salad dressing, and butter and margarine.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
5. reduce foods with lots of cholesterol such as eggs, beef, shrimp and lobster.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
6. reduce refined grains such as white bread and rolls and plain pasta.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly

In the past month, my parents and siblings gave me helpful reminders to:

7. reduce foods with lots of solid fats such as cookies, cakes, pies and donuts.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
8. reduce foods with lots of sugar such as sweets, candy, candy bars, regular soda and sugar-sweetened beverages.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
9. reduce foods with lots of sodium such as chips and crackers and salted foods.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
10. reduce foods with lots of saturated fats such as fried potatoes and other fried foods, high-fat beef, ice cream and high-fat dairy foods, salad dressing, and butter and margarine.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly

11. reduce foods with lots of cholesterol such as eggs, beef, shrimp and lobster.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
12. reduce refined grains such as white bread and rolls and plain pasta.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
In the past month, my parents and siblings:						
13. reduced the amount of cookies, cakes, pies and donuts that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
14. reduced the amount of sweets, candy, candy bars, regular soda and sugar-sweetened beverages that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
15. reduced the amount of chips, crackers and salted foods that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
16. reduced the amount of fried potatoes and other fried foods, high-fat beef, ice cream and high-fat dairy foods, salad dressing, and butter and margarine that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
17. reduced the amount of eggs, beef, shrimp and lobster that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
18. reduced the amount of white bread and rolls and plain pastas that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
Self-efficacy						
Please tell us how sure you are about the following statements.						
On most days, I can:						
1. reduce the amount of high-fat foods that I eat.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
2. reduce the amount of high-sugar foods that I eat.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
3. reduce the amount of high-sodium or high-salt foods that I eat.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
4. reduce the amount of foods that contain saturated fats that I eat.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
5. reduce the amount of foods that contain cholesterol that I eat.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
6. reduce the amount of refined bread and plain pasta that I eat.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
7. ask my parents to reduce the amount of high-fat foods available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
8. ask my parents to reduce the amount of high-sugar foods available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
9. ask my parents to reduce the amount of high-sodium or high-salt foods available in	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	

the house.					
10. ask my parents to reduce the amount of foods that contain saturated fats available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
11. ask my parents to reduce the amount of foods that contain cholesterol available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
12. ask my parents to reduce the amount of refined bread and plain pasta available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
13. replace cookies, cakes, pies and donuts with vegetables or fruits.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
14. replace sweets, candy, candy bars, regular soda and sugar-sweetened beverages with vegetables or fruits.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
15. replace solid fats with oils.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
16. replace high-fat milk and dairy foods with non-fat milk and dairy foods.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
17. replace high-fat meats with low-fat meats or cooked dried beans.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
18. replace fried potatoes with other vegetables.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
19. limit white bread and rolls to 2 or 3 slices.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
20. ask my parents to buy foods with less solid fats and added sugars, sodium or salt, saturated fats and cholesterol.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
21. ask my parents to buy less refined grains and plain pasta.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
Self-regulation					
Please tell us how the following statements describe you.					
I often set a goal or plan for:					
1. how many cookies and donuts and how much cake and pie I will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
2. how many sweets and candy bars and how much candy, regular soda and sugar-sweetened beverages I will have for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
3. how many chips, crackers and salted foods I will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
4. how many fried potatoes and other fried foods and how much high-fat beef, ice cream and high-fat dairy foods, salad dressing, and butter and margarine I will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
5. how many eggs and how much beef,	1 Does not	2	3 Somewhat	4	5 Describes me

shrimp and lobster I will eat for the day.	describe me		describes me		completely
6. how much white bread and rolls and plain pasta I will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
Each day, I usually tell other people that I will:					
7. avoid eating cookies, cakes, pies and donuts.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
8. avoid eating sweets, candy, candy bars, regular soda and sugar-sweetened beverages.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
9. avoid eating chips, crackers and salted foods.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
10. avoid eating fried potatoes and other fried foods, high-fat beef, ice cream and high-fat dairy foods, salad dressing, and butter and margarine.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
11. avoid eating eggs, beef, shrimp and lobster.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
12. avoid eating white bread and rolls and plain pasta.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
13. If I do not meet my goals for food intake, I figure out why I was not able to do this during the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
Outcome expectations					
Please tell us if you agree with the following statements.					
If I reduce the amount of cookies, cakes, pies and donuts that I eat each day, I will:					
1. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
2. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
3. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
4. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
5. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If I reduce the amount of sweets, candy, candy bars, regular soda and sugar-sweetened beverages that I have each day, I will:					
6. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
7. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
8. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree

9. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
10. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If I reduce the amount of chips, crackers and salted foods that I eat each day, I will:					
11. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
12. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
13. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
14. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
15. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If I reduce the amount of fried potatoes and other fried foods, high-fat beef, ice cream and high-fat dairy foods, salad dressing, and butter and margarine that I eat each day, I will:					
16. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
17. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
18. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
19. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
20. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If I reduce the amount of eggs, beef, shrimp and lobster that I eat each day, I will:					
21. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
22. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
23. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
24. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
25. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If I reduce the amount of white bread and rolls and plain pasta that I eat each day, I will:					
26. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
27. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
28. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree

29. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
30. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree

Increasing Selected Foods and Nutrients

Social/family support

Please tell us how often the following things happened.

In the past month, my friends or classmates gave me helpful reminders to:

1. eat more vegetables.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
2. eat more fruits.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
3. eat more whole grains.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
4. drink more non-fat milk and eat more non-fat dairy foods.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
5. eat more seafood or fish.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
6. eat more oils.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly

In the past month, my parents and siblings gave me helpful reminders to:

7. eat more vegetables.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
8. eat more fruits.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
9. eat more whole grains.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
10. drink more non-fat milk and eat more non-fat dairy foods.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
11. eat more seafood and fish.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
12. eat more oils.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly

In the past month, my parents and siblings:

13. increased the amount of vegetables that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
14. increased the amount of fruits that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
15. increased the amount of whole grains that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
16. increased the amount of non-fat milk and non-fat dairy foods that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
17. increased the amount of seafood and fish foods that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
18. increased the oils that were available around the house.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly

Self-efficacy

Please tell us how sure you are about the following statements.

--

On most days, I can:					
1. increase the amount of vegetables that I eat.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
2. increase the amount of fruits that I eat.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
3. increase the amount of whole grains that I eat.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
4. increase the amount of non-fat milk that I drink and non-fat dairy foods that I eat.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
5. increase the amount of seafood and fish that I eat.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
6. increase the amount of oils that I eat.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
7. ask my parents to increase the amount of vegetables available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
8. ask my parents to increase the amount of fruits available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
9. ask my parents to increase the amount of whole grains available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
10. ask my parents to increase the amount of non-fat milk and non-fat dairy foods available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
11. ask my parents to increase the amount of seafood and fish available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
12. ask my parents to increase the amount of oils available in the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
13. replace cookies, cakes, pies and donuts with vegetables or fruits.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
14. replace sweets, candy, candy bars, regular soda and sugar-sweetened beverages with vegetables or fruits.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
15. replace solid fats with oils.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
16. replace high-fat milk and dairy foods with non-fat milk and dairy foods.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
17. replace high-fat meats with seafood and fish.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
18. replace fried potatoes with other vegetables.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
19. eat at least 5 servings of vegetables and fruits.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
20. eat 2 or 3 slices of whole grain breads and rolls or 2 or 3 servings of whole grain cereals or pastas.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
Self-regulation					
Please tell us how the following statements describe you.					

I often set a goal or plan for:					
1. how many vegetables I will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
2. how many fruits I will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
3. how many whole grains I will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
4. how much non-fat milk I will drink and non-fat dairy foods I will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
5. how much seafood and fish I will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
6. how many oils I will eat for the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
Each day, I usually tell other people:					
7. how many vegetables I will eat.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
8. how many fruits I will eat.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
9. how many whole grains I will eat.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
10. how much non-fat milk and non-fat dairy foods I will eat.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
11. how much seafood and fish I will eat.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
12. how many oils I will eat.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
13. If I do not meet my goals for food intake, I figure out why I was not able to do this during the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
Outcome expectations					
Please tell us if you agree with the following statements.					
If I increase the amount of vegetables that I eat each day, I will:					
1. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
2. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
3. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
4. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree

5. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If I increase the amount of fruits that I eat each day, I will:					
6. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
7. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
8. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
9. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
10. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If I increase the amount of whole grains that I eat each day, I will:					
11. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
12. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
13. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
14. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
15. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If I increase the amount of non-fat milk that I drink and non-fat dairy foods that I eat each day, I will:					
16. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
17. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
18. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
19. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
20. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If I increase the amount of seafood and fish that I eat each day, I will:					
21. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
22. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
23. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
24. have better health today.	1 I strongly	2 I kind of	3 I do not disagree	4 I kind	5 I strongly

	disagree	disagree	or agree	of agree	agree
25. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If I increase the amount of oils that I eat each day, I will:					
26. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
27. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
28. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
29. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
30. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree

Building Health Eating Patterns**Social/family support**

Please tell us how often the following things happened.

In the past month, my friends or classmates gave me helpful reminders to:

1. eat 3 meals each day.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
2. eat out less often.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
3. eat a vegetarian diet.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
4. avoid fast-food restaurants.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
5. eat healthy snacks only when hungry.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
6. drink more water each day.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
7. eat a healthy breakfast each day.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
8. eat more plant foods such as vegetables, fruits and cooked dried beans rather than animal foods such as beef or pork.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
9. avoid eating while watching television, playing a video game or working at a computer.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly

In the past month, my parents and siblings gave me helpful reminders to:

10. eat 3 meals each day.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
11. eat out less often.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
12. eat a vegetarian diet.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
13. avoid fast-food restaurants.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
14. eat healthy snacks only when hungry.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
15. drink more water each day.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly

16. eat a healthy breakfast each day.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
17. eat more plant foods such as vegetables, fruits and cooked dried beans rather than animal foods such as beef or pork.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
18. avoid eating while watching television, playing a video game or working at a computer.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
In the past month, my family:						
19. ate 3 meals each day more often than usual.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
20. ate away from home less often than usual.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
21. ate a vegetarian diet more often than usual.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
22. avoided fast-food restaurants more often than usual.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
23. skipped breakfast more often than usual.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
24. ate fewer unhealthy snacks than usual.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
25. drank more water and less regular soda or sugar-sweetened beverages more often than usual.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
26. watched television, played video games, or worked at a computer while eating meals less often than usual.		1 Never	2 Seldom	3 Sometimes	4 Often	5 Repeatedly
Self-efficacy						
Please tell us how sure you are about the following statements.						
On most days, I can:						
1. eat 3 meals.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
2. eat at home or school.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
3. eat a vegetarian diet.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
4. avoid eating at a fast-food restaurant.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
5. eat healthy snacks only when hungry.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
6. drink more water.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
7. eat a healthy breakfast.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
8. eat more plant foods such as vegetables, fruits and cooked dried beans rather than animal foods such as beef or pork.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
9. avoid watching television, playing a video game or working at a computer while I am eating a meal or snack.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can	
On most days, I can ask my parents to:						

10. fix 3 meals for me.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
11. eat at home more often.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
12. fix a vegetarian diet for me.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
13. avoid eating at a fast-food restaurant.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
14. have healthy snacks available around the house.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
15. avoid buying regular soda or sugar-sweetened beverages for me.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
16. fix a healthy breakfast for me.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
17. fix more plant foods such as vegetables, fruits and cooked dried beans rather than animal foods such as beef or pork for me.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can
18. avoid watching television, playing a video game or working at a computer while the family is eating a meal or snack.	1 I am sure I cannot	2	3 I am somewhat sure I can	4	5 I am sure I can

Self-regulation

Please tell us how the following statements describe you.

I often set a goal or plan for:

1. eating 3 meals each day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
2. eating at home or at school.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
3. eating a vegetarian diet.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
4. not eating at a fast-food restaurant.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
5. eating healthy snacks only when hungry.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
6. drinking more water.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
7. eating a healthy breakfast.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
8. eating more plant foods such as vegetables, fruits and cooked dried beans rather than animal foods such as beef or pork.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
9. not watching television, playing a video game, or working at a computer while I am eating a meal or snack.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely

Each day, I usually tell other people that I will:

10. eat 3 meals.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
11. eat at home or school.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely

12. eat a vegetarian diet.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
13. avoid eating at a fast-food restaurant.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
14. eat healthy snacks only when hungry.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
15. drink more water.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
16. eat a healthy breakfast.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
17. eat more plant foods such as vegetables, fruits and cooked dried beans rather than animal foods such as beef or pork.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
18. avoid watching television, playing a video game or working on a computer while eating a meal or snack.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
19. If I do not meet my goals for healthy eating, I figure out why I was not able to do this during the day.	1 Does not describe me	2	3 Somewhat describes me	4	5 Describes me completely
Outcome expectations					
Please tell us if you agree with the following statements.					
If I eat 3 meals each day, I will:					
1. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
2. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
3. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
4. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
5. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If I eat at home or at school each day, I will:					
6. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
7. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
8. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
9. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree

10. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If I eat a vegetarian diet each day, I will:					
11. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
12. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
13. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
14. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
15. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If I avoid eating at fast-food restaurants each day, I will:					
16. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
17. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
18. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
19. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
20. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If I eat healthy snacks only when hungry each day, I will:					
21. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
22. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
23. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
24. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
25. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If I drink more water each day, I will:					
26. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
27. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
28. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
29. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree

	disagree	disagree	or agree	of agree	agree
30. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If I eat a healthy breakfast each day, I will:					
31. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
32. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
33. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
34. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
35. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If I eat more plant foods such as vegetables, fruits and cooked dried beans rather than animal foods such as beef or pork each day, I will:					
36. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
37. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
38. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
39. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
40. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
If I avoid watching television, playing a video game or working at a computer while I am eating a meal or snack each day, I will:					
41. have more energy.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
42. change my body weight.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
43. feel happier.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
44. have better health today.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree
45. have better health when I am older.	1 I strongly disagree	2 I kind of disagree	3 I do not disagree or agree	4 I kind of agree	5 I strongly agree

Lesson 11: Family Menu Planning



Supplies:

- Copies of MyPlate principles handout (See pg. 2 in supplemental materials)
- Copies of Activity 1 handout (See pg. 3 in supplemental materials)
- Copies of Family Schedules handout (See pg. 4 in supplemental materials)
- Copies of Activity 2 handout (See pg. 5 in supplemental materials)
- Copies of Food Tasks handout (See pg. 6 in supplemental materials)
- Copies of Quick Cooking Tips handout (See pg. 7 in supplemental materials)
- Copies of Healthy Eating Outside The Home handout (See pg. 8 in supplemental materials)
- Copies of Steps To Creating A Family Shopping List handout (See pgs. 10-13 in supplemental materials)
- Copies of Activity 4 handout (See pgs. 14-15 in supplemental materials)
- Pencils & Calculators (1 per student)
- Styrofoam plates (3 per student)
- Styrofoam cups (3 per student)
- Markers (5 boxes of assorted colors)
- Stopwatch
- Grocery store gift cards (1 per student)
- Stereo & dance CD
- Jump ropes (1 per student)

Set-up: (15-20 min.)

- Make 1 copy of each handout for every student (See pgs. 2-13 in supplemental materials)

Learning Objectives:

Students will be able to ...

1. Explain the four USDA MyPlate principles for building healthy meals.
2. Identify healthy choices among each food group that follow the USDA MyPlate principles.
3. Write out weekly family activities and identify days of the week that are free for preparing family meals.
4. Identify family meal tasks.
5. Describe quick cooking tips.
6. Explain five tips for eating family meals away from home.
7. Describe steps for completing family shopping lists.

Lesson 11: Family Menu Planning



Instructional Steps

Discussion 1: Menu Planning With MyPlate (20 min.)

- The goal of menu planning is to build a healthy plate for every meal
- We can use the USDA MyPlate principles to build healthy plates with the 5 food groups for every meal
- Distribute the MyPlate Principles handout (See pg. 2 in supplemental materials) and discuss each principle:

1. Make half your plate fruits and vegetables

Fruits Group –

- Vary the fruits on your plate
- Make at least half of the fruits on your plate whole fruits instead of fruit juices



Ask! Can you name some different fruits you would put on your plate?

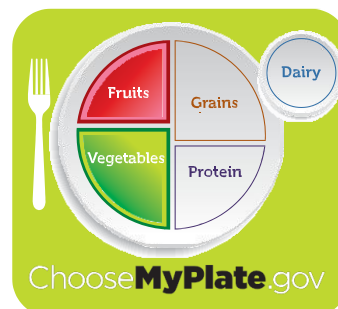
Vegetables Group –

- Vary the color of veggies on your plate with red, orange, and dark-green veggies



Ask! Can you name some red, orange, and dark green veggies?

- Green – broccoli & spinach
- Red – red peppers & tomatoes
- Orange – sweet potatoes & carrots





Lesson 11: Family Menu Planning

2. Make at least half of the grains on your plate whole grains

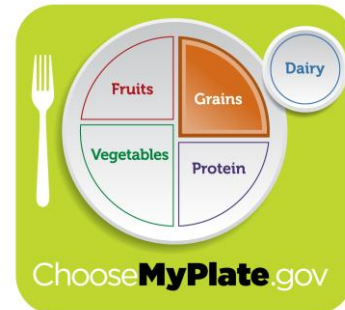
Grains Group –

- Build your plate with 100% whole-grain cereals, breads, crackers, rice, and pasta
- Replace refined grains on your plate with whole grains (e.g., replace white rice with brown rice)
- Avoid building your plate with refined grains high in empty calories (solid fats & added sugars) like cookies and cakes



Ask! Can you give an example of a refined grain you could replace with a whole grain on your plate?

- Replace white roll at dinner with wheat roll



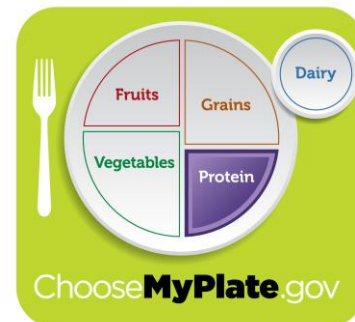
3. Vary the protein food choices on your plate

Protein Foods Group –

- Make seafood the protein on your plate twice a week
- Try building your plate with fiber-rich protein sources like beans or peas
- Build your plate with small portions of lower fat (lean) meats and poultry



Ask! Can you give an example of a seafood you could add to your plate?



Lesson 11: Family Menu Planning

P.A.W.S



4. Choose fat-free or low-fat milk and milk products for your plate

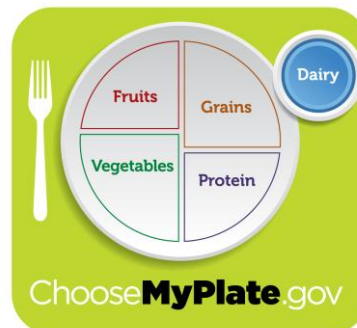
Dairy Group –

- Replace higher fat milk and milk products with fat-free or low-fat products
- Try calcium-fortified soy milk foods as an alternative to dairy foods



Ask! Can you give an example of a higher fat milk product you could replace with a low-fat or fat-free milk product on your plate?

- Replace full-fat cheese with low-fat cheese



Activity 1: Build Your Plate (15 min.)

- Distribute the Activity 1 handout (See pg. 3 in supplemental materials) and explain the instructions
- Distribute styrofoam plates and cups to students (3 of each per student) and pass out markers of assorted colors
- Give students ~10 min. to complete the activity
- Bring students together as a group for ~5 min. and have students volunteer to present their activity assignment

Lesson 11: Family Menu Planning



Discussion 2: Family Menu Planning (30 min.)

- Family is important for helping us build healthy plates for every meal
- We can plan healthy plates with our families by focusing on several key tips:

Family Tip #1: Make time to prepare and eat healthy plates together as a family at home

- Write out the family schedule for the week
- Identify busy days where you have to plan for quick healthy plates and free days where you can cook and eat healthy plates together as a family
- Distribute the Family Schedules handout (See pg. 4 in supplemental materials) and walk students through a family schedule example:

Day of Week	Family Activities
Monday – BUSY DAY	Me: Soccer practice after school until 6PM Sister: Play practice until 7:30PM Dad: Out of town on business
*Tuesday – FREE DAY Family Dinner Day	Me: No after school events Sister: Drama club until 5PM Dad: Home from business trip
Wednesday – BUSY DAY	Me: Soccer game at 5PM Sister: Play practice until 7PM Mom: School board meeting from 6-8PM
*Thursday – FREE DAY Family Dinner Day	Me: No after school events Sister: No after school events
Friday – BUSY DAY	Me: Soccer practice after school until 6PM and going to movies with friends at 7:30PM Sister: Sleep over at friend's house after school
Saturday – FREE DAY Family Breakfast, Lunch, and/or Dinner Day	Me: Piano practice at 10AM and going to mall with mom and sister after piano practice Sister: Piano practice at 11AM
Sunday – FREE DAY Family Breakfast, Lunch, and/or Dinner Day	Me: Go to church at 11AM with family and visit with grandma after church Dad: Pack for business trip on Monday morning

Key Take Home Messages:

- Tuesday, Thursday, Saturday, and Sunday are free for cooking and eating healthy plates together as a family
- Focus on eating dinner together as a family on free weekdays
- Choose at least one meal on free weekend days (e.g., Breakfast, Lunch, or Dinner) to eat as a family

Lesson 11: Family Menu Planning



Activity 2: Create Your Family Schedule (10 min.)

- **Distribute the Activity 2 handout (See pg. 5 in supplemental materials) and explain the instructions**
- **Give students ~10 min. to complete the activity**

Family Tip #2: Work together to build healthy plates

- **Assign food tasks to each family member to save time and involve each family member in the building of healthy plates**
- **Distribute the Family Food Tasks handout (See pg. 6 in supplemental materials) and review examples:**

<u>Family Food Task Examples</u>
Wash and cut fruits and vegetables
Set the table for the meal
Help cook fruits and vegetables
Cleanup table after meal (wash, dry, and put away dishes)
Properly store leftover food for another meal

Key Take Home Messages:

- **Each food task is important for successfully building a healthy and safe plate for the family to enjoy together**
- **Vary family food tasks every meal so that each family member gets to help out in different ways**
- **Be creative with your assigned food tasks**
 - **Cut fruits and vegetables into fun shapes for the family**
 - **Fold napkins on the table in different ways on the table**
 - **Experiment with new spices when cooking fruits and vegetables**
 - **Play some music and dance in place while washing the dishes**

Lesson 11: Family Menu Planning



Family Tip #3: Plan to eat healthy on busy days

- Use quick cooking strategies to build healthy plates when you don't have time to build plates as a family
- Distribute the Quick Cooking Tips handout (See pg. 7 in supplemental materials) and review tips:

Quick Cooking Tip #1: Build healthy plates with leftovers

Example: Properly re-heat salmon and brown rice from a previous dinner meal and incorporate with a newly microwaved sweet potato

Quick Cooking Tip #2: Cook with healthier versions of convenience foods

Example 1: Frozen fruits and vegetables with no added empty calories (solid fats and added sugars) or sodium that can be cooked quickly in the microwave

Example 2: Pre-packaged whole grains like brown rice with no empty calories or sodium that can be cooked quickly with water in the microwave

Example 3: Canned beans or peas with no added empty calories or sodium that can be quickly drained and heated in the microwave

Example 4: Pre-packaged fat-free or low-fat milk and milk products like shredded cheese or yogurt

Quick Cooking Tip #3: When you have time to prepare a family meal on a free day, make enough of the meal to provide you with a full leftover meal for a busy day (Note! Cooking twice as much does not take twice as long!)

Lesson 11: Family Menu Planning



Family Tip #4: Plan to eat healthy outside the home

- Distribute the Healthy Eating Outside The Home handout (See pg. 8 in supplemental materials) and review tips:

Eating Out Tip #1: Ask for nutrition facts and ingredient information about menu items to make healthier choices

Eating Out Tip #2: Order water or fat-free/low-fat milk to drink instead of soda or sweetened iced tea

Eating Out Tip #3: Ask for fruits and vegetables as side dishes instead of side dishes that are high in empty calories (solid fats and added sugars) and sodium like fried white potatoes

Eating Out Tip #4: Ask if any or all foods in the meal can be prepared without empty calories (e.g., solid butter, oil, and sugar) and sodium

Eating Out Tip #5: Watch your portion sizes by eating until you feel satisfied rather than finishing your plate (Note! You can always take leftovers home for another day)

Lesson 11: Family Menu Planning



Activity 3: Planning For Family Fitness (25 min.)

- Living a healthy lifestyle involves planning healthy plates and planning to incorporate daily family physical activity
- We should focus on participating in 60 minutes or more of daily physical activity
- A good family fitness activity is brisk walking before or after family meals
- Stand in front of students to begin warm-up exercises and stretching
- Warm-up students with brisk walking in place, side-to-side shuffling, and grapevine (~5 min.)
- Stretch students for ~5 min. (See pg. 9 in supplemental materials for recommended stretches)
- Turn on music CD and guide students through the following three group stations:
 - Station #1: Jump Rope
 - Station #2: Jumping Jacks
 - Station #3: Running In Place
- Cool down students for ~5 min. with stretching (See pg. 9 in supplemental materials for recommended stretches) and give students a water break

Lesson 11: Family Menu Planning



Discussion 3: Family Shopping Lists & Budgeting (30 min.)

- Preparing weekly shopping lists ensures that our family has the foods in the home to build healthy plates
- We can create a shopping list by using simple math to determine how much of each food group we need to purchase
- Distribute the Steps To Create A Family Shopping List handout (See pgs. 10-13 in supplemental materials) and review the steps:

Creating A Shopping List For A Family Of 4:

Step #1: Determine how many portions of each food group you need per day for the whole family

GRAINS: *6 ounces/day x 4 family members = 24 ounces/day

VEGETABLES: *2.5 cups/day x 4 family members = 10 cups/day

FRUITS: *2 cups/day x 4 family members = 8 cups/day

DAIRY: *3 cups/day x 4 family members = 12 cups/day

PROTEIN FOODS: *5.5 ounces/day * 4 family members = 22 ounces/day

Step #2: Determine how many portions of each food group you need per week for the whole family

GRAINS: 24 ounces * 7 days = 168 ounces/week

VEGETABLES: 10 cups * 7 days = 70 cups/week

FRUITS: 8 cups * 7 days = 56 cups/week

DAIRY: 12 cups * 7 days = 84 cups/week

PROTEIN FOODS: 22 ounces * 7 days = 154 ounces/week

***Note!** Portions of each food group per day are the recommended amount for a 2,000 calorie diet. Members of your family may need more or less depending on gender, age, height, weight, and level of physical activity.

Lesson 11: Family Menu Planning

P.A.W.S



Step #3: Create a shopping list of healthy food choices in each food group that your whole family will enjoy

Food Group	Weekly Portions Needed	Healthy Food Choices
Grains	168 ounces (at least 84 ounces should be whole grains)	- Whole wheat bread - Boxes of cereal with whole grains - Family size bag of brown rice
Vegetables	70 cups (purchase a variety of red, orange, and dark-green vegetables)	- Sweet potatoes - Broccoli - Carrots - Red peppers - Green Beans
Fruits	56 cups	- Apples - Bananas - Watermelons - Peaches
Dairy	84 cups (purchase low-fat or fat-free dairy foods)	- Skim milk - Low-fat yogurt (strawberry & blueberry) - Part-skim string cheese - Low-fat provolone cheese
Protein Foods	154 ounces (purchase seafood, beans or peas, and lean meat/poultry)	- Boneless/skinless chicken breasts - Lean ground beef - Salmon filets

Lesson 11: Family Menu Planning



Step #4: Revise Grocery Shopping List With Budgeting Techniques

- You can eliminate the amounts of foods you need to purchase on the grocery shopping list by estimating the portions of un-expired foods you already have in your kitchen cabinets, cupboards, pantry, refrigerator, and freezer (Note! See Step #4 in the Steps To Create A Family Shopping List handout on pg. 12 in supplemental materials for estimation strategies)
- You can check the paper and grocery store ads for the week to make sure that the healthy food choices you chose to buy will be on sale

<u>Food Group</u>	<u>Weekly Portions Needed</u>	<u>Healthy Food Choices</u>	<u>Home Food Inventory</u>
Grains	168 ounces 116 ounces (at least 58 ounces should be whole grains)	- Whole wheat bread - Boxes of cereal with whole grains - Family size bag of brown rice	- Have 1 loaf of wheat bread = 24 ounces - 2 boxes of whole grain cereal = 28 ounces
Vegetables	70 cups (purchase a variety of red, orange, and dark-green vegetables)	- Sweet potatoes - Broccoli - Carrots - Red peppers - Green Beans	None.
Fruits	56 cups ~48 cups	- Apples - Bananas - Watermelons - Peaches	- Have 3 medium bananas = 2.5 cups - Have 2 medium apples = 2 ¾ cups - Have 20-ounce container of raisins = 2.5 cups
Dairy	84 cups 65 cups (purchase low-fat or fat-free dairy foods)	- Skim milk - Low-fat yogurt (strawberry & blueberry) - Part-skim string cheese - Low-fat provolone cheese	- ½ gallon of skim milk = 16 cups - 8 slices of American cheese = 3 cups
Protein Foods	154 ounces 136.5 ounces (purchase seafood, beans or peas, and lean meat/poultry)	- Boneless/skinless chicken breasts - Lean ground beef - Salmon filets	- 4 medium boneless skinless chicken breasts (13.5 ounces) - 4 large eggs = (4 ounces)



Lesson 11: Family Menu Planning

Step #5: Shop Till You Drop!

- Take your modified grocery shopping list into the store and use the “weekly portions needed” column to help you determine how much of each food in the “healthy food choices” column you need to purchase
- You can determine how much of each food to purchase by looking at the total weight of the food on the front of the package

Activity 4: Create Your Family’s Shopping List

- Distribute the Activity 4 handout (See pgs. 14-15 in supplemental materials) and explain the instructions
- Students will be asked to complete the Activity at home and bring a copy to the next lesson

P.A.W.S



Lesson 11: Family Menu Planning
Supplemental Materials

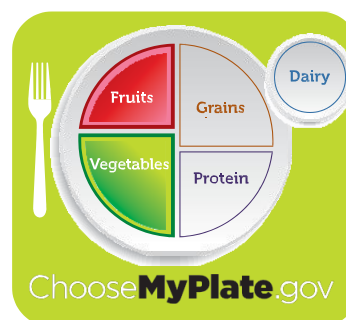
MyPlate Principles Handout

Fruits Group –

- Vary the fruits on your plate
- Make at least half of the fruits on your plate whole fruits instead of fruit juices

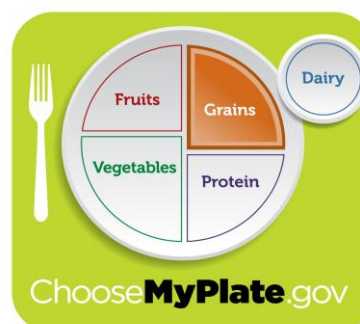
Vegetables Group –

- Vary the color of veggies on your plate with red, orange, and dark-green veggies



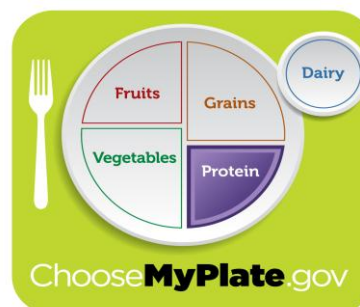
Grains Group –

- Build your plate with 100% whole-grain cereals, breads, crackers, rice, and pasta
- Replace refined grains on your plate with whole grains (e.g., replace white rice with brown rice)
- Avoid building your plate with refined grains high in empty calories (solid fats and added sugars) like cookies and cakes



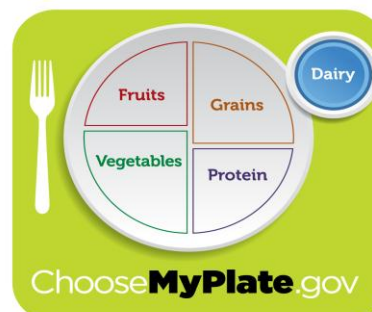
Protein Foods Group –

- Make seafood the protein on your plate twice a week
- Try building your plate with fiber-rich protein sources like beans or peas
- Build your plate with small portions of lower fat (lean) meats and poultry



Dairy Group –

- Replace higher fat milk and milk products with fat-free or low-fat products
- Try calcium-fortified soy milk foods as an alternative to dairy foods



Activity #1 Handout: Build Your Plate

Instructions: In this activity you will be asked to build a plate for breakfast, lunch and dinner using the principles in the MyPlate Principles handout. Use the assorted markers to write names or draw pictures of healthy food choices in each food group on plates for each meal. You may use the MyPlate logo below as a model for what your plate should look like. You will be given 10 minutes to complete this activity and then we will meet for 5 minutes as a group to discuss your findings! Be creative and don't be afraid to write down the names of healthy food choices that you have never eaten but would like to try!



Family Schedules Handout

<u>Day of Week</u>	<u>Family Activities</u>
Monday – BUSY DAY	Me: Soccer practice after school until 6PM Sister: Play practice until 7:30PM Dad: Out of town on business
*Tuesday – FREE DAY Family Dinner Day	Me: No after school events Sister: Drama club until 5PM Dad: Home from business trip
Wednesday – BUSY DAY	Me: Soccer game at 5PM Sister: Play practice until 7PM Mom: School board meeting from 6-8PM
*Thursday – FREE DAY Family Dinner Day	Me: No after school events Sister: No after school events
Friday – BUSY DAY	Me: Soccer practice after school until 6PM and going to movies with friends at 7:30PM Sister: Sleep over at friend's house after school
Saturday – FREE DAY Family Breakfast, Lunch, and/or Dinner Day	Me: Piano practice at 10AM and going to mall with mom and sister after piano practice Sister: Piano practice at 11AM
Sunday – FREE DAY Family Breakfast, Lunch, and/or Dinner Day	Me: Go to church at 11AM with family and visit with grandma after church Dad: Pack for business trip on Monday morning

Key Take Home Messages:

- Tuesday, Thursday, Saturday, and Sunday are free for cooking and eating healthy plates together as a family
- Focus on eating dinner together as a family on free weekdays
- Choose at least one meal on free weekend days (e.g., Breakfast, Lunch, Dinner) to eat as a family

Activity #2 Handout: Create Your Family Schedule

Instructions: In this activity you will be asked to use the blank schedule below to write down the activities that are going on in your house this week. Be as detailed as you can about what the activity is, who in your family is performing the activity, where the activity is being held, and how long the activity lasts. Use the family schedule in the Family Schedules handout as an example of what information to include in your schedule. After you write down your activities, be sure to write “FREE DAY” on days where your family could have a family meal together and “BUSY DAY” on days where your family might have to eat healthy separately. Be sure to also write the type of family meal you could have on your free days (e.g., Breakfast, Lunch, or Dinner).

<u>Day of Week</u>	<u>Family Activities</u>
Monday	
Tuesday	
Wednesday	
Thursday	
Friday	
Saturday	
Sunday	

Family Food Tasks Handout

<u>Family Food Task Examples</u>
Wash and cut fruits and vegetables
Set the table for the meal
Help cook fruits and vegetables
Cleanup table after meal (wash, dry, and put away dishes)
Properly store leftover food for another meal

Key Take Home Messages:

- Each food task is important for successfully building a healthy and safe plate for the family to enjoy together
- Vary family food tasks every meal so that each family member gets to help out in different ways
- Be creative with your food tasks
 - Cut fruits and vegetables into fun shapes for the family
 - Fold napkins on the table in different ways on the table
 - Experiment with new spices when cooking fruits and vegetables
 - Play some music and dance in place while washing the dishes

Quick Cooking Tips Handout

Quick Cooking Tip #1: Build healthy plates with leftovers

Example: Properly re-heat salmon and brown rice from a previous dinner meal and incorporate with a newly microwaved sweet potato

Quick Cooking Tip #2: Cook with healthier versions of convenience foods

Example 1: Frozen fruits and vegetables with no added empty calories (solid fats and added sugars) or sodium that can be cooked quickly in the microwave

Example 2: Pre-packaged whole grains like brown rice with no empty calories or sodium that can be cooked quickly with water in the microwave

Example 3: Canned beans or peas with no added empty calories or sodium that can be quickly drained and heated in the microwave

Example 4: Pre-packaged fat-free or low-fat milk and milk products like shredded cheese or yogurt

Quick Cooking Tip #3: When you have time to prepare a family meal on a free day, make enough of the meal to provide you with a full leftover meal for a busy day (Note! Cooking twice as much does not take twice as long!)

Healthy Eating Outside The Home Handout

Eating Out Tip #1: Ask for nutrition facts and ingredient information about menu items to make healthier choices

Eating Out Tip #2: Order water or fat-free/low-fat milk to drink instead of soda or sweetened iced tea

Eating Out Tip #3: Ask for fruits and vegetables as side dishes instead of side dishes that are high in empty calories (solid fats and added sugars) and sodium like fried white potatoes

Eating Out Tip #4: Ask if any or all foods in the meal can be prepared without empty calories (e.g., solid butter, oil, and sugar) and sodium

Eating Out Tip #5: Watch your portion sizes by eating until you feel satisfied rather than finishing your plate (Note! You can always take leftovers home for another day)

Guidelines for Stretching

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American College of Sports Medicine Recommended Stretches: [30 seconds per position/2 x per position]

Hamstrings

1. Sit on the ground with legs straight in front of you.
2. Gently lean your arms forward (try to keep the back straight)
3. Keep your arms straight and try to touch your toes.
4. The stretch is felt on the back of the thighs.



Hip Flexors:

1. Stand on right foot and bring the left foot back to the buttocks.
2. Pull your left foot backwards while keeping your left knee pointed at the ground and your hips straight.
3. You may hold onto a counter or chair to keep your balance.
4. Repeat stretch by standing on left foot and bringing the right foot back.



Calves:

1. Step forward with right leg.
2. Shift your weight forward toward the right leg while keeping the back left heel on the ground.
3. Repeat stretch with left leg forward.



Chest Muscles:

1. Standing in a corner, bring hands up to shoulder height and place them against the wall on either side.
2. Keeping hands in this position, lean your body forward until a stretch is felt in the front of the chest.



Steps To Create A Family Shopping List

How To Create A Shopping List For A Family Of 4:

Step #1: Determine how many portions of each food group you need per day for the whole family

GRAINS: *6 ounces/day x 4 family members = 24 ounces/day

VEGETABLES: *2.5 cups/day x 4 family members = 10 cups/day

FRUITS: *2 cups/day x 4 family members = 8 cups/day

DAIRY: *3 cups/day x 4 family members = 12 cups/day

PROTEIN FOODS: *5.5 ounces/day * 4 family members = 22 ounces/day

Step #2: Determine how many portions of each food group you need per week for the whole family

GRAINS: 24 ounces * 7 days = 168 ounces/week

VEGETABLES: 10 cups * 7 days = 70 cups/week

FRUITS: 8 cups * 7 days = 56 cups/week

DAIRY: 12 cups * 7 days = 84 cups/week

PROTEIN FOODS: 22 ounces * 7 days = 154 ounces/week

***Note!** Portions of each food group per day are the recommended amount for a 2,000 calorie diet. Members of your family may need more or less depending on gender, age, height, weight, and level of physical activity.

Step #3: Create a shopping list of healthy food choices in each food group that your whole family will enjoy

<u>Food Group</u>	<u>Weekly Portions Needed</u>	<u>Healthy Food Choices</u>
Grains	168 ounces (at least 84 ounces should be whole grains)	- Whole wheat bread - Boxes of cereal with whole grains - Family size bag of brown rice
Vegetables	70 cups (purchase a variety of red, orange, and dark-green vegetables)	- Sweet potatoes - Broccoli - Carrots - Red peppers - Green Beans
Fruits	56 cups	- Apples - Bananas - Watermelons - Peaches
Dairy	84 cups (purchase low-fat or fat-free dairy foods)	- Skim milk - Low-fat yogurt (strawberry & blueberry) - Part-skim string cheese - Low-fat provolone cheese
Protein Foods	154 ounces (purchase seafood, beans or peas, and lean meat/poultry)	- Boneless/skinless chicken breasts - Lean ground beef - Salmon filets

Step #4: Revise Grocery Shopping List With Budgeting Techniques

- You can eliminate foods to purchase on the grocery shopping list by estimating the portions of foods you already have in your kitchen cabinets, cupboards, pantry, refrigerator, and freezer (Note! Check the expiration date to make sure the foods have not gone bad!):
 - Look at the front-of-package weight of unopened packages (e.g., 1 box of cereal = 14 ounces)
 - Estimate the weight of opened packages by subtracting the unopened weight minus the amount left in the package (e.g., $\frac{1}{2}$ box of cereal = $1 \text{ box}/2 = 7$ ounces)
- You can check the paper and grocery store ads for the week to make sure you purchase healthy food choices in each food group that will be on sale

<u>Food Group</u>	<u>Weekly Portions Needed</u>	<u>Healthy Food Choices</u>	<u>Home Food Inventory</u>
Grains	168 ounces 116 ounces (at least 58 ounces should be whole grains)	- Whole wheat bread - Boxes of cereal with whole grains - Family size bag of brown rice	- Have 1 loaf of wheat bread = 24 ounces - 2 boxes of whole grain cereal = 28 ounces
Vegetables	70 cups (purchase a variety of red, orange, and dark-green vegetables)	- Sweet potatoes - Broccoli - Carrots - Red peppers - Green Beans	None.
Fruits	56 cups ~48 cups	- Apples - Bananas - Watermelons - Peaches	- Have 3 medium bananas = 2.5 cups - Have 2 medium apples = $2 \frac{3}{4}$ cups - Have 20-ounce container of raisins = 2.5 cups
Dairy	84 cups 65 cups (purchase low-fat or fat-free dairy foods)	- Skim milk - Low-fat yogurt (strawberry & blueberry) - Part-skim string cheese - Low-fat provolone cheese	- $\frac{1}{2}$ gallon of skim milk = 16 cups - 8 slices of American cheese = 3 cups
Protein Foods	154 ounces 136.5 ounces (purchase seafood, beans or peas, and lean meat/poultry)	- Boneless/skinless chicken breasts - Lean ground beef - Salmon filets	- 4 medium boneless skinless chicken breasts (13.5 ounces) - 4 large eggs = (4 ounces)

Step #5: Shop Till You Drop!

- Take your modified grocery shopping list into the store and use the “weekly portions needed” column to help you determine how much of each food in the “healthy food choices” column you need to purchase
- You can determine how much of each food to purchase by looking at the total weight of the food on the front of the package

Activity #4 Handout: Create Your Family's Shopping List

Instructions: In this activity you will be asked to use the blank shopping list below to create a week-long shopping list for your family. Use “Step #1 and Step #2” in the Steps To Create A Family Shopping List handout as a guide to first calculate the number of weekly portions of each food group your family will need. In the “Healthy Food Choices” column, write down the types of foods you and your family would like to purchase in each food group. Get your family involved in this activity by asking them what types of foods they would like to eat in each food group. Make compromises by adding foods to your shopping list that all family members enjoy.

Ask your family to then help you modify the number of weekly portions you need of the healthy food choices by exploring what foods you already have in your kitchen. If you end up needing less of a certain food because you already have some in the house, subtract the number of portions you have from the total portions you need to get a new weekly portions number. Be sure to write down the new weekly portions number you need in your shopping list. You may use “Step #4” as a guide for modifying the weekly portions numbers. Please make a copy of your completed activity and bring it to our next lesson.

Food Group	Weekly Portions Needed	Healthy Food Choices	Home Food Inventory
Grains			
Vegetables			
Fruits			
Dairy			
Protein Foods			

P.A.W.S



Lesson 3: Culinary Skills

Supplies:

- Knife set (1 for teacher & 1 for each student)
- Copies of Knives 101 handout (See pgs. 2-4 in supplemental materials)
- Copies of Cooking Methods 101 handout (See pg. 9 in supplemental materials)
- Supplies for teacher & student knife holding demonstrations (See pg. 5 in supplemental materials)
- Supplies for cutting demonstrations (See pg. 6 in supplemental materials)
- Supplies for cooking demonstrations (See pgs. 10-12 in supplemental materials)
- Sample cups for fruit & vegetable snacks
- Stereo & dance CD
- Stopwatch
- 1 Standard ruler
- Grocery store gift cards (1 per student)

Set-up: (5-10 min.)

- Make 1 copy of each handout for every student (See pgs. 2-12 in supplemental materials)

Learning Objectives:

Students will be able to ...

1. Identify the parts of a knife.
2. Demonstrate how to properly hold a knife.
3. Identify key knives used for cutting fruits and vegetables.
4. Describe key methods for cutting fruits and vegetables
5. Name the key principles of food safety.
6. Describe key methods for cooking fruits and vegetables.
7. Identify main cooking vessels used to perform each key cooking method.
8. Perform basic preparation steps such as, measuring and timing.

Lesson 3: Culinary Skills



Instructional Steps

Discussion 1: Knives 101 (50 min.)

- Distribute and discuss the Knives 101 handout (See pgs. 2-4 in supplemental materials):

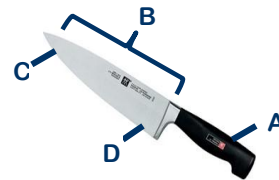
1. Identify the parts of a knife:

Handle (A) – Place where dominant hand holds the knife

Blade (B) – Used for all types of cutting

Tip (C) – Used for delicate cutting

Heel (D) – Used for forceful cutting



Teacher Demonstration! *How To Hold A Knife* (See pg. 5 in supplemental materials for supplies)

Instructions for Demo:

1. Place your dominant index finger and thumb on opposite sides of the blade and rest your remaining three fingers loosely curled around the knife handle:



2. Place blade on the food while gripping the food firmly with the fingers on your non-dominant hand (Note! Curl fingers inward and rest knuckles on the blade when gripping to protect your fingers)



Lesson 3: Culinary Skills



Student Demonstration! *Can you hold a knife?*

Instructions for Demo:

1. Ask students to practice holding a knife from their knife set.
2. Walk around the classroom and ask each student to show you how to hold the knife.
3. Distribute small apples to every student and ask them to practice holding the knife while gripping the apple.
4. Walk around the classroom and ask each student to show you how to hold the knife and grip the apple.

2. Describe the SHS principles of knife safety:

1. S = Selection –

- Use a sharp knife (Note! Dull knives are more likely to slip from your hands during use because they require more force to cut)
- Choose the correct type of knife for your specific food (Note! Knife types will be discussed later in the lesson)
- Wash knives before cutting different foods

2. H = Handling –

- Do not grab blindly for a knife but rather reach deliberately for the handle
- Hold knives firmly and cut away from the body
- Point the handle towards another person when passing the knife

3. S = Storage –

- Store knives on a clean and flat surface with the blade pointed away from the body
- Keep knives away from the edge of a table
- Make sure that knives are never covered with towels, napkins, or other disguising materials

3. Describe three knives used for cutting fruits and vegetables:

Note! Hold up each knife during your explanation and ask students to locate each knife in their knife set. Show different sizes by holding up a standard ruler as a reference.

Chef's Knife – All-purpose knife used for multiple cuts such as dicing and slicing

- **Shape:** Curved shape that allows you to rock the knife while cutting to make more precise cuts
- **Size:** Varies in length between 6 and 12 inches





Lesson 3: Culinary Skills

Paring Knife – Used for more delicate or intricate cuts like peeling, coring, and julienning

- **Shape:** Curved shape similar to a Chef's Knife
- **Size:** Smaller knife that varies in length between 2 ½-4 inches

Serrated Knife – Used for slicing fruits and vegetables that are hard on the outside and soft on the inside

- **Shape:** Long saw-like blade useful for cutting fruits and vegetables with tough skins
- **Size:** Varies in length between 6-10 inches

Teacher Demonstration! *Cutting Fruits and Vegetables* (See pg. 6 in supplemental materials for teacher instructions and supplies)

- **First describe the food safety principles:**
 - Wash your hands and clean your fruits and vegetables before cutting
 - Clean the surfaces where you cut foods
 - Use different knives when cutting raw foods (e.g., raw/uncooked chicken breast) and fruits or vegetables

Demo #1: *Using a Chef's Knife*

Slicing Apples:

1. Hold the apple on cutting board with stem facing straight up.
2. Cut straight down on the apple about an inch away from the stem.
3. Repeat step #2 for the remaining sides of the apple in a square pattern until only the core is left and discard the core.
4. Place the flat side of each of the four large apple slices face down on the cutting board.
5. Slice each of the four large slices into smaller slices of your choice.



STEP 1

STEP 2

STEP 3

STEP 4

STEP 5

Lesson 3: Culinary Skills



Dicing Potatoes:

1. Cut the top and bottom of the potato.
2. Slice the skins off the potato on all sides in a square pattern.
3. Cut rectangular slabs off the potato.
4. Stack the slabs on top of each other.
5. Slice the stacked potatoes into long rectangular strips.
6. Keeping the stack together, turn the stack 90-degrees and cut the slab into cubes of a desired thickness.



STEP 1

STEP 2

STEP 3

STEP 4

STEP 5

STEP 6

Demo #2: *Using a Paring Knife*

Peeling Oranges:

1. Hold the orange in your non-dominant hand.
2. Hold the handle of the paring knife in your dominant hand by wrapping all four fingers around the handle.
3. Rest your thumb against the side of the blade.
4. Make a small cut into the side of the orange by cutting down beneath the skin.
5. Peel away the skin by rotating the orange while pushing the blade under the skin horizontally.
6. Repeat step 4 and 5 until all skin is removed.



STEP 1

STEP 2

STEP 3

STEP 4

STEP 5



Lesson 3: Culinary Skills

Julienne Red Peppers:

1. Cut off the top of the pepper just under the stem and the bottom of the pepper with a chef's knife.
2. Stand the pepper upright on either side and cut a slit down one side with a chef's knife.
3. Place the pepper skin side down and shave off the ribs and seeds to remove the core with the chef's blade parallel to the cutting board.
4. Hold the pepper flat and cut matchstick-size strips with the paring knife. (Note! For shorter pieces, cut the matchstick pieces in half)



STEP 1

STEP 2

STEP 3

STEP 4

Demo #3: Using a Serrated Knife

Slicing Squash:

1. Cut off about ¼-inch from the top and bottom of the squash.
2. Use a vegetable peeler to peel off the outer layer of the squash.
3. Stand the peeled squash upright on the cutting board and make one long cut down the middle of the squash from top to bottom.
4. Use a spoon to scrape out the seeds and pulp from the squash cavity.
5. Place the squash halves cavity-side down on the cutting board and cut each squash half into halves.
6. Cut each squash section length-wise into slices.



STEP 1

STEP 2

STEP 3

STEP 4

STEP 5

STEP 6



Lesson 3: Culinary Skills

Slicing Pineapple:

1. Place the pineapple on its side.
2. Cut the top of the pineapple just below the stem and the bottom of the pineapple.
3. Stand the pineapple up on one end and cut from top to bottom to remove the skin of the pineapple with the black eye spots.
4. Lay the pineapple on its side and make length-wise cuts.
5. Stack the pineapple circles on top of one another and cut slices of desired sizes.



STEP 1



STEP 2



STEP 3



STEP 4



STEP 5

Activity 1: Cutting the rug! (30 min.)

- Stand in front of students to begin warm-up exercises and stretching
- Warm-up students with brisk walking in place, side-to-side shuffling, and grapevine (~5 min.)
- Stretch students for ~5 min. (See pg. 7 in supplemental materials for recommended stretches)
- Turn on music CD and guide students through the following three group stations:
 - Fast Feet
 - High Knees
 - Sit-Ups
- Cool down students for ~5 min. with stretching (See pg. 7 in supplemental materials for recommended stretches) and give students a water break

Discussion 2: Cooking Fruits & Veggies 101 (35 min.)

- **Distribute the Cooking Methods 101 handout and describe some methods for cooking fruits and vegetables (See pg. 9 in supplemental materials):**

Note! Show students cooking vessels and devices needed for each method.

Steaming – The process of cooking in a covered container above boiling water (100°C)

Microwaving – The process of cooking quickly in a microwave with little to no fat (e.g., oil) or water in a covered microwave-safe dish



Lesson 3: Culinary Skills

Stir-Frying – The process of cooking in a frying pan on high heat in a small amount of fat (e.g., oil) while stirring constantly

Sautéing – The process of cooking or browning rapidly in a stove pan with a small amount of fat (e.g., oil) on medium-high heat

Simmering – The process of cooking in a liquid just below the boiling point (100°C)

Boiling – The process of cooking food in boiling water (100°C)

Baking – The process of cooking with dry heat in an oven



Teacher Demonstration! *Cooking Fruits & Vegetables* (See pgs. 10-12 in supplemental materials for teacher instructions and supplies)

Note! Don't forget to wash hands, cutting surfaces, knives, cooking surfaces, cooking vessels, and fruits/vegetables before cooking.

Demo #1: *Steaming Broccoli Florets & Stems*

1. Use a chef's knife to cut off and discard the bottom part of the stem.
2. Use a paring knife to trim away any small branches.
3. Use a chef's knife to cut off the rest of the stem.
4. Slice the stems with a chef's knife to a desired thickness.
5. Use a chef's knife to cut individual florets of a desired size.
6. Add ~1 inch of water in the steamer pot and bring the water to a boil (100°C) with high heat.
7. Turn the heat to medium-low and place the broccoli florets and stems in the steamer basket and cover the steamer tightly with a lid.
8. Steam until tender-crisp (~5-7 minutes).
9. Distribute steamed broccoli for students to taste.

Demo #2: *Microwaving Carrots*

1. Use a chef's knife to trim the ends of the carrot.
2. Use a peeler to remove the rough surface layer of the carrot.
3. Use a chef's knife to cut the carrot into small slices of a desired thickness.
4. Place carrots in a microwave safe dish like glass or ceramic/plastic containers labeled for microwave use.
5. Add 3 tablespoons of water for 3 cups of sliced carrots.
6. Cover with a napkin or lid and microwave on high for 10-12 minutes. (Note! Stir carrots after 5-6 minutes)
7. Leave carrots stand for 3-4 minutes before eating.
8. Distribute microwaved carrots for students to taste.



Lesson 3: Culinary Skills

Demo #3: *Sautéing bananas*

1. Peel one banana and use a chef' knife to diagonally cut banana slices that are ~2 inches thick.
2. Add one half tablespoon of olive oil to a pan.
3. Adjust your stove burner to a medium-high heat and put the pan on the heated burner.
4. Heat the oil for ~2-3 minutes.
5. Add the sliced bananas to the pan.
6. Fry the bananas until one side turns golden brown and then flip the bananas to the un-fried side with a spatula.
7. When both banana sides are golden brown, remove the bananas from the heated pan.
8. Distribute sautéed bananas for students to taste.

Demo #4: *Boiling Spinach*

- Use a paring knife to remove any tough stems.
- You may use a chef's knife to chop the leaves into desired sizes or you may cook the leaves whole.
- Add water to stove pot and heat pot on high heat until water boils.
- Add the spinach to the pot and heat for ~1 minute (Note! Leave the pot uncovered)
- Remove spinach from pot with a spatula.
- Distribute boiled spinach for students to taste.

Demo #5: *Simmering Blackberries, Blueberries, and Raspberries*

1. Put ~1-3 cups of water in a saucepan on the stove.
2. Place the lid on the saucepan heat pan on high heat until water boils.
3. Reduce the water to medium heat and add the berries.
4. Cook berries on stove for ~2 minutes.
5. Pour the berries and liquid mixture into a bowl to eat.
6. Distribute simmered berries for students to taste.

Demo #6: *Stir-frying Asparagus*

1. Snap the ends off the asparagus with your hands by gently bending each spear.
2. Add one half tablespoon of olive oil to a large frying pan.
3. Adjust your stove burner to a high heat and put the pan on the heated burner.
4. Add the asparagus to the pan and stir continuously for ~3-5 minutes.
5. Remove asparagus from pan and eat.
6. Distribute stir-fried asparagus for students to taste.



Lesson 3: Culinary Skills

Demo #7: *Baking Pears*

1. Preheat oven to recipe temperature for 10 minutes before baking (375°F for this demo recipe)
2. Use a peeler to peel all skin off the pear.
3. Cut the pear in half length-wise and remove the seeds and stem.
4. Spray a small baking pan with non-stick cooking spray with enough to cover the entire pan.
5. Place the pears on the pan cut-side up.
6. You may sprinkle the pears with a small amount of white or brown sugar and then bake the pears for ~20 minutes.
7. While the pears are baking, go to Discussion 3: Wrapping It Up.
8. Distribute baked pears for students to taste.

Discussion 3: Wrapping It Up! (5 min.)

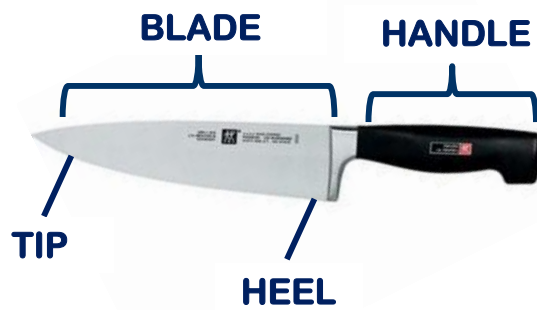
- **Summarize the concepts that students learned in the lesson:**
 1. **Parts of a knife** – Handle, Blade, Tip, Heel (Note! Hold up knife for students and point to these knife parts)
 2. **How to hold a knife**
 3. **How to use a knife properly with the SHS (Selection, Handling, and Storage) principles of knife safety**
 4. **Three knife types** - Chef's, Paring, and Serrated knives (Note! Hold up each knife for students)
 5. **Four cutting methods** – Slicing, Dicing, Peeling, and Julienning (Note! Hold up fruits and vegetables cut with each method from the Cutting Fruits and Vegetables teacher demonstration)
 6. **Seven cooking methods** – Steaming, Microwaving, Stir-frying, Sautéing, Simmering, Boiling, and Baking (Note! Point to the cooking vessel and device used for each method)



Lesson 3: Culinary Skills **Supplemental Materials**

Knives 101 Handout

Parts Of A Knife:



Handle – Place where the dominant hand holds the knife

Blade – Used for all types of cutting

Tip – Used for delicate cutting

Heel – Used for forceful cutting

How To Hold A Knife:



1



2

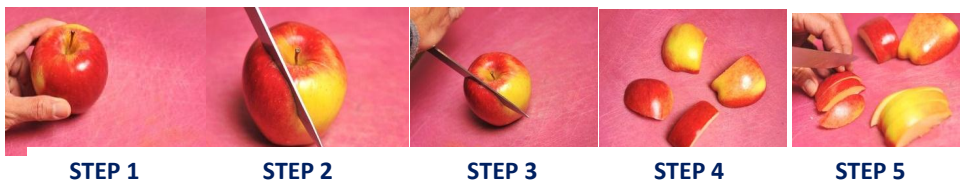


3

Cutting Methods:

Slicing – A more general cutting method done with an all-purpose Chef's knife to cut fruits and vegetables into pieces of no particular shape and size.

Example: Slicing Apples –



Dicing – To cut fruits and vegetables into cubes of specific sizes and shapes with a Chef's knife.

Example: Dicing Potatoes –



Peeling – To remove the skin or inedible parts of fruits and vegetables with a Paring knife.

Example: Peeling Oranges –



Julienning – To cut fruits and vegetables into long thin strips with a Paring knife.

Example: Julienning Red Peppers

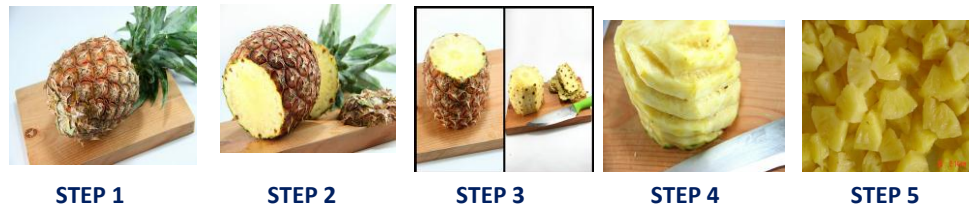


Serrated Knife Cutting – To cut fruits and vegetables with hard outside skins and soft interiors with a Serrated knife.

Example 1: Cutting Squash



Example 2: Cutting Pineapple



Teacher & Student Holding A Knife Demo

Teacher Supplies:

- Knife set with Chef's, Paring, and Serrated knives (1 for teacher and 1 for each student)
- Medium apple (1 for teacher and 1 for each student)

Cutting Fruits & Vegetables Demo

Teacher Instructions:

- Wash each knife and food before cutting so that students understand the importance of food safety
- Ask students to gather around the cutting area and slowly perform each cutting demo
- Use the steps in the lesson plan as a guide to describe how to perform each cut

Teacher Supplies:

Demo #1 –

- 1 Medium apple
- 1 Large potato
- 1 Chef's knife

Demo #2 –

- 1 Large orange
- 1 Large red pepper
- 1 Paring knife
- 1 Chef's knife

Demo #3 –

- 1 Large squash
- 1 Large pineapple
- 1 Serrated knife
- 1 Vegetable peeler

Guidelines for Stretching

American College of Sports Medicine Recommended Stretches: [30 seconds per position/2 x per position]

Hamstrings

1. Sit on the ground with legs straight in front of you.
2. Gently lean your arms forward (try to keep the back straight)
3. Keep your arms straight and try to touch your toes.
4. The stretch is felt on the back of the thighs.



Hip Flexors:

1. Stand on right foot and bring the left foot back to the buttocks.
2. Pull your left foot backwards while keeping your left knee pointed at the ground and your hips straight.
3. You may hold onto a counter or chair to keep your balance.
4. Repeat stretch by standing on left foot and bringing the right foot back.



Calves:

1. Step forward with right leg.
2. Shift your weight forward toward the right leg while keeping the back left heel on the ground.
3. Repeat stretch with left leg forward.



Chest Muscles:

1. Standing in a corner, bring hands up to shoulder height and place them against the wall on either side.
2. Keeping hands in this position, lean your body forward until a stretch is felt in the front of the chest.



Cooking Methods 101 Handout

Steaming – The process of cooking in a covered container above boiling water (100°C)

Microwaving – The process of cooking quickly in a microwave with little or no fat (e.g., oil) or water in a covered microwave-safe dish

Stir-frying – The process of cooking in a frying pan on high heat in a small amount of fat (e.g., oil) while stirring constantly

Sautéing – The process of cooking or browning in a stove pan with a small amount of fat (e.g., oil) on medium high heat

Simmering – The process of cooking in a liquid just below the boiling point (100°C)

Boiling – The process of cooking food in boiling water (100°C)

Baking – The process of cooking with dry heat in an oven

Cooking with Fruits & Veggies Demo

Teacher Instructions:

- Ask students to gather around the cooking area
- In each cooking demonstration, highlight the following elements as necessary:
 - Knife types you knife cutting methods used in different parts of the recipe
 - How to turn on and/or set the temperature of each cooking device - stove, microwave, & oven
 - How to set a cooking time with a stopwatch
 - Key cooking vessels - steamer pot, microwave-safe container, stove pan, stove pot, stove saucepan, & baking pan
 - Key cooking utensils - spatula & metal spoon
 - How to use measuring cups and spoons
- Cut and serve a small and equal portion of each demo food to students after they have been cooked

Teacher Supplies:

Demo #1 –

- 1 Chef's knife
- 1 Paring knife
- 1 Steamer pot with basket
- 2 Full heads of broccoli
- Sample cups for tasting (1 per student)
- 1 Stopwatch

Demo #2 –

- 1 Chef's knife
- 1 Vegetable peeler
- 1 Glass/ceramic microwave-safe dish
- 1 Set of measuring spoons
- 1 Set of measuring cups
- 3 Large carrots
- Sample cups for tasting (1 per student)

- 1 Stopwatch

Demo #3 –

- 1 Chef's knife
- 1 Set of measuring spoons
- 1 Stove pan
- 1 Spatula
- 3 Large bananas
- 1 Container of olive oil
- Sample cups for tasting (1 per student)
- 1 Stopwatch

Demo #4 –

- 1 Paring knife
- 1 Chef's knife
- 1 Stove pot
- 1 Spatula
- 2 Big bags of raw spinach
- Sample cups for tasting (1 per student)
- 1 Stopwatch

Demo #5 –

- 1 Set of measuring cups
- 1 Saucepan
- 1 Package of blackberries
- 1 Package of blueberries
- 1 Package of raspberries
- 1 Large bowl
- Sample cups for tasting (1 per student)
- 1 Stopwatch

Demo #6 –

- 1 Set of measuring spoons
- 1 Frying pan
- 5-10 asparagus spears
- 1 Metal spoon
- 1 Container of olive oil
- Sample cups for tasting (1 per student)
- 1 Stopwatch

Demo #7 –

- 1 Vegetable peeler
- 1 Chef's knife
- 1 Can of non-stick spray
- 1 Medium baking pan
- 3 Pears
- 1 Container of brown/white sugar
- Sample cups for tasting (1 per student)

Lesson 4: Culinary Skills In Action



Supplies:

- Knife set (1 for teacher & 1 for each student)
- Copies of How To Follow A Recipe handout (See pg. 12 in supplemental materials)
- Copies of Knife Cards (1 deck per student group, See pgs. 2-3 in supplemental materials)
- Copies of Cutting Methods Cards (1 deck per student group, See pgs. 4-5 in supplemental materials)
- Student prizes for Activities 1 & 2
- Copies of Cooking Methods Cards (1 deck per student group, See pgs. 9-11 in supplemental materials)
- Stereo & dance CD
- Stopwatch
- Sample cups to serve Teacher Demonstration Snack
- Aprons (1 per student)
- Copies of Recipe #1 and Recipe #2 (See pgs. 14-15 in supplemental materials)

Set-up (30-45 min.):

- Make copies of How To Follow A Recipe Handout for each student (See pg. 12 in supplemental materials)
- Make copies of Activity #1-3 cards for each student group (See pgs. 2-5 & 9-11 in supplemental materials)
- Cut and display fruits and vegetables on plates for Activity #1
- Make copies of Recipe #1 and Recipe #2 for every student (See pgs. 14-15 in supplemental materials)

Learning Objectives:

Students will be able to ...

1. Correctly identify key knives and cutting methods.
2. Properly hold a knife.
3. Perform key cutting methods with proper knife types.
4. Correctly identify key cooking methods.
5. Read key parts of a recipe.
6. Describe how much of each ingredient is required if recipes are increased or decreased.
7. Properly follow the steps for fruit and vegetable recipes.

Lesson 4: Culinary Skills In Action



Instructional Steps

Activity 1: Name that knife! (10 min.)

- Arrange students into groups of 3 or 4
- Give each group a deck of cards with pictures of knives (See pgs. 2-3 in supplemental materials for cards)
- Give each group a deck of cards with names of different cutting methods (See pgs. 4-5 in supplemental materials for cards)
- Give short descriptions of fruits and vegetables and ask students to vote within their groups to choose a knife and cutting method card for each description (See pg. 6 in supplemental materials for teacher instructions)
- Ask each group to hold up the cards they chose for the knife type and cutting method

Activity 2: Knife Skills In Action! (20 min.)

- Distribute student knife sets and ask students to wash their hands
- Distribute the following fruits and vegetables to every student and instruct students how to cut the following fruits and vegetables:
 - **1 Large Carrot** - Teach how to julienne with a Paring Knife
 - **1 Kiwi** - Teach how to slice with a Serrated Knife
 - **1 Medium Baked Potato** - Teach how to dice with a Chef's Knife

Lesson 4: Culinary Skills In Action



Activity 3: Name that cooking method! (10 min.)

- Arrange students in the same groups of 3 or 4
- Give each student a deck of cards with names of different cooking methods (See pgs. 9-11 in supplemental materials for cards)
- Give short descriptions of cooking methods and ask students to vote within their group to choose a cooking method card (See pg. 8 in supplemental materials for cooking method descriptions)
- Ask each group to hold up the cards they chose for the cooking method
- Give prizes to the group(s) that get the most correct answers from Activity #1 and Activity #3 (See pg. 7 for Activity #1 answers and pg. 8 for Activity #3 answers in supplemental materials for answers)

Lesson 4: Culinary Skills In Action



Discussion 1: Following A Recipe (20 min.)

- Distribute the How To Follow A Recipe Handout (See pg. 12 in supplemental materials)
- Explain to students that following recipes tests your ability to bring together cutting and cooking skills
- Describe the following steps for following a recipe:
 1. **Read the different parts of the recipe:**
 - **Ingredients List** - Make sure you have all the ingredients before starting the recipe
 - **Number of Servings** - Look at the number of servings the recipe makes and make sure you have enough ingredients if you need to make more servings
 - **Cooking Methods and Utensils** – Read the recipe directions and make sure you have the required cooking equipment and utensils to complete the recipe

Apple Salad

Yield	8 servings
Serving size	1/2 cup

Number of Servings

Cooking Utensils (Measuring Cups & Spoons)

Ingredients List

2 cups	apple (diced)
1 cup	celery (diced)
1/2 cup	raisins
1/2 cup	nuts
2 tablespoons	salad dressing (or mayonnaise)
1 tablespoon	orange juice

Instructions

1. Mix orange juice with salad dressing or mayonnaise.
2. Toss apples, celery, raisins and nuts with the dressing mixture.

Lesson 4: Culinary Skills In Action



1. Prepare all the things needed for the recipe:

- Wash hands with soap and hot water before using any utensils and preparing any food (Note! Make sure to re-wash your hands after handling any raw food during the recipe)
- Gather all the ingredients for the recipe and wash the fruits and vegetables with water
- Get out all of the cooking equipment and cooking utensils needed to make the recipe
- Prepare foods that need something done to them before the recipe is started (e.g., Cut all fruits and vegetables as directed by the recipe ingredients list before starting the recipe)

Apple Salad

Yield	8 servings
Serving size	1/2 cup

Ingredients

2 cups	apple (diced)
1 cup	celery (diced)
1/2 cup	raisins
1/2 cup	nuts
2 tablespoons	salad dressing (or mayonnaise)
1 tablespoon	orange juice

Instructions

1. Mix orange juice with salad dressing or mayonnaise.
2. Toss apples, celery, raisins and nuts with the dressing mixture.

Annotations:

- Wash with water and dice with Chef's knife before starting the recipe (pointing to apple and celery)
- Gather measuring cups and spoons before starting the recipe (pointing to the ingredients list)

Lesson 4: Culinary Skills In Action



1. Follow the recipe carefully:

- o Follow the recipe instructions in order
- o Make sure to adjust the amount of each ingredient added if you need to increase or decrease the serving size:

Example 1 – Decreasing the Serving Size

Apple Salad

Yield	8 X servings	Making 4 Servings
Serving size	1/2 cup	

Ingredients

2 cups	apple (diced)
1 cup	celery (diced)
1/2 cup	raisins
1/2 cup	nuts
2 tablespoons	salad dressing (or mayonnaise)
1 tablespoon	orange juice

Cut recipe measurements in half to make 4 servings:

1 cup – apple (diced)
 1/2 cup – celery (diced)
 1/4 cup – raisins
 1/4 cup – nuts
 1 tablespoons – salad dressing
 1/2 tablespoons – orange juice

Instructions

1. Mix orange juice with salad dressing or mayonnaise.
2. Toss apples, celery, raisins and nuts with the dressing mixture.

Example 2 – Increasing the Serving Size

Apple Salad

Yield	8 X servings	Making 16 Servings
Serving size	1/2 cup	

Ingredients

2 cups	apple (diced)
1 cup	celery (diced)
1/2 cup	raisins
1/2 cup	nuts
2 tablespoons	salad dressing (or mayonnaise)
1 tablespoon	orange juice

Double recipe measurements to make 16 servings:

4 cups – apple (diced)
 2 cup – celery (diced)
 1 cup – raisins
 1 cup – nuts
 4 tablespoons – salad dressing
 2 tablespoons – orange juice

Instructions

1. Mix orange juice with salad dressing or mayonnaise.
2. Toss apples, celery, raisins and nuts with the dressing mixture.

Lesson 4: Culinary Skills In Action



Teacher Demonstration! *Following A Recipe*

- **Teach students how to make Apple Salad with the following steps:**
 1. Wash hands with soap and hot water before starting the recipe
 2. Gather all ingredients to double the recipe (Note! Show students each ingredient as you name it from the ingredient list)
 3. Gather measuring cups and measuring spoons (Note! Show students the different measuring cups and spoons shown on the How To Follow A Recipe Handout on pg. 14 in the supplemental materials as you name the ones you need for the recipe)
 4. Wash apples and celery, dice with a Chef' knife, and measure out 4 cups of diced apples and 2 cups of diced celery.
 5. Measure out the raisins and nuts.
 6. Complete step #1 in the recipe instructions (Note! Mix the ingredients in a large bowl)
 7. Complete step #2 in the recipe instructions, show students what the finished apple salad looks like, and store salad in the refrigerator until ready to serve after Activity #3.

Apple Salad

Yield	8 servings	Making 16 Servings
Serving size	1/2 cup	

Ingredients

2 cups	apple (diced)
1 cup	celery (diced)
1/2 cup	raisins
1/2 cup	nuts
2 tablespoons	salad dressing (or mayonnaise)
1 tablespoon	orange juice

Double recipe measurements
to make 16 servings:

4 cups – apple (diced)
2 cup – celery (diced)
1 cup – raisins
1 cup – nuts
4 tablespoons – salad dressing
2 tablespoons – orange juice

Instructions

1. Mix orange juice with salad dressing or mayonnaise.
2. Toss apples, celery, raisins and nuts with the dressing mixture.



Lesson 4: Culinary Skills In Action

Activity 4: Cooking Up Movements (30 min.)

- Stand in front of students to begin warm-up exercises and stretching
- Warm-up students with brisk walking in place, side-to-side shuffling, and grapevine (~5 min.)
- Stretch students for ~5 min. (See pg. 13 in supplemental materials for recommended stretches)
- Turn on music CD and guide students through the following three group stations:
 - Station #1: Jump Rope
 - Station #2: High Knees
 - Station #3: Sit-Ups
- Cool down students for ~5 min. with stretching (See pg. 13 in supplemental materials for recommended stretches) and give students a water break
- Bring students back together as a group and distribute 1 serving of Apple Salad (1/2 cup) to every student

Lesson 4: Culinary Skills In Action



Activity 5: Cooking With Fruits & Vegetables (30 min.)

- Distribute aprons to students and break students into groups of 3 or 4
- Explain to students that they will be guided through group recipes to test their cutting and cooking skills
- Distribute Recipe #1 to all groups and lead them through the following tasks (Note! Leave some time at the end of the recipe for students to taste the dish):

Task #1: Read the recipe and set out the cooking utensils and measuring cups/spoons you need for the recipe

Task #2: Set the oven temperature (Note! The oven will beep when the temperature is ready for cooking)

Task #3: Choose the proper knives and cut each vegetable for the recipe (Note! Be sure to wash each vegetable before cutting and to wash your knives before cutting different vegetables)

Task #4: Follow the recipe instructions to cook the vegetables

- Distribute Recipe #2 to all groups and guide them through the following tasks (Note! Leave some time at the end of the recipe for students to taste the dish):

Task #1: Read the recipe and set out the cooking utensils and measuring cups/spoons you need for the recipe

Task #2: Choose the proper knives and cut each fruit for the recipe (Note! Be sure to wash each fruit before cutting and to wash your knives before cutting different fruits)

Task #3: Follow the recipe instructions to cook the fruits

P.A.W.S.

Lesson 4: Culinary Skills In Action **Supplemental Materials**

Activity 1: Name that knife!

Knife Cards: Cut these cards on the serrated lines and copy enough cards for there to be one of each card per group.

Chef's Knife

Paring Knife



Serrated Knife



Cutting Methods Cards: Cut these cards on the serrated lines and copy enough cards for there to be one of each card per group.

Slicing

Juliennning

Dicing

Peeling

Tough Slicing

Teacher instructions: Read the following fruit/vegetable descriptions to students and ask them to raise the knife type card and cutting method card that best matches the description:

Description #1: Carrots cut into thin strips.

Description #2: Pineapple cut into large chunks.

Description #3: Orange with skin removed.

Description #4: Potatoes cut into small cubes.

Description #5: Apples cut into thick strips.

Activity #1 Answers

Description #1:

Cutting Method = Juliennening
Knife Type = Paring Knife

Description #2:

Cutting Method = Tough Slicing
Knife Type = Serrated Knife

Description #3:

Cutting Method = Peeling
Knife Type = Paring Knife

Description #4:

Cutting Method = Dicing
Knife Type = Chef's Knife

Description #5:

Cutting Method = Slicing
Knife Type = Chef's Knife

Activity 3: Name that cooking method!

Teacher instructions: Read the following cooking method descriptions to students and ask them to raise the cooking card that best matches the description:

Cooking Method Descriptions/Answers

Description #1: Boiling – The process of cooking food in water that reaches 100°C

Description #2: Sautéing – The process of cooking or browning food rapidly in a stove pan with a small amount of fat (e.g., oil) on medium-high heat

Description #3: Steaming – The process of cooking food in a covered container above boiling water

Description #4: Baking – The process of cooking food with dry heat in an oven

Description #5: Simmering – The process of cooking food in a liquid just below the boiling point

Description #6: Microwaving – The process of cooking food quickly for a set amount of time with little to no fat (e.g., oil) and/or water in a covered dish

Description #7: Stir-frying – The process of cooking food in a frying pan on high heat in a small amount of fat (e.g., oil) while stirring constantly

Cooking Method Cards: Cut these cards on the serrated lines and copy enough cards for there to be one of each card per group.

Boiling

Sautéing

Steaming

Baking

Simmering

Microwaving

Stir-Frying

How To Follow A Recipe Handout

Apple Salad

Yield	8 servings
Serving size	1/2 cup

Number of Servings

Wash with water and dice with Chef's knife before starting

Ingredients

2 cups	apple (diced)
1 cup	celery (diced)
1/2 cup	raisins
1/2 cup	nuts
2 tablespoons	salad dressing (or mayonnaise)
1 tablespoon	orange juice

List of Ingredients

Instructions

1. Mix orange juice with salad dressing or mayonnaise.
2. Toss apples, celery, raisins and nuts with the dressing mixture.

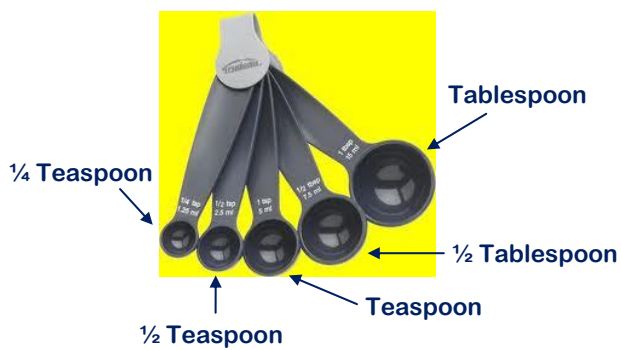
Cooking Utensils (Measuring Cups & Spoons)

Cooking Utensils 101

Measuring Cup



Measuring Spoons



Guidelines for Stretching

American College of Sports Medicine Recommended Stretches: [30 seconds per position/2 x per position]

Hamstrings

1. Sit on the ground with legs straight in front of you.
2. Gently lean your arms forward (try to keep the back straight)
3. Keep your arms straight and try to touch your toes.
4. The stretch is felt on the back of the thighs.



Hip Flexors:

1. Stand on right foot and bring the left foot back to the buttocks.
2. Pull your left foot backwards while keeping your left knee pointed at the ground and your hips straight.
3. You may hold onto a counter or chair to keep your balance.
4. Repeat stretch by standing on left foot and bringing the right foot back.



Calves:

1. Step forward with right leg.
2. Shift your weight forward toward the right leg while keeping the back left heel on the ground.
3. Repeat stretch with left leg forward.



Chest Muscles:

1. Standing in a corner, bring hands up to shoulder height and place them against the wall on either side.
2. Keeping hands in this position, lean your body forward until a stretch is felt in the front of the chest.



Recipe #1:**Vegetable Variety Pack**[Español](#) | [View](#)

Yield	5 servings
Serving size	3/4 cup

Ingredients

2	zucchini (small, washed and sliced)
2	yellow squash (small, washed and sliced)
4	potatoes (small, scrubbed and sliced)
1/2	onion (peeled and sliced)
1/2	green bell pepper (or red) (washed, seeded and sliced)
1/4 cup	Italian salad dressing (light)

Cooking Utensils Needed:

1 Large Bowl

1 Measuring Cup

1 Package of Aluminum Foil

Instructions

1. Preheat the oven to 350°F.
2. Stir vegetables and dressing in a large bowl.
3. Tear off a large sheet of aluminum foil and spread out flat on the kitchen counter.
4. Spread the vegetables and dressing in the center of the aluminum foil.
5. Bring together the four sides of the aluminum foil and seal together to make a packet.
6. Place the aluminum foil packet with the vegetables in the oven when the oven temperature has reached 350°F (Note! You will hear a beep when the oven is ready).
7. Set the cooking timer on the oven for 25 minutes.
8. Bake the vegetables for 25 minutes (Note! The oven will beep when the vegetables are done cooking).
9. Use temperature-safe cooking gloves to remove the vegetables when they are done cooking.

Recipe #2: Double the recipe!**Fruity Homemade Oatmeal**

Yield	2 servings ← Make 4 Servings!
Serving size	1/2 of recipe

Ingredients

3/4 cups	old-fashioned rolled oats
2 tablespoons	raisins or currants
1	apple (cored and chopped)
1 teaspoon	cinnamon

Cooking Utensils Needed:

- 1 Peeler
- 1 Saucepan
- 1 Measuring Cup
- 1 Set of Measuring Spoons
- 1 Large Metal Spoon

Instructions

1. Use a peeler to remove the apple skin and slice the apple into small pieces.
2. Pour 1 ½ cup of water into a saucepan and place the saucepan on the stove.
3. Set the stove to a medium heat setting and bring the water to a boil.
4. Once the water is boiling, stir in the oatmeal, raisins, chopped apple, and cinnamon.
5. Turn heat on stove to low.
6. Cook the mixture for 5 minutes while stirring often with a spoon.

VITA

SARAH ANN NELSON

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<u>EDUCATION</u>	<p>Penn State University, University Park, PA Ph.D. Candidate in Nutritional Sciences Cumulative GPA: 3.92</p> <p>Carnegie Mellon University, Pittsburgh, PA, May 2010 BS Decision Science, University & College Honors Health Professions Program Cumulative GPA: 3.78 Major Based GPA: 4.00</p>
<u>WORK EXPERIENCE</u>	<p>H.J. Heinz Company, Project Research and Guidance Associate Manager: (2013 – Present)</p> <ul style="list-style-type: none"> Manage product research for Condiments & Sauces and Food Service CP/HPC <p>USDA Center for Nutrition Policy and Promotion, Dr. Trish Britten Ph.D. Intern: (Spring Semester 2012)</p> <ul style="list-style-type: none"> Developed a curriculum for using SuperTracker in middle schools Updated the USDA nutrient and food database <p>H.J. Heinz Company, Stacey Cox, Product Research and Guidance Innovation Center Intern: (2011)</p> <ul style="list-style-type: none"> Analyzed preexisting product research data <p>Carnegie Mellon University, Dr. Julie Downs, Department of Social and Decision Sciences Research Assistant: (2010)</p> <ul style="list-style-type: none"> Facilitated a laboratory-based calorie estimation study Designed a menu labeling field experiment <p>Children's Hospital of Pittsburgh, Dr. Toni Darville, Division of Pediatric Infectious Diseases Undergraduate Researcher: (2009)</p> <ul style="list-style-type: none"> Contributed to research on the role of CD4+ T cells in Chlamydial infection Collected & ran assays on whole-blood seropositive samples for Senior Honors Thesis
<u>ABSTRACTS & PUBLICATIONS</u>	<p>SA Nelson, CJ Metzgar, KE Piehowski, AG Preston, DL Miller, SM Nickols-Richardson. (2011). <i>Effects of a Calorie-Controlled Diet, Rich in Cocoa Flavanols, on Metabolic Syndrome Criteria in Premenopausal Women With Excess Adiposity</i>. Presented at the Research Symposium for the Graduate Program in Nutritional Sciences. Penn State University, October 21-22.</p> <p>CJ Metzgar, SA Nelson, AG Preston, DL Miller, SM Nickols-Richardson. (2012). <i>Exploratory Analysis of Facilitators and Barriers to Weight Loss Maintenance in Premenopausal Women</i>. Presented at Experimental Biology. San Diego, CA, April 21 – 25.</p> <p>Nelson SA, Corbin MA, Nickols-Richardson SM. A call for culinary skills education in childhood obesity prevention interventions: how has the call been answered and how can it be done better. <i>Under Review in the Journal of the Academy Nutrition and Dietetics</i>.</p> <p>SA Nelson, MA Corbin, SM Nickols-Richardson. (2013). <i>Instrument Testing of Behavior Change Questionnaires for the PAWS Club: Peer-education About Weight Steadiness Study</i>. To be presented at Experimental Biology. Boston, MA, April 20 – 24.</p>
<u>VOLUNTEER EXPERIENCE</u>	<p>Let's Move In School Day, Bald Eagle Area School District (2010)</p> <ul style="list-style-type: none"> Educated students in grades K-6th about the 2010 USDA Dietary Guidelines for Americans <p>Prevention Point Pittsburgh, (2009 – 2010)</p> <ul style="list-style-type: none"> Provided sterile syringes, biohazard containers, and overdose training to IV drug users
<u>ACTIVITIES</u>	<p>State College High School Women's Lacrosse Coach, (2010 – 2012)</p> <p>Carnegie Mellon Men's Lacrosse Manager, (2007 – 2010)</p> <p>Carnegie Mellon Orientation Counselor, (2007)</p>
<u>ACADEMIC HONORS</u>	<p>Kappa Omicron Nu Honor Society Member, Pennsylvania State University (2011 – Present)</p> <p>Graham Endowed Fellowship, Pennsylvania State University, (2010 – 2011)</p> <p>Senior Honors Thesis Student, Carnegie Mellon University, (2009 – 2010)</p> <p>Phi Beta Kappa Honor Student, Carnegie Mellon University, (Spring 2010)</p> <p>Dean's List with Honors, Carnegie Mellon University, (Spring 07'/Fall 07'/Spring 08')</p> <p>Dean's List with High Honors, Carnegie Mellon University, (Fall 06'/Fall 08'/Spring 09'/Fall 09'/Spring 10')</p>
<u>SKILLS</u>	<p>Technical Proficiency</p> <p>Operating Systems: MS Windows, Mac OS X</p> <p>Office Applications: MS Excel, Word, PowerPoint</p> <p>Statistical Programs: SPSS, SAS</p>