An Outcome and Follow-Up Evaluation of ‘Food Fit’: A Theory Based Childhood Overweight Prevention Curriculum

Thesis

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By

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ABSTRACT

Over the past 30 years, the prevalence of childhood overweight has more than tripled in the United States. In the past, interventions aimed at improving children’s eating behavior have had mixed results. These modest results may be due to limitations in program design, implementation, or evaluation. ‘Food Fit’ (FF) is a 14 week theoretically based nutrition behavior change program designed to overcome limitations in previous interventions and promote behaviors associated with obesity prevention. Food Fit was developed using Social Cognitive Theory (SCT) as a theoretical framework. The purpose of this study is to evaluate Food Fit’s impact on the SCT psychosocial constructs of behavioral capability (BC), self-efficacy (SE), and outcome expectancy (OE). While outcomes for children from middle-income communities who participated in FF have been favorable, FF has not been implemented with children from low-income communities. During the 2007-2008 school year FF was implemented at seven low-income after-school programs in Columbus, Ohio where the prevalence of obesity is higher than both the national averages and averages for the state of Ohio. One hundred eight children were enrolled in FF. Topics for the lessons included choosing lower calorie snack foods, choosing beverages without added sugars, and learning serving sizes.
Pre-and post-tests were administered at each lesson to evaluate changes in BC, SE, and OE. A standardized instrument (Child Modified Food Behavior Checklist) was administered before, during, and after the program to evaluate dietary behaviors. Process evaluations were used to assure program integrity. Significant increases in behavioral capability were found for eleven of the fourteen lessons (overall \( p < .001 \)). Significant dietary changes included: eat more than one type of vegetable per day \( (p = .003) \), eat more than two servings of vegetables per day \( (p = .019) \), and consume raw vegetables for snacks \( (p < .019) \). Compared to the previous study, which took place in a middle income group, this group had fewer self-reported changes in confidence (SE) and desire (OE) to use the skills discussed during the lessons. There was a significant increase in SE for only two of the fourteen lessons, and there were no increases in OE. A positive effect was found for all three constructs; BC had a medium effect size (.49) while SE and OE were considerably smaller (.15 and .10 respectively). Food Fit is very effective at impacting children’s behavioral capabilities, but less effective at impacting SE and OE in this low-income group. Reasons for the differences between the socioeconomic groups necessitate further investigation to assess the impact of poverty on children’s dietary behaviors.
Dedication

Dedicated to my husband, Mike, for all of his love, support, and comedic relief during this process.

And to my parents and family for their guidance, wisdom, patience, and unconditional love.

And finally, to the Author of Life without whom I could do nothing.
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CHAPTER 1

Introduction

The prevalence of childhood obesity and overweight has continued to increase over the past three decades in the United States (1). In 2004, 37.2% of children aged six to eleven in the United States were overweight (greater than or equal to the 85th percentile for sex and age) and of these 18.8% were obese (greater than or equal to the 95th percentile for sex and age) (1). Specifically, in Franklin County the prevalence of childhood overweight (for children ages zero to seventeen) is 24.8% (2). One of the consequences of this epidemic is that overweight children are more likely to become obese as adults (3). This is of concern since obesity and overweight are associated with numerous health issues including type 2 diabetes, sleep apnea, hypertension, dyslipidemia, and metabolic syndrome (4). These diseases adversely affect quality of life and overall productivity of an individual.

Health care expenditures due to obesity related diseases have also increased and were estimated to be $75 billion dollars in 2003; Ohio had the seventh highest medical expenditures ($3.3 billion) (5). Experts agree that early health promoting intervention is key to decreasing childhood overweight and obesity, and could alleviate health problems and health care costs associated with these problems.
Many programs have been developed to improve health behaviors in children. In a meta-analysis of 57 randomized controlled trials of obesity prevention programs among children, nineteen studies focused on improving nutrition. The review included only studies of programs for children in elementary or secondary school that had a school component, comparison group, and a wide variety of outcomes (not just knowledge or attitude). Of the studies focused on only nutrition, six showed no significant difference between treatment and control, twelve had mixed results, and only one was clinically significant. Out of the fifty-seven studies reviewed (which included nutrition and/or physical activity components), four studies showed clinically significant results. Three of the four programs were CATCH (Child and Adolescent Trial for Cardiovascular Health), Gimme 5, and Planet Health. The fourth study was a physical activity program only. One of the commonalities between the four clinically significant studies was the program was rooted either implicitly or explicitly in Social Cognitive Theory (SCT). Problems with other programs included a lack of theoretical basis and lack of process evaluation. The reviewer also pointed out that few studies performed any follow-up studies, making it unknown if changes were maintained (6).

Food Fit is designed to overcome the previously noted limitations. It is a nutrition education program based on Social Cognitive Theory that is intended for elementary aged children. The program is designed to target select food behaviors, such as choosing lower calorie snack food items, choosing beverages low in sugar, and eating vegetables with lunch, all of which are thought to be important in the prevention of childhood overweight (29). The constructs of Social Cognitive Theory measured in the Food Fit curriculum are behavioral capabilities, self-efficacy, and outcome expectancies. The
outcome evaluations that Food Fit uses to assess impact of its program are pre- and post-tests per lesson, a Child Modified Food Behavior Checklist, 24-hour recalls, and height and weight. The study was approved by the Institutional Review Board of the Ohio State University on August 31, 2007.

Food Fit was delivered at seven after school programs during the 2007-2008 school year by trained dietetic interns from The Ohio State University. Children from the after school programs who were between the ages of six and eleven were eligible to participate in the Food Fit program. The first assessment occurred prior to the implementation of lessons 1-7 in September of 2007. Heights and weights, 24-hour recalls (with the aid of a food journal), and completing the Child Modified Food Behavior Checklist were completed by each subject enrolled in the study. Following the first assessment, seven lessons were delivered by trained dietetic interns. In December of 2007, the subjects were assessed again. Due to winter break, children were reassessed in January 2008 before seven more lessons were delivered. After these seven lessons the subjects were assessed again. The follow-up assessments occurred in May of 2009.

Each lesson began with a pre-test administered by dietetic interns. The dietetic interns led the education portion, which included role-playing, modeling, and an activity that reinforced the goals of the lesson. Taste testing was also a part of each lesson. At the close of the education portion, the assistant administered the post-test.

The objective of this study was to determine the changes in the psychosocial constructs of behavioral capability, self-efficacy, and outcome expectancy. Another objective was to examine changes in dietary behavior and weight status. The long-term effectiveness of the Food Fit program was also evaluated. This study tested the null
hypothesis that there would be no change in BMI percentile, Food Behavior Checklist responses, and behavioral capabilities, self-efficacy, and outcome expectancies between the Assessments. The alternative hypotheses were that there would be a significant change in BMI percentile, Food Behavior Checklist responses, and behavioral capabilities, self-efficacy, and outcome expectancies between the assessments. The specific aims of this study were the following:

1) Determine the effect Food Fit has on Behavioral Capability, Self-efficacy, and Outcome Expectancies for selected food behaviors.

   HO: There will be no statistically significant differences in Behavior Capability between the pre-tests and post-tests for Lessons 1 through 14.
   HA: There will be statistically significant differences in Behavior Capability between the pre-tests and post-tests for Lessons 1 through 14.

   HO: There will be no statistically significant differences in Self-efficacy between the pre-tests and post-tests for Lessons 1 through 14.
   HA: There will be statistically significant differences in Self-efficacy between the pre-tests and post-tests for Lessons 1 through 14.

   HO: There will be no statistically significant differences changes in Outcome Expectancies between the pre-tests and post-tests for Lessons 1 through 14.
   HA: There will be statistically significant differences changes in Outcome Expectancies between the pre-tests and post-tests for Lessons 1 through 14.

2) Determine the effect of Food Fit on overall eating behaviors.

   a. Compare composite scores on Child Modified Food Behavior Checklist between different assessment periods

   HO: There will be no statistically significant differences in Food Behavior Checklist between Assessment 1 and Assessment 2
   HA: There will be statistically significant differences in Food Behavior Checklist between Assessment 1 and Assessment 2
H₀: There will be no statistically significant differences in Food Behavior Checklist between Assessment 1 and Assessment 4

Hₐ: There will be statistically significant differences in Food Behavior Checklist between Assessment 1 and Assessment 4

H₀: There will be no statistically significant differences in Food Behavior Checklist between Assessment 3 and Assessment 4

Hₐ: There will be statistically significant differences in Food Behavior Checklist between Assessment 3 and Assessment 4

H₀: There will be no statistically significant differences in Food Behavior Checklist between Assessment 4 and Assessment 5

Hₐ: There will be statistically significant differences in Food Behavior Checklist between Assessment 4 and Assessment 5

b. Explore the relationship between number of lessons participated in and the change in Child Modified Food Behavior Checklist

H₀: There will be no statistically significant differences between children who participated in more lessons and children who participated in fewer lessons on the Food Behavior Checklist, 24-hour recall, and follow-up test

Hₐ: There will be statistically significant differences between children who participated in more lessons and children who participated in fewer lessons on the Food Behavior Checklist, 24-hour recall, and follow-up test

3) Determine the effect Food Fit has on Body Mass Index percentile.

H₀: There will be no statistically significant differences in BMI percentile between Assessment 1 and Assessment 2

Hₐ: There will be statistically significant differences in BMI percentile between Assessment 1 and Assessment 2

H₀: There will be no statistically significant differences in BMI percentile between Assessment 1 and Assessment 4

Hₐ: There will be statistically significant differences in BMI percentile between Assessment 1 and Assessment 4
HO: There will be no statistically significant change in BMI percentile between Assessment 2 and Assessment 3

HA: There will be statistically significant differences in BMI percentile between Assessment 2 and Assessment 3

HO: There will be no statistically significant differences in BMI percentile between Assessment 3 and Assessment 4

HA: There will be statistically differences in BMI percentile between Assessment 3 and Assessment 4

HO: There will be no statistically significant differences in BMI percentile between Assessment 4 and Assessment 5

HA: There will be statistically significant differences in BMI percentile between Assessment 4 and Assessment 5

4) Determine the effect Food Fit has on the retention of selected food behaviors.

HO: There will be no statistically significant difference in Behavior Capability between the answer on the post-test and the answer on the follow-up test at Assessment 5

HA: There will be a statistically significant difference in Behavior Capability between the answer on the post-test and the answer on the follow-up test at Assessment 5

HO: There will be no statistically significant difference in Self-efficacy between the answer on the post-test and the answer on the follow-up test at Assessment 5

HA: There will be a statistically significant difference in Self-efficacy between the answer on the post-test and the answer on the follow-up test at Assessment 5

HO: There will be no statistically significant difference in Outcome Expectancies between the answer on the post-test and the answer on the follow-up test at Assessment 5

HA: There will be a statistically significant difference in Outcome Expectancies between the answer on the post-test and the answer on the follow-up test at Assessment 5
CHAPTER 2

Review of Literature

Description of the Problem

The prevalence of overweight and obesity in children and adolescents continues to increase at an alarming rate (4). Between 1980 and 2000 the prevalence of childhood overweight tripled in the United States (4). School-age children and adolescents have the highest prevalence of overweight among children (1). According to the National Health and Nutrition Examination Survey (NHANES) 2004, 18.4% of school-age children (ages 6-11 years) were in the overweight category (85th-95th percentile) and 18.8% of school-age children (ages 6-11 years) were in the obese category (>95th percentile) (1).

Differences in prevalence among ethnic groups also exist. Mexican-American boys ages six to eleven have a higher prevalence of overweight than non-Hispanic white and non-Hispanic black boys (1). For the girls, non-Hispanic blacks are more likely to be overweight compared to non-Hispanic whites (1). Lutfiyya, et al. found that overweight children were more likely to be African American and Hispanic than white, male than female, live in households with incomes below 150% of the Federal poverty level, watch television three or more hours daily, and not have received preventive care in the past twelve months (7). Geographically, the highest prevalence of overweight or obese
children is in the southeastern states, followed by south central states, lower Midwestern states (from Illinois to Ohio), and most of the Midatlantic states (8). In Ohio, 16.1% of the children are overweight and 20.2% are obese. Therefore, 36.3% of children in Ohio are overweight or obese (8). This phenomenon is not limited to the United States. There have been observed increases in childhood overweight and obesity in Canada, the United Kingdom, China, Germany, France, and Finland (4). Because excess weight is hard to reduce once it is established, preventing overweight by tailoring programs to children should be a priority (9).

There are numerous comorbidities associated with childhood overweight (4). These include metabolic syndrome, Type 2 Diabetes Mellitus, inflammation, cardiovascular abnormalities, psychosocial abnormalities, orthopedic issues, sleep apnea, dyslipidemia, acanthosis nigricans, and hyperandrogenemia in girls (4, 10). Along with these comorbidities is the concern that obese children have twice the risk for becoming obese adults when compared to non-obese children (3). In a review of literature, approximately one-third (26-41%) of obese preschool children were obese as adults. Among obese school-age children about half (42-63%) were obese as adults. The more obese and the older the child, the higher the risk is for adult obesity (3).

Health care expenditures due to obesity related diseases have also increased and were estimated to be $75 billion dollars in 2003; Ohio had the seventh highest medical expenditures ($3.3 billion) (5). Experts agree that early health promoting intervention is vital to decreasing childhood overweight and obesity, which could alleviate health problems and health care costs associated with overweight and obesity.
In an examination between overweight and family incomes, Wang found that there is not a straightforward correlation between the two, rather their results “indicate complex patterns that vary across ethnic groups and over time” (11). Previously, there was a strong connection between socioeconomic status and weight status, but as the obesity rates continue to rise there is a weakening association between socioeconomic status and overweight (11). Among white girls there exists a reverse association, meaning that girls in higher socioeconomic brackets have a lower prevalence of overweight. This is in contrast with black girls where there is a higher prevalence of overweight in higher socioeconomic brackets (11). However, Cade found that in the poorest 15% of the U.S. population there were higher rates of obesity and central obesity in adults and children (12). This population also consumed more fat spreads, oils, soft drinks, red and processed meats, whole milk, and table sugar than the general population. They also consumed only half the recommended daily intake of fruit and vegetables (12). Altogether, the obesity epidemic is a complex and pervasive problem that needs to be addressed.

Current Approaches to the Problem

Since it is more difficult and costly to treat obesity rather than prevent it, much focus has been placed on preventing obesity (13). An expert committee on child and adolescent overweight and obesity formed by the American Medical Association has developed recommendations for the prevention, assessment, and treatment of child and adolescent overweight and obesity (14). Preventing child overweight and obesity through
family and parental tactics is crucial, however school- and community-based programs also have an important role to play in prevention (14).

Many programs have been developed to improve health behaviors in children. In a review of 57 randomized controlled trials of obesity prevention programs among children, nineteen studies focused on improving nutrition. Of the studies focused on only nutrition, six showed no significant difference between treatment and control, twelve had mixed differences, and only one was clinically significant. Out of the fifty-seven studies reviewed (which included nutrition and/or physical activity components), four studies showed clinically significant results. The reviewer also pointed out that few studies performed any follow-up studies, making it unknown if changes were maintained (6).

In another review of 220 nutrition education research interventions, the programs that set behavior change as the goal and directed the education towards that goal were more efficacious at improving dietary practices (15). However, most intervention effects were modest, and few interventions saw change in all the variables measured in the study in order to determine program effectiveness (15). These reviews indicate that there is still a great need for effective nutrition programming.

Theory-based Interventions

Interventions based in theory are more likely to be successful than those with no theoretical underpinnings (4, 16). Using a theory has many advantages. Theory guides the researchers on how to discern why people behave the way they do, what the
intervention should target, how programs and activities should be structured, and what should be monitored and measured (17).

**Social Cognitive Theory**

While having a theoretical approach is an advantage for such programming, not all programs report positive outcomes in body weight or body fat (4). In the previously mentioned review of obesity prevention programs even with statistical differences between intervention and control group, only four studies showed clinically significant results. One of the commonalities between the four clinically significant studies was the program was rooted in Social Cognitive Theory (SCT) (6).

In another review of effective school-based childhood overweight interventions (where effective is defined as ones that resulted in a significant reduction in body mass index or body weight in children ages four to fourteen years), three of the ten studies explicitly stated that Social Cognitive Theory was used as the theoretical framework. Social Cognitive Theory constructs were utilized in five other studies. Therefore, eight of the ten effective programs had some degree of rooting in Social Cognitive Theory (18).

Social Cognitive Theory (SCT) is “a unified theoretical framework for analyzing human thought and behavior” (19). One tenet of SCT is the belief in reciprocal determinism which states that people are neither objects controlled by their environments nor are they free to become whatever they choose. There is a relationship between individuals and their environment. Social Cognitive Theory states that humans are
influenced heavily by observational learning, have a profound ability to utilize symbols, and have the ability to self-direct and self-regulate (19).

While there are many constructs within SCT, the construct that is essential to the behavior change model proposed by Social Cognitive Theory is self-efficacy. Self-efficacy is the key factor because it affects both motivation and action (20). Self-efficacy is the confidence a person feels in his or her ability to perform a certain skill or behavior or to overcome barriers (21). A person’s perception of his or her self-efficacy is a predictor of how much effort he or she will put into the change and how he or she will proceed once faced with obstacles (22). Repetition of a skill helps to increase self-efficacy, which helps to promote behavior change (21). Additionally, the skills should be broken down to small components. This helps an individual master small skills thereby building self-efficacy (21).

In order to feel confident about performing a certain behavior a person needs to know the skills necessary for performing the behavior. Behavioral capability, another Social Cognitive Theory construct, refers to a person’s knowledge of a behavior and how to perform skills associated with the behavior (21). SCT maintains that if people observe a behavior being performed and manage to symbolically code this behavior either visually or verbally they will be better able to remember this behavior (19).

Once a person knows a skill and has confidence in performing the skill it is important to know whether they value the outcomes from doing the behavior. A third Social Cognitive Theory construct, outcome expectancy, is the worth the individual puts on a given outcome. SCT also posits that short-term rewards or benefits are a better motivator than long-term rewards or benefits (19). The expectancies should be identified
early in the development of an intervention in order to target the motivators for that behavior (19). Other major constructs in Social Cognitive Theory are environment, situation, expectations, self-control, observational learning, reinforcement, and emotional coping responses (21).

Interventions based in Social Cognitive Theory

One of the most widely known nutrition interventions that are based in Social Cognitive Theory is the CATCH (Child and Adolescent Trial for Cardiovascular Health) Kids Club program. The CATCH curriculum is a teacher-led program that has an education component, a physical activity component, and a snack component (23). The study was evaluated using direct observation of physical activity, self-reported food-intake and physical activity, and focus group interviews with after-school staff. The lessons and activities were developed using SCT. The nutrition aspect of the curriculum helps kids make healthy food choices for lunches, snacks, and when eating out. The methods for teaching these behaviors included modeling, goal setting, making contracts, skill training, practice, and reinforcements (23). In the after-school pilot study, the After School Student Questionnaire (ASSQ) was used to determine the children’s previous-day dietary intake for selected foods, health behaviors and nutrition knowledge, and food intentions and knowledge (23). The authors note that almost all of the intervention effects moved in a positive direction, however only food knowledge showed a significant improvement (effect size of 1.45). Vegetable intake and eating fruit for lunch were both marginally significant. The researchers concluded that although the results were modest,
the CATCH Kids Club has potential to be an effective program in the after-school setting (23).

The CATCH program is also one of the only programs to study the long-term effects of the program through a Follow-Up study. Following a feasibility study of the studies, the second phase of the CATCH project was an intervention for kids in grades 3 through 5 at 56 intervention schools (24). There were 40 schools that acted as controls. During this intervention phase the researchers found that levels of vigorous physical activity increased and daily intakes of energy from total fat and saturated fat decreased. Dietary knowledge also significantly improved (24). Phase Three of the CATCH project was a 3-year follow-up study. The follow-up study utilized 24-hour dietary recalls, food checklist, a self-administered physical activity checklist, the Health Behavior Survey (HBS), which measured the psychosocial variables targeted through the CATCH intervention, and physiological variables including total cholesterol, HDL cholesterol, apolipoprotein B levels, height, weight, skinfold thickness, and blood pressure (24).

At the end of the phase 2 intervention, students in the intervention schools had a significant reduction in energy intake compared to students at the control sites (24). However, at the 3-year follow-up, the difference in energy intake between the treatment and control sites was not significant. The intervention group also had a significant 1.8% decrease in energy from total fat at the end of the intervention. At the follow-up that difference had diminished to 1.0%, but it was still significant (24). There was a decrease in energy intake from saturated fat, which remained significant at the follow-up. The authors concluded that the multi-component CATCH intervention, which included a classroom component, food service modifications, physical education alterations, and
family involvement, produced an intervention effect that was still measurable three years post-intervention. Because the intervention effects, though some were still significant, diminished more work needs to be done on sustaining the effect (24). Even though some intervention effects were achieved and maintained, there were still no significant differences between treatment and control groups in physiological measures such as body mass index or serum cholesterol at both the end of the intervention and the follow-up (24).

Another relatively successful nutrition program rooted in Social Cognitive Theory is the Gimme 5 program. In the Gimme 5 Fruit, Juice, and Vegetables for Fun and Health study eight elementary schools participated in a 6-week, 12-session, grade appropriate intervention (25). Eight elementary schools, matched with the intervention schools, acted as controls. There were five objectives for the GIMME 5 program: (1) increase fruit, juice, and vegetable availability and accessibility at home and at fast food restaurants through role playing, (2) enhance students’ preferences for fruit, juice, and vegetables by encouraging the students to taste recipes prepared during the sessions, (3) train the students to prepare fast, simple, safe, and tasty (FaSST) recipes, (4) train students in goal setting, and (5) train the students problem-solving skills so that children are able to overcome barriers. Gimme 5 sessions lasted 45-55 minutes, and children earned points towards a small prize if they reached three dietary change goals (25).

In a study evaluating the program, a 7-day food record and a questionnaire that measured psychosocial variables and food knowledge was used to assess program effectiveness. At the end of the intervention, the treatment group had a significantly higher combined fruit, juice, and vegetable consumption, vegetable consumption, asking
behaviors, and knowledge score (25). Fruit consumption, fruit, vegetable, and snack preferences, positive outcome expectations, negative outcome expectations, eating fruits and vegetables self-efficacy, asking and shopping self-efficacy, and social norms were not significantly different between the two groups (25). Again, this is a study with modest effectiveness.

Another program, Planet Health, uses components from behavioral choice and social cognitive theories (26). Planet Health is a school-based multidisciplinary program that focuses on decreasing consumption of high-fat foods, increasing fruit and vegetable intake, decreasing television viewing, and increasing moderate and vigorous physical activity. Planet Health integrates health lessons into the current curricula of language arts, math, science, social studies, and physical education classes the children take. The study included five intervention schools and five control schools in the Boston metropolitan area. The main outcome measure of Planet Health was obesity as measured by body mass index and triceps skinfold. The secondary measures were changes in television viewing, diet, and activity as measured by the Food and Activity Survey (26).

Obesity prevalence among female students in the Planet Health schools decreased from 23.6% to 20.3% while obesity prevalence among female students in the control schools increased from 21.5% to 23.7%. For boys, obesity declined in both the control and intervention schools, with no significant difference between the two groups of schools. Girls and boys in the intervention group significantly decreased their television viewing time compared to girls and boys in the control group. Girls in the intervention group had a significantly higher fruit and vegetable consumption than girls in the control group. However, results from regression suggested that only television viewing mediated
the intervention effect (decreased obesity prevalence). The study did not include a follow-up to see if the changes were maintained (26).

The purpose of the Kids Living Fit study was to decrease BMI in overweight and obese children and maintain weight in normal weight children (27) in an after-school setting. A secondary purpose was to decrease waist circumference. Two schools received the Kids Living Fit intervention, and two schools acted as controls. Heights, weights, and waist circumferences were measured at the beginning and at the end of the intervention. During the study the children met once a week for twelve weeks. The program had a physical activity component and a dietary component. The dietary component was a 30 minute education presentation. Children completed a food, activity, and satisfaction questionnaire three times throughout the study. They also completed food and activity diaries and wore pedometers. The treatment group had a significant decrease (2.3%) in body mass index compared to the control group. Both the treatment group and the contrast group had an increase in waist circumference, but the treatment group had a smaller increase (27).

Color Me Healthy is a nutrition and physical activity intervention based in Social Cognitive Theory and the socioecological model (28). The program was designed for children ages four and five and for use in the child-care setting. The program included 12 circle time lesson plans, picture cards, classroom posters, music, hand stamps, and a parent component (28). A 38 item evaluation was completed by the child-care providers in order to assess the effectiveness of the Color Me Healthy Program. At the end of the program there was an increase in physical activity, students’ knowledge about movement, and students’ knowledge of healthy eating. (28).
This wide array of studies indicate that nutrition programs based in Social Cognitive Theory can be effective, but consistent changes or changes in physiological measurements such as body mass index is still elusive. There is still more research that needs to be done to find interventions that are highly effective.

Food Fit

Food Fit is a nutrition intervention based in Social Cognitive Theory designed by faculty and a graduate student in the department of Human Nutrition at The Ohio State University (29). The six-lesson program was designed to affect children’s behavioral capabilities, self-efficacy, and outcome expectancies. These three constructs were carefully chosen. Self-efficacy is one of the keys to SCT (20). In order to be confident in one’s ability to perform a certain behavior, a person would need to know the skills involved and how to perform the skills. This is behavioral capability. Once a person knows the skills and is confident that he or she can perform the behavior, they need to have the drive to do a behavior. This drive is described in terms of outcome expectancy. It is the value that is placed on an expected outcome. If the outcome of a behavior is highly valued it is more likely the person will engage in the behavior.

The content of the six lessons in the curriculum was designed to address the food behaviors thought to be associated with childhood overweight and obesity (14). The lessons included: Choosing Lower Calorie Snack Foods (Lesson 1), Choosing 1 Serving of a Snack Food When Eating from a Large Container (Lesson 2), Choosing Beverages Without Added Sugar (Lesson 3), Choosing Cereals With a Low Amount of Added Sugar
(Lesson 4), Eating Whole Fruit and Choosing Fruit for Breakfast and Snacks (Lesson 5),
and Eating Vegetables and Choosing Raw Vegetables for a Snack (Lesson 6) (29).

Instead of using self-reporting methods, Food Fit uses a skill based pre and
posttest in order to measure student’s behavioral capability. Self-efficacy and outcome
expectancies are measured using a self-report 3 point Likert scale (agree, neutral,
disagree). Self-efficacy statements begin with the root ‘I am sure I can’ (29, 30).
Outcome expectancies begin with the root ‘I want to’ (29).

In the Food Fit study, fifty-eight children, grades 3 to 5, from five YMCA
sponsored after school were recruited. Dietary behaviors were assessed before and after
the intervention. The study used a treatment only design with the children acting as their
own control (29). Six lessons were given over a six-week period, with one lesson per
week. The lessons were given by trained undergraduates who were enrolled in Human
Nutrition 704 (Community Nutrition) at The Ohio State University. Each site had 5-6
implementers and a 1:6 teacher to student ratio. The lessons used techniques such as
hands-on activities, modeling, role-playing, and taste testing (29).

Significant improvements in behavioral capabilities were seen in lessons 2, 5, and
6. There were significant improvements in self-efficacy for lessons 1, 2, 3, and 5. For
outcome expectancies, significant improvements were observed for lessons 1, 3, and 6
(29). There was a significant increase in the Food Behavior Checklist score after the
intervention. Specifically, the four self-reported items which improved were: consuming
more fruits and vegetables as snacks, increased consumption of citrus fruits and juice,
increased consumption of raw vegetables, and increased use of the food label to
determine food selection (29).
This study indicates that Food Fit is effective in positively affecting the psychosocial variables of behavioral capability, self-efficacy, and outcome expectancy for select dietary behaviors (29). However, this study did not include a follow-up, so it is unclear as to whether these changes would be maintained.

Overweight and obesity continue to increase, and effective interventions are needed to prevent children from becoming overweight or obese. Targeting poor eating behaviors is an essential component in the development of effective programming. The purpose of this study is to evaluate the short-term and long-term effectiveness of the expanded Food Fit program.
CHAPTER 3

METHODOLOGY

Research Design

The design for the pilot study of the Food Fit intervention was a one-group pretest-posttest design. This design controls for selection bias and experimental mortality since there is only one group and no comparison group. One possible threat to internal validity is a testing effect where the taking of a pretest has an effect on the scores of the posttest. There are threats to external validity inherent in this design. There could be an interaction of testing and the treatment, meaning that results cannot be generalized to people who were not pretested since everyone took a pretest. Adding a control group could control this threat. For the follow-up portion of this pilot study the design is a treatment only with children acting as their own controls.
Research Timeline

At Assessment 1, Assessment 2, Assessment 3, and Assessment 4 height and weight were assessed. A Child Modified Food Behavior Checklist and 24-hour recall with food diary were also collected. A pre-test and post-test were given at each lesson (Lessons 1-14). At Assessment 5, height and weight along with a Child Modified Food Behavior Checklist were collected. At Assessment 5 a written test with material from all fourteen post-tests was given to the subjects.

Subject Selection

Children aged six to eleven who participated in after school programs at seven locations in Columbus, Ohio were eligible to participate in the Food Fit program. The seven after school programs were Northbranch Y-Club, Urbancrest Y-Club, Harmon Y-Club, Fairwood Y-Club, Southwood at Reeb Y-Club, Southside Settlement House Y-Club, and Prairie Lincoln Y-Club. The majority of these after school sites were in
Columbus zip codes with the highest level of adult overweight and obesity (31). These areas are also low-income areas. If a household receives Food Stamps, Temporary Assistance for Needy Families, or earns below 130% of poverty level, the children are eligible for free lunches. Children whose families earn between 130 and 185% of poverty level are eligible for reduced price lunches (32). Four of the seven sites where the Food Fit intervention was delivered were schools. At these schools the percentages of children eligible for free or reduced priced lunches ranged from 58.14% to 70.81% of the school population (33).

A total of 108 children participated in the Food Fit program. The sixty-six children who participated in the Food Fit program and were still in the program at the time of the three-month follow-up were eligible to participate in the follow-up portion of the study (Assessment 5). There was a 38.9% attrition rate between Assessment 1 and Assessment 5. For the three-month follow-up, fifty-one children from six after school programs participated.

**Intervention Description**

Food Fit was designed using Social Cognitive Theory. Each of the fourteen lessons was created to stand alone, without relying on previous lessons. This allowed children who did not participate in a previous lesson to participate in the current lesson. A variety of teaching methods were used throughout the lessons. The methods included hands on activities to teach abstract concepts, skills development though instructor modeling and practice, positive role modeling, role-playing, positive and vicarious
reinforcement, and taste-testing healthy foods (29). The previous FF study included six lessons while this study tested an expanded FF with fourteen lessons.

Lessons were designed to last between 30 to 45 minutes (29). The topics covered during the lessons were the following: Choosing lower calorie snack foods (Lesson 1), choosing one serving of a snack food (Lesson 2), choosing beverages without added sugar (Lesson 3), choosing cereals with a low amount of added sugars (Lesson 4), eating fruit and choosing whole fruit for breakfast and snacks (Lesson 5), eating vegetables and choosing raw vegetables for a snack (Lesson 6), drinking milk and choosing low fat varieties (Lesson 7), eating breakfast everyday (Lesson 8), learning the proper serving size for fruit and fruit juice (Lesson 9), learning the proper serving size for vegetables (Lesson 10), choosing low calorie entrees when eating out (Lesson 11), choosing low calorie side dishes when eating out (Lesson 12), choosing 100% whole wheat breads (Lesson 13), and choosing low calorie meats and toppings for sandwiches (Lesson 14).

Each of the lessons followed the same format. The lesson consisted of five sections: Introduction, Benefits and Consequences, Modeling and Taste Testing, Role-Playing, and Wrap-Up (29). The instructor introduced the lesson’s key objectives during the Introduction. During the Benefits and Consequences section the children participated in activities designed to demonstrate the benefits and consequences of the targeted behavior. In the Modeling and Taste Testing section the instructor modeled the targeted behavior and led a taste testing activity. Children were encouraged to taste the healthy foods being targeted in the lesson. The next part of the lesson was role-playing where the children participated in role-playing demonstrating the behavior learned in the lesson. The instructor wrapped up the lesson by reviewing the main concepts of the lesson (29).
Interns from the Dietetic Internship program in the department of Human Nutrition in the College of Human Ecology at The Ohio State University were trained at the Clinical Research Center in anthropometrics. The week before the lesson, the interns practiced the detailed script for each lesson with the program coordinator who was a graduate student and Registered Dietitian (29).

**Outcome Measures**

The outcome measures used during Assessments 1-4 included behavioral capabilities, self-efficacy, outcome expectancies, Child Modified Food Behavior Checklist, height, weight, and 24-hour recall with a food diary aid. The outcome measures used during Assessment 5 (the two month follow-up) were very similar to the assessments used during the delivery of the 14 lessons Food Fit program. Height and weight were recorded for each subject. From that data, body mass index (BMI) and body mass index percentile were calculated. Behavioral capability, self-efficacy, and outcome expectancies were measured at Assessment 5 as well through the use of a comprehensive test over the fourteen lessons. Assessment 1 was the assessment period before the first lesson. Assessment 2 was the assessment period after the seventh lesson and before winter break. Assessment 3 was the assessment period after winter break and before the next seven lessons. Assessment 4 was the assessment period after the fourteenth lesson. Assessment 5 was the assessment period at the two-month follow-up.

In addition to anthropometric data, information on the dietary behaviors of the subjects was obtained through a Child Modified Food Behavior Checklist. The Food
Behavior Checklist (FBC) is a brief survey containing 22 questions. It has been proven both valid and reliable, was written at an elementary reading level, and takes approximately ten minutes to complete (36). Children answered a ‘child-modified’ version, which rewrites or omits questions, making it most suitable for children (29).

Behavioral capabilities, self-efficacy, and outcome expectancies initially promoted during Food Fit were evaluated during the follow-up. Behavioral capabilities were measured through simulations and self-efficacy and outcome expectancies were evaluated using a self-report 3-point Likert scale.

The assessments were divided between seven stations. Tri-fold poster boards divided the stations. Each child received a packet of paper containing an information sheet and seven color-coded tests that corresponded to the seven color-coded stations. The information sheet included name, age, gender, grade, race/ethnicity, height in centimeters, and weight in kilograms. The children filled out everything except the height and weight, which was measured by trained study personnel.

The test for each station covered topics from two lessons. The questions for the follow-up were taken from the post-tests of the original lessons. Different food items were used, but wording remained the same. For instance, the question from the original post-test might read, ‘Sima didn’t eat a vegetable for breakfast. Which one of these snack foods is a raw vegetable that she could eat? A. Corn Bread B. Onion Rings C. Lettuce Leafs.’ The follow-up question would read, ‘Phil didn’t eat a vegetable for breakfast. Which one of these snack foods is a raw vegetable that he could eat? A. French Fries B. Carrot Sticks C. Baked Beans.’ Not every question from the lesson’s post-test was used in the follow-up assessment in order to ensure the follow-up
assessment was not too long. Key concepts from the lessons were tested in the follow-up assessment. Behavior questions, as opposed to straight skill questions, were generally chosen for the behavioral capabilities. For example, on the pretest for lesson one the first two questions ask the student to locate the food label and record the amount of calories in a snack item (straight skill). The third question might read, ‘Amy is going to have a snack. Which food item should Amy pick if she wants to eat the snack with the least amount of Calories?’ This third question is a behavior question, and these are the types of questions asked on the follow-up. The self-efficacy and outcome expectancy questions paralleled the behavioral capability questions.

*Conditions of Testing*

The assessments took place during after school program hours. The start times of the after school programs ranged from 2:45 p.m. to 4:15 p.m., and the sites ranged from a classroom-like setting to a gymnasium. The Food Fit program was generally the first activity the children did after attendance and snack. At Assessment 1, 2, 3, 4, and 5 the participating children first had their height and weight measured by a trained dietetic intern or assistant. Children were asked to remove their shoes before being measured. After the children were measured they were directed to a quiet location to complete the Child Modified Food Behavior Checklist. At Assessment 1, 2, 3, and 4 a trained dietetic intern or assistant performed one-on-one 24 hour recalls with the children.

The lessons began with an assistant giving the children the pre-test. Once all the children had completed the pre-test the instructor began the lesson. At the completion of the lesson the assistant gave the children the post-test.
The follow-up testing was conducted at the after school sites during the weeks of May 19\textsuperscript{th} and May 26\textsuperscript{th}. The seven stations were set up with as much distance apart as space would allow. Once heights, weights, and the Food Behavior Checklist were completed, children reported to the assistant and were directed to the first of seven stations. Students were given a time limit of two minutes at each station. Once a student was finished with a station, the assistant would direct them to the next station. Each station was reset to the original configuration before the next student was allowed to start the station. Assistants were allowed to aid students if they had problems reading a question, but they were not allowed to aid the student in finding the correct answer. Once the student was finished with all seven stations they were directed to return to the after school programming.

\textit{Data Analysis}

\textit{Psychosocial constructs}

To estimate the change in the psychosocial variables behavioral capability, self-efficacy, and outcome expectancies a paired t-test was used. On each pre- and post-test there were 2-5 behavioral capability questions, 2-5 self-efficacy questions, and 2-5 outcome expectancy questions. A composite score for each variable for each lesson was calculated. Correct answers to behavioral capability questions were scored with a 1, while incorrect answers received a 0. For self-efficacy and outcome expectancy questions an agree response was coded as 2, neutral as 1, and disagree as 0. Each lesson constituted its own dataset. Three t-tests, one for each variable, were conducted for each
lesson. The overall alpha-level for each t-test for each lesson was .05. Using Bonferroni’s adjustment, the alpha level of each variable was .05/3=0.017. The efficacy of the program as a whole was examined using weighted mean differences and by calculating effect size of the program on the three psychosocial variables.

Dietary Behavior

Changes in responses to items on the Food Behavior Checklist between Assessments 1 and 2, Assessments 1 and 4, Assessments 3 and 4, and Assessments 4 and 5 were examined using a paired t-test of composite Food Behavior Checklist scores. The responses to the Food Behavior Checklist were either dichotomous (Yes/No) or frequency (0-5). For the dichotomous responses a 1 was given for the healthy behavior and a 0 was given for the less healthy behavior. The scores for each question were summed to give the Food Behavior Checklist composite score. McNemar’s test was used to determine which questions on the Food Behavior Checklist contributed to significance.

Weight Status

Change in BMI percentile between Assessments 1 and 2, Assessments 1 and 4, Assessments 3 and 4, and Assessments 4 and 5 was examined using a paired t-test.

Follow-up

The change in behavioral capability, self-efficacy, and outcome expectancies between the post-tests during lessons 1 to 14 and the corresponding lesson at Assessment 5 was determined by using a paired t-test. Each question on the follow-up was a question from the post-test of the original lesson. A composite score was developed by adding up the BC, SE, and OE scores for each question on the follow-up. A McNemar’s test was run to determine which lessons were contributing to the significance.
To explore the relationship between the number of lessons participated in and the change in the Food Behavior Checklist score a Pearson's correlation and box plot was used. A post-hoc test was run to see if there was a difference between those who attended two or fewer compared to those who attended three or more lessons. Statistical significance was determined at $P<0.05$ and marginal statistical significance at $P<.10$. Statistical software used was SPSS Statistics version 17 (SPSS Inc. Chicago, IL).
CHAPTER 4

RESULTS

Demographics

One hundred eight children were enrolled in the study. There were more 61 males and 47 females. The children ranged in ages from 8 to 13 with an average age of 9.23 years. The self-reported ethnicities of the children included Caucasian (47.2%), African American (45.4%), Hispanic (5.6%), and Other (1.5%). The weight statuses of the subjects at first assessment were: 3.7% underweight, 48.1% normal, 17.6% overweight, and 29.6% obese. Almost half of the subjects (47.2%) were either overweight or obese.

Outcome Evaluations

Changes in Psychosocial Variables

An average of 47 children participated in each lesson; children attended a mean of 6.19 lessons. There was a significant improvement in behavioral capability for eleven of the fourteen lessons (Table 1). The lessons where behavioral capability was significantly improved were: Choosing lower calorie snack foods, choosing one serving
of a snack food, choosing beverages without added sugars, choosing cereals with a low amount of added sugars, eating fruit and choosing whole fruit for breakfast and snacks, eating vegetables and choosing raw vegetables for a snack, drinking milk and choosing low-fat varieties, eating breakfast everyday, proper serving size for fruit and fruit juice, proper serving size for vegetables, choosing 100% whole wheat bread. The lessons that did not have an improvement in behavioral capability were: choosing low calorie entrees when eating out, choosing low calorie side dishes when eating out, and choosing low calorie meats and toppings for sandwiches.

<table>
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<th>N</th>
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<th>Post-Test Mean</th>
<th>Poss. Score</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>P-value</th>
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*Significance p<.017

Table1. Change in Behavioral Capability per lesson.
There was significant improvement in self-efficacy for two out of fourteen lessons (Table 2). The lessons that had improvement were: choosing lower calorie snack foods and choosing one serving of a snack food.

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*Significance  

p<.017

Table 2. Change in Self-efficacy per lesson.
There were no lessons that had a significant improvement in outcome expectancies (Table 3).

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Table 3. Change in Outcome Expectancies per lesson.

*Pilot Evaluation of Program*

As a further analysis of the efficacy of the program as a whole the weighted mean difference for the psychosocial variables for each lesson were evaluated. There were a total of 658 observations from 100 subjects on the 14 distinct lessons. The mean BC score increase for each lesson was 0.6 (±1.2), and it was statistically significant (p=0.000). The mean SE score increase was 0.2 (±1.4) (p=.144). The mean OE score increase for each lesson was 0.146 (±1.6) (p=.351). The Cohen’s effect size for behavioral capability was 0.49, which was a medium effect size (37). The effect sizes for
self-efficacy and outcome expectancy were 0.15 and 0.09 respectively. These effect sizes were small, but were still trending in the positive direction.

*Changes in Food Behavior Checklist*

Four comparisons were made between the composite scores on the food behavior checklist at the different assessment periods. An overall alpha level was 0.05, with an individual alpha level at 0.05/4=0.0125. Mean difference was calculated as score at later assessment period minus score at earlier assessment period. For example, Assessment 1 to Assessment 2 would be the score at Assessment 2 minus the score at Assessment 1. A positive difference indicates that there was a larger score at the later assessment. The mean baseline score at Assessment 1 was 6.96 (±1.7). There was a significant increase in food behavior checklist scores from Assessment 1 to Assessment 4 (Table 4).

\[
\begin{array}{cccc}
\text{N} & \text{Mean Difference} & \text{Standard Deviation} & \text{P-value} \\
\hline
\text{Assessment 1 to Assessment 2} & 93 & 0.44 & 1.96 & 0.033 \\
\text{Assessment 1 to Assessment 4} & 62 & 0.69 & 2.06 & 0.010^* \\
\text{Assessment 3 to Assessment 4} & 66 & 0.27 & 1.89 & 0.244 \\
\text{Assessment 4 to Assessment 5} & 52 & -0.12 & 2.43 & 0.734 \\
\end{array}
\]

*Significance p<0.0125

Table 4. Change in Food Behavior Checklist between assessment periods.
To further evaluate the change in food behavior checklist scores from Assessment 1 to Assessment 4 McNemar’s test was run to determine which questions contributed to the significance. The four questions which contributed to the significance were: Do you eat more than 1 kind of vegetable a day (p-value=0.003), Do you eat 2 or more servings of vegetables at your main meal (p-value=0.019), During the past week, did you have raw vegetables (p-value=0.019), and During the past week, did you have fish (p-value=0.008).

Changes in Body Mass Index Percentiles

There was a significant increase in body mass index percentile from Assessment 1 to Assessment 4 and from Assessment 4 to Assessment 5 (Table 5).

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean Difference</th>
<th>Standard Deviation</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assessment 1 to Assessment 2</td>
<td>95</td>
<td>0.90</td>
<td>7.22</td>
<td>0.229</td>
</tr>
<tr>
<td>Assessment 1 to Assessment 4</td>
<td>63</td>
<td>2.09</td>
<td>6.45</td>
<td>0.012*</td>
</tr>
<tr>
<td>Assessment 3 to Assessment 4</td>
<td>66</td>
<td>0.87</td>
<td>6.18</td>
<td>0.255</td>
</tr>
<tr>
<td>Assessment 4 to Assessment 5</td>
<td>51</td>
<td>5.16</td>
<td>7.71</td>
<td>0.000*</td>
</tr>
</tbody>
</table>

*Significance p<.0125

Table 5. Change in BMI percentile between assessment periods.
Follow-up

There was a significance overall decrease in behavioral capability between the original lesson’s post-test and the follow-up. There was not a significant change in self-efficacy or outcome expectancy (Table 6). A post hoc analysis of the change in behavior capability revealed that Lesson 1 and Lesson 10 contributed to the significant change. There was an improvement in Lesson 1 behavioral capability at the 3-month follow-up (p-value=0.03), and there was a decrease in Lesson 10 behavioral capability at the 3-month follow-up (p-value=0.001). Lesson 1 was choosing lower calorie snack foods, and Lesson 10 was choosing the proper serving size for vegetables.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean Difference</th>
<th>Standard Deviation</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BC v</td>
<td>51</td>
<td>-0.155</td>
<td>0.24</td>
<td>0.000*</td>
</tr>
<tr>
<td>BC Follow</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>SE v</td>
<td>50</td>
<td>0.002</td>
<td>0.22</td>
<td>0.942</td>
</tr>
<tr>
<td>SE Follow</td>
<td></td>
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</tr>
<tr>
<td>OE v</td>
<td>50</td>
<td>0.019</td>
<td>0.35</td>
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<tr>
<td>OE Follow</td>
<td></td>
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*Significance p<0.017

Table 6. Change in psychosocial variables at 3-month follow-up.

Relationship between participation and change in Food Behavior Checklist

A box plot and regression analysis did not reveal any relationship between the number of lessons participated in and a change in Food Behavior Checklist composite
score (Figure 2). The regression analysis had a slope equal to 0.037, R² value of 0.077 with a p-value of 0.449.

Figure 2. Box plot of total lessons attended and change in FBC score

A post hoc test found that there was a significant difference in FBC score between subjects who attended more than two lessons and those that attended less than or equal to two lessons (mean difference=1.035, p-value=0.025).
CHAPTER 5

DISCUSSION

This study indicates that the Food Fit program is very efficacious in positively affecting children’s behavioral capability for certain nutritional behaviors. According to Bandura and Social Cognitive Theory, repeated exposure to a modeling stimuli “produce enduring, retrievable images of modeled performances” (19). Food Fit focuses on repeatedly modeling a behavior. The Food Fit instructor asks every child present at the lesson to demonstrate that they too can perform the behavior. Children are more likely to remember a behavior if they actually rehearse or model the behavior than children who just visually observe the model (19).

The three lessons for which there was no increase in behavioral capability were: choosing low calorie entrees when eating out, choosing low calorie side dishes when eating out, and choosing low calorie meats and toppings for sandwiches. In the eating out lessons, children were given printouts of all the nutrition information for products on the website from a fast food restaurant such as Wendy’s. This is different from other lessons where the children had actual food items, which they could pick up and look at. It may have difficult for the children to search through the ten pages of nutritional
information in order to find the number of calories in a single item. Children had difficulty in locating the item in the pages of information. The amount of information could have been overwhelming. It might have been more effective if the information could have been shown on the actual website rather than pages and pages of printouts.

Choosing low calorie meats and toppings for sandwiches was the final lesson of Food Fit. There was no change in behavioral capability for this lesson. Since this was the last lesson there may have been some burnout. This lesson had three different components: bread, meats, and toppings. This is quite a bit of information to learn in one lesson. The fourth question on the pre- and post- test might have been confusing as well. It asks for the best choice for a sandwich in terms of meat, topping, and bread. If they chose the right meat and bread, but not the right topping, they would receive no points. It could be possible that the children understood two out of the three concepts, but it would be measured as not understanding any of the concepts.

The follow-up data on behavioral capability is encouraging. Even though there was a decrease in behavioral capability at the three-month follow-up the further analysis revealed that most of the behaviors did not change and one behavior even increased (choosing lower calorie snack foods). One behavioral capability that decreased significantly was choosing the proper serving size for vegetables. Children had the choice of choosing a baseball, tennis ball, or ping-pong ball to represent the proper serving size for vegetables. The children had the same choices of balls to represent the proper serving size for fruits. It could have been confusing using the same props for both fruits and vegetables. Furthermore, children may not have been able to distinguish the difference in size between a baseball and a tennis ball, which were used for vegetables.
and fruits, respectively. It is not unexpected that the behavioral capability for serving sizes for vegetables decreased.

Since Food Fit had increased most behavioral capabilities at the post-test, no change for the majority of behavioral capabilities at the three-month follow-up suggests that the children retained what they had learned for at least three months. For some behaviors, they were retained longer than three months since the lessons were conducted from October to March.

The skill that was taught in order to help kids choose lower calorie snack foods was label reading. In order to choose which item had the lowest amount of calories the children had to be able to identify and read the food label. It is not surprising that the behavioral capability for choosing lower calorie snack foods increased at the three-month follow-up because label reading was a part of eight of the fourteen lessons. Exposure to this concept for eight times helped to increase the behavioral capability with regards to label reading.

In this study children’s perceived self-efficacy about choosing lower calorie snack foods and choosing one serving of a snack food increased after the respective lessons. However, self-efficacy for the rest of the nutrition behaviors was not increased. This finding is different than that found in a previous study on Food Fit where there was an increase in self-efficacy for four of the six lessons. The populations of the two studies were different and this may account for the different results. The previous study took place in middle-income areas of Columbus, while in this study many of the after school sites were located in low-income areas of Columbus. In Columbus, 41% of children living in the 100-200% poverty range are overweight (31). Many of the students in Food
Fit received free or reduced lunches. Cultures of low-income populations often experience a sense of powerlessness in changing one’s situation while high incomes can reinforce a people’s sense of mastery and self-efficacy (34). Since this study was conducted in lower income areas of Columbus it is feasible that these children may not feel like they have the control to change eating behaviors and therefore, may not have much self-confidence in their ability to do so.

Social Cognitive Theory posits that within any social group there are individuals who are more likely to be respected and valued, and that modeling by these individuals is more effective than modeling by people of low status (19). Furthermore, a variety of models can be more effective than one model (19). Food Fit generally had one model at each lesson. Usually, but not always, the moderator was a white, young adult, female. Having a wider variety of models may have helped the children believe they could do the behaviors being taught. If a peer or valued person could do a behavior the children might feel more efficacious in their ability to do a behavior. Using more appropriate models for this group may have a greater increase in self-efficacy among the children.

The root used for assessing self-efficacy was ‘I am sure’. The children might not have understood what the statements meant. Conducting a focus group with the students may shed light on why there was no increase in self-efficacy for 12 out of the 14 lessons. Because children generally do not do the grocery shopping for the household, the children may have felt that could do the behavior, but would not have the opportunity to do the behavior and therefore answered that they disagreed with or was neutral with the ‘I am sure’ statements.
In this study, outcome expectancy did not change for children who participated in the Food Fit program. The root ‘I want to’ has not been validated. Therefore the instrument may not be a valid measure of outcome expectancy. The rationale for using the ‘I want to’ root is that if a person expects a behavior to produce a certain result, and they value that result then they would want to do that behavior. However, outcome expectancy by definition is value a person places on an expected outcome. Instead of measuring outcome expectancy, it is possible that the instrument was measuring motivation.

The outcome expectancy questions also did not always focus on an expected outcome. For example, one question read ‘I want to choose lower calorie snack foods when I eat.’ The question does not state what the outcome of this behavior might be and whether or not the respondent values the outcome. Perhaps the outcomes were not explained well enough. Another possible explanation for the lack of effect is that Food Fit was not targeting the appropriate outcomes for this group of children. The primary outcome of the nutrition behaviors targeted by Food Fit is the ability to move, work, and play. Perhaps these outcomes are not highly valued by the population Food Fit was targeting. Focus groups with the children may shed light on the outcome they would value. In children, outcome expectancy may be even more influential than self-efficacy with regards to dietary behavior.

In a study on the socioeconomic differences in attitudes and beliefs about health behaviors, the researchers found that thinking about the future (either short-term or long-term) was something that lower-socioeconomic respondents rarely did (35). Outcome expectancy is focused on the future, what one expects to happen and it that outcome is
valuable. If low socioeconomic groups, like the Food Fit group in this study, are not concerned with the future, than it is no surprise that there was not a change in outcome expectancy. Focusing on immediate outcomes may prove more fruitful.

The primary purpose of this study was to affect the psychosocial variables of behavioral capability, self-efficacy, and outcome expectancy. Ideally, these constructs should act as mediating variables and subsequently affect the targeted behavior. The change in dietary behavior was measured by using the Child-Modified Food Behavior Checklist (CM-FBC). There was a significant positive increase in FBC score from Assessment 1 to Assessment 4. Assessment 1 was baseline and Assessment 4 was at the end of the intervention. This is an encouraging result. Another encouraging result is that the changes in CM-FBC were maintained between Assessments 4 and 5 (follow-up). Since not all constructs of Social Cognitive Theory were measured in this study and this study did not have a control group, it cannot be said that just a change in behavioral capability was the exclusive causative factor for changes in dietary behavior as evidenced by the score on FBC.

Further analysis of the questions which contributed to the significant increase in Food Behavior Checklist scores between the first and fourth assessment identified the following questions: Do you eat more than 1 kind of vegetable a day (p-value=0.003), Do you eat 2 or more servings of vegetables at your main meal (p-value=0.019), During the past week, did you have raw vegetables (p-value=0.019), and During the past week, did you have fish (p-value=0.008). The first three questions are all subjects targeted by Food Fit. The lessons on vegetables focus on having raw vegetables as a snack and teaching strategies for eating three servings of vegetables a day. Food Fit does not target the
consumption of fish during the lessons. One possible explanation is that Assessment 4 occurred in March during Lent. Many schools offer fish (usually in the form of fish sticks) at lunches on Fridays during Lent. This could explain the increase in children answering that they did consume fish in the past week.

There did not appear to be a strong relationship between the number of lessons attended and an increase in Food Behavior Checklist Composite scores. A post hoc test did indicate that after three lessons, as the number of lessons increased, the change in Food Behavior Checklist composite score increased. This suggests having consistent participation in the Food Fit program is more likely to have a greater effect.

National figures from National Health and Nutrition Examination Survey 2003-2004 estimate the proportion of children to be overweight or obese to be 37.2% with 18.8% obese (1). This group had a higher prevalence of overweight and obese children. From the National Survey of Children’s Health 2003, in Ohio 30.4% of children are overweight or obese (7). Again, this group had a much higher prevalence of overweight and obesity compared to the state and national averages.

Ideally, if there is a change in dietary behaviors as evidenced by the Food Behavior Checklist, then there may be a change in weight status as evidenced by Body Mass Index (BMI) percentile. In this study an increase in BMI percentile was seen from Assessment 1 to Assessment 4 and from Assessment 4 to Assessment 5. There were no differences in the groups at Assessment 1, Assessment 4, and Assessment 5 with regards to age, ethnicity, number of lessons attended, gender, or weight status. This study took place from October to March. It is unclear whether there is seasonal weight gain in children, and further research is needed to address this question. One problem with BMI
is that it is a continuous scale up until the 99th percentile where it becomes categorical. A child just barely in the 99th percentile is categorized just the same as someone way above the 99th percentile. Food Fit may have helped to decrease the weight of children in the 99th percentile, but due to the categorization of 99th percentile the change would not have been captured.

Limitations

There are a few limitations to this study that need to be considered. One of the primary limitations is that instruments used in this study have not been validated in children. The Child-Modified Food Behavior was derived from the Food Behavior Checklist, which is a validated tool in adults. This FBC was altered to be child-appropriate by using grade-level appropriate language and omitting questions such as food security questions. The pre- and post-tests were also not validated. The root for self-efficacy questions had been validated in assessing children’s fruit and vegetables self-efficacy (30). This root was used in the same manner, but replaced fruit and vegetable with the behavior of the lesson.

Another limitation to the study was that there was no control group to act as a comparison in order to evaluate the overall impact of the program. Participation between the lessons also widely varied because the study was conducted in the after school setting and attendance is not as consistent as during school time. Even though this intervention is targeted towards children six to eleven years old, there is a substantial difference in cognition between six year olds and eleven year olds. There was an insufficient sample
size to look at differences between the ages. As discussed above, body mass index percentile may not be the best measurement of weight status in children. Alternative methods of measuring weight status and changes in weight status need to be examined.

Implications for Future Research

One of the first goals of future research should be on validating the instruments utilized in the Food Fit study. Paring down the lessons from fourteen lessons would be a step to consider since many children expressed burn out by the end of the Food Fit program. Focusing on fewer concepts and repeating these concepts throughout the lessons might be more effective. Ideally, a randomized controlled trial would eliminate some of the threats to internal and external validity. A large, multi-site randomized controlled trial would be useful in validating potential mediating variables, and for understanding how the Food Fit intervention works for different subgroups under different circumstances. This information would be invaluable to refining Food Fit into a targeted and highly effective intervention.
CHAPTER 6

EPILOGUE

Conclusion

Food Fit is an overweight prevention program developed to target dietary behaviors associated with obesity prevention in children. The Food Fit program was implemented at after-school programs in low income areas of Columbus, Ohio. The Food Fit program was evaluated through the measurement of psychosocial variables, dietary behaviors, and weight status. After participating in the program, children had significant improvements in behavioral capability for selected dietary behaviors. There was a slight increase in self-efficacy for two of the fourteen lessons and no increase in outcome expectancies for any of the lessons. There were favorable changes in dietary behaviors as measured by the Child Modified Food Behavior Checklist. Those changes included: eating more than one type of vegetable per day, eating more than two servings of vegetables per day, and consuming raw vegetables for snacks. In the previous FF study, which was conducted in middle income areas, there were greater changes in self-efficacy and outcome expectancies. This discrepancy in results between the two economic groups warrants further investigation into the impact of poverty on children’s self-efficacy and dietary behaviors.
**Limitations**

There are limitations of this study to consider. First, the instruments used in this study have not been validated with children. Construct validity is difficult with psychosocial variables, but the instruments could be tested for face and content validity. There was also no control group. In addition to these limitations, the program included children from ages eight to thirteen. There is a substantial difference in learning and cognition between the ages. Furthermore, attendance at lessons was sporadic because the program was implemented during the after school time.

**Recommendations**

Research is needed to validate the instruments used by Food Fit to evaluate the program. A focus group with the children who participated in Food Fit would be useful in developing more accurate instruments. Adding a control group to the study would strengthen comparisons between groups. Implementing Food Fit in a school-setting would alleviate some of the problems of attendance to the lessons. A multi-site randomized control trial would be useful in determining which variables are acting as mediating variables. This would allow for greater tailoring of programs to different subgroups, such as middle and low-income groups.
LIST OF REFERENCES


Appendix A: Consent Form
The Ohio State University Parental Permission
For Child’s Participation in Research

Study Title: Evaluating the Impact of Food Fit on Skills and Behaviors of Children Enrolled in After School Programming

Researcher: Dr. Gail Kaye

Sponsor: None

This is a parental permission form for research participation. It contains important information about this study and what to expect if you permit your child to participate.

Your child’s participation is voluntary.

Please consider the information carefully. Feel free to discuss the study with your friends and family and to ask questions before making your decision whether or not to permit your child to participate. If you permit your child to participate, you will be asked to sign this form and will receive a copy of the form.

Purpose:

The purpose of this study is to evaluate the impact of an after school program “Food Fit”.

Procedures/Tasks:

Would like to measure your child’s height and weight. To assure your child feels comfortable, they will be measured in privacy with two of our staff of the same gender.

We would also like them to fill out a simple survey asking them about the types of foods they regularly eat.

In addition to the food survey, we would like to ask your child to make a simple food journal to record the foods they eat over 24 hours. This tool will be used when we perform a 24 hour recall, where a trained member of our staff will interview your child and ask them to recall the foods they have eaten the past day.

We would also like to evaluate the impact of each Food Fit lesson by asking your child to complete a survey before and after each lesson. These surveys will only take about 10 minutes to complete.
Lastly, our staff would like to observe the program, and take field notes while your child participates in each lesson.

Your child may leave the study at any time. If you or your child decides to stop participation in the study, there will be no penalty and neither you nor your child will lose any benefits to which you are otherwise entitled. Your decision will not affect your future relationship with The Ohio State University. Lastly, your decision to participate or not participate in the evaluations will have no effect on your child’s ability to participate in the Food Fit.

Duration:
From September 2007 – May 2008, Food Fit will be given weekly, in 1 hour sessions, during the established after school programming hours. All assessments will be made during the time children are in their after school program.

Starting in the week of September 24th, investigators will come to the after school program to make pre-assessments to children who have signed parental consents. Pre assessments will take place during normal after school hours, and take approximately 1 hour to complete an entire site, and for each participant it will take approximately 20 minutes.

After pre-assessments are made, starting the week of October 15th, investigators will implement a lesson from the curriculum Food Fit for one hour each week, for 8 weeks. Before and after each lesson children will complete a Pre and Post test that will take approximately 10 minutes combined.

During the week of December 10th, Post Assessments will be completed at each site, and take approximately 1 hour to complete at each site, and for each participant it will take approximately 20 minutes.

During the week of January 14th, children will complete another pre-assessment period, that will take approximately 1 hour per site, and 20 minutes per participant.

After pre-assessments are made, starting the week of January 21st, investigators will implement a lesson from the curriculum Food Fit for one hour each week, for 10 weeks. Before and after each lesson children will complete a Pre and Post test that will take approximately 10 minutes combined.

During the week of April 14th, Post Assessments will be completed at each site, and take approximately 1 hour to complete at each site, and for each participant it will take approximately 20 minutes.

In total, children will have the opportunity to participate in 18 lessons from the Food Fit curriculum, that will take one hour per lesson, per week, for a total of 18 hours of programming, over 8 months.
In total, children will have the opportunity to participate in evaluations that will take approximately 20 minutes per week for 4 assessment weeks (80 minutes total), and 10 minutes per week for 18 pre and post tests (total of 180 minutes), over 22 weeks. (totaling 260 minutes).

Your child may leave the study at any time. If you or your child decides to stop participation in the study, there will be no penalty and neither you nor your child will lose any benefits to which you are otherwise entitled. Your decision will not affect your future relationship with The Ohio State University.

**Risks and Benefits:**

There is minimal, if any, risk associated with participation in this evaluation. This research will show the investigators the impact Food Fit has on the eating behaviors of children, and help develop further programming designed to help children learn strategies and skills needed to choose healthy food selections.

**Confidentiality:**

Efforts will be made to keep your child’s study-related information confidential. However, there may be circumstances where this information must be released. For example, personal information regarding your child’s participation in this study may be disclosed if required by state law. Also, your child’s records may be reviewed by the following groups (as applicable to the research):
- Office for Human Research Protections or other federal, state, or international regulatory agencies;
- The Ohio State University Institutional Review Board or Office of Responsible Research Practices;
- The sponsor, if any, or agency (including the Food and Drug Administration for FDA-regulated research) supporting the study.

**Incentives:**

None

**Participant Rights:**

You or your child may refuse to participate in this study without penalty or loss of benefits to which you are otherwise entitled. If you or your child is a student or employee at Ohio State, your decision will not affect your grades or employment status.
If you and your child choose to participate in the study, you may discontinue participation at any time without penalty or loss of benefits. By signing this form, you do not give up any personal legal rights your child may have as a participant in this study.

An Institutional Review Board responsible for human subjects research at The Ohio State University reviewed this research project and found it to be acceptable, according to applicable state and federal regulations and University policies designed to protect the rights and welfare of participants in research.

Contacts and Questions:
For questions, concerns, or complaints about the study you may contact Dr. Gail Kaye: 614-292-5512 or gkaye@ehe.ohio-state.edu.

For questions about your child’s rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

If your child is injured as a result of participating in this study or for questions about a study-related injury, you may contact Dr. Gail Kaye: 614-292-5512 or gkaye@ehe.ohio-state.edu.
Signing the parental permission form

I have read (or someone has read to me) this form and I am aware that I am being asked to provide permission for my child to participate in a research study. I have had the opportunity to ask questions and have had them answered to my satisfaction. I voluntarily agree to permit my child to participate in this study.

I am not giving up any legal rights by signing this form. I will be given a copy of this form.

| Printed name of subject |

| Printed name of person authorized to provide permission for subject | Signature of person authorized to provide permission for subject |
| Relationship to the subject | AM/PM |
| Date and time |

Investigator/Research Staff

I have explained the research to the participant or his/her representative before requesting the signature(s) above. There are no blanks in this document. A copy of this form has been given to the participant or his/her representative.

| Printed name of person obtaining consent | Signature of person obtaining consent |
| Date and time |
| AM/PM |
Appendix B: Child-Modified Food Behavior Checklist
Child-Modified Food Behavior Checklist

Subject # ____________

Answer the following items by checking yes or no. Note that some answers are related to serving portions

1. Do you eat more than 1 kind of fruit daily?  
   Yes  No

2. During the past week, did you have citrus fruit or citrus juice? (like orange juice or grapefruit juice)  
   Yes  No

3. Do you eat more than 1 kind of vegetable a day?  
   Yes  No

4. How many servings of vegetables do you eat each day?  
   None  1 Serving  2 Servings  3 Servings  4 Servings  5 Servings

5. Do you eat 2 or more servings of vegetables at your main meal?  
   Yes  No

6. Do you eat fruit or vegetables as snacks?  
   Yes  No

7. How many servings of fruit do you eat each day?  
   None  1 Serving  2 Servings  3 Servings  4 Servings  5 Servings

8. During the past week, did you have raw vegetables?  
   Yes  No

9. Do you drink milk daily?  
   Yes  No
10. During the past week, did you have milk as a beverage or on cereal?
   Yes   No

11. During the past week, did you have fish?
   Yes   No

12. How many times a week do you usually eat food from a fast food restaurant?
   None   1 Serving   2 Servings   3 Servings   4 Servings   5 Servings

13. During the past week did you have eggs?
   Yes   No

14. If you eat eggs, about how many eggs do you usually eat in a week?
   None   1 Serving   2 Servings   3 Servings   4 Servings   5 Servings

15. Do you eat low-fat instead of high fat foods?
   Yes   No

16. When choosing a food to eat, do you use the Nutrition facts on the food label?
   Yes   No

17. Do you drink regular soft drinks?
   Yes   No

18. Do you drink kool-aid, Gatorade, sunny delight, or other fruit drink/punch?
   Yes   No

19. Would you describe your diet as:
   Excellent   Very Good   Good   Fair   Poor
Appendix C: Per Lesson Pre and Post Tests
Pretest for Lesson 1

Subject #__________

Directions: Please use the foods in front of you to answer questions 1-3. You will not need the food items to answer the remaining questions.

1. On each food item, which letter is next to the Food Label?
   a. A
   b. B
   c. C
   d. D

2. How many calories does each package have?
   a. Pretzels _______
   b. Potato Chips _______
   c. Cheese Crackers _______

3. Amy is going to have a snack. Which food item should Amy pick if she wants to eat the snack with the least amount of Calories?
   a. Pretzels
   b. Potato Chips
   c. Cheese Crackers

For the remaining questions circle which face you think best describes how you feel about the statement.

😊 = Agree
😊 = Neutral
😊 = Disagree

4. I am sure I can identify the food labels on different foods on my own. 😊😊😊
5. I am sure I can read Calories on food labels on my own. 😊😊😊
6. I am sure I can use the food label to choose lower calorie snack foods on my own. 😊😊😊
7. I want to read the food label to chose lower calorie snack foods. 😊😊😊
8. I want to choose lower calorie snack foods when I eat. 😊😊😊
Posttest for Lesson 1

Subject #_________

Directions: Please use the foods in front of you to answer questions 1-3. You will not need the food items to answer the remaining questions.

1. On each food item, which letter is next to the Food Label?
   a. A  
   b. B  
   c. C  
   d. D

2. How many calories does each box of popcorn have in one serving?
   a. Chocolate Chip Cookies  ______
   b. Fig Newtons  ______
   c. Oreo Cookies  ______

3. Bobby is at the store, and wants to buy a snack. Which option in front of you should Bobby pick if he wants to eat the snack with the least amount of Calories?
   a. Chocolate Chip Cookies
   b. Fig Newtons
   c. Oreo Cookies

For the remaining questions circle which face you think best describes how you feel about the statement.

😊 = Agree
😊 = Neutral
😊 = Disagree

4. I am sure I can identify the food labels on different foods on my own.  😊😊😊
5. I am sure I can read Calories on food labels on my own. 😊😊😊
6. I am sure I can use the food label to choose lower calorie snack foods on my own. 😊😊😊
7. I want to read the food label to chose lower calorie snack foods. 😊😊😊
8. I want to choose lower calorie snack foods when I eat. 😊😊😊
Pretest for Lesson 2

Subject #________

Directions: Please use the foods in front of you to answer questions 1-4. You will not need the food items to answer the remaining questions.

1. How many wheat crackers are in 1 serving?
   a. 9 Crackers
   b. 15 Crackers
   c. 30 Crackers
   d. the whole bag

2. How many servings of wheat crackers are in this box?
   a. 1 serving
   b. 7 servings
   c. 9 servings
   d. 15 servings

3. How many Calories are in 1 serving of Wheat crackers?
   a. 100 Calories
   b. 150 Calories
   c. 60 Calories
   d. 160 Calories

For the remaining questions circle which face you think best describes how you feel about the statement.

☺ = Agree  ☹ = Neutral  ☻= Disagree

4. I am sure I can read the serving size on food labels by myself.

5. I am sure I can use the food label to find out how many servings are in a package of food, by myself.

6. I am sure I can use the food label to find out how many calories are in 1 serving of a food by myself.

7. I am sure I can use the food label to portion out 1 serving of a food, when it comes in a large container.

8. I want to read the serving size on foods labels before I eat a food.

9. I want to find out how many calories are in 1 serving of a food, before I eat it.

10. I want to eat 1 Serving of Snack of a Snack Food.
Posttest for Lesson 2

Subject #__________

Directions: Please use the foods in front of you to answer questions 1-4. You will not need the food items to answer the remaining questions.

1. How many animal cookies are in 1 serving?
   a. 1 cookie
   b. 6 cookies
   c. 12 cookies
   d. The whole bag

2. How many servings of animal cookies are in this bag?
   a. 1 serving
   b. 6 servings
   c. 12 servings
   d. 140 servings

3. How many Calories are in 1 serving of animal cookies?
   a. 140 Calories
   b. 45 Calories
   c. 12 Calories
   d. 240 Calories

For the remaining questions circle which face you think best describes how you feel about the statement.

☺ = Agree   ☹ = Neutral   ☹= Disagree

4. I am sure I can read the serving size on food labels by myself.
   ☹ ☹ ☹

5. I am sure I can use the food label to find out how many servings are in a package of food, by myself.
   ☹ ☹ ☹

6. I am sure I can use the food label to find out how many calories are in 1 serving of a food by myself.
   ☹ ☹ ☹

7. I am sure I can use the food label to portion out 1 serving of a food, when it comes in a large container.
   ☹ ☹ ☹

8. I want to read the serving size on foods labels before I eat a food.
   ☹ ☹ ☹

9. I want to find out how many calories are in 1 serving of a food, before I eat it.
   ☹ ☹ ☹

10. I want to eat 1 Serving of Snack of a Snack Food. ☹ ☹ ☹
Pretest for Lesson 3

Subject #________

Directions: Please use the foods in front of you to answer questions 1-2. You will not need the food items to answer the remaining questions.

1. How much Added Sugars does each drink in front of you have?
   Coke ______
   Hi-C ______
   Bottled Water ______

2. Hank is doing his homework, and is thirsty. Which drink would be the healthiest choice?
   a. Coke
   b. Hi-C
   c. Bottled Water

3. True or False: Extra sugar is added to Skim Milk.

4. True or False: Extra sugar is added to 100% Fruit Juice.

For the remaining questions circle which face you think best describes how you feel about the statement.

☺ = Agree ☻ = Neutral ☻= Disagree

5. I am sure I can tell how much Added Sugar a drink has by reading the food label on my own.

6. I am sure I can use the food label to choose drinks without Added Sugar on my own.

7. I want to read how much Added Sugars are in drinks by reading the food label before I drink them.

8. I want to use the food label to choose drinks without Added Sugar.

9. I want to choose drinks without Added Sugar.
Posttest for Lesson 3

Subject #________

Directions: Please use the foods in front of you to answer questions 1-2. You will not need the food items to answer the remaining questions.

1. How much Added Sugars does each drink in front of you have?
   - Powerade ______
   - Bottled Water ______
   - Root Beer ______

2. Lindsey is doing her homework, and is thirsty. Which drink would be the healthiest choice?
   a. Powerade
   b. Bottled Water
   c. Root Beer

3. True or False: Extra sugar is added to Skim Milk.

4. True or False: Extra sugar is added to 100% Fruit Juice.

For the remaining questions circle which face you think best describes how you feel about the statement.

☺ = Agree    ☹ = Neutral    ☹ = Disagree

5. I am sure I can tell how much Added Sugar a drink has by reading the food label on my own.

6. I am sure I can use the food label to choose drinks without Added Sugar on my own.

7. I want to read how much Added Sugars are in drinks by reading the food label before I drink them.

8. I want to use the food label to choose drinks without Added Sugar.

9. I want to choose drinks without Added Sugar.
Pretest for Lesson 4

Subject #_________

Directions: Please use the foods in front of you to answer questions 1-3. You will not need the food items to answer the remaining questions.

1. How many grams of sugar does each cereal have in front of you?
   Cinnamon Toast Crunch ______
   Cheerios ______
   Lucky Charms ______

2. Which cereal has the most grams of sugar?
   e. Cinnamon Toast Crunch
   f. Cheerios
   g. Lucky Charms

3. Josh is at the store with his dad. When they go down the cereal lane, Josh’s dad tells him to pick out the cereal he wants to have for breakfast. Which cereal should Josh pick, if he wants to eat the cereal with the lowest amount of sugar in it?
   a. Cinnamon Toast Crunch
   b. Cheerios
   c. Lucky Charms

For the remaining questions circle which face you think best describes how you feel about the statement.

☺ = Agree  ☺= Neutral  ☺= Disagree

4. I am sure I can tell how much sugar a cereal has by reading the food label on my own

5. I am sure I can use the food label to choose cereals lower in sugar on my own.

6. I want to read how much sugar a cereal has by reading the food label.

7. I want to use the food label to choose cereals lower in sugar.

8. I want to choose cereals lower in sugar.
Posttest for Lesson 4

Subject #__________

Directions: Please use the foods in front of you to answer questions 1-3. You will not need the food items to answer the remaining questions.

1. How many grams of sugar does each cereal have in front of you?
   Trix ______
   Corn Flakes ______
   Apple Jacks ______

2. Which cereal has the most grams of sugar?
   a. Trix
   b. Corn Flakes
   c. Apple Jacks

3. Pete just woke up. When he goes to the kitchen, he sees the three cereals you have in front of you, and needs to pick which one he is going to have. Which cereal should Pete pick, if he wants the cereal with the lowest amount of sugar?
   a. Trix
   b. Corn Flakes
   c. Apple Jacks

For the remaining questions circle which face you think best describes how you feel about the statement.

☺ = Agree    ☹ = Neutral    ☹ = Disagree

4. I am sure I can tell how much sugar a cereal has by reading the food label on my own.

5. I am sure I can use the food label to choose cereals lower in sugar on my own.

6. I want to read how much sugar a cereal has by reading the food label.

7. I want to use the food label to choose cereals lower in sugar.

8. I want to choose cereals lower in sugar.
Pretest for Lesson 5

Subject #_________

Directions: Please answer the questions below. You will need the cups in front of you for question 4 Only.

1. How many different fruits should we eat everyday?
   a. 1
   b. 3
   c. 5

2. What should you do if you do not eat a fruit for breakfast?
   a. Have 1 fruit for lunch and have 1 fruit for dinner
   b. Don’t worry about eating fruit
   c. Have fruit for a snack

3. Manny is going to have Corn Flakes for breakfast. What could Manny have to make sure he has fruit for breakfast?
   a. Put bananas on his Corn Flakes
   b. Eat a Strawberry Pop Tart
   c. Have toast, and put Grape Jelly on it.

4. Which cup in front of you would be the amount of 100% fruit juice that equals 1 serving of fruit?
   a. Cup 1
   b. Cup 2
   c. Cup 3

For the remaining questions circle which face you think best describes how you feel about the statement.
☺ = Agree
= Neutral
= Disagree

5. I am sure I can eat fruit for breakfast every morning. ☺ ☺ ☺

6. I am sure I can eat fruit for a snack if I don’t eat enough fruit at my meals. ☺ ☺ ☺

7. I am sure I can eat whole fruit instead of foods that are fruit flavored. ☺ ☺ ☺

8. I am sure I can portion out the amount of 100% fruit juice that equals 1 serving of fruit when I drink 100% fruit juice. ☺ ☺ ☺

9. I want to eat fruit for breakfast every morning. ☺ ☺ ☺

10. I want to eat fruit as a snack when I don’t eat enough fruit at my meals. ☺ ☺ ☺

11. I want to eat whole fruits instead of foods that are fruit flavored. ☺ ☺ ☺

12. I want to portion out the amount of 100% fruit juice that equals 1 serving of fruit when I drink 100% fruit juice. ☺ ☺ ☺
Posttest for Lesson 5

Subject #________

Directions: Please answer the questions below. You will need the cups in front of you for question 4 only.

1. How many different fruits should we eat everyday?
   a. 1
   b. 3
   c. 5

2. What should you do if you do not eat a fruit for breakfast?
   a. Have fruit for a snack
   b. Have 1 fruit for lunch and have 1 fruit for dinner
   c. Don’t worry about eating fruit

3. Peter is going to have Cheerios for breakfast. What could Peter have to make sure he has fruit for breakfast?
   a. Eat a blueberry Pop Tart
   b. Have toast and put Strawberry Jam on it.
   c. Put strawberries on his Cheerios

4. Which cup in front of you would be the amount of 100% fruit juice that equals 1 serving of fruit?
   a. Cup 1
   b. Cup 2
   c. Cup 3

For the remaining questions circle which face you think best describes how you feel about the statement.

😊 = Agree    😞 = Neutral    😞 = Disagree

5. I am sure I can eat fruit for breakfast every morning.

6. I am sure I can eat fruit for a snack if I don’t eat enough fruit at my meals.

7. I am sure I can eat whole fruit instead of foods that are fruit flavored.

8. I am sure I can portion out the amount of 100% fruit juice that equals 1 serving of fruit when I drink 100% fruit juice.

9. I want to eat fruit for breakfast every morning

10. I want to eat fruit as a snack when I don’t eat enough fruit at my meals.

11. I want to eat whole fruits instead of foods that fruit flavored.

12. I want to portion out the amount of 100% fruit juice that equals 1 serving of fruit when I drink 100% fruit juice.
Pretest for Lesson 6

Subject #_________

Directions: Please use the foods in front of you to answer questions 1-4. You will not need the food items to answer the remaining questions.

1. How many different vegetables should we eat everyday?
   n. 1
   o. 3
   p. 5

2. Margaret didn’t eat a vegetable for breakfast. Which one of these snack foods is a raw vegetable that she could eat?
   a. French Fries
   b. Celery Sticks
   c. Baked Beans

3. What could you do if you do not eat a vegetable for breakfast?
   a. Have 1 vegetable for lunch and have 2 vegetables for dinner
   b. Have 1 vegetable for lunch, 1 vegetable for a snack, and have 1 vegetable for dinner
   c. You could do A or B
   d. Don’t worry about eating vegetables

For the remaining questions circle which face you think best describes how you feel about the statement.

😊 = Agree
.grade = Neutral
ément = Disagree

4. I am sure I can eat a raw vegetable for a snack every day.

5. I am sure I can eat raw vegetables instead of higher Calorie snack foods.

6. I am sure I can eat extra vegetables for dinner if I don’t eat enough vegetables during the day.

7. I want to eat raw vegetables for a snack every day.

8. I want to eat raw vegetables instead of higher Calorie snack foods.

9. I want to eat extra vegetables for dinner when I don’t eat enough vegetables during the day.
Posttest for Lesson 6

Subject #_________

Directions: Please use the foods in front of you to answer questions 1-4. You will not need the food items to answer the remaining questions.

1. How many different vegetables should we eat everyday?
   a. 1
   b. 3
   c. 5

2. Sima didn’t eat a vegetable for breakfast. Which one of these snack foods is a raw vegetable that she could eat?
   a. Corn Bread
   b. Onion Rings
   c. Lettuce Leafs

3. What could you do if you do not eat a vegetable for breakfast?
   a. Have 1 vegetable for lunch and have 2 vegetables for dinner
   b. Have 1 vegetable for lunch, 1 vegetable for a snack, and have 1 vegetable for dinner
   c. You could do A or B
   d. Don’t worry about eating vegetables

For the remaining questions circle which face you think best describes how you feel about the statement.

😊 = Agree
😊 = Neutral
😊 = Disagree

4. I am sure I can eat a raw vegetable for a snack every day.

5. I am sure I can eat raw vegetables instead of higher Calorie snack foods.

6. I am sure I can eat extra vegetables for dinner if I don’t eat enough vegetables during the day.

7. I want to eat raw vegetables for a snack every day.

8. I want to eat raw vegetables instead of higher Calorie snack foods.

9. I want to eat extra vegetables for dinner when I don’t eat enough vegetables during the day.
Pretest for Lesson 7  
Subject #_________  
Directions: Please answer the questions below.

1. How many servings of the Milk Group should we eat or drink everyday?  
   q. 1  
   r. 3  
   s. 5

2. Which of these foods DO NOT belong in the Milk Group?  
   a. Strawberry Yogurt  
   b. 1% Milk  
   c. Wheat Bread

3. Megan needs to choose a drink for dinner. Which of these drinks would be the best choice?  
   a. Chocolate Milk  
   b. Skim Milk  
   c. Orange Soda

4. Which cup in front of you would be the amount of Skim Milk that equals 1 serving of the Milk Group?  
   a. Cup 1  
   b. Cup 2  
   c. Cup 3

5. What should you do if you do not have anything from the Milk Group for Breakfast?  
   a. Have 1 Serving from the Milk Group for lunch and 1 Serving for dinner  
   b. Don’t worry about having foods and drinks from the Milk Group  
   c. Have a serving from the Milk Group for a Snack

For the remaining questions circle which face you think best describes how you feel about the statement.

6. I am sure I can drink skim or 1% milk with my meals or as a snack everyday.  
   Agree ☐ Neutral ☐ Disagree ☐

7. I am sure I can choose skim or 1% milk instead of chocolate milk.  
   ☐ ☐ ☐

8. I am sure I can choose skim or 1% milk instead of drinks with a high amount of added sugar like soda and pop.  
   ☐ ☐ ☐

9. I am sure I can have another serving from the Milk Group as a snack if I don’t get enough servings from the Milk Group during the day.  
   ☐ ☐ ☐

10. I am sure I can portion out the amount of skim or 1% milk that equals 1 serving of the Milk Group when I drink skim or 1% milk  
   ☐ ☐ ☐

11. I want to drink skim or 1% milk with my meals or as a snack everyday.  
    ☐ ☐ ☐

12. I want to choose skim or 1% milk instead of chocolate milk.  
    ☐ ☐ ☐

13. I want to choose skim or 1% milk instead of drinks with a high amount of added sugar like soda and pop.  
    ☐ ☐ ☐

14. I want to have another serving from the Milk Group as a snack if I don’t get enough servings from the Milk Group during the day.  
    ☐ ☐ ☐

15. I want to portion out the amount of skim or 1% milk that equals 1 serving of the Milk Group when I drink skim or 1% milk  
    ☐ ☐ ☐
Posttest for Lesson 7
Subject #_________
Directions: Please answer the questions below.

1. How many servings of the Milk Group should we eat or drink everyday?
   t. 1
   u. 3
   v. 5

2. Which of these foods DO NOT belong in the Milk Group?
   a. String Cheese
   b. Strawberry
   c. Skim Milk

3. Stephanie needs to choose a drink for lunch. Which of these drinks would be the best choice?
   a. Coke
   b. Chocolate Milk
   c. Skim Milk

4. Which cup in front of you would be the amount of Skim Milk that equals 1 serving of the Milk Group?
   a. Cup 1
   b. Cup 2
   c. Cup 3

5. What should you do if you do not have anything from the Milk Group for Breakfast?
   a. Have 1 Serving from the Milk Group for lunch and 1 Serving for dinner
   b. Don’t worry about having foods and drinks from the Milk Group
   c. Have a serving from the Milk Group for a Snack

For the remaining questions circle which face you think best describes how you feel about the statement.

6. I am sure I can drink skim or 1% milk with my meals or as a snack everyday.
   Agree          Neutral       Disagree

7. I am sure I can choose skim or 1% milk instead of chocolate milk.
   ☻            ☻            ☻

8. I am sure I can choose skim or 1% milk instead of drinks with a high amount of added sugar like soda and pop.
   ☻            ☻            ☻

9. I am sure I can have another serving from the Milk Group as a snack if I don’t get enough servings from the Milk Group during the day.
   ☻            ☻            ☻

10. I am sure I can portion out the amount of skim or 1% milk that equals 1 serving of the Milk Group when I drink skim or 1% milk
    ☻            ☻            ☻

11. I want to drink skim or 1% milk with my meals or as a snack everyday.
    ☻            ☻            ☻

12. I want to choose skim or 1% milk instead of chocolate milk.
    ☻            ☻            ☻

13. I want to choose skim or 1% milk instead of drinks with a high amount of added sugar like soda and pop.
    ☻            ☻            ☻

14. I want to have another serving from the Milk Group as a snack if I don’t get enough servings from the Milk Group during the day.
    ☻            ☻            ☻

15. I want to portion out the amount of skim or 1% milk that equals 1 serving of the Milk Group when I drink skim or 1% milk
    ☻            ☻            ☻
Pretest for Lesson 8
Subject #_________

Directions: Please answer the questions below.

1. How often should I have breakfast?
   a. Everyday
   b. Days I go to school.
   c. Only when there is enough time to have breakfast.

2. Ray wakes up in the morning, and wants to have breakfast. Which of these foods could Ray have for breakfast?
   a. Cereal with milk, and an apple
   b. Grilled Cheese with carrots
   c. Pizza with mushrooms
   d. Ray could have any of the choices for breakfast

3. If you were going to have a drink for breakfast, which would be the best to have if you have the amount of drink that is marked on the cup in front of you?
   a. Skim Milk
   b. 100% Grape Juice
   c. Coca-Cola

For the remaining questions circle which face you think best describes how you feel about the statement.

4. I am sure I can eat breakfast everyday.
5. I am sure I can choose healthy foods to have with my breakfast everyday.
6. I am sure I can choose healthy drinks to have with my breakfast everyday.
7. I am sure I can plan to have breakfast the night before I go to bed, or in the morning when I wake up.
8. I want to eat breakfast everyday.
9. I want to choose healthy foods to have with my breakfast everyday.
10. I want to choose healthy drinks to have with my breakfast everyday.
11. I want to plan to have breakfast the night before I go to bed, or in the morning when I wake up.
Directions: Please answer the questions below.

1. How often should I have breakfast?
   a. Everyday
   b. Days I go to school.
   c. Only when there is enough time to have breakfast.

2. Tina wakes up in the morning, and wants to have breakfast. Which of these foods could Tina have for breakfast?
   a. Oatmeal with green grapes
   b. Chicken Burrito with Beans
   c. Eggs and toast
   d. Tina could have any of the choices for breakfast

3. If you were going to have a drink for breakfast, which would be the best to have if you have the amount of drink that is marked on the cup in front of you?
   a. Skim Milk
   b. 100% Apple Juice
   c. Sprite

For the remaining questions circle which face you think best describes how you feel about the statement.

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<th>Question</th>
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<th>Neutral</th>
<th>Disagree</th>
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<td>7. I am sure I can plan to have breakfast the night before I go to bed, or in the morning when I wake up.</td>
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<td>8. I want to eat breakfast everyday.</td>
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<td>11. I want to plan to have breakfast the night before I go to bed, or in the morning when I wake up.</td>
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Pretest for Lesson 9

Subject #_________

Directions: Please use the foods in front of you to answer questions 1-4. You will not need the food items to answer the remaining questions.

1. How many different fruits should we eat everyday?
   cc. 1
   dd. 3
   ee. 5

2. What should you do if you do not eat a fruit for breakfast?
   a. Have fruit for a snack
   b. Have 1 fruit for lunch and have 1 fruit for dinner
   c. Don’t worry about eating fruit

3. Out of the objects in front of you, which most resembles the size of a piece of fruit, that would count as 1 serving of fruit?
   a. 1
   b. 2
   c. 3

4. Which cup in front of you would be the amount of 100% fruit juice that equals 1 serving of fruit?
   a. Cup 1
   b. Cup 2
   c. Cup 3

For the remaining questions circle which face you think best describes how you feel about the statement.

☺ = Agree
٪ = Neutral
恕 = Disagree

5. I am sure I can eat the right amount of fruit everyday.
6. I am sure I can eat fruit for a snack if I don’t eat enough fruit at my meals.
7. I am sure I can identify the size of what 1 serving of fruit should be.
8. I am sure I can portion out the amount of 100% fruit juice that equals 1 serving of fruit, when I drink 100% fruit juice.
9. I want to eat the right amount of fruit everyday.
10. I want to eat fruit as snacks when I don’t eat enough fruit at my meals.
11. I want to portion out the amount of 100% fruit juice that equals 1 serving of fruit, when I drink 100% fruit juice.
Posttest for Lesson 9

Subject #_________

Directions: Please use the foods in front of you to answer questions 1-4. You will not need the food items to answer the remaining questions.

1. How many different fruits should we eat everyday?
   - ff. 1
   - gg. 3
   - hh. 5

2. What should you do if you do not eat a fruit for breakfast?
   - a. Have fruit for a snack
   - b. Have 1 fruit for lunch and have 1 fruit for dinner
   - c. Don’t worry about eating fruit

3. Out of the objects in front of you, which most resembles the size of a piece of fruit, that would count as 1 serving of fruit?
   - a. 1
   - b. 2
   - c. 3

4. Which cup in front of you would be the amount of 100% fruit juice that equals 1 serving of fruit?
   - a. Cup 1
   - b. Cup 2
   - c. Cup 3

For the remaining questions circle which face you think best describes how you feel about the statement.

☺ = Agree
☻ = Neutral
☺ = Disagree

5. I am sure I can eat the right amount of fruit everyday.
6. I am sure I can eat fruit for a snack if I don’t eat enough fruit at my meals.
7. I am sure I can identify the size of what 1 serving of fruit should be.
8. I am sure I can portion out the amount of 100% fruit juice that equals 1 serving of fruit, when I drink 100% fruit juice.
9. I want to eat the right amount of fruit everyday.
10. I want to eat fruit as snacks when I don’t eat enough fruit at my meals.
11. I want to portion out the amount of 100% fruit juice that equals 1 serving of fruit, when I drink 100% fruit juice.
Pretest for Lesson 10

Subject #________

Directions: Please use the foods in front of you to answer questions 1-4. You will not need the food items to answer the remaining questions.

1. How many different vegetables should we eat everyday?
   i. 1
   jj. 3
   kk. 5

2. Maggy didn’t eat a vegetable for Lunch. Which one of these snack foods is a vegetable that she could eat?
   a. Potato chips
   b. Twinkie
   c. Carrots and dip

3. What could you do if you do not eat a vegetable for breakfast?
   a. Have 1 vegetable for lunch and have 2 vegetables for dinner
   b. Have 1 vegetable for lunch, 1 vegetable for a snack, and have 1 vegetable for dinner
   c. You could do A or B
   d. Don’t worry about eating vegetables

4. Out of the objects in front of you, which most resembles the size of a vegetable, that would count as 1 serving of vegetables?
   a. 1
   b. 2
   c. 3

For the remaining questions circle which face you think best describes how you feel about the statement.

☺ = Agree
 siè = Neutral
☺ = Disagree

5. I am sure I can eat the right amount of vegetables everyday. ☺ ☻ ☻

6. I am sure I can eat extra vegetables ☺ ☻ ☻ for dinner if I don’t eat enough vegetables during the day.

7. I am sure I can identify the size of what 1 serving of a vegetable should be. ☺ ☻ ☻

8. I want to eat the right amount of vegetables everyday. ☺ ☻ ☻

9. I want to eat extra vegetables for dinner when I don’t eat enough vegetables during the day. ☺ ☻ ☻
Posttest for Lesson 10

Subject #________

Directions: Please use the foods in front of you to answer questions 1-4. You will not need the food items to answer the remaining questions.

1. How many different vegetables should we eat everyday?
   a. 1
   b. 3
   d. 5

2. Melanie didn’t eat a vegetable for Lunch. Which one of these snack foods is a vegetable that she could eat?
   a. Celery and Dip
   b. Hamburger
   c. French Fries

3. What could you do if you do not eat a vegetable for breakfast?
   a. Have 1 vegetable for lunch and have 2 vegetables for dinner
   b. Have 1 vegetable for lunch, 1 vegetable for a snack, and have 1 vegetable for dinner
   c. You could do A or B
   d. Don’t worry about eating vegetables

4. Out of the objects in front of you, which most resembles the size of a vegetable, that would count as 1 serving of vegetables?
   a. 1
   b. 2
   c. 3

For the remaining questions circle which face you think best describes how you feel about the statement.

☺ = Agree
☺ = Neutral
☺ = Disagree

5. I am sure I can eat the right amount of vegetables everyday. ☺ ☺ ☺

6. I am sure I can eat extra vegetables ☺ ☺ ☺ for dinner if I don’t eat enough vegetables during the day.

7. I am sure I can identify the size of what 1 serving of a vegetable should be. ☺ ☺ ☺

8. I want to eat the right amount of vegetables everyday. ☺ ☺ ☺

9. I want to eat extra vegetables for dinner when I don’t eat enough vegetables during the day. ☺ ☺ ☺
Pretest for Lesson 11

Subject #__________

Directions: Please use the foods in front of you to answer questions 1-4. You will not need the food items to answer the remaining questions.

1. Out of the foods in front of you, circle the foods that are in the dairy group?
   - Cottage Cheese
   - Apple Yogurt
   - Orange

2. How many servings of dairy should you eat everyday?
   a. 1
   b. 2
   c. 3
   d. 4

3. True or False: Milk, yogurt, cheese, pudding and cottage cheese all count as dairy servings.

4. Billy is doing his homework. Which of the following would be a good choice to have from the dairy group?
   a. Strawberry Milkshake
   b. Chocolate Ice Cream
   c. Low-Fat Vanilla Yogurt

For the remaining questions circle which face you think best describes how you feel about the statement.

☺ = Agree
😊 = Neutral
☻ = Disagree

5. I am sure I can identify healthy foods from the dairy group.

6. I am sure I can eat or drink 3 servings from the dairy group everyday.

7. I want to identify healthy foods from the dairy group.

8. I want to eat or drink 3 servings from the dairy group everyday.
Posttest for Lesson 11

Subject #__________

Directions: Please use the foods in front of you to answer questions 1-4. You will not need the food items to answer the remaining questions.

1. Out of the foods in front of you, circle the foods that are in the dairy group?
   - Cottage Cheese
   - Apple Yogurt
   - Orange

2. How many servings of dairy should you eat everyday?
   a. 1
   b. 2
   c. 3
   d. 4

5. True or False: Milk, yogurt, cheese, pudding and cottage cheese all count as dairy servings.

6. Bruce is doing his homework. Which of the following would be a good choice to have from the dairy group?
   a. Non-Fat Cheese Stick
   b. Chocolate Milkshake
   c. Vanilla Pudding

For the remaining questions circle which face you think best describes how you feel about the statement.

☺ = Agree
☆ = Neutral
☆☆ = Disagree

5. I am sure I can identify healthy foods from the dairy group. ☺ ☺ ☺

6. I am sure I can eat or drink 3 servings from the dairy group everyday. ☺ ☺ ☺

7. I want to identify healthy foods from the dairy group. ☺ ☺ ☺

8. I want to eat or drink 3 servings from the dairy group everyday. ☺ ☺ ☺
Pretest for Lesson 12
Subject #________

Directions: Please answer the questions below.

***Use the Nutrition Information sheets to answer questions 1-2***

1. How many calories are in the following side items?
   I. Plain Baked Potato _______
   II. Small French Fries _______
   III. Side Salad _______

2. Mandy needs to choose an entree for dinner. Which of these entrees would be the best choice?
   oo. Plain Baked Potato
   pp. Small French Fries
   qq. Side Salad

For the remaining questions circle which face you think best describes how you feel about the statement.

3. I am sure I can ask for Nutrition Facts from a restaurant.
   Agree ☺ Neutral ☺ Disagree ☺

4. I am sure I can read Nutrition Facts that restaurants provide me with, on my own.
   ☺ ☺ ☺

5. I am sure I can choose healthier side items based on calories and key words.
   ☺ ☺ ☺

   ☺ ☺ ☺

7. I want to read Nutrition Facts that restaurants provide me with, on my own.
   ☺ ☺ ☺

8. I want to choose healthier side items based on calories and key words.
   ☺ ☺ ☺
Posttest for Lesson 12
Subject #_________

Directions: Please answer the questions below.

***Use the Nutrition Information sheets to answer questions 1-2***

1. How many calories are in the following side items?
   - rr. Caesar Side Salad with Caesar Dressing _______
   - ss. Low Fat Strawberry Flavored Yogurt _______
   - tt. Sour Cream and Chives Baked Potato _______

2. Adam needs to choose a side item to eat with dinner. Which of these side items would be the best choice?
   - uu. Caesar Side Salad with Caesar Dressing
   - vv. Low Fat Strawberry Flavored Yogurt
   - c. Sour Cream and Chives Baked Potato

For the remaining questions circle which face you think best describes how you feel about the statement.

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<th>Statement</th>
<th>Agree</th>
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Pretest for Lesson 13

Subject#________

Directions: Please use the food in front of you to answer questions 1-4. You will not need the food items to answer the remaining questions.

1. How many different foods made from whole grains should we eat everyday?
   a. At least 1
   b. At least 3
   c. At least 5

2. Which bread has Whole Wheat Flour as the first ingredient?
   a. Bread A
   b. Bread B
   c. Bread C

3. Kevin is going to have a sandwich for lunch. What kind of bread could Kevin have to make sure he has whole grains?
   a. Bread A
   b. Bread B
   c. Bread C

For the remaining questions circle which face you think best describes how you feel about the statement.

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4. I am sure I can identify the ingredients list before I choose bread on my own.

5. I am sure I can eat at least three different servings of food made with whole grains everyday.

6. I am sure I can choose whole grain breads instead of breads not made with whole grains.

7. I want to identify the ingredients list before I choose bread on my own.

8. I want to eat at least three different servings of food made with whole grains everyday.

9. I want to choose whole grain breads instead of breads not made with whole grains.
Posttest for Lesson 13

Subject#________

Directions: Please use the food in front of you to answer questions 1-4. You will not need the food items to answer the remaining questions.

1. How many different foods made from whole grains should we eat everyday?
   d. At least 1
   e. At least 3
   f. At least 5

2. Which bread has Whole Wheat Flour as the first ingredient?
   a. Bread A
   d. Bread B
   e. Bread C

3. Amanda is going to have a sandwich for lunch. What kind of bread could Amanda have to make sure she has whole grains?
   a. Bread A
   b. Bread B
   c. Bread C

For the remaining questions circle which face you think best describes how you feel about the statement.

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4. I am sure I can identify the ingredients list before I choose bread on my own.

5. I am sure I can eat at least three different servings of food made with whole grains everyday.

6. I am sure I can choose whole grain breads instead of breads not made with whole grains.

7. I want to identify the ingredients list before I choose bread on my own.

8. I want to eat at least three different servings of food made with whole grains everyday.

9. I want to choose whole grain breads instead of breads not made with whole grains.
Pretest for Lesson 14

Subject#______

Directions: Please use the food in front of you to answer questions 1-4. You will not need the food items to answer the remaining questions.

1. How many calories does each lunchmeat have?
   a. Turkey  _______
   b. Bologna  _______

2. How many calories does each topping have?
   a. Mayonnaise  _______
   b. Mustard  _______

3. Which bread would be a better choice for a sandwich?
   a. 100% Whole Wheat Bread
   b. White Bread

4. Kandace is going to have a sandwich. Which combination would be the best choice?
   a. Turkey with Mayonnaise on White Bread
   b. Bologna with Mustard on White Bread
   c. Turkey with Mustard on 100% Whole Wheat Bread
   d. Bologna with Mayonnaise on 100% Whole Wheat Bread

For the remaining questions circle which face you think best describes how you feel about the statement.

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5. I am sure I can read the food label to choose healthier lunchmeats on my own.

6. I am sure I can read the food label to choose healthier toppings on my own.

7. I am sure I can choose healthier breads on my own.

8. I am sure I can choose healthier sandwiches on my own.

9. I want to read the food label to choose healthier toppings on my own.

10. I want to read the food label to choose healthier toppings on my own.

11. I want to choose healthier breads on my own.

12. I want to choose healthier sandwiches on my own.
Posttest for Lesson 14

Subject# ______

Directions: Please use the food in front of you to answer questions 1-4. You will not need the food items to answer the remaining questions.

1. How many calories does each lunchmeat have?
   a. Salami _______
   b. Ham _______

2. How many calories does each topping have?
   a. Miracle Whip _______
   b. Spicy Mustard _______

3. Which bread would be a better choice for a sandwich?
   a. 100% Whole Wheat Bread
   b. White Bread

4. Kandace is going to have a sandwich. Which combination would be the best choice?
   c. Salami with Miracle Whip on White Bread
   d. Ham with Brown Mustard on 100% Whole Wheat Bread
   e. Salami with Brown Mustard on White Bread
   f. Ham with Miracle Whip on 100% Whole Wheat Bread

For the remaining questions circle which face you think best describes how you feel about the statement.

<table>
<thead>
<tr>
<th>Agree</th>
<th>Neutral</th>
<th>Disagree</th>
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5. I am sure I can read the food label to choose healthier lunchmeats on my own. ☺ ☻ ☩

6. I am sure I can read the food label to choose healthier toppings on my own. ☺ ☻ ☩

7. I am sure I can choose healthier breads on my own. ☺ ☻ ☩

8. I am sure I can choose healthier sandwiches on my own. ☺ ☻ ☩

9. I want to read the food label to choose healthier toppings on my own. ☺ ☻ ☩

10. I want to read the food label to choose healthier toppings on my own. ☺ ☻ ☩

11. I want to choose healthier breads on my own. ☺ ☻ ☩

12. I want to choose healthier sandwiches on my own. ☺ ☻ ☩
Appendix D: Follow-up Assessment
First Station

Directions: Please use the foods in front of you to answer the questions below.

1. Tina is going to have a snack. Which food item should Tina pick if she wants to eat the snack with the least amount of Calories?
   a. Potato Chips
   b. Wheat Crackers
   c. Doritos

2. How many Teddy Grahams are in 1 serving?
   a. 12 Grahams
   b. 18 Grahams
   c. 24 Grahams
   d. The whole box

3. How many servings of Teddy Grahams are in this box?
   a. 3 servings
   b. 5 servings
   c. 7 servings
   d. 9 servings

Directions: Circle which face you think best describes how you feel about the statement.

☺ = Agree
(#) = Neutral
(#) = Disagree

4. I am sure I can use the food label to choose lower calorie snack foods on my own.

5. I am sure I can read the serving size on food labels by myself.

6. I want to choose lower calorie snack foods when I eat.

7. I want to eat 1 serving of a snack food.

Please go to the next station.
Second Station

Directions: Please use the foods in front of you to answer the questions below.

1. Danny is doing his homework and is thirsty. Which drink should Danny choose if he wants to choose the drink without added sugars?
   a. Coke
   b. Powerade
   c. Water

2. How many servings of the Milk Group should we eat or drink everyday?
   a. 1
   b. 3
   c. 5

3. Which cup in front of you would be the amount of Skim Milk that equals 1 serving of the Milk Group?
   a. Cup 1
   b. Cup 2
   c. Cup 3

Directions: Circle which face you think best describes how you feel about the statement.

☺ = Agree
😊 = Neutral
✿= Disagree

4. I am sure I can tell how much Added Sugar a drink has by reading the Food label on my own.
   ☺ ☻ ☿

5. I am sure I can drink skim or 1% milk with my meals or a snack everyday.
   ☺ ☻ ☿

6. I want to choose drinks without Added Sugar.
   ☺ ☻ ☿

7. I want to drink skim or 1% milk with my meals or as a snack everyday.
   ☺ ☻ ☿

Please go to the next station.
Third Station

Directions: Please use the foods in front of you to answer the questions below.

1. Erin is at the store with her dad. When they go down the cereal aisle, Erin’s dad tells her to pick out the cereal she wants to have for breakfast. Which cereal should Erin pick if she wants to eat the cereal with the lowest amount of sugar in it?
   a. Kix
   b. Apple Jacks
   c. Lucky Charms

2. How often should I have breakfast?
   a. Everyday
   b. Days I go to school
   c. Only when there is enough time to have breakfast

Directions; Circle which face you think best describes how you feel about the statement.

☺ = Agree
☺ = Neutral
☺= Disagree

3. I am sure I can use the food label to choose cereals lower in sugar on my own.
   ☺ ☺ ☺

4. I am sure I can eat breakfast everyday.
   ☺ ☺ ☺

5. I want to choose cereals lower in sugar.
   ☺ ☺ ☺

6. I want to eat breakfast everyday.
   ☺ ☺ ☺

Please go to the next station.
Fourth Station

Directions: Please use the cups in front of you to answer the questions below.

1. How many different foods should we eat everyday?
   a. 1
   b. 3
   c. 5

2. Which cup in front of you would be the amount of 100% fruit juice that equals 1 serving of fruit?
   a. Cup 1
   b. Cup 2
   c. Cup 3

3. Which item in front of you best represents the portion size of 1 serving of fruit?
   a. Ping pong ball
   b. Tennis ball
   c. Baseball

Directions: Circle which face you think best describes how you feel about the statement.

☺️ = Agree
☺️ = Neutral
☺️= Disagree

4. I am sure I can eat the correct number of different fruits everyday. ☻ ☻ ☻

5. I am sure I can eat the right portion of fruit when I eat fruit everyday. ☻ ☻ ☻

6. I am sure I can portion out the amount of 100% fruit juice that equals 1 serving of fruit when I drink 100% fruit juice. ☻ ☻ ☻

7. I want to eat the correct number of different fruits everyday. ☻ ☻ ☻

8. I want to eat the right portion of fruit when I eat fruit everyday. ☻ ☻ ☻

9. I want to portion out the amount of 100% fruit juice that equals 1 serving of fruit when I drink 100% fruit juice. ☻ ☻ ☻

Please go to the next station.
Fifth Station

Directions: Please use the foods in front of you to answer the questions below.

1. How many different vegetables should we eat everyday?
   a. 1
   b. 3
   c. 5

2. Phil didn’t eat a vegetable for breakfast. Which one of these snack foods is a raw vegetable that he could eat?
   a. French Fries
   b. Carrot Sticks
   c. Baked Beans

3. Which object represents the portion size for vegetables?
   a. Ping pong ball
   b. Tennis ball
   c. Baseball

Directions: Circle which face you think best describes how you feel about the statement.

☺ = Agree
☹ = Neutral
☹= Disagree

4. I am sure I can eat the correct number of different vegetables everyday. ☺ ☐ ☐

5. I am sure I can eat a raw vegetable for a snack everyday. ☺ ☐ ☐

6. I am sure I can eat the right portion of vegetables when I eat vegetables everyday. ☺ ☐ ☐

7. I want to eat the correct number of different vegetables everyday. ☺ ☐ ☐

8. I want to eat raw vegetables for a snack everyday. ☺ ☐ ☐

9. I want to eat the right portion of vegetables when I eat vegetables everyday. ☺ ☐ ☐

Please go to the next station.
Sixth Station

Directions: Please use the nutrition information sheets in front of you to answer the questions below.

1. Beth needs to choose an entrée for dinner. Which of these entrees would be the best choice?
   a. Crispy Chicken Sandwich
   b. Jr. Cheeseburger
   c. Baconator

2. Ron needs to choose a side for dinner. Which of these sides would be the best choice?
   a. Caesar Side Salad
   b. Small French Fries
   c. Sour Cream and Chives Baked Potato

Directions: Circle which face you think best describes how you feel about the statement.

😊 = Agree
😊 = Neutral
);} = Disagree

3. I am sure I can choose healthier entrée choices based on calories. 😊😊😊

4. I am sure I can choose healthier side items based on calories. 😊😊😊

5. I want to choose healthier entrée choices based on calories. 😊😊😊

6. I want to choose healthier side items based on calories. 😊😊😊

Please go to the next station.
**Seventh Station**

*Directions: Please use the food in front of you to answer the questions below.*

1. Andrew is going to have a sandwich for lunch. What kind of bread could Andrew have to make sure he has whole grains?
   a. Bread A
   b. Bread B
   c. Bread C

2. Sarah is going to have a sandwich. **Circle** the bread, meat, and topping that would be the best choice.
   a. Bread: 100% Whole Wheat Bread or White Bread
   b. Meat: Bologna or Turkey
   c. Topping: Mayonnaise or Mustard

*Directions: Circle which face you think best describes how you feel about the statement.*

☺ = Agree  
☹ = Neutral  
 пациифик = Disagree

3. I am sure I can choose whole grain breads instead of breads not made with whole grains.

4. I am sure I can read the food label to choose healthier lunchmeats and toppings on my own.

5. I want to choose whole grain breads instead of breads not made with whole grains.

6. I want to choose healthier sandwiches on my own.

YOU ARE DONE!!!!! Thank you so much!! ☺