Evaluation of The Coordinated Approach to Child Health (catch) Program in Third Through Fifth Graders in Northern Illinois

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ABSTRACT

EVALUATION OF THE COORDINATED APPROACH TO CHILD HEALTH (CATCH) PROGRAM IN THIRD THROUGH FIFTH GRADERS IN NORTHERN ILLINOIS

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**Background:** The Coordinated Approach to Child Health (CATCH) is a school-based education program designed to improve dietary habits and increase physical activity among children and adolescents based on the Social Cognitive Theory (SCT). The objective of this study was to evaluate the effectiveness of CATCH program, delivered by dietetic interns and Northern Illinois University (NIU) students, to 3rd-5th graders in Northern Illinois, in increasing their nutrition knowledge and healthy choices behavior.

**Methods:** In total, 167 elementary school children in grades 3-5 in Northern Illinois participated in a non-experimental program evaluation study. We delivered 6 CATCH lessons throughout the academic year to five elementary schools. Lessons were focused on 'Go, Slow, Whoa' food categories to help children understand healthier food choices. Validated questionnaires from the CATCH Global Foundation were administered in classrooms and online, pre/post intervention, to assess nutritional knowledge and healthy choices.
**Results:** Children in third through fifth grades significantly increased their knowledge about nutrient dense foods, $p < .001$, $p < .001$, $p < .001$, respectively. Fourth and fifth graders exhibited a significant increase in their ability to make healthier food choices, $p = .03$ and $p = .007$, respectively. As grade level increased from third to fifth grade, improvement in nutrition knowledge and adoption of healthy food choices did not increase significantly, $p = .973$ and $p = .637$, respectively.

**Conclusion:** We conclude that children in grades 3-5 who participated in the 6 lessons of the CATCH program expanded their nutritional knowledge and improved their ability to make healthier choices. Conducting evaluations of health promotion programs is imperative to determine the impact of the program, as well as to explore possible improvements in content and delivery.
EVALUATION OF THE COORDINATED APPROACH TO CHILD HEALTH (CATCH) PROGRAM IN THIRD THROUGH FIFTH GRADERS IN NORTHERN ILLINOIS

BY

PAULINA KARECKA
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A THESIS SUBMITTED TO THE GRADUATE SCHOOL IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE MASTER OF SCIENCE

SCHOOL OF HEALTH STUDIES

Thesis Director:
Henna Muzaffar
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CHAPTER ONE

INTRODUCTION

The Dietary Guidelines for Americans is an evidence based food and beverage recommendations document for healthy individuals ages 2 and older. These guidelines aim to promote health, prevent chronic disease, and aid in reaching and maintaining healthy weight. Dietary Guidelines provide recommendations and strategies used by public health agencies, healthcare providers, and educational institutions. Most importantly, these guidelines play a significant role when providing up to date nutrition information. Federal nutrition programs and policies, as well as local, state, and national health promotion and disease prevention initiatives rely on Dietary Guidelines.

According to the Dietary Guidelines, healthy eating patterns need to stay within appropriate calorie limits for a person’s age, sex, and activity level, they must meet nutritional needs, and be achievable and maintainable in the long-term. First and foremost, consuming a diet that is healthy contains nutrient-dense vegetables such as dark green, red and orange, legumes, starchy, and other variations of vegetables. Furthermore, a healthful diet includes whole fruits, grains that are at least half whole grains, low-fat dairy products, various protein foods, and healthy oils from plants. Additionally, the Dietary Guidelines highlight the importance of limiting calories from added sugars and saturated fats, and reducing sodium intake. They
recommend limiting added sugars to less than 10% of total calories daily, limiting saturated and trans fats to less than 10% of total calories daily, and limiting sodium to less than 2,300mg daily (for adults and children 14 years and older).\textsuperscript{1}

Health benefits of consuming a nutritious diet that is rich in fruits and vegetables may reduce risk for heart disease like heart attack and stroke, as well as act as a preventative agent for certain types of cancers.\textsuperscript{2} Notably, a diet rich in foods containing fiber may reduce the risk of heart disease, obesity, and type 2 diabetes.\textsuperscript{2} According to KidsHealth, kids 5-10 years old should get anywhere between 10-20 grams of fiber a day.\textsuperscript{3} This source also states that kids who are overweight and obese are now developing weight-related health problems, such as type 2 diabetes, high cholesterol, and high blood pressure (hypertension).\textsuperscript{3} A child who is overweight or obese is at risk for medical problems, which can affect their health now and in the future.\textsuperscript{3} Diseases like type 2 diabetes, high blood pressure, and hypertension were once considered adult diseases.\textsuperscript{3} Although there are several factors that could contribute to a child’s weight gain, diet and lifestyle are significant contributors.\textsuperscript{3}

National data shows that 31 percent of children under the age of 18 are overweight and 17 percent are obese.\textsuperscript{4} Previous research has shown that children who are clinically obese are likely to maintain that weight status into their adulthood.\textsuperscript{4} Not every child who falls under these categories during their youth years will maintain it as an adult, however, there is a significantly higher chance for those individuals to develop other health concerns in the future that would be directly related to being overweight during their childhood.

There are specific subgroups of the US pediatric population who have higher prevalence of childhood obesity compared to other groups. According to previous research on these populations, 33 percent of Non-Hispanic whites are overweight and 16 percent obese, 35 percent
of Non-Hispanic blacks are overweight and 20 percent obese, and 37 percent of Mexican Americans are overweight and 19 percent are obese. One key factor that has been recognized within these groups is that pediatric obesity has been linked to individuals’ socioeconomic status (SES). Low SES results in many dietary barriers for some segments of the population, particularly those with children, because it limits the amount of appropriate resources that are available to them. A large number of children in low-income households do not consume the recommended amounts of fruits and vegetables. However, It is important to recognize that these obstacles do not exist in only such environments, but in wealthier households as well.

Including a balanced mix of fruits and vegetables in one’s diet can ensure you are getting a variety of nutrients. Fruits are higher in sugar and calories than vegetables, but both fruits and vegetables are rich in fiber, vitamins, minerals, and antioxidants that are necessary for maintaining good health. Fruits and vegetables are vital components of a healthy diet, because they are important for optimal growth, weight management, and can reduce the risks of many non-communicable diseases such as cardiovascular diseases, certain types of cancer, and diabetes. According to the Centers for Disease Control and Prevention, children in the U.S. ate 67% more whole fruit from 2003-2010, although the amount of vegetables is still significantly low. While children consume more fruits, children in the U.S are still not eating the recommended amounts of fruits and vegetables per day. Similarly, adequate amount of fiber is not being consumed by children (and parents) each day. Fiber is an important nutrient, because it helps keep our bodies full and it keeps things moving in the digestive tract. Children and adults may experience constipation if there is inadequate fiber in their diet. Fiber rich foods also contain an abundance of vitamins that may help reduce the risk of heart disease, certain types of cancer, and obesity. Lastly, dairy rich foods such as milk, cheese, and yogurt, should be a staple
in every child’s diet. Dairy products are the main source of calcium that helps build strong bones 
and teeth. According to a recent Australian National Children’s Nutrition Survey, it was found 
that 77 percent of girls and 64 percent of boys aged 12 to 15 years old are not consuming 
adequate amounts of calcium. It’s imperative to encourage the consumption of calcium-rich 
foods in children to help them thrive as they grow.

Establishing healthy dietary practices at an early age is crucial, as dietary behaviors in 
childhood track to adulthood. Within some school districts, certain schools have implemented 
various health promotion programs, such as the Coordinated Approach to Child Health 
(CATCH), in order to educate children on healthy eating and exercise.

Statement of Problem

Health promotion programs such as CATCH, require a significant amount of support 
from staff, teachers, parents, and volunteers who help run the program. Evaluations of health 
promotion programs assessing their effectiveness and impact is an important step in 
implementation science. Literature review suggests that no data exists about the impact and 
effectiveness of CATCH when delivered by dietetic interns and university students. This study 
evaluated the effectiveness of CATCH that was delivered by dietetic interns and university 
students from Northern Illinois University (NIU) in Northern Illinois elementary schools. The 
results from this evaluation could potentially enhance the development and implementation of 
CATCH and other school health programs here in Northern Illinois as well other similar sites.
Background and Significance

The CATCH program, also referred to as the Child and Adolescent Trial for Cardiovascular Health, was first developed in the late 1980s and was funded by the National Heart Lung and Blood Institute. This was accomplished through a collective effort by the University of California at San Diego, University of Minnesota, Tulane University, and the University of Texas Health Science Center at the Houston School of Public Health. "In 1988, the original CATCH study was the largest school-based health promotion study ever conducted in the United States.” This program is consistently being tested with the help of researchers at The University of Texas Health Science Center at Houston School of Public Health for more than 25 years. Due to their accomplishments, the CATCH program has been expanded into more programs and health education curriculum for early childhood through middle school, as well as for after-school and childcare settings.

CATCH is a national obesity prevention program, which focuses on healthy eating, increased physical activity, and reduced screen time. In Northern Illinois, this program is largely facilitated by the Northern Illinois University (NIU) student volunteers as well as dietetic interns in the Sycamore and Genoa-Kingston school districts. The CATCH program adapted by NIU consists of six lessons for each grade level, to be delivered in one academic year. Each 25-minute lesson is delivered once a month to each grade level, K-5. Topics of lessons vary by grade level, which can be anything from playing with mock foods while learning what they are, to older kids building a human artery and pretending to be the blood that travels through it when their diet is nutritious and when it isn’t. This study strictly focused on the evaluation of the
CATCH program in third through fifth graders who received the CATCH program by dietetic interns and university students from NIU.

Although most public schools (99 percent) offer nutrition education at some point in their curriculum, there is limited evidence on the extent and quality of the nutrition messages students are receiving. Nutrition education can be integrated in the health curriculum, science classes, or school health programs. Nutrition education interventions can be a powerful learning tool that can benefit students’ healthy eating habits and improve their lifestyle. These types of interventions can also increase students’ consumption of high fiber foods, help differentiate between nutrient dense foods and those less healthy options, expand their fruit and vegetable knowledge and increase willingness to try them outside of a learning environment. These are positive outcomes a student may have from participating in a nutrition education program, however, further evidence is needed to show the effectiveness and success of these interventions, especially over the long term. CATCH is a program that has been around for a long time, without having any consistent evaluations in Northern Illinois, which is what this study focused on.

Multiple studies such as the work done by Osborne and Forestells’ and Dazeley and Houston-Prices’ have been partially successful in showing a positive correlation between children’s consumption of fruits and vegetables and exposure to these foods. Osborne and Forestell’s study aimed to determine how eight days of home exposure to information about healthful foods and eating behaviors in the form of children’s books and various fruits and vegetables interacted to affect 4-8-year-old children’s consumption of fruits and vegetables. According to Osborne and Forestell, toddlers who are repeatedly exposed to pictures of fruits and vegetables may learn to favorably focus on these foods compared to other unexposed
Exposure to a variety of foods or to food information increased children’s acceptance of commonly consumed fruit. Likewise, children who were exposed to food information were slightly more likely to try a novel fruit than were those who were not exposed to information. The results, however, did not provide any evidence that this exposure increased children’s willingness to accept vegetables. Dazeley and Houston-Price learned that demonstration of hands-on activities with unfamiliar fruits and vegetables to 1-3 year old children can enhance their willingness to taste these foods. The aim of this study was to test the effects of a holistic, sense-based approach to food familiarization, as it might be applied in a day-care or home setting. Children showed greater willingness to touch exposed than non-exposed vegetables, however there was no significant effect seen in the consumption and willingness to try fruit. An additional pattern was observed with children’s tasting behavior. Although children did not taste significantly more of the exposed foods overall, they tasted more of the exposed vegetables than of the non-exposed vegetables; no effect was found for fruit.

The above interventions demonstrated unique strategies of exposing children to healthy options, however, they were only partially successful as indicated by their results. These examples also show how extremely difficult it can be to create an intervention that increases both fruit and vegetable consumption. Although CATCH has been operating for the last three decades, there have been limited efforts to evaluate the effectiveness of the program. The potential for success in such programs can be validated by conducting program evaluations, and if the study results indicate effectiveness of these programs. As the program is assessed, evaluations can aid in finding areas of improvement and adjustment of the curriculum.

In this study evaluating the CATCH program, the dietetic interns and university students delivered the program in the classrooms and helped expose kids to healthy foods. Dietetic interns
and university students brought awareness of what foods are out there using various materials such as plastic foods, books, and more, and continued that exposure over the academic school year. Throughout all grade levels, students were exposed to and reminded of what healthy food options are. Dietetic interns and student volunteers used the GO, SLOW, and WHOA foods method. The goal of using this method was to distinguish a healthier option from a less healthy option. For example, students were taught that the goal is to eat more GO foods than SLOW foods, and to eat WHOA foods only in very small amounts. GO describes foods that are whole grain, unprocessed fruits and vegetables, lowest in fat, contain no added sugar, and can be eaten daily. SLOW foods are defined as those that may be slightly processed and may have some added salt, fat, or sugar. Lastly, WHOA foods are those that have the highest fat and sugar content. Over the course of the academic year, students participated in activities that reminded them of these categories and what healthier foods look like and why.

Overall, most studies indicate some level of effectiveness of nutrition education in classrooms and their potential to reduce high rates of childhood obesity and promote healthy behaviors. According to a systematic review done by Dunley, Cotton, and Peralta, 11 studies reported on outcomes of food consumption and the overall energy intake of school-aged children. “Curriculum-based approaches were the most popular (seven studies) and reported achieving statistical significance of p < .05 or better across nine studies reducing food consumption or energy intake outcomes.” Fruit and vegetable intake was also reported in these studies. Curriculum-based approaches were once again the most popular. More than half of curriculum-based approaches discovered statistically significant (p < .05) improvements in fruit and vegetable consumption. Some studies that used curriculum-based approaches, also supplemented their interventions with secondary approaches. For example, they coupled it with
experiential-learning or parental-involvement, which is why at this stage, it is difficult to
determine which curriculum-based approach is more effective in improving dietary intake. “Of
the 30 effect sizes that were calculated by the researchers, 33% had a medium to large effect and
further 23% had a small effect size.”18 More program evaluation efforts are needed to build a
strong evidence base for the effectiveness of nutrition education in schools. Evaluating programs
that have been introduced and delivered in schools for a long period of time helps to determine
their effectiveness; these results may help in the improvement of nutrition and health promotion
interventions.

Purpose of the Study

The purpose of this study was to evaluate the effectiveness of the Coordinated Approach
to Child Health program delivered by Northern Illinois University students and dietetic interns.
This study evaluated the effectiveness of the CATCH program in improving nutrition knowledge
and healthy food choices for third through fifth graders who participated in the program using
two surveys titled “The CATCH Healthy Choices Survey” and “The CATCH Nutritional
Knowledge Survey”19 at baseline and at the end of the program. It was hypothesized that
implementation of the program curriculum by university students and dietetic interns will
significantly increase students’ growth in nutrition knowledge and healthy food choices.
Objectives

1. Determine if the CATCH program improves nutrition knowledge of children after participation in six sessions of the program in one academic year.

2. Determine if the CATCH program promotes healthy food choices after participation in six sessions of the program in one academic year.

3. Determine if there are any grade level (3rd through 5th) differences between CATCH participants for improvement in nutrition knowledge and adoption of healthy food choices after participation in six sessions of the program in one academic year.

Questions:

1. Will there be a significant improvement in nutrition knowledge from pre to post assessment in third through fifth graders after participation in six sessions of CATCH program from September 2019 – April 2020?

2. Will there be a significant improvement in healthy food choices from pre to post assessment in third through fifth graders after participation in six sessions of CATCH program from September 2019 – April 2020?

3. Will there be a grade level difference (3rd through 5th) between CATCH participants for improvement in nutrition knowledge and adoption of healthy food choices after participation in six sessions of the CATCH program from September 2019 – April 2020?
Hypothesis:

1. Children in grades 3rd, 4th, and 5th, will increase their knowledge about nutrient-dense foods after participating in six sessions of the CATCH program.

2. Children in grades 3rd, 4th, and 5th, will be able to make healthier food choices after participating in the six sessions of the CATCH program.

3. There will be a grade level (3rd through 5th) difference between CATCH participants for improvement in nutrition knowledge and adoption of healthy food choices after participating in the six sessions of the CATCH program, such that higher grades will show more positive changes.
CHAPTER TWO

LITERATURE REVIEW

Child Nutrition

Schools can play an important role in the education and promotion of healthy eating among children.\(^{18}\) There have been numerous health promotion programs focusing on improving children’s eating and exercise habits, however, childhood obesity continues to prevail at astronomical rates. Educating children on the consumption of healthy foods such as fruits, vegetables, whole grains, and low fat dairy options is needed across all school levels. According to the President’s Council on Sports, Fitness & Nutrition\(^{20}\), children must learn the value of a well-balanced diet and how vital it is to the overall good health. Effective nutrition education and health promotion programs focus on making healthy food choices and teaching about various nutrients and what function they serve in our bodies. Children need to understand the basics of a well-balanced meal and adopt healthy eating to thrive as adults.

According to the Centers for Disease Control and Prevention, only 1 in 10 adults meet their daily fruit and vegetable recommendations.\(^{21}\) The recommended fruit and vegetable intake for adults is at least 2 cups per day of fruits and 2 to 3 cups of vegetables per day.\(^{21}\) According to the latest Vital Signs report by the Centers for Disease Control and Prevention, children aged 2-
18 years old increased the amount of whole fruit consumed each day by 67 percent from 2003 to 2010, but is still low.\(^5\) While this is significant progress, children still fail to meet recommendations for both fruit and vegetable intake per day. “Sixty percent of children did not eat enough fruit to meet daily recommendations in 2007-2010, and 93 percent of children didn’t eat enough vegetables.”\(^2\) The recommended amount of fruits and vegetables for children is similar to that of an adult, about 2 servings of fruits and about 3 servings of vegetables each day.\(^2\) The recommended amount of grains for this age group is about 4-6 ounces, and half of those must come from whole grains.\(^2\) Dairy recommendations are anywhere between 2-3 cups of low-fat or fat-free milk/dairy products.\(^2\) Eating a diet that is rich in fruits and vegetables daily, can better help to reduce the risk of many leading causes of illnesses such as heart disease, type 2 diabetes, some cancers, and obesity. It is vital for children, who are growing individuals, to get the best nutrition during their pre-school and elementary years so they can perform to the best of their ability. Another reason why children should consume more fruits and vegetables is because it significantly reduces their risk of developing non-communicable diseases such as cardiovascular diseases, certain cancers, diabetes, and obesity.\(^3\)

Although low fruit and vegetable consumption is seen in all income groups as well as adults, children especially in the low-income group have been shown to have a significantly low daily fruit and vegetable consumption rate. There is a greater concern of childhood obesity for specific subgroups of the US pediatric population as compared to others. According to previous research, 25.8 percent of Hispanics are obese, 22 percent of non-Hispanic black are obese, 14 percent of non-Hispanic whites are obese, and 11 percent of non-Hispanic Asians are obese.\(^2\) Certain groups in the US are affected more than others, particularly because of their SES status. Families with low SES face many dietary barriers because they have limited resources to offer
healthy foods to the members in their household. A large number of children in low-income households do not consume the recommended amounts of fruits and vegetables.\textsuperscript{24} A major barrier parents face is their minimal knowledge regarding a healthy diet. One review stated that higher-quality diets are associated with wealthier populations, and energy-dense diets that are lower in nutrients are seen in lower socioeconomic populations.\textsuperscript{24} Furthermore, foods such as “whole grains, lean meats, fish, low-fat dairy-products, and fresh vegetables and fruit are more likely to be consumed by groups of higher SES.”\textsuperscript{24} In contrast, the consumption of refined grains and added fats has been associated with lower SES.\textsuperscript{24}

School Based Health Promotion Programs

Planet Health is a curriculum for public middle schools designed to improve cardiovascular health and lower the prevalence of obesity among this population.\textsuperscript{25} This program incorporates several theories of health behavior and learning, including the social cognitive theory, which recognizes that behavior is influenced by social, environmental, and personal attributes.\textsuperscript{26} Classroom teachers lead lessons that are aimed to fit into already existing classes such as language, math, science, social studies, and PE classes. A strong component of this program is promoting the importance of decreasing television viewing, which has been shown to contribute to obesity by promoting sedentary behavior.\textsuperscript{25} Ready-to-use lesson plans are utilized to promote healthy nutrition and activity through classroom and physical education activities. Additionally, materials and instructions are provided to implement Power Down, a two-week campaign to reduce television viewing and FitCheck, a self-assessment tool to help students track and improve their activity levels.\textsuperscript{27} Planet Health, a 21-month randomized controlled study
from 1995 to 1997 was funded by the National Institute of Child Health and Human Development in 10 public middle schools. This study was successful in that it resulted in a reduction in television watching for both boys and girls, a significant decrease in prevalence of obesity in the girls, an increase in fruit and vegetable consumption in girls, and a significant decrease in daily calories consumed by girls. Following the success of this program, other schools like Boston Public Schools expressed interest in Planet Health.

A West Virginia based program, Not-On-Tobacco (N-O-T), aims to strengthen school-based tobacco control initiatives. This is an effective, user-friendly teenage smoking cessation program that could be adopted statewide. Teachers, students, and school health professionals led this project with the help of the American Lung Association (ALA) and CDC (Centers for Disease Control and Prevention). The effectiveness of the program was evaluated with the help of the ALA experts and researchers. This curriculum focused on providing a smoking cessation program that could improve adolescent health, fulfill the needs of students who want to quit smoking, reduce school tobacco policy violations, and provide an educational alternative to those who violate these school tobacco policies. Also, increasing healthy lifestyle behaviors such as physical activity and healthy eating, and improving stress management, decision making, coping ability, and social support skills were further intentions of this project. More than 6000 youths in 489 schools, after a 3 month use of this program, showed that participants were twice as likely to have quit smoking than adolescents in conventional smoking cessation programs. N-O-T trainings have now been delivered in 47 states, Europe, and Canada. Involvement of multiple stakeholders, such as schoolteachers, students, and ALA may create a stronger team that could result in higher program success.
Murimi, Moyeda-Carabaza, Nguyen, et al, reviewed 41 published articles and identified factors associated with successful nutrition education interventions delivered to children.\(^9\) This review accounted for the large age range (2-19 years) and cognitive development of children; categories included preschool, elementary, and secondary school children. Experiential activities such as gaming, gardening, and cooking demonstrations were some of the key factors associated with successful nutrition education interventions.\(^9\) Also, interventions that involved parents through face-to-face interaction and delivered extensive training for external experts and teachers to enhance fidelity were more likely to achieve their objectives.\(^9\) Age-appropriate interventions delivered over at least a six month period have been shown to change behavior in all age groups of school children.\(^9\) Adequate duration (at least six months) and trained implementers is critical for elementary school children, while the use of technology is a significant component for secondary school children.

Social Cognitive Theory Based Programs

The Social Cognitive Theory (SCT) is a widely used model for developing elementary nutrition education programs; however, few instruments are available to assess the impact of such programs on the main constructs of the SCT.\(^28\) Hall, Chai, Koszewski, and Albrecht (2015), developed and validated a 40-item instrument using content validity and tested among 98 fifth grade students for internal consistency reliability.\(^28\) Survey instruments on nutrition and physical activity exist, however they primarily measure knowledge and behavior, and only a few evaluate self-efficacy. Self-efficacy is a significant component of the SCT. Knowledge, behavior, and self-efficacy relationships were assessed using Pearson Correlation Coefficients. Self-efficacy
and behaviors scores were positively correlated ($r=0.40, p=0.0001$), however, knowledge scores were not associated with self-efficacy ($r=0.02, p=0.88$) or behavior scores ($r=0.14, p=0.23$). This evaluation tool is a reliable instrument to assess SCT-based elementary nutrition education programs, especially for self-efficacy and behavior.

The Healthy Highway program was evaluated on its effectiveness on healthy eating literacy and healthy food choice among primary school children. Healthy Highway is a metaphorical application of the ‘safety rules of the road’ which translate to ‘healthy eating rules of daily life’. This concept has helped schools use creative activities in classrooms and gymnasiums. Physical education teachers and school nurses are trained to implement Healthy Highway in the classroom and gymnasium settings. Social cognitive theory and the health belief model are used within the healthy eating promotion strategies. Jung, Huang, Eagan, and Oldenburg (2019), conducted a pretest-posttest evaluation, using two treatment groups and one control group targeting two elementary schools of Oswego County. Two survey questionnaires were developed for pre- and post-assessments for two different age groups (kindergarten to 2nd graders and 3rd to 6th graders) and another survey questionnaire was made for the 2nd stage survey, the food detective assessment. A stop light system was used when asked which foods are healthy versus unhealthy. Third through fifth graders made improvements in their food literacy, particularly in their responses on frozen yogurt, broccoli, bacon, banana, and green beans. Behavioral changes were measured using the food detective survey, assessing students’ knowledge level when differentiating between healthy and unhealthy foods. A higher percentage of students in the control group selected chocolate milk (72.2%) compared to the treatment group combined (59.9%), which was statistically significant ($\chi^2 = 30.35, p<.05$); chocolate milk was categorized as a ‘red’ food in the treatment group.
A quasi-experimental design study, the Healthy Kids and Families, compared the lifestyle intervention vs. an attention-control comparison condition.\textsuperscript{30} SCT and social ecological principals were utilized in the lifestyle intervention focusing on child’s social and physical home environment by intervening with parental weight-related knowledge, beliefs, and skills for managing child obesogenic behaviors.\textsuperscript{30} Additionally, this intervention included families’ needs for community resources that supported a healthy lifestyle. The aim of this study was to test the effectiveness of Healthy Kids and Families led by a parent-focused community health worker (CHW)-delivered lifestyle intervention to prevent childhood obesity among low-income and minority families.\textsuperscript{30} This two-year long study consisted of parent child dyads from four schools, intervention group, and five schools were assigned to the attention-control group. Consistent with SCT, the intervention encouraged parents to set realistic goals for behavior change of the entire family involving modifications to the food and activity environment in the home; encouraged problem-solving of strategies to attain the set goals, and reminded parents that they can be positive role models for their children.\textsuperscript{30} Behavioral targets comprised of diet goals such as healthy low-calorie snacks, reduction of fast food, and reduction of sugar sweetened beverages. Activity goals were set for at least 60 min/day and screen time to less than 2 h/day. A trained CHW established and maintained contact with parents through two yearly one-hour in-person sessions; plus, parents received monthly newsletters, Facebook messages, and mailed invitations to community events, all of which are unique in an intervention.
Despite research showing that schools can make a positive impact on children’s nutritional outcomes, it is also reported that schools and teaching staff note barriers that restrict nutritional education programming and delivery. Since nutrition education content is not included on standardized tests, it’s often seen as unnecessary. Elementary school teaching staff do not have access to appropriate resources and may not have the expertise, motivation or capacity to deliver evidence-based nutrition education. Providing professional learning for teachers is time consuming and often requires financial investment that may not align with the school’s professional learning goals. Schools and teachers have sought community organizations that comprise of nutrition education experts in order to deliver such programs in elementary schools. An updated systematic review and meta-analysis emphasizes the importance and effect of nutrition education programs on children’s energy intake, fruit, vegetable and sugar consumption and nutritional knowledge. Findings from this review suggest that nutrition education programs in elementary schools that are delivered by teachers can have modest effects on a child’s nutritional knowledge and eating behaviors. Interestingly, elementary school teachers and nutritional education programs can have a small to medium effect on reducing children’s energy intake, and an even smaller effect on increasing fruit and vegetable consumption. Lastly, the smallest effect was shown on reducing children’s sugar consumption, with teachers and nutritional education programs. Teachers can make an important contribution to the knowledge and dietary habits of children, as discovered in this systematic review and meta-analysis; subsequently, parents and caregivers also play a vital role in children’s knowledge and dietary habits.
Online vs. Face-to-Face Approach

The use of technology as a means to delivering online nutrition education has increased. Digital Education to Limit Salt in the Home (DELISH) program focused on improving knowledge, self-efficacy, and behaviors in 83 children (mean age, 9.2 years) in a 5-week period. This unique study conducted a SCT based intervention via weekly online interactive education sessions. Weekly sessions were designed to take about 20 minutes to complete. Comic strips were used at the beginning of each session, detective cases that focused on key intervention behavioral messages were assigned to each child, and the overall program was intended to be fun with added video content and sound effects. 35% to 76% of children viewed weekly education session; children with complete survey data (n=75) had improved scores for salt-related knowledge (+3.6±0.4 points; P<.001; CD: 1.16), behaviors (+1.3±0.1 points; P<.001; CD: 1.08), and self-efficacy (+0.9±0.2 points; P<.001; CD: 0.64), but not attitude. Based on the results from this study, it appears that the interactive online sessions, linked to behavioral theory, were engaging for targeted school grades, 2-4. Although parental outcomes were not the focus of this study, the online intervention did include parental resources such as online newsletters or short message service texts throughout the intervention.

Coultrhard and Sealy’s (2017) work described how children are able to see, handle, and smell foods, which can help develop non-taste sensory familiarization and later increase children’s fruit and vegetable intake. Sixty-two children (27 boys and 35 girls) participated in this study who were mostly White-British, with one child who was of Chinese origin. The experiment consisted of three groups, children who were playing with fruits and vegetables, a non-food play control group, and a visual exposure control group. Children in the sensory fruit
and vegetable play group ended up trying a lot more fruits and vegetables after participation in the program compared to those in the other two groups. These results suggest that food exposure increases children’s willingness to try unfamiliar foods after interacting with foods during playtime.\textsuperscript{34}

A safety education program designed for elementary school children was evaluated on the effectiveness after presenting it in three modes, a lecture, a demonstration, and a film.\textsuperscript{35} Knowledge, attitude, and behavior intentions were assessed about airline cabin safety before and after children took a safety education course. Four elementary schools (5th and 6th graders) participated as well as students and teachers volunteered in the program. Three hundred seventeen (71\%) participants said that safety information delivered and explained by the instructor was more understandable than the safety information in the film (29\%).\textsuperscript{35} A 10 Likert scale (1-5) items was used to assess children’s knowledge of and attitudes about cabin safety; children made progress in their awareness of cabin safety knowledge because of the instructor’s specific explanations\textsuperscript{35} of the “what’s and “why’s,” which Schrader and Lawless (2004)\textsuperscript{36} said knowledge should include. The instructor led safety course was reported to be more understandable than the film because there was direct interaction between the students and the instructor.\textsuperscript{35} Including a live human seems to be an essential and effective component with elementary school students.\textsuperscript{35}

Osborne and Forestell (2012), hypothesized that exposure to a variety of foods would increase children’s consumption of the test foods.\textsuperscript{37} Fifty mothers and their sixty-four four to eight-year-old children participated. This paired experiment lasted 10 days with pre-posttest. Groups received books and/or food during an 8-day home exposure period.\textsuperscript{37} There were a total of four groups – Group F (food exposure only), Group B (book exposure only), Group F-B (food
and book exposure), and Group C (the control group which received neither book nor food exposure). On day one (pre-test), children were presented with six foods that are commonly consumed uncooked in their natural form. On day 10 (post-test), children were again presented with the original six foods. Additionally, they were presented with two new fruits and two new vegetables. Children were offered one fruit or vegetable per day. Each mother who received books (Groups B and F-B) was asked to read one to their child each day in alternation over the eight-day home exposure period. All mothers in Groups F and B were asked to keep a log of the time spent reading to their children each day. Children who received books (Groups F-B and B) showed an overall increase in fruit consumption (p<0.03). Similarly, those who were exposed to foods (Groups F-B and F) increased their fruit consumption (p<0.06). There were no between group differences in consumption among the time spent reading to children (Group B and Group F-B) as well as for those who took home food (Groups F-B and F). Likewise, while children tried a greater number of fruits than vegetables during the home exposure, the groups did not differ in the number of fruits and vegetables tried (p>0.05). Exposure to foods and food information increased children’s acceptance of commonly consumed or novel fruit, than those who were not exposed.

CATCH Program

Hoelscher et al. (2012) examined regional changes in the prevalence of obesity after statewide policies and programs among children in grade 4, 8, and 11 in Texas. This cross-sectional, probability-based sample of 23,190 students found that reduction of child obesity levels observed in the El Paso area is one of the few examples of effective programs and policies
based on a population-wide survey. The program most relevant to the observed reduction in obesity observed in 4th grade students was a health initiative funded by the Paso del Norte Health Foundation, that began the implantation of the CATCH program. Additionally, this program also included community-level programs for nutrition and physical activity, as well as radio and television advertisements.

Hoelscher et al (2010), compared the impact of two intervention approaches while focusing on the prevalence of child overweight and obesity. The researchers examined the CATCH BasicPlus (BP) program and the CATCH BasicPlus and Community program (BPC). Classroom teachers delivered the curriculum to both programs. The CATCH BP program provided training, materials, and facilitator support to schools, whereas the CATCH BP and Community BPC program received additional promotion of community partnerships. The study showed that the CATCH BPC program was more effective than the CATCH BP program in reducing the prevalence of child overweight in school children.

Another study applied the CATCH program to low-income elementary schools. The population sample consisted of four El Paso CATCH and four control elementary schools in Texas; a total of 896 third graders participated in this study. The intervention consisted of delivering the community-based program of CATCH, including CATCH PE, Eat Smart, classroom curriculum, and Home Team components. The study methods included a pre-posttest, matched control group, quasi-experimental design. Researchers noted that the most noticeable difference from the national CATCH implementation was that schools were allowed to implement each component of El Paso CATCH in a way that suited the school environment. For example, some schools did not use the classroom curriculum for anything but a general reference and had classroom teachers participate in school-wide CATCH events each year.
instead. Overall results indicate that girls in control schools had significant increases in percentage of risk of overweight or overweight from third to fifth grades, as did girls in El Paso CATCH schools, however, the rate of increase for girls in EL Paso CATCH schools was only 2% compared with 13% in control girls. A similar pattern was seen for boys, 1% compared with 9% for control boys, respectively. Community organizing and evaluation feedback should be underlined when implementing evidence-based school health programs in low-income Hispanic communities.

The CATCH program is an elementary school program that focuses on supporting positive environmental influences in order to increase physical activity and improve healthy eating. This particular program involves both classroom and physical education teachers, school food service workers, and students’ families. It aims to change behaviors of elementary school children both in and out of school. Classroom teachers use an age-appropriate curriculum to teach about physical activity and healthy eating. A 3 year follow-up study conducted between 1995 and 1998 assessed diet, physical activity, and related health indicators among 3714 (73%) of the initial CATCH participants and learned that CATCH participants maintained a lower total fat and saturated fat diet, compared to those children not receiving this program. These results suggest how CATCH positively influences children who receive this program. A major lesson from this program is the strong team involvement of teachers, food service workers, staff, and parents, who all worked together in order to ensure program acceptability.

Another program, The Smart Nutrition and Conditioning for Kids (SNACK) Program, also described as an approach to increasing nutrition knowledge of second-grade students, was designed to teach young children how to choose healthy foods. This program comprised of presenting nutrition lessons to students in an urban elementary school during regularly scheduled
physical education class twice a week for 8 weeks. These nutrition lessons were designed to be fun and interactive for students. This program was evaluated by using two surveys titled The CATCH Healthy Choices survey and The CATCH Nutritional Knowledge survey at pre and post intervention. Students who received the nutrition lessons scored higher on their Healthy Choices survey, but not the Nutrition Knowledge survey, thus indicating the program was only partially successful.

The CATCH program in Northern Illinois stands out because mostly NIU dietetic interns and student volunteers deliver the sessions, and not classroom teachers as commonly seen in previous studies. Literature suggests that a stronger team effort could result in higher program success by involving multiple stakeholders, like school teachers and students. CATCH in Northern Illinois involves community leaders, NIU professors, dietetic interns, and student volunteers from health majors in delivering the program. Furthermore, the community leaders and NIU provide all necessary support such as training, materials, and facilitator support for delivering the program in schools. Prior to delivery of lessons, dietetic interns and student volunteers must go through a training presented by a CATCH leader. A training session lasts approximately one hour and provides information of lessons, examples, and tips on how to deliver a successful lesson to all grade levels involved.

The CATCH program is delivered in a classroom setting, which has shown to improve students’ attention span and retention of the curriculum. This study differed from the previously discussed studies because the dietetic interns did not provide real whole foods to taste or touch, but rather plastic foods that the children could play with. This was still a great opportunity for kids to get hands-on experience playing with foods, which is the key component of some lessons in the CATCH program. Also, during the intervention phase of this study, students were able to
color pictures of foods they saw during a given activity. These activities were hypothesized to aid in remembering which foods are healthier to consume than others, as well as understanding the concepts from lessons presented to them.
CHAPTER 3

METHODS

Research Design

This is a non-experimental program evaluation study using a convenience, purposive sample of children, in grades third through fifth, in five elementary schools (North, North Grove, SouthEast, Genoa, and South Prairie) in Northern Illinois. Due to the Covid-19 pandemic, Genoa, North, and South Prairie elementary schools were the only schools that participated in the posttest, which ultimately impacted the total number of participants in the study. Northern Illinois University (NIU) student volunteers (all majors) and dietetic interns delivered the CATCH program to three grade levels (3rd, 4th, and 5th grades) from September 2019 to May 2020. Prior to the delivery of the program, children who were able to participate in this study completed a survey, including questions from the CATCH Nutrition Knowledge and the CATCH Healthy Choices surveys. The same survey was used with the participating children at the end of the last session of CATCH program via an online platform due to Covid-19 pandemic restrictions. Institutional Review Board (IRB) approval was obtained from the IRB of Northern Illinois University prior to data collection, entry and analysis.
Study Population

The study population for the pretests was roughly 800 students from five elementary schools who participated in Sycamore and Genoa County, shown in Table 1; however, due to Covid-19 there were limited responses for the posttests. The final sample size was 167 participants from three out of the five schools, shown in Table 2. For pretests, North Grove Elementary School included three classrooms from each grade level. South Prairie Elementary School included two third grade classrooms and one fourth and fifth grade level classroom. North Elementary School included two classrooms from each grade level. Genoa Elementary School included four classrooms from each grade level. For posttests, South Prairie Elementary School included two third grade classrooms, one fourth grade classroom, and two fifth grade classrooms. North Elementary School included one third grade classroom. Genoa Elementary School included two third grade classrooms and four classrooms for both, fourth and fifth grade levels. There were about 25-30 children in each classroom. The inclusion criteria for the study participants was that they are in one of the classrooms that received the CATCH program from the NIU students and dietetic interns. Exclusion criteria included students who were not in one of the initial classrooms chosen for the study or if the student did not receive permission from their parent or caregiver to complete pre and post surveys.
Table 1. Pre-Test Sample Population

<table>
<thead>
<tr>
<th>Grade</th>
<th>Age</th>
<th>Classrooms</th>
<th># of Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd</td>
<td>8-9</td>
<td>2</td>
<td>32</td>
</tr>
<tr>
<td>4th</td>
<td>9-10</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>5th</td>
<td>10-11</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td>South Prairie Elementary School</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd</td>
<td>8-9</td>
<td>2</td>
<td>57</td>
</tr>
<tr>
<td>4th</td>
<td>9-10</td>
<td>2</td>
<td>49</td>
</tr>
<tr>
<td>5th</td>
<td>10-11</td>
<td>2</td>
<td>56</td>
</tr>
<tr>
<td>North Elementary School</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd</td>
<td>8-9</td>
<td>4</td>
<td>119</td>
</tr>
<tr>
<td>4th</td>
<td>9-10</td>
<td>4</td>
<td>104</td>
</tr>
<tr>
<td>5th</td>
<td>10-11</td>
<td>4</td>
<td>114</td>
</tr>
<tr>
<td>Genoa Elementary School</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3rd</td>
<td>8-9</td>
<td>3</td>
<td>75</td>
</tr>
<tr>
<td>4th</td>
<td>9-10</td>
<td>3</td>
<td>81</td>
</tr>
<tr>
<td>5th</td>
<td>10-11</td>
<td>3</td>
<td>84</td>
</tr>
<tr>
<td>North Grove Elementary School</td>
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<td>3rd</td>
<td>8-9</td>
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</tr>
<tr>
<td>4th</td>
<td>9-10</td>
<td>3</td>
<td>74</td>
</tr>
<tr>
<td>5th</td>
<td>10-11</td>
<td>2</td>
<td>60</td>
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<tr>
<td>Southeast Elementary School</td>
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</table>
Table 2. Post-Test Sample Population

<table>
<thead>
<tr>
<th>School</th>
<th>Grade</th>
<th>Age</th>
<th>Classroom(s)</th>
<th># of Students</th>
</tr>
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<tr>
<td>South Prairie Elementary School</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>8-9</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
<td>9-10</td>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>5&lt;sup&gt;th&lt;/sup&gt;</td>
<td>10-11</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>North Elementary School</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>8-9</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Genoa Elementary School</td>
<td>3&lt;sup&gt;rd&lt;/sup&gt;</td>
<td>8-9</td>
<td>2</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>4&lt;sup&gt;th&lt;/sup&gt;</td>
<td>9-10</td>
<td>4</td>
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</tr>
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<td></td>
<td>5&lt;sup&gt;th&lt;/sup&gt;</td>
<td>10-11</td>
<td>4</td>
<td>76</td>
</tr>
</tbody>
</table>
Procedure

Once the researcher received permission from the principal for conducting this study in their schools (Appendix B), consent and assent forms (Appendix C) where placed in each child’s take-home folders for their parents or caregivers to read and sign if they choose to be a part of the study. Pre-surveys were administered at the beginning of the first lesson and took approximately 15 minutes for all the students to complete. The first three intervention sessions took about 20-30 minutes per session in the classroom and the last three intervention sessions took about 20-30 minutes per session. Third, fourth, and fifth grade lessons are outlined in Tables 3, 4, and 5. All lessons were based on Illinois Learning Standards, outlined in Appendix D (3rd Grade), Appendix E (4th Grade), Appendix F (5th Grade). Teachers were not involved in the delivery of the program lessons. We did not incorporate the school lunch program in the CATCH delivery in Northern Illinois. Due to Covid-19 pandemic, the researcher and one NIU student volunteer created CATCH videos for lessons 4, 5 and 6 based on the already created curriculum for students to watch at home. After the delivery of the CATCH program at the end of the academic year (6 total lessons), the researcher then administered post-surveys using a web-based platform, Qualtrics, to be completed by all students who participated in the initial surveys. All participants received approximately one month to complete their posttests. The average time students took completing posttests in unknown.
<table>
<thead>
<tr>
<th>Lesson #</th>
<th>Lesson Title</th>
<th>Purpose</th>
<th>Objectives</th>
</tr>
</thead>
</table>
| 1       | Heart Health                 | To review the body’s circulatory system and the important effects that healthy eating and exercise have on the heart. | 1. Review the basic function of the circulatory system.  
2. Identify healthy eating and exercise as behaviors that promote heart health.  
3. Identify specific foods that are good for your heart.  
4. Illustrate their own message of healthy eating and exercise. |
| 2       | Heart Smart                  | To identify activities that are healthy and unhealthy for your heart.  | 1. Learn the size and functions of the heart.  
2. Identify the different activities that are good and bad for your heart. |
| 3       | The ‘Whole’ Truth            | To distinguish between whole grains and processed foods.               | 1. Discuss the parts of a grain.  
2. Distinguish between GO, SLOW, and WHOA foods in the grain group.  
3. Determine whether foods are made with whole grains based on information on the Nutrition Facts food label. |
| 4       | Sometimes Sweet             | To identify the types of added sugars in food and beverages.           | 1. Identify the different types of added sugars in food and beverages.  
2. Understand reasons that added sugars should be consumed in moderation.  
3. Determine whether beverages are GO or WHOA based on information on the Nutrition Facts food label.  
4. Modify a meal to reduce the amount of added sugar. |
| 5       | Yoga Kids                   | To discuss the importance of all types of activities.                 | 1. Discuss the importance of all types of activities.  
2. Understand the importance of breathing and stretching our bodies  
3. Participate in yoga poses. |
| 6       | Go Foods Fill Us Up!        | To raise awareness of how eating lower-calorie, nutrient-dense foods can increase satiety more as compared with eating calorie-dense foods. | 1. Identify GO, SLOW, and WHOA foods on the MyPlate  
2. Understand that by eating GO foods lower in calories and greater in volume will make them feel full longer. |
<table>
<thead>
<tr>
<th>Lesson #</th>
<th>Lesson Title</th>
<th>Purpose</th>
<th>Objectives</th>
</tr>
</thead>
</table>
| 1        | Ready, Set, GO For Health!   | To review the importance of physical activity and healthy eating        | 1. Review the importance of physical activity and healthy eating.  
2. Interview other students on healthy behaviors                                                                                                           |
| 2        | Energy Balance               | To review the importance of achieving energy balance – balancing the amount of food and drinks they consume (energy in) to provide the right amount of fuel their bodies need for healthy growth, everyday living, and physical activity (energy out). | 1. Be introduced to the concept of Energy Balance.  
2. Generate ideas about where energy comes from and how it is used.  
3. Identify ways that Energy Balance can contribute to an active, healthy lifestyle.  
4. Understand five ways to help achieve energy balance.                                                                                                     |
| 3        | GO! For Energy Balance       | To recognize the importance of choosing GO foods to keep their body in energy balance. | 1. Review the concept of Energy Balance.  
2. Recognize that choosing GO foods helps keep them in energy balance.  
3. Play a game that illustrates the concept of energy balance.                                                                                             |
| 4        | SNACK-vertising GO Foods     | To identify the types of added sugars in food and beverages.            | 1. Identify ad techniques for WHOA foods  
2. Create and present an ad for a GO food                                                                                                                      |
| 5        | Less Mindless Eating         | To identify mindless eating and ways to reduce their own mindless eating. | 1. Understand the negative effects of mindless eating.  
2. Read scenarios about mindless eating a problem solve.  
3. Identify scenarios of mindless eating.                                                                                                                   |
| 6        | Food Fat Facts               | To distinguish between healthy and unhealthy fats.                     | 1. Distinguish between healthy and unhealthy fats.  
2. Modify meals so that they contain fewer unhealthy fats.                                                                                                     |
<table>
<thead>
<tr>
<th>Lesson #</th>
<th>Lesson Title</th>
<th>Purpose</th>
<th>Objectives</th>
</tr>
</thead>
</table>
| 1       | Breaking Through Barriers             | To practice making healthy choices by applying four options they can use to overcome barriers to doing GO activities and eating GO foods. | 1. Identify barriers to eating GO foods and doing GO activities.  
2. Practice making healthy choices by applying four GO for Healthy Options  
3. Analyze a problem that prevents kids their age from eating GO foods or doing GO activities and apply the GO for Healthy Options by providing advice to these people. |
| 2       | MyPlate                               | To review MyPlate and apply it to cafeteria menu.                      | 1. Review the MyPlate food groups through a game show format.  
2. Learn about vegetable subgroups (dark-green, starchy, red and orange, beans and peas)  
3. Apply MyPlate to a week of cafeteria menus. |
| 3       | Going for FIT                        | To recognize that physical activities should be done frequently, with intensity, and for 60 minutes a day. | 1. Review the importance of physical activity.  
2. Recognize that physical activity should be done frequently, with intensity, and for 60 minutes a day.  
3. Measure and calculate pulse.  
4. Compare pulse with the level of intensity of physical activity. |
| 4       | Portion Distortion                    | To recognize portion sizes and apply the MyPlate guidelines.           | 1. See the difference in what they think a portion size is and what it actually should be.  
2. Learn what “eating in moderation” means.  
3. Estimate portions and apply the MyPlate guidelines to their eating habits. |
| 5       | Be Your Best You!                     | To explore the concept of the media’s impact on our healthy body images. | 1. Define body image and explore how the media impacts this.  
2. State that beauty is an opinion and changeable and should not be dictated by magazines and popular opinion.  
3. Develop an ad campaign for Be Your Best You! |
| 6       | Plan of Action                        | To develop a plan of action to incorporate physical activity into a healthy lifestyle. | 1. Complete program evaluation.  
2. Review what was learned in CATCH  
3. Develop a plan of action for physical activity and healthy eating. |
Recruitment and Consent

Before recruiting, researchers obtained permission from the Sycamore and Genoa school districts with Andrea Hein’s help. Andrea is one of the leaders for CATCH, and she assisted with acquiring approval from the school district superintendents. Next, IRB application was submitted for review. Once IRB approval was obtained (Appendix A), contact was established with each principal to seek help on how to best deliver parental consent and child assent forms in their school. Recruitment took place in the third, fourth, and fifth grade classrooms, only in those schools that permitted data collection.

Data Collection and Description of Instruments

The questionnaire used (Appendix G) for this study included questions from two validated surveys from the CATCH program curriculum (CATCH Global Foundation). These surveys are titled, “The CATCH Healthy Choices Survey” and “The CATCH Nutritional Knowledge Survey.” The pre-posttest consisted of items measuring healthy choices, nutritional knowledge, and children’s perception of the program. Example questions include, “Which is a healthier choice? Apple Sauce or Fresh Apple?” a question testing nutritional knowledge like, “Which food is a GO food? Hot Dog or Orange?” and a question about children’s perception of the program like, “I enjoyed the CATCH program, Yes or No?” I did not address any SCT based variables.
Data Analyses

The research questions were addressed using a paired-sample t-test and One-Way ANOVA. For all the inferential analysis the alpha level was set to .05. Table 6 provides the analysis techniques used for the different research questions. A paired sample t-test was used to determine if there was any significant increase in nutrition knowledge and healthy choices from pre- to post-assessment. A One-Way ANOVA test was used to determine if there was a grade level difference between CATCH participants for improvement in nutrition knowledge and adoptions of healthy food choices. Descriptive statistics were used to report students’ age, grade level, gender, and race/ethnicity. Statistical Package for the Social Sciences (SPSS) version 26 was used for data analysis.
Table 6. Analysis Techniques Used for Hypotheses

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Variables</th>
<th>Statistics</th>
<th>Survey Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Children in grades 3rd, 4th, and 5th, will increase their knowledge</td>
<td>Independent Variable (IV): Exposure to Dietetic Interns’ nutrition</td>
<td>1. Paired Sample</td>
<td>Items 1-14</td>
</tr>
<tr>
<td>about nutrient dense foods after participating in six sessions of the</td>
<td>education lessons.</td>
<td>T-Test</td>
<td></td>
</tr>
<tr>
<td>CATCH program.</td>
<td>Dependent Variable (DV): Children’s ability to recall nutrient dense</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>foods.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Children in grades 3rd, 4th, and 5th, will be able to make healthier</td>
<td>Independent Variable (IV): Exposure to Dietetic Interns’ nutrition</td>
<td>2. Paired Sample</td>
<td>Items 15-34</td>
</tr>
<tr>
<td>food choices after participating in the six sessions of the CATCH</td>
<td>education lessons.</td>
<td>T-Test</td>
<td></td>
</tr>
<tr>
<td>program.</td>
<td>Dependent Variable (DV): Children’s ability to make healthier food</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>choices.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. There will be a grade level (3rd through 5th) difference between</td>
<td>Independent Variable (IV): Grade Levels</td>
<td>3. One-Way ANOVA</td>
<td>Items 34-40</td>
</tr>
<tr>
<td>CATCH participants for improvement in nutrition knowledge and adoption</td>
<td>Dependent Variables (DV): Scores on nutrition knowledge and ability to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>of healthy food choices after participating in six sessions of the program</td>
<td>make healthier choices.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>per academic year.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Children’s participation did not involve any significant risks. They may have felt emotional discomfort as a result of talking about fruits and vegetables they dislike or through the participation in the intervention component of the study. Each participant was monitored for safety purposes. Every child was assigned an ID number on the pre/posttest questionnaires to ensure confidentiality. Children’s participation in this study was voluntary and they had the option to stop participating at any time. All participants were informed that their classroom teachers wouldn’t see their scores on the surveys and their school grades would not be affected by their answers. All data, the pre/posttests as well as the parental consent forms are stored in a locked filing cabinet accessible only to the researchers. Data will be destroyed five years after the end of the research study to ensure confidentiality.

Expected Findings

My expectation when I started working on this study included the following. I expected to find a significant positive effect in students’ nutrition knowledge and healthy food choices after participation in the CATCH program that was delivered by the dietetic interns. As the year progressed, I expected to see an increase in children’s knowledge on nutrient dense foods in grades three to five, as well as being able to confidently recall healthier options. I expected to see a grade level (3rd through 5th) difference between CATCH participants in improvement in nutrition knowledge and adoption of healthy food choices after participating in six sessions of
the program after one academic year. I expected to discover these findings by following a research timeline outlined in Table 7.

Table 7. Research Timeline

<table>
<thead>
<tr>
<th>Dates</th>
<th>Research Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>September -November 2019</td>
<td>Research proposal, prepare and submit IRB application, request permission from all schools and students, conduct all pre-surveys, start data collection</td>
</tr>
<tr>
<td>October – March 2020</td>
<td>Deliver the CATCH program to third, fourth, and fifth grades</td>
</tr>
<tr>
<td>March/April 2020</td>
<td>Collect post-intervention data from third, fourth, and fifth grades in all five schools</td>
</tr>
<tr>
<td>March-October 2020</td>
<td>Continue data entry and analysis with statistician</td>
</tr>
<tr>
<td>October – November 2020</td>
<td>Finish data analysis, write thesis, work on presentation material, thesis preparation for defense and submission</td>
</tr>
</tbody>
</table>
CHAPTER 4

RESULTS

This section will address the results and findings of this study regarding the effectiveness of the CATCH program in improving nutrition knowledge and healthy food choices in third through fifth graders. All data were analyzed using Statistical Package for the Social Sciences (SPSS) version 26 for MAC iOS Statistical Software (SPSS Inc., Chicago, IL, USA). First, the demographics of the sample used in this study will be discussed. Then, the findings of the pre and posttests for nutrition knowledge and healthy food choices will be addressed.

Participant Characteristics

Eight hundred \((n = 800)\) participants participated in the pretest survey. Although 800 participants completed the pretest survey, due to Covid-19 restrictions and modifications to the delivery of posttest surveys, only one hundred sixty-seven \((n = 167)\) participants participated in both pre and posttest surveys. Of these 167 participants, 80 were girls (48%) and 87 were boys (52%). Out of these 167 participants, 121 were White (72.5%), 5 were African American (3%), 28 were Hispanic (16.8%), and 13 were Other (7.8%). Students’ ethnicity and gender ratios revealed 58 White girls and 63 boys, 3 African American girls and 2 boys, 11 Hispanic girls and
17 boys, 8 Other girls and 5 boys. Of the 167 participants 32 were third graders (19.2%), 56 were fourth graders (33.5%), and 79 were fifth graders (47.3%). Table 3 and Figure 1 provide details of demographic characteristics of respondents.

Table 8. Demographic Characteristics of Respondents

<table>
<thead>
<tr>
<th>Variables</th>
<th>Girls n(%)</th>
<th>Boys n(%)</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>80 (47.9)</td>
<td>87 (52.1)</td>
<td>167 (100)</td>
</tr>
<tr>
<td>White</td>
<td>58 (47.93)</td>
<td>63 (52.06)</td>
<td>121 (100)</td>
</tr>
<tr>
<td>African American</td>
<td>3 (60)</td>
<td>2 (40)</td>
<td>5 (100)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>11 (39.28)</td>
<td>17 (60.71)</td>
<td>28 (100)</td>
</tr>
<tr>
<td>Other</td>
<td>8 (61.53)</td>
<td>5 (38.46)</td>
<td>13 (100)</td>
</tr>
</tbody>
</table>

Figure 1. Participant Breakdown Based on Race and Gender
Results of Survey Instrument

The CATCH Nutritional Knowledge Survey and the CATCH Healthy Choices Survey were developed by the investigators of previous research, which were based on content from the CATCH (CATCH Global Foundation, 2017) nutrition program. This research utilized the surveys in the same way as the current study. Both components of the survey were used to assess the students’ nutritional knowledge and healthy choices pre and postintervention. APPENDICES H and I provide detailed statistical results from all grade levels, for each individual question. The demographic portion of the survey instrument along with the last six questions pertaining to students’ perception of the CATCH program was an added component. The results from students’ perception of the program provided valuable feedback to the CATCH leaders.

Results of Hypothesis Testing

The following subsections will discuss the research hypotheses for this study and the results generated from statistical data analysis.

Nutritional Knowledge

Research Hypothesis 1: *Children in grades 3rd, 4th, and 5th, will increase their knowledge about nutrient dense foods after participating in six sessions of the CATCH program* was tested using a paired sample t-test to assess the mean differences in students’ knowledge about nutrient dense foods. Table 9 summarizes hypothesis 1 grade level outcomes and their significance. Children in 3rd grade increased their knowledge about nutrient dense foods by an average of $M = 1.78$ points.
with $SD = 2.35$, after participating in six sessions of the CATCH program (Figure 2). The treatment effect was statistically significant, $t(31) = 4.284, p < .001, r^2 = .31, 95\% CI[0.93, 2.62]$, $d = .75$. The effect of this analysis was close to being a large effect ($d = .75$) per Cohen’s (1988) guidelines. Children in 4th grade increased their knowledge about nutrient dense foods by an average of $M = 1.82$ points with $SD = 2.68$, after participating in six sessions of the CATCH program (Figure 3). The treatment effect was statistically significant, $t(55) = 5.07, p < .001, r^2 = .17, 95\% CI[1.10, 1.54]$, $d = .67$. The effect of this analysis was medium ($d = .67$) per Cohen’s (1988) guidelines. Children in 5th grade increased their knowledge about nutrient dense foods by an average of $M = 1.37$ points with $SD = 2.23$, after participating in six sessions of the CATCH program (Figure 4). The treatment effect was statistically significant, $t(78) = 3.39, p < .001, r^2 = .15, 95\% CI[0.65, 2.10]$, $d = .42$. The effect of this analysis was close to being a medium effect ($d = .42$) per Cohen’s (1988) guidelines. Table 11 provides a summary of all three grade levels results for the nutritional knowledge pre-post surveys.
Table 9. Summary of Hypothesis 1 Grade Level Outcomes and Significance

<table>
<thead>
<tr>
<th>Alternative Hypothesis</th>
<th>Variables</th>
<th>p-value</th>
<th>Accept or Reject Null Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children in 3&lt;sup&gt;rd&lt;/sup&gt; grade, will increase their knowledge about nutrient dense foods after participating in six sessions of the CATCH program.</td>
<td>Posttest Knowledge Score – Adjusted Pretest Knowledge Score</td>
<td>.000*</td>
<td>Reject Null Hypothesis</td>
</tr>
<tr>
<td>Children in 4&lt;sup&gt;th&lt;/sup&gt; grade, will increase their knowledge about nutrient dense foods after participating in six sessions of the CATCH program.</td>
<td>Posttest Knowledge Score – Adjusted Pretest Knowledge Score</td>
<td>.000*</td>
<td>Reject Null Hypothesis</td>
</tr>
<tr>
<td>Children in 5&lt;sup&gt;th&lt;/sup&gt; grade, will increase their knowledge about nutrient dense foods after participating in six sessions of the CATCH program.</td>
<td>Posttest Knowledge Score – Adjusted Pretest Knowledge Score</td>
<td>.000*</td>
<td>Reject Null Hypothesis</td>
</tr>
</tbody>
</table>

*<i>p < 0.001; α = .05</i>
Figure 2. 3rd Grade Pre-Post Nutritional Knowledge Results
Figure 3. 4th Grade Pre-Post Nutritional Knowledge Results
Figure 4. 5th Grade Pre-Post Nutritional Knowledge Results
Table 10. Hypothesis 1 Summary

<table>
<thead>
<tr>
<th>Alternative Hypothesis</th>
<th>Grade</th>
<th>Pre-Survey (Max Points = 20)</th>
<th>Post-Survey (Max Points = 20)</th>
<th>Mean Difference (SD)</th>
<th>n</th>
<th>t</th>
<th>p</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children in 3rd grade, will increase their knowledge about nutrient dense foods after participating in six sessions of the CATCH program.</td>
<td>3rd</td>
<td>14.53 (2.03)</td>
<td>16.31 (2.77)</td>
<td>1.78 (2.35)</td>
<td>32</td>
<td>4.28</td>
<td>.000*</td>
<td>Reject Null Hypothesis</td>
</tr>
<tr>
<td>Children in 4th grade, will increase their knowledge about nutrient dense foods after participating in six sessions of the CATCH program.</td>
<td>4th</td>
<td>14.94 (2.51)</td>
<td>16.79 (2.43)</td>
<td>1.82 (2.68)</td>
<td>56</td>
<td>5.07</td>
<td>.000*</td>
<td>Reject Null Hypothesis</td>
</tr>
<tr>
<td>Children in 5th grade, will increase their knowledge about nutrient dense foods after participating in six sessions of the CATCH program.</td>
<td>5th</td>
<td>15.36 (2.63)</td>
<td>16.74 (3.16)</td>
<td>1.37 (3.23)</td>
<td>79</td>
<td>3.79</td>
<td>.000*</td>
<td>Reject Null Hypothesis</td>
</tr>
</tbody>
</table>

Hence, children increased their knowledge about nutrient dense foods.
Healthy Food Choices

Research Hypothesis 2: *Children in grades 3rd, 4th, and 5th, will be able to make healthier food choices after participating in the six sessions of the CATCH program* was tested using a paired sample t-test to assess the mean differences in students’ adoption of healthy food choices. Table 11 summarizes hypothesis 2 grade level outcomes and their significance. Children in 3rd grade were able to make healthier food choices by an average of $M = 0.65$ points with $SD = 2.00$, after participating in six sessions of the CATCH program (Figure 5). The treatment effect was not statistically significant, $t(31) = 1.84, p = .074, 95\% \text{ CI}[-0.06, 1.38]$. Children in 4th grade were able to make healthier food choices by an average of $M = 0.57$ points with $SD = 1.91$, after participating in six sessions of the CATCH program (Figure 6). The treatment effect was statistically significant, $t(55) = 2.23, p = 0.03, r^2 = .04, 95\% \text{ CI}[0.05, 1.08]$, $d = .29$. The effect of this analysis was small ($d = .29$) per Cohen’s (1988) guidelines. Children in 5th grade were able to make healthier food choices by an average of $M = 0.64$ points with $SD = 2.06$, after participating in six sessions of the CATCH program (Figure 7). The treatment effect was statistically significant, $t(78) = 2.77, p = 0.007, r^2 = .018, 95\% \text{ CI}[0.18, 1.10]$, $d = .31$. The effect of this analysis was small ($d = .31$) per Cohen’s (1988) guidelines. Table 12 provides a summary of all three grade levels results for the healthy choices pre-post surveys.
Table 11. Summary of Hypothesis 2 Grade Level Outcomes and Significance

<table>
<thead>
<tr>
<th>Alternative Hypothesis</th>
<th>Variables</th>
<th>p-value</th>
<th>Accept or Reject Null Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children in 3rd grade</td>
<td>Posttest Healthy Choice Score – Adjusted Pretest Healthy Choice Score</td>
<td>.074</td>
<td>Fail to Reject the Null Hypothesis</td>
</tr>
<tr>
<td>will be able to make</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>healthier food choices</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>after participating in</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>the six sessions of the</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CATCH program.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children in 4th grade</td>
<td>Posttest Healthy Choice Score – Adjusted Pretest Healthy Choice Score</td>
<td>.030</td>
<td>Reject Null Hypothesis</td>
</tr>
<tr>
<td>will be able to make</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>healthier food choices</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>after participating in</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>the six sessions of the</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CATCH program.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Children in 5th grade</td>
<td>Posttest Healthy Choice Score – Adjusted Pretest Healthy Choice Score</td>
<td>.007</td>
<td>Reject Null Hypothesis</td>
</tr>
<tr>
<td>will be able to make</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>healthier food choices</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>after participating in</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>the six sessions of the</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CATCH program.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* \( \alpha = .05 \)
Figure 5. 3rd Grade Pre-Post Healthy Choices Results
Figure 6. 4th Grade Pre-Post Healthy Choices Results
Figure 7. 5th Grade Pre-Post Healthy Choices Results
<table>
<thead>
<tr>
<th>Alternative Hypothesis</th>
<th>Grade</th>
<th>Pre-Survey (Max Points = 14)</th>
<th>Post-Survey (Max Points = 14)</th>
<th>Mean Difference</th>
<th>n</th>
<th>t</th>
<th>p</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children in 3rd grade will be able to make healthier food choices after participating in the six sessions of the CATCH program</td>
<td>3rd</td>
<td>11.93 (1.86)</td>
<td>12.59 (1.10)</td>
<td>.65 (2.00)</td>
<td>32</td>
<td>1.84</td>
<td>.074</td>
<td>Fail to Reject the Null Hypothesis</td>
</tr>
<tr>
<td>Children in 4th grade will be able to make healthier food choices after participating in the six sessions of the CATCH program</td>
<td>4th</td>
<td>12.28 (1.55)</td>
<td>12.85 (1.47)</td>
<td>.57 (1.91)</td>
<td>56</td>
<td>2.23</td>
<td>.030</td>
<td>Reject Null Hypothesis</td>
</tr>
<tr>
<td>Children in 5th grade will be able to make healthier food choices after participating in the six sessions of the CATCH program</td>
<td>5th</td>
<td>12.43 (1.89)</td>
<td>13.07 (1.11)</td>
<td>.64 (2.06)</td>
<td>79</td>
<td>2.77</td>
<td>.007</td>
<td>Reject Null Hypothesis</td>
</tr>
</tbody>
</table>

Although children indicated higher post-test scores, results were statistically non-significant.
Nutrition Knowledge and Adoption of Healthy Food Choices and Grade Levels

Research Hypothesis 3: As grade level increases from 3rd to 5th grade, improvement in nutrition knowledge and adoption of healthy food choices will increase after participating in the six sessions of the CATCH program was tested using an ANOVA test. As grade level increased from 3rd to 5th grade, improvement in nutrition knowledge and adoption of healthy food choices did not increase after participating in the six sessions of the CATCH program. In both, the difference in pre and posttest for healthy choices and knowledge scores revealed no statistical significance with $p = .973$ and $p = .637$, respectively. Table 13 summarizes hypothesis 3 grade level outcomes and their significance.
Table 13. Summary of Hypothesis 3 Outcomes and Significance

<table>
<thead>
<tr>
<th>Alternative Hypothesis</th>
<th>Variables</th>
<th>p-value</th>
<th>Accept or Reject Null Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>As grade level increases from 3&lt;sup&gt;rd&lt;/sup&gt; to 5&lt;sup&gt;th&lt;/sup&gt; grade, improvement in nutrition knowledge will increase after participating in the six sessions of the CATCH program.</td>
<td>Difference in Pre &amp; Post Test Knowledge</td>
<td>.973*</td>
<td>Fail to Reject the Null Hypothesis</td>
</tr>
<tr>
<td>As grade level increases from 3&lt;sup&gt;rd&lt;/sup&gt; to 5&lt;sup&gt;th&lt;/sup&gt; grade, improvement in adoption of healthy food choices will increase after participating in the six sessions of the CATCH program.</td>
<td>Difference in Pre &amp; Post Test Healthy Choice</td>
<td>.637*</td>
<td>Fail to Reject the Null Hypothesis</td>
</tr>
</tbody>
</table>

* α = .05

Participants’ Perception of CATCH

The last few questions of the survey served as feedback for the CATCH team to gain a better perspective of their participants’ acceptance and likability of the program. These questions asked students about their favorite lessons, what they wish the lessons to be (i.e. longer or shorter), if they enjoy eating healthy foods or be active, if they enjoyed the CATCH program, and if the program helped them be healthier. The following visuals are a representation of the pre and post-surveys of the questions mentioned above. In the pre-survey of the question titled, “My
favorite lessons in CATCH were (check all that apply):” showed 89 students chose Healthy Eating, 106 students chose Physical Activity, and 23 students chose Decreasing Screen Time. In the post-survey, 44 students chose healthy Eating, 101 students chose Physical Activity, and 12 students chose Decreasing Screen Time (Figure 8).

Figure 8. Participants' Favorite CATCH Lessons Pre-Post Survey
In the pre-survey of the question titled, “I wish CATCH lessons were (check all that apply):” showed 113 students chose More Often, 69 students chose Longer, 28 students chose Shorter, and 15 students chose Less Often. In the post-survey, 65 students chose More Often, 24 students chose Longer, 12 students chose After School Too, 32 students chose Shorter, and 17 students chose Less Often (Figure 9). It’s important to note that the majority of students who responded to this question (160 of 167), still wish to have CATCH more often (40%) and for longer (21%) after participating in the 6 sessions of CATCH.

![Participant's Perception of CATCH](image)

Figure 9. Participants' Preference on Length of CATCH Lessons Pre-Post Survey
The last four questions of the survey asked students if they enjoy eating healthy foods or be active, if they enjoyed the CATCH program, and if the program helped them be healthier. The following representation shows the pre and post-survey version of these questions (Figure 10) A key message to take away from this data is that students’ enjoyment in eating healthy foods and being active increased by 3.5% and 8.8%, respectively.

Figure 10. Participants’ Preference of CATCH
CHAPTER 5

DISCUSSION

CATCH is a national obesity prevention program that focuses on healthy eating, increasing physical activity, and reducing screen time. In Northern Illinois, NIU dietetic students and student volunteers from all majors volunteer in Sycamore and Genoa-Kingston school districts by delivering CATCH lessons once a month throughout the academic year. This study evaluated the CATCH program in third through fifth graders in Northern Illinois over the course of one academic year. Participants who completed pre and posttests answered questions that tested their ability to make healthy food choices and their knowledge on nutrient dense foods. Due to the Covid-19 pandemic, final sample size \((n=167)\) was significantly lower than expected \((n=800)\), which lessened the strength of some results. Nevertheless, this study uncovered valuable pieces of information, discovered opportunities for improvement, and learned how future research could benefit the programs’ curriculum.

Knowledge About Nutrient Dense Foods

After participating in six sessions of the CATCH program, children in grades third, fourth, and fifth increased their knowledge about nutrient dense foods by an average of 1.78,
1.82, and 1.37 points, respectively. Although these are statistically significant improvements, there is room for even more growth. Research suggests that there are many factors that influence children’s nutrition knowledge, self-efficacy, and healthy lifestyle choices. Bandura’s Social Cognitive Theory (SCT) is the most commonly used theoretical framework that supports these three key components. Promoting physical activity, healthy eating, and preventing obesity in youth are more likely to be achieved when using the SCT model. The CATCH program is based on this theory, highlighting the relationship between personal factors like knowledge, personal responsibility, social and physical environments, and behavior in its lesson plans. However, the evaluation of CATCH program did not incorporate SCT variables, which limits the ability of this study to assess improvement in SCT mediating variables.

Ability to Make Healthier Food Choices

After participating in the six sessions of the CATCH program, children in grades fourth and fifth increased an average of 0.57 and 0.64 points, respectively, in their ability to make healthier food choices. However, third graders did not show a significant growth in their ability to make healthier food choices when comparing pre and posttests. It’s important to note that fourth and fifth graders have been receiving the CATCH program for one-two years more than third graders; they were exposed to nutrition education and healthy choices for longer. As mentioned previously, CATCH is based on SCT, which emphasizes the relationship between environmental, personal, and behavior factors. Since many behaviors that are related to chronic diseases start to develop in early childhood and adolescence, this program believes that SCT mediating variables play an important role in creating healthy behavior change. Meanwhile, the
current study did not evaluate the SCT constructs, which might have explained the outcome of the third graders and their ability to create healthy choices.

Participants’ Perception of CATCH

Overall, participant’s perception of CATCH was positive, however, a lot of the scores in the post-tests declined. This may be indirectly related to the Covid-19 pandemic and our change in the delivery method (online). Additionally, during this time a lot of students were completing their schoolwork from home, which could have been stressful for them and they did not fully participate in the CATCH lessons. The question asking about students’ preference of the length of the program also showed that students want to see shorter lessons. This could have also been indirectly impacted by the online delivery method. Perhaps, maybe students don’t enjoy watching videos of CATCH and in fact they prefer the in-person delivery method. When comparing the delivery methods of the cabin safety education program, the instructor led safety course was more favorable by the elementary school children. Students did show an increase in scores from their pre- to post-tests when asked whether they enjoy eating healthy foods and enjoy being active.

Nutritional Knowledge and Healthy Food Choices and Grade Levels

The third hypothesis, as grade level increases from 3rd to 5th grade, improvement in nutrition knowledge and adoption of healthy food choices will increase after participating in the six sessions of the CATCH program, did not show significant improvement or growth, which
may be due to the research not testing the same individual over the years. For example, the same third graders were not surveyed when they reached fifth grade. Current research is skewed because it only looked at the uneven number of participants in each grade, over just a one-year time period.

Conclusion

The evaluation of the CATCH program in third through fifth graders was found to have a strong positive effect on children’s nutritional knowledge and ability to make healthier food choices after receiving 6 sessions of the program. Results of this study found that third through fifth graders increased their nutritional knowledge. Third graders did show a higher score in the post-test for healthy choices, however the results were statistically non-significant. Both fourth and fifth graders revealed significant improvement in making healthier choices after completion of the CATCH program. Findings from participants’ perception of the program also uncovered valuable information. Students provided positive feedback of the program in their posttest, rating physical activity and healthy eating as two of the top lessons they enjoy most. Students also displayed higher scores in their posttests when asked to answer “yes or no” to questions, “I enjoy eating healthy foods” and “I enjoy being active.” These results indicate positive outcomes on students’ learning, effectiveness of the program, as well as students’ satisfaction with CATCH.

The use of ‘Go, Slow, and Whoa’ food categories are implemented in similar ways across various elementary school health promotion programs. CATCH introduces ‘Go, Slow, Whoa’ food categories to help children understand healthier food choices and the Healthy Highway
program uses the ‘safety rules of the road’ idea which translate to ‘healthy eating rules of daily life’ in the school. This system also found great success when teaching children how to differentiate between a healthy and unhealthy food choices. Perhaps, the color distinction is easy to understand for this population.

Strengths

A strength of this study was using an instrument that showed high reliability in previous research and was developed specifically for CATCH. The survey covered two subtopics titled the CATCH Nutritional Knowledge and the CATCH Healthy Choices. Both pre and posttests were not only identical to one another, but they also tested the same participant, which was a significant strength of the study. Another strength was the inclusion of third through fifth graders (8-11 years old). Including upper elementary school students provides an insight into the program’s effects on older students participating in the CATCH and their retention of nutrition information. An additional strength this study has is the balanced diversity in gender, including 80 girls and 87 boys.

Limitations

This study has many limitations. While the anticipated sample size was roughly 800 participants between all five schools, due to Covid-19 pandemic and modification of the delivery of the posttest survey, the final count was 167 participants from three schools. This limited the strength of the tests and overall research. Covid-19 also limited the research due to the need for
change in the delivery method of last three lessons of the program. The researcher along with one other NIU student volunteer created video lessons based on the appropriate lesson-grade curriculum. Additionally, these lessons were delivered using a web-based survey system and not in a classroom setting. Students may have not watched the lesson videos and still taken the posttest or they may have chosen to watch the videos, however not take the posttest. These barriers may have impacted the overall outcomes of this study. Another limitation of this study is the self-completed survey component. Students completed surveys that were self-reported and may have been misunderstood, misreported or simply skipped in the process. Additionally, posttests were delivered via an online survey that was sent to the students’ principal, which was then sent to the parents’ email, and lastly reaching the student. This long trail is a limitation on its own, because of the many barriers the survey had prior to reaching the participant. The researcher had limited control in sending the surveys to the participants once they were sent to the principals, including not having the ability to send email reminders. Furthermore, when the posttest reached one of the 167 participants, the researcher did not have control of the students’ individual honest work. This means that parents, grandparents, caregivers, or siblings could have been partaking in the posttests, skewing overall data and validity. This study did not demonstration diversity in race, with an uneven number of White (121), African American (5), Hispanic (28), and Other (13) participants. This may have been because of the shrunken sample size due to the Covid-19 pandemic. Another limitation in this study is not incorporating SCT in evaluating the effectiveness of the CATCH program. This may have influenced the results of this research since CATCH interventions are based on this model. There were two questions missing from the posttest due to researchers’ miscalculation. This error was accounted for while
analyzing the data by taking those missed questions out of the pretests. Lastly, this study did not include a control group, which could’ve made a significant impact on the overall outcomes.

Future Research

The unforeseen circumstances of the Covid-19 pandemic limited the current research in numerous ways, nonetheless, it uncovered opportunities for improvement moving forward. Future research is needed to promote growth of CATCH curriculum and further comprehension of the effectiveness of the program in Northern Illinois. It would be best to see the results when pre and posttest data is collected in the same style, whether it’s via paper or online surveys, it should be consistent. More emphasis should be placed on the sample size, diversity in race, and participation of all five schools. As mentioned previously, the testing of third hypothesis, as grade level increases from 3rd to 5th grade, improvement in nutrition knowledge and adoption of healthy food choices will increase after participating in the six sessions of the CATCH program revealed negative findings. This particular hypothesis should be retested in a 2-3 year time frame. For example, pretesting third graders on their nutritional knowledge and healthy choices before starting the CATCH program and following them for 3 years, completing the posttest after the completion of the last CATCH session in Grade 5. This may provide stronger, more valid results that indicate the effectiveness of the program as well as the retention of students’ nutrition information. Future research should be sensitive of the demographics of their sample population. Due to the sudden switch to an online delivery method of the post-survey in this study, some students may have experienced a socioeconomic (SES) barrier preventing them from participating. Individuals living in low SES may face barriers such as limited access to
technology, which could also impact participation in health promotion programs. Future research should use a control group to increase validity of the results. Lastly, using focus groups/interventions with children to provide feedback of CATCH when delivered by college students could offer more specific insight on their perception of CATCH in Northern Illinois.

Trends

Surprisingly, all 167 (100%) participants answered the question from Healthy Choices, Which is a healthier choice? Ice Cream or Yogurt, correctly on the post-test. Although this question wasn’t specific on the type of ice cream or the type of yogurt it was asking about, students may have connected the ice cream to the Go, Slow, Whoa categories. Ice cream would be a “Whoa” food and yogurt (if low-fat), would be a “Go” food. In the pre-survey, several questions had multiple answers marked, which automatically disqualified the entire question. This may be because students did not pay close attention to the directions, were confused by the question, didn’t know the correct answer, or they simply did not take this seriously. About 165 (98%) of 3rd graders did not miss questions in the pre-test. This may be because halfway through the pre-surveys, CATCH volunteers realized it was taking this age group significantly longer than expected. In order to save time for the lesson, CATCH volunteers read each question out loud to the class. Overall, I noticed that several participants skipped questions in the post-test. This could be due to multiple factors, however, it could be related to the formatting of the Qualtrics post-survey, which allowed students to move on to the next question without completing the previous one.
Implications for Dietetic Practice

The findings from this study add value to the existing pool of research that aims to improve nutrition education programs for prevention of childhood obesity, and highlight the need for continuing such interventions in the future. It emphasizes the need for more research to be conducted in not just third through fifth graders participating in nutrition education programs, but to evaluate grades below those as well. Partnerships with universities and school districts are also underlined in this study. Having the dietetic interns versus school staff as the teacher for CATCH can be more sustainable. This would not involve a monetary component and it would allow for school staff to focus on other obligations such as preparing for class or meetings. Dietetic internship programs in universities could seek out partnerships with the local school systems to provide training for the interns, but also to improve the health and well-being of school children and personnel. Pediatric dietitians may also benefit from the methods used in the CATCH program in their own practice; CATCH uses creative ways to deliver fun and interactive nutrition education to children. Implementing cartoons as an online nutrition education delivery method, such as Elmo or Big Bird, could be a new way to reach this population as well. Lastly, when conducting further research, dietitians should assess SCT variables in relation to the programs. Using the SCT model when evaluating health promotion programs like CATCH, could highlight more significant results that match the curriculum and delivery methods. Incorporating these variables could provide a more detailed evaluation of the impact CATCH has on children participating in the program.
REFERENCES


Approval Notice

Initial Review

09-Dec-2019

TO: Paulina Kuzelka (01740860)
School of Health Studies


Your Initial Review submission was reviewed and approved under Member Review procedures by the Institutional Review Board on 09-Dec-2019. Please note the following information about your approved research protocol:

Protocol Approval period: 09-Dec-2019 - 08-Dec-2020

If your project will continue beyond that date, or if you intend to make modifications to the study, you will need additional approval and should contact the Office of Research Compliance and Integrity for assistance. Continuing review of the project, conducted at least annually, will be necessary until you no longer retain any identifiers that could link the subjects to the data collected. Please remember to use your protocol number (HS20-0183) on any documents or correspondence with the IRB concerning your research protocol.

Please note that the IRB has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

Unless you have been approved for a waiver of the written signature of informed consent, this notice includes a date-stamped copy of the approved consent form for your use. NIU policy requires that informed consent documents given to subjects participating in non-exempt research bear the approval stamp of the NIU IRB. This stamped document is the only consent form that may be photocopied for distribution to study participants.

It is important for you to note that as a research investigator involved with human subjects, you are responsible for ensuring that this project has current IRB approval at all times, and for retaining the signed consent forms obtained from your subjects for a minimum of three years after the study is concluded. If consent for the study is being given by proxy (guardian, etc.), it is your responsibility to document the authority of that person to consent for the subject. Also, the committee recommends that you include an acknowledgment by the subject, or the subject's representative, that he or she has received a copy of the consent form. In addition, you are required to promptly report to the IRB any injuries or other, unanticipated problems or risks to subjects and others. The IRB extends best wishes for success in your research endeavors.
APPENDIX B

PERMISSION FORM FOR PRINCIPALS
Dear PRINCIPAL NAME

My name is Paulina Karecka, and I am a Nutrition and Dietetics graduate student at Northern Illinois University (NIU). I am working towards my Master’s thesis that aims to evaluate the CATCH program. This project will be conducted under the supervision of Dr. Muzaffar, an Assistant Professor and Registered Dietitian at NIU.

I am writing to you today to request your assistance as I conduct this research study. The primary goal is to compare students’ surveys before delivery of the first lesson as well as after the delivery of the last lesson. After a program has been implemented for an extended period of time, it is imperative to perform appropriate evaluations of interventions in order to determine the impact and effectiveness. The results from this evaluation completed via pre and post surveys in grades third, fourth, and fifth only, could potentially enhance the development and implementation of CATCH.

The study has received approval from Northern Illinois University’s Institutional Review Board Office. I will be happy to share the results with you when the study is completed next year.

Thank you for the opportunity to help improve the health and well-being of children in our community. Please do not hesitate to contact me if you have any additional questions.

Best,

Paulina Karecka
Nutrition and Dietetics Graduate Student
Northern Illinois University
APPENDIX C

CONSENT/ASSENT FORMS
Informed Consent Form for Child and Parent

PLEASE READ, SIGN ON THE LAST PAGE, AND RETURN THE FORM to Dr. Muzaffar

Title of Project: Evaluation of the Coordinated Approach to Child Health (CATCH) Program in Third Through Fifth Graders in Northern Illinois

Principal Investigator: Henna Muzaffar, Ph.D., RD, Thesis Chair
Wirtz 323D
hmuzaffar@niu.edu

1. Purpose of the Study: The purpose of this study is to evaluate the effectiveness of the CATCH program in the DeKalb, IL County in third through fifth graders.

2. Procedures to be followed: During the last 5-15 minutes of first and last lessons delivered to third, fourth, and fifth graders during the 2019-2020 academic year, pre- and post-surveys will be distributed in each participating classroom. Both surveys are identical, and will assess children’s’ nutrition knowledge and healthy choices. This will allow the CATCH team to learn what students are retaining in the span of one school year while in the CATCH program. A CATCH leader will be present in the classroom during the duration of the surveys, if any questions arise. The results from these surveys will be used to assess the effectiveness of CATCH in order to improve the program. It is up to you to decide if you want your child’s scores to be used in this study.

3. Discomforts and Risks: The risks in this study are minimal. There are no anticipated discomforts or dangers to your child in this study.

4. Incentives/Benefits: Children will not receive any incentive for completing surveys, as these will be administered during the class time and will not require the child/parent to make any special arrangements.

5. Duration/Time: Participation in this study will not exceed 30 minutes in total.

6. Statement of Confidentiality: Your participation in this research is confidential. Data (any information that you provide to the investigators) will be stored and secured in Wirtz Hall on the
Northern Illinois University campus in a locked file cabinet. Any information stored on a computer will be on a password-protected computer at Northern Illinois University.

Northern Illinois University’s Office of Division of Research and Innovation and the Institutional Review Board may review records related to this research study. In the event of a publication or presentation resulting from the research, no personally identifiable information will be shared. Only the investigators of this study or students of the investigators will be allowed access to any data. If you want to share your information with other people, such as your friends or parents, this is up to you.

7. **Right to Ask Questions**: Please contact Dr. Muzaffar at 815-753-5178 with questions, complaints or concerns about this research. You can also call this number if you feel this study has harmed you. If you have any questions, concerns, or problems about your rights as a research participant or would like to offer input, please contact the Northern Illinois University’s Institutional Review Board Office (815-753-1438). The Office for Research Protections cannot answer questions about research procedures. Questions about research procedures can be answered by the research team.

8. **Payment for participation**: There is no payment for this study.

9. **Voluntary Participation**: Your child’s participation is voluntary. If you feel your child has in any way been pressured into participation, please inform the faculty advisor. We also ask that you read this letter to your child (if age-appropriate) and inform your child that this participation is voluntary.

You must be in 3rd, 4th, or 5th grade to consent to take part in this research study. If you agree to take part in this research study and the information outlined above, please sign your name and indicate the date below. Your parent also must sign and date below.

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

Please check one option and fill in the information requested below, then return the form by Friday, December 5th, 2019. If you do not send a response back, researchers will assume you agree to participate in this study.

- [ ] I give permission for my child to participate in the study.
- [ ] I do not give permission for my child to participate in the study.

<table>
<thead>
<tr>
<th>Parent’s name (Print)</th>
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<th>Parent’s Signature</th>
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<th>Participant’s (Child’s) Signature</th>
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<th>Person Obtaining Consent</th>
<th>Date</th>
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APPENDIX D

3rd GRADE ILLINOIS LEARNING STANDARDS
<table>
<thead>
<tr>
<th>Lesson #</th>
<th>Lesson Title</th>
<th>Learning Standards</th>
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</table>
| 1        | Heart Health     | 1. Engage effectively in a range of collaborative discussions with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.  
2. Come to discussions prepared, having read or studied required material; explicitly draw on that preparation and other information known about the topic to advance their own ideas and claims in their discussion.  
3. Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.  
4. Explain their own ideas and understanding in light of the discussion.  
5. Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.  
6. Identify real-life connections between words and their use (e.g., describe people who are friendly or helpful). |
| 2        | Heart Smart      | 1. Engage effectively in a range of collaborative discussions with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.  
2. Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.  
3. Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.  
4. Identify real-life connections between words and their use (e.g., describe people who are friendly or helpful). |
| 3        | The 'Whole' Truth | 1. Engage effectively in a range of collaborative discussions with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.  
2. Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.  
3. Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.  
4. Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.  
5. Identify real-life connections between words and their use (e.g., describe people who are friendly or helpful). |
| 4        | Sometimes Sweet  | 1. Compare and contrast the most important points and key details presented in two texts on the same topic.  
2. Engage effectively in a range of collaborative discussions with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.  
3. Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.  
4. Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.  
5. Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.  
6. Identify real-life connections between words and their use (e.g., describe people who are friendly or helpful). |
| 5        | Yoga Kids        | 1. Engage effectively in a range of collaborative discussions with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.  
2. Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.  
3. Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.  
4. Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.  
5. Distinguish the literal and nonliteral meanings of words and phrases in context (e.g., take steps). |
| 6        | Go Foods Fill Us Up! | 1. Engage effectively in a range of collaborative discussions with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly.  
2. Ask questions to check understanding of information presented, stay on topic, and link their comments to the remarks of others.  
3. Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.  
4. Ask and answer questions about information from a speaker, offering appropriate elaboration and detail.  
5. Identify real-life connections between words and their use (e.g., describe people who are friendly or helpful). |
APPENDIX E

4th GRADE ILLINOIS LEARNING STANDARDS
<table>
<thead>
<tr>
<th>Lesson #</th>
<th>Lesson Title</th>
<th>Learning Standards</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ready, Set, GO for Health</td>
<td>1. Read with sufficient accuracy and fluency to support comprehension.</td>
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<tr>
<td></td>
<td></td>
<td>2. Read on-level text with purpose and understanding.</td>
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<td>3. Use context or self-correct word recognition and understanding, rereading as necessary.</td>
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<td>4. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.</td>
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<td></td>
<td>5. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.</td>
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<td></td>
<td></td>
<td>6. Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.</td>
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<tr>
<td>2</td>
<td>Energy Balance</td>
<td>1. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.</td>
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<td></td>
<td>2. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.</td>
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<td></td>
<td></td>
<td>3. Identify the reasons and evidence a speaker provides to support particular points.</td>
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<tr>
<td>3</td>
<td>GO! For Energy Balance</td>
<td>1. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.</td>
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<td>2. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.</td>
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<td>3. Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.</td>
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<tr>
<td>4</td>
<td>Snackvertising GO Foods</td>
<td>1. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.</td>
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<td>2. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.</td>
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<td>3. Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.</td>
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<td>4. Add audio recording and visual displays to presentations when appropriate to enhance the development of main ideas or themes.</td>
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<td>5. Produce complete sentences, recognizing and correcting inappropriate fragments and run-ons.</td>
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<td>6. Choose words and phrases to convey ideas precisely.</td>
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<tr>
<td>5</td>
<td>Less Mindless Eating</td>
<td>1. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.</td>
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<td>2. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.</td>
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<td>3. Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.</td>
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<td>4. Identify the reasons and evidence a speaker provides to support particular points.</td>
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<td>6</td>
<td>Food Fat Facts</td>
<td>1. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.</td>
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<td></td>
<td>2. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion.</td>
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<td>3. Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.</td>
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APPENDIX F

5th GRADE ILLINOIS LEARNING STANDARDS
# Fifth Grade Lessons (Illinois Learning Standards)

<table>
<thead>
<tr>
<th>Lesson Title</th>
<th>Learning Standards</th>
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| **Breaking Through Barriers** | 1. Compare and contrast the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts.  
2. Write opinion pieces on topics or texts, supporting a point of view with reasons and information.  
3. Engage effectively in a range of collaborative discussions with diverse partners on grade 5 topics and texts, building on others’ ideas and expressing their own clearly.  
4. Pose and respond to specific questions to clarify or follow up on information and make comments that contribute to the discussion and link to the remarks of others.  
5. Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.  
6. Summarize written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally. |
| **MyPlate**                 | 1. Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently.  
2. Engage effectively in a range of collaborative discussions with diverse partners on grade 5 topics and texts, building on others’ ideas and expressing their own clearly.  
3. Pose and respond to specific questions to clarify or follow up on information and make comments that contribute to the discussion and link to the remarks of others.  
4. Summarize written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.  
5. Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. |
| **Going for FIT**           | 1. Engage effectively in a range of collaborative discussions with diverse partners on grade 5 topics and texts, building on others’ ideas and expressing their own clearly.  
2. Pose and respond to specific questions to clarify or follow up on information and make comments that contribute to the discussion and link to the remarks of others.  
3. Summarize written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally. |
| 4 | Portion Distortion | 1. Engage effectively in a range of collaborative discussions with diverse partners on grade 5 topics and texts, building on others’ ideas and expressing their own clearly.
2. Pose and respond to specific questions to clarify or follow up on information and make comments that contribute to the discussion and link to the remarks of others.
3. Summarize written text read aloud or information presented in diverse media and formats, including visually, quantitively, and orally.
4. Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. |

| 5 | Be Your Best You! | 1. Engage effectively in a range of collaborative discussions with diverse partners on grade 5 topics and texts, building on others’ ideas and expressing their own clearly.
2. Pose and respond to specific questions to clarify or follow up on information and make comments that contribute to the discussion and link to the remarks of others.
3. Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.
4. Summarize written text read aloud or information presented in diverse media and formats, including visually, quantitively, and orally.
5. Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.
6. Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. |

| 6 | Food Fat Facts | 1. Engage effectively in a range of collaborative discussions with diverse partners on grade 5 topics and texts, building on others’ ideas and expressing their own clearly.
2. Pose and respond to specific questions to clarify or follow up on information and make comments that contribute to the discussion and link to the remarks of others.
3. Review the key ideas expressed and draw conclusions in light of information and knowledge gained from the discussions.
4. Summarize written text read aloud or information presented in diverse media and formats, including visually, quantitively, and orally. |
NAME

________________________________________

FAVORITE ‘GO’ FOOD

________________________________________
Survey Tool - Students

Thank you for completing this survey on your healthy choices and nutrition knowledge. The survey should take approximately 15 minutes and your answers will be confidential.

- In this survey, you are being asked to answer questions about your healthy choices and nutrition knowledge. No one at school or at home will see your answers.
- Taking part in this project is up to you. Your choice about taking part will not affect your grades in school or your ability to take part in any school activities.
- If you do not want to answer a question, you can skip it.
- You may stop taking part in this survey at any time.

INSTRUCTIONS: Please read the questions carefully and check the box that best fits your answer.

I am a
- Boy
- Girl

I am
- 7 years old
- 8 years old
- 9 years old
- 10 years old
- 11 years old

I am (check all that apply)
- White
- African American
- Hispanic
- Other
INSTRUCTIONS: Please read the questions carefully and circle the choice that best fits your answer.

The CATCH Healthy Choices

Which is a healthier choice? Circle your answer.

Apple Sauce OR Fresh Apple

Orange Slices OR Orange Juice

Banana OR Banana Bread

Fried Chicken OR Grilled/Baked Chicken

Peanut Butter Crackers OR Lightly Salted Peanuts/Nuts

Cheeseburger OR Grilled Chicken Sandwich

Chips and Dip OR Carrot sticks and Humus

Broccoli with Cheese Sauce OR Pretzels and Cheese

Apples and Peanut Butter OR Peanut butter cookies

Ham and cheese sandwich on WHITE bread OR Ham and cheese sandwich on WHEAT bread

Low Fat Chocolate Milk OR Regular Chocolate Milk

Ice Cream OR Yogurt

Cheese Sticks OR Corn Chips

Water OR Fruit Juice

Soda OR Fruit Juice
INSTRUCTIONS: Please read the questions carefully and check the box that best fits your answer.

The CATCH Nutritional Knowledge

1. Which has more calcium?
   - Milk
   - Apple

2. Which food is a grain?
   - Bread
   - Pumpkin

3. Which food is a protein?
   - Pepper
   - Chicken

4. Which food is a fruit?
   - Peas
   - Watermelon

5. Which food is a dairy?
   - Yogurt
   - Peanut Butter

6. Which food is a vegetable?
   - Broccoli
   - Banana

7. Which food is a WOAH food?
   - Chips
   - Plain Popcorn

8. Which food is a GO food?
   - Hot Dog
   - Orange

9. Which helps clean your insides?
   - Fiber
   - Calcium

10. What is sodium?
    - Sugar
    - Salt

11. What is a better drink choice?
    - Water
    - Juice

12. What keeps your bones and teeth strong?
    - Sodium
    - Calcium

13. Which food will make me need to move less?
    - Baked Chicken
    - Cheeseburger

14. What type of food helps muscles grow?
    - Protein
    - Grains

15. What type of food gives long lasting energy?
    - Grains
    - Sugar

16. Which food is a protein?
    - Eggs
    - Oatmeal

17. What type of food gives more vitamins and minerals?
    - Grains
    - Fruits and Veggies

18. Which food is a grain?
    - Nuts
    - Brown Rice

19. High-calorie food usually have?
    - High Fat/High Sugar
    - High Protein/High Fiber

20. Which food will make me need to move MORE?
    - Fruits and Veggies
    - Chips and Dip

21. Which foods have the lowest calories?
    - Veggies
    - Grains
22. I enjoy eating healthy foods.
   □ Yes
   □ No

23. I enjoy being active.
   □ Yes
   □ No

24. I enjoyed the CATCH program.
   □ Yes
   □ No

25. The CATCH program helped me be healthier:
   □ Yes
   □ No

26. My favorite lessons in CATCH were on (check all that apply):
   □ Healthy Eating
   □ Physical Activity
   □ Decreasing Screen Time

27. I wish CATCH lessons were (check all that apply):
   □ Longer
   □ Shorter
   □ More often
   □ Less often
   □ After school too

Thank you for your time and feedback!

Note. Content developed based on the CATCH program curriculum (CATCH Global Foundation, 2017).
APPENDIX H

NUTRITIONAL KNOWLEDGE PRE-POST RESULTS
<table>
<thead>
<tr>
<th>Questions - Nutritional Knowledge</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Questions:</strong></td>
<td>M (SD)</td>
<td>M (SD)</td>
</tr>
<tr>
<td>Which has more calcium?</td>
<td>0.65 (0.48)</td>
<td>0.77 (0.42)</td>
</tr>
<tr>
<td>Which food is a grain?</td>
<td>0.94 (0.24)</td>
<td>0.97 (0.17)</td>
</tr>
<tr>
<td>Which food is a protein?</td>
<td>0.81 (0.39)</td>
<td>0.93 (0.26)</td>
</tr>
<tr>
<td>Which food is a fruit?</td>
<td>0.97 (0.17)</td>
<td>0.99 (0.11)</td>
</tr>
<tr>
<td>Which food is a dairy?</td>
<td>0.95 (0.23)</td>
<td>0.99 (0.08)</td>
</tr>
<tr>
<td>Which food is a vegetable?</td>
<td>0.96 (0.20)</td>
<td>0.96 (0.19)</td>
</tr>
<tr>
<td>Which food is a woah food?</td>
<td>0.84 (0.37)</td>
<td>0.83 (0.37)</td>
</tr>
<tr>
<td>Which food is a go food?</td>
<td>0.95 (0.21)</td>
<td>0.96 (0.19)</td>
</tr>
<tr>
<td>Which helps clean your insides?</td>
<td>0.71 (0.45)</td>
<td>0.86 (0.35)</td>
</tr>
<tr>
<td>What is sodium?</td>
<td>0.57 (0.50)</td>
<td>0.80 (0.40)</td>
</tr>
<tr>
<td>What keeps your bones and teeth strong?</td>
<td>0.77 (0.42)</td>
<td>0.88 (0.33)</td>
</tr>
<tr>
<td>Which food will make me need to move less?</td>
<td>0.50 (0.50)</td>
<td>0.54 (0.50)</td>
</tr>
<tr>
<td>What type of food helps muscles grow?</td>
<td>0.91 (0.29)</td>
<td>0.92 (0.27)</td>
</tr>
<tr>
<td>What type of food gives long lasting energy?</td>
<td>0.62 (0.49)</td>
<td>0.75 (0.44)</td>
</tr>
<tr>
<td>Which food is a protein?</td>
<td>0.70 (0.46)</td>
<td>0.79 (0.41)</td>
</tr>
<tr>
<td>What type of food gives more vitamins and minerals?</td>
<td>0.83 (0.37)</td>
<td>0.87 (0.34)</td>
</tr>
<tr>
<td>Which food is a grain?</td>
<td>0.68 (0.47)</td>
<td>0.86 (0.35)</td>
</tr>
<tr>
<td>High-calorie food usually have?</td>
<td>0.69 (0.46)</td>
<td>0.72 (0.45)</td>
</tr>
<tr>
<td>Which food will make me need to move more?</td>
<td>0.40 (0.49)</td>
<td>0.53 (0.50)</td>
</tr>
<tr>
<td>Which foods have the lowest calories?</td>
<td>0.68 (0.47)</td>
<td>0.82 (0.39)</td>
</tr>
</tbody>
</table>
APPENDIX I

HEALTHY CHOICES PRE-POST RESULTS
<table>
<thead>
<tr>
<th>Questions - Healthy Choices</th>
<th>Pre-test</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M (SD)</td>
<td>M (SD)</td>
</tr>
<tr>
<td>Which is a healthier choice?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apple sauce or fresh apple?</td>
<td>0.96 (0.19)</td>
<td>0.96 (0.19)</td>
</tr>
<tr>
<td>Orange slices or orange juice?</td>
<td>0.94 (0.24)</td>
<td>0.95 (0.23)</td>
</tr>
<tr>
<td>Banana or banana bread?</td>
<td>0.98 (0.15)</td>
<td>0.99 (0.08)</td>
</tr>
<tr>
<td>Fried chicken or grilled/baked chicken?</td>
<td>0.84 (0.37)</td>
<td>0.92 (0.27)</td>
</tr>
<tr>
<td>Peanut butter crackers or lightly salted peanuts/nuts?</td>
<td>0.72 (0.45)</td>
<td>0.80 (0.40)</td>
</tr>
<tr>
<td>Cheeseburger or grilled sandwich?</td>
<td>0.86 (0.35)</td>
<td>0.95 (0.21)</td>
</tr>
<tr>
<td>Chips and dip or carrot sticks and hummus?</td>
<td>0.96 (0.20)</td>
<td>0.99 (0.11)</td>
</tr>
<tr>
<td>Broccoli with cheese sauce or pretzels and cheese?</td>
<td>0.94 (0.24)</td>
<td>0.92 (0.27)</td>
</tr>
<tr>
<td>Apples and peanut butter or peanut butter cookies?</td>
<td>0.99 (0.11)</td>
<td>0.98 (0.13)</td>
</tr>
<tr>
<td>Ham and cheese sandwich on white bread or ham and cheese sandwich on wheat bread?</td>
<td>0.80 (0.40)</td>
<td>0.90 (0.30)</td>
</tr>
<tr>
<td>Low fat chocolate milk or regular chocolate milk?</td>
<td>0.91 (0.29)</td>
<td>0.95 (0.23)</td>
</tr>
<tr>
<td>Ice cream or yogurt?</td>
<td>0.98 (0.15)</td>
<td>1.00 (0.00)</td>
</tr>
<tr>
<td>Cheese sticks or corn chips?</td>
<td>0.54 (0.50)</td>
<td>0.64 (0.48)</td>
</tr>
<tr>
<td>Water or fruit juice?</td>
<td>0.98 (0.15)</td>
<td>0.99 (0.11)</td>
</tr>
</tbody>
</table>