What effect does nutrition intervention have on snack choice for middle school students in the Raleigh area participating in after-school programs?

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Amber Caitlin Schryver
April 17, 2012

TABLE OF CONTENTS

What effect does nutrition intervention have on snack choice for middle school students in the Raleigh area participating in after-school programs?

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Abstract

Can nutrition education make an immediate difference in youth snack choice? Behaviors learned during adolescence often become habits into adulthood. Studies have shown that the majority of youth in the US age 8-18 are consuming less than the recommended amounts of fruits and vegetables but are consuming greater amounts of processed foods. The purpose of this study is to evaluate the effectiveness of nutrition education as an intervention method to change the behavior of student's selecting a snack choice in a middle school after-school program. Students were provided with snack options and nutrition knowledge assessment before and after intervention. Four consecutive, weekly sessions, along with a healthy snack, were given to students (n=13) participating in a local after-school program. Nutrition knowledge assessments along with snack choices were analyzed to determine the effectiveness of nutrition education. Research suggests that as nutrition knowledge increases, snack choice behaviors will improve. The results of this study for the students participants indicated that nutrition education did not have an effect on behavior, however this may not be true for all populations in the same demographic.

INTRODUCTION

The purpose of this study was to evaluate the effectiveness of nutrition education on snack choice in middle school student participants. Over 6-weeks between February and March 2012, voluntary middle school students participating in an after school program at a local, private middle school underwent a pre- and post-assessment, pre- and post-snack test, and 4 nutrition education sessions also providing a healthy snack. Snack choice, knowledge assessment, and a staff survey were the three corners of triangulation of the data. The Health Belief Model (HOM) suggests that if an individual can change their perception about their health, then they will also be more conscious of their health-related decisions.[1] Based on that HOM theory, the hypothesis of this study was that nutrition intervention will have a positive effect on snack choice behavior in the middle students participating in a specific after school program.

LITERATURE REVIEW

Nutrition Intervention

The concept of a nutrition intervention is to increase nutrition knowledge and be able to apply that knowledge. Countless studies have implemented nutrition interventions in order to determine the most effective way for school-aged children to acquire nutrition knowledge. Studies differ in terms of setting, location, focus, duration, audience and framework, but the findings are worth comparing in order to justify the rationale for this study.

Nutritional intervention studies that focus on school-aged children seem to focus predominantly on elementary students, however, there are some preschool-K and adolescent groups. A study conducted by Başkale and Bahar[2] was based on Piaget's theory and conducted on 5- to 6-year-old children. Başkale and Bahar intervened to determine if a 6-lesson nutrition education program affected knowledge, behavior, and

anthropometric measurements. They did find that even in such a young age group, appropriately strategized theory framework resulted in increase nutritional knowledge and a positive change in food preferences.

Components of interventions have impact on the success of outcomes; two of those components are participant's age and program environment. One study by Freedman and Nickell[3] found that after-school nutrition workshops in a public library setting were not successful in producing lasting behavioral changes in snack choice behavior. After comparing the pre-test, 3-week post-test and 3-month follow-up, researchers found only lasting behavior change to be significant in water intake behavior. Implementing a nutrition intervention in that environment was not effective. One study[4] conducted in a community garden setting in Los Angeles, California, focused on the Latino population, was shown to have a much more effective impact on the participants' health and eating behaviors than the public library study. The approach taken for a 12-week intervention involved a cooking demonstration and lesson, a nutrition lecture, and a gardening component. Overall, results showed increased fiber intake and decreased diastolic blood pressure of overweight participants, while some reduced BMI or a slowed rate of weight gain. In this intervention, the elementary school students were not only taught how to eat healthier, but they were given the resources and the applicable experience to reinforce what they learned. The nutrition intervention with cooking, gardening, and nutrition education components was effective in making behavioral changes in children. The literature regarding nutrition interventions that take place in schools is more abundant because not all the students have the same resources available at home than when they are at school. Based on this the school-based programs are going to be the focus of the nutrition intervention review.

Many school-based nutrition interventions are conducted during school hours and in the classroom. Moreno et al[5] is an example of study performed during school within the school curriculum. The focus of the study was to improve students' knowledge as it related to energy balance, however, the researchers found that 3rd-7th grade students already had decent knowledge of calories, exercise, and energy use. The pre-assessment revealed that those students had less knowledge on portion sizes, food sources for more energy, and essential nutrients. The particular program taught, *Food and Fitness*, was not effective because according to their data, the student's mean score after completion of the teaching unit was 58% correct. Researchers suggested that more classes and experience be given to improve knowledge. A similar study given within the same time span (1 month) yielded different results. According to the data from a study conducted by Fahlman et al,[6] total nutrition knowledge scores increased from 32 to 49 percent and level of confidence increased from 4.2 to 6.3 in the intervention group for the Michigan Model Nutrition Curriculum. While this short-term study did could not determine long-term impact, it did show that school-based nutrition intervention can increase nutrition knowledge and increase students' personal confidence in their ability to make healthier choices.

A science-based approach study used a 24-lesson program called *Choice, Control & Change*.[7] This study had several topics and included increased intake of water, fruits, and vegetables; increased physical activity, and decreased intake of sweetened-beverages, processed snacks, and fast food. The curriculum proved to be effective in decreasing the consumption of fast food, sweetened-beverages, and processed snacks, as well as increase in positive behaviors, such as walking more and spending less time in front of a screen. Programs that are longer in length and conducted by trained

educators seem to yield more positive results in nutrition knowledge[5] and eating behavior[7].

While interventions conducted in the classroom may be effective, other settings within the school should be considered. An after-school environment assessment conducted by Coleman et al[8] looked at physical activity and healthy eating in the after-school setting. Researchers found that after-school snacks offered on the sites included fruit, fruit juice or vegetables on only 36% of the days observed. Studies have shown that nutrition education interventions for children can be beneficial and the after-school environment may be an appropriate setting for program success. In a study by Matvienko,[9] the impact of nutrition education on snack choice of 6- and 7-year-olds was evaluated in an after-school setting. The 4-week intervention included lessons in nutrition, healthy snacks, and lessons for the parents. Immediately after the completion of the program and 4 months following, the snack test was administered to evaluate child snack choice. The results from this after-school program were favorable in that at least 25% of the intervention group chose healthier snacks, even at 4 months following program completion. There is a need for further literature on the impact of nutrition education on snack choice when conducted in an after-school environment.

A nutrition intervention cannot be effective without preceding exploration into what makes a nutrition intervention effective. There are two studies that have reviewed content and characteristics of effectiveness of past nutrition interventions. One study evaluated 17 studies conducted since 1990 to determine what makes an adolescent nutrition education effective.[10, 11] Lytle found that within the nutrition education studies that certain characteristics appeared to play a role in the effectiveness of the programs. These study characteristics are: focus on behavior, adequate time and intensity, self-evaluation and feedback, and parental/community involvement. The other analytical study conducted by Roseman, Riddell, and Haynes was a content analysis of kindergarten-12th grade school-based nutrition interventions. The analysis of past interventions yielded ten recommendations for effective school-based interventions: behavioral focus, multicomponent, healthful food/school environment, family involvement, self-assessment, quantitative evaluation, community involvement, ethnic groups, multimedia technology, and sequential and sufficient duration.[12] All of these characteristics should be taken into consideration when analyzing other interventions, as well as when designing a nutrition intervention for future study.

Food Consumption and Motivation

In 1991 the Center for Disease Control and Prevention (CDC) developed the Youth Risk Behavior Surveillance Survey (YRBSS) to track health-risk behaviors in youth. The most recent survey, issued in 2009, provides an overview of nation-wide dietary behaviors that can affect health. According to the USDA MyPlate guidelines, youth need about 2 ½ -3 cups of vegetables and 1 ½ -2 cups of fruit everyday day.[13] The national YRBSS revealed that only about 22.3% of students ate 5+ servings of fruits and vegetables per day and percentage seemed to decrease with age. In addition, only about 14.5% of youth surveyed drank the recommended 3+ glasses of milk per day.[14] The Dietary Guidelines are in place to inform consumers about how to acquire and maintain a healthy lifestyle and are available to everyone. Unfortunately, it is noticeable that consumers are not availing themselves to those resources and are therefore not providing for and teaching their children to make healthy choices.

In addition to individual responsibility, the public schools are also held responsible to provide proper nutrition through the National School Lunch Program (NSLP). The Institute of Medicine stated in a recent report that in order for schools to be reimbursed for meals, they must meet the

Nutrition Standards and Meal Requirements that were set in place in 1995 and provided additional recommendations based on the Dietary Guidelines.[15] A study done in a Texas middle school investigated to see if children were really getting the recommended amounts of fruits, vegetables and whole grains.[16] They found that students who ate school meals consumed about ½ serving of fruit, ¾ serving of vegetables, a cup of milk, and a ⅓ serving of whole grains at lunch, resulting in consumption of about half the recommended serving amounts. Students who did not eat school meals had even lower consumption. Another study examined the correlation between healthy food availability within school lunches and eating behavior.[17] This study found that there was a positive correlation and suggested that if schools had high nutrition standards for competitive foods (i.e. a la carte items) sold during lunch, then students would be more likely to have healthier eating behavior. An environmental intervention conducted to improve a la carte items in middle schools sought to choose vendors who could provide low-fat items that were still affordable.[18] Some of the schools warmly accepted the change, however the popularity and significant revenue that comes from high-fat a la carte products is difficult for schools to sacrifice. In one study, most parents and teachers surveyed believed that nutrition should be a school priority and 90% thought that healthy snacks needed to be more readily available in vending machines and lunch lines.[19] More research could be done in the area of school lunch nutrition and competitive foods, however there is suggestion that simply improving the availability of healthy foods and raising a la carte nutrition standards could improve healthy eating behavior in students.

Although school lunch meals have standards, after-school programs may not. In order to be reimbursed from the USDA, there are specific requirements a school has to meet, but if an after-school program is not part of the NSLP, then there are no nutrition requirements. The after-school environment has the potential to be a great setting for providing a healthy snack. A study conducted to evaluate whole-grain snack intake in elementary school children in an after-school program and found that children accepted crackers with partial amounts of whole-grains, but did not accept crackers with high amounts of whole-grains.[20] Children could tell the difference between a 0g whole-grain Goldfish and an 8g whole-grain Goldfish. They really disliked the 26g whole-grain graham cracker verses the 5g whole-grain. The taste for full whole-grains is not widely accepted by children today. In another after-school program evaluation, one study found that the observed after-school programs offered milk products or 100% fruit juices as drinks and a variety of foods were offered for snacks including: fruits, vegetables, sweet breads, cookies, cereals, crackers, cheese, and snack bars, but whole fruits and vegetables were rarely offered.[8] Currently, after-school programs do not have to provide healthy snacks and children are not developing a taste for more nutritious foods. Snacks that are high in fat and sugar, whether they are in after-school programs or offered as an a la carte product at lunch, are more available to students for consumption. Snacking for adolescents has been found to be associated with higher caloric intake and data from the USDA MyPyramid database 2003-4 reported that although 38% of fruits consumed by adolescents came from snacks, 32% of oils, 20% solid fats, 27% discretionary calories, and 34% of added sugars also came from snacks. Over 50% of adolescents consume at least 2 snacks per day and these are opportunities to get in healthful foods.[21]

It is clear that children are not consuming enough of the recommended amounts of fruits, vegetables, and whole-grains that they need every day. Aside from availability, it is important to be aware of some of the other factors that affect children's eating behavior. A research article presented a conceptual framework for understanding adolescent eating behaviors that

included individual influences, social environmental influences, physical environmental influences, and macrosystem (societal) influences.[22] The interaction between each of these influences is very complex and interventions could be implemented in many levels and knowing how these levels of influence interact may help with intervention development. According to the article, taste and appearance of food were primary influences on food choice for adolescents while health and nutrition were not. Cost is considered the next most influential factor that drives food choice. Family, peer, and cultural attitudes toward food and mass media are also outside factors that affect food choice. Another study looked at how environmental, personal, and behavioral factors affected food choice affected food-related behavior at home, at school, and at restaurants.[23] This study found that food choices at home were not healthy due to lack of availability, children did not enjoy school lunches, and they preferred buffet-style restaurants because of the autonomy that allowed them to eat whatever they wanted. These eating behaviors put these children at risk for unhealthy lifestyles and over 50% of those surveyed were already overweight or obese. With proper nutrition knowledge and understanding of its impact on health, children may make health and nutrition a greater influence in food choice.[24]

Health Risk

Youth and adolescents that do not have healthy eating behaviors and inactive lifestyles are at risk for developing chronic disease and becoming overweight or obese. According to a 2008 CDC report, obesity has doubled for children ages 6-11 years old and tripled for children ages 12-19 years old. These children that are overweight and obese are also much more likely to develop type 2 diabetes and atherosclerosis as well, which can lead to heart disease. [25] An article by Dr. Leslie Lytle, RD describes some of the nutritional issues for adolescents.[26] Lytle states that poor dietary behaviors put youth at risk for cardiovascular disease and cancer, type 2 diabetes, eating disorders, and osteoporosis and bone mineralization. The behaviors that put youth risk are based on dietary intake of fat, fruits, vegetables, fiber, sodium, calcium-containing foods, and soda. The lack of healthful eating among youth and adolescents is putting them at risk for chronic disease and obesity. The obesity epidemic that is sweeping the nation is an increasing problem that needs to not only be treated, but it needs to be prevented.

In order to prevent adolescents from making unhealthy choices, adolescents need to be educated on how to make healthy choices. Various studies have used different forms of nutrition interventions to determine effectiveness, but little research has been done on adolescents or the after-school program environment. Additionally, understanding what motivates adolescents' food choices will be important in communicating change because of the health risks that currently face their population. This study sought to improve snack choice for middle school students participating in an after-school program by providing them with a 4-week nutrition intervention and healthy snacks.

STUDY DESIGN AND PARTICIPANTS

The quasi-experimental study was approved by the Institutional Review Board (IRB) of Meredith College. The duration of the study was six weeks with 4 20-minute education sessions that took place between February and March 2012.

The study involved a convenience sample ranging from 11-16 middle school students from a local private school participating in the Extra School Day (ESD) after-school program. Students voluntarily participated with signed consent from their parent/guardian. The participant group consisted of boys and girls from grades 6-8. Demographic data was not recorded. Of the student participants in the study, 12 completed the pre-assessment and 11 completed the post-

assessment. All sessions were inclusive so new students could participate, therefore, by the end of the program, some students were present that had not been present initially.

INSTRUMENTS

Pre-assessment and post-assessment. The pre- and post-assessments used in the study were based on the lesson plans in order to cover questions answered during the nutrition education sessions. The "yes" or "no" questions on the pre-assessment were identical to the questions on the post-assessment to compare knowledge before and after intervention. Assessment questions were related to nutrition knowledge and eating behavior.

Snack test. The snack test assessment component of the study was adapted from the snack test used by Matvienko[9]. The snack test assessed the snack choice of the participants at baseline (mid-February) and after the 4-week program (mid-March). Snack test was conducted using the same snack options as the study conducted by Matvienko. Snack choices offered consisted of seven food options: fruit gummies, apples, refined flour crackers, whole-grain crackers, cheese, potato chips, and baby carrots; and 3 beverage options: water, milk, and fruit drink. A content analysis was conducted to code and record snack choices[27]. Snack options coded as high nutritional value were: skim milk, water, apple (fresh fruit), whole-grain crackers, baby carrots, and cheese. Low nutritional value snacks were: fruit drink, fruit gummies, refined flour crackers, and potato chips.

For the snack test, students were instructed to come to the snack table one at a time to choose up to 2 snacks and 1 beverage. Any chosen food items were replenished on the table after each student got their snack to reduce influence of peer choices and all choices were recorded.

Education curriculum. The curriculum used for the 20-minute nutrition lessons was based on lessons found in *Planet Health: An Interdisciplinary Curriculum for Teaching Middle School Nutrition and Physical Activity* written by Carter et al[28]. Lesson concepts from the text were used, however due to the 20-minute time constraint, activity components of the lesson could not be performed. Additionally, *Planet Health* was published in 2001 and while the content is relevant, the food guide pyramid is out of date. In order to teach with the most recent icons and guidelines, the *2010 Dietary Guidelines for Americans*[29] and *MyPlate*[30] were also consulted. Lesson content included: food groups, nutrition facts labels, serving sizes, dietary fat, chronic disease, fruits and vegetables, and healthy snacking. Pre- and post-assessments were related to these topics. A lesson plan was written for each session and met at least one North Carolina Department of Public Instruction (NCDPI) Competency objective[31] for the middle school population.

PROCEDURE

In order to proceed with the intervention, participants had to return a signed letter of consent from their parent/guardian that acknowledged their permission to participate in the study. The letter of consent also included space for parents to write-in any food allergies that the student may have in order to eliminate any snacks containing food allergens during the snack test.

The first week of the intervention consisted of informing the students that an educator would be present for one day a week for the next five weeks in ESD to teach a nutrition session and provide a snack. The nutrition educator administered the pre-assessment and the snack test to the 13 students present. During the following four weeks, a snack was provided and then a 20-minute nutrition lesson was taught to the students. The snacks consisted of: grapes, whole-grain goldfish, low-fat and non-fat yogurt, and

celery with peanut butter. The last week of the program involved the administration of the post-assessment and the snack test to the 12 students present. Nutrition sessions were not given on assessment and snack test weeks. In addition to the intervention modeled after the study done by Matvienko, a survey was given to the supervising staff member during week six in order to provide a third party perspective and feedback on the student's response over the course of the program.

The knowledge assessment was another component in the study. The knowledge assessment was composed of 6 multiple-choice questions and 2 "Yes" or "No" answer questions. Only the multiple-choice questions assessed the nutrition education content covered during the program (pre- and post-assessment questions can be found in Appendix A). In **Figure 3**, the percent correct is displayed as a group average per question.

RESULTS

The pre- and post-knowledge assessments revealed that students increased their nutritional knowledge by the end of the program. Data from the pre- and post-snack test revealed that behavior in snack choice did not improve. According to the data in **Figure 1**, healthier choices were made less often during the post assessment. This finding is unexpected because students enjoyed all the healthy snacks provided during the program: grapes, whole grain Goldfish®, yogurt, and celery with peanut butter. **Figure 2** identifies the percentage of high nutritional value snack choices and low nutritional value snack choices participants made during the snack tests. Both of the pre- and post- test groups had the same percentage (27.8%) of participants that chose high nutritional value snacks. However, in the post-snack test, the percentage of participants that chose low nutritional value snacks increased.

Figure 2

Nutritive Value of Snack Choices		
	Pre	Post
High Nutritional Value	27.8%	27.8%
Low Nutritional Value	59.0%	66.7%

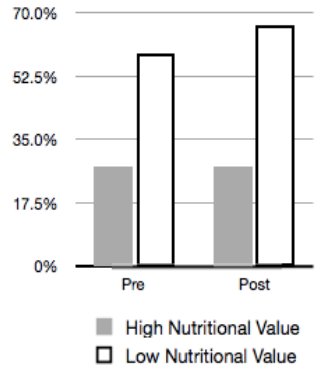
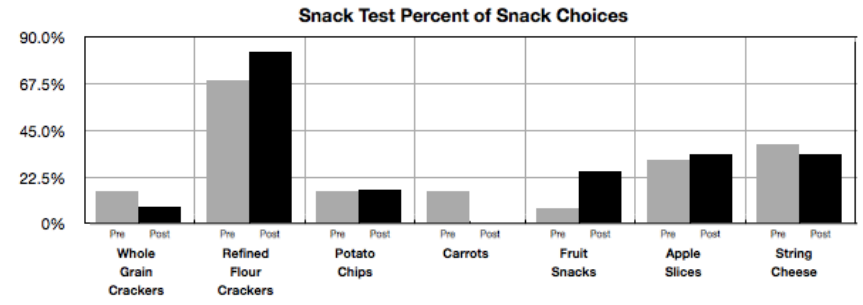


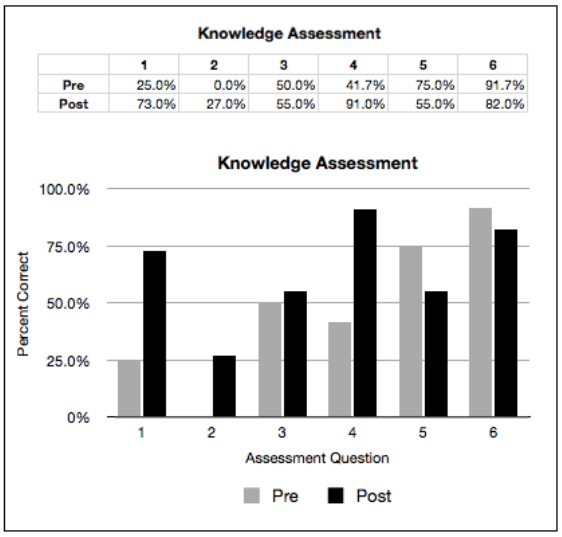
Figure 1

Snack Test Percent of Snack Choices							
	Whole Grain Crackers	Refined Flour Crackers	Potato Chips	Carrots	Fruits Snacks	Apple Slices	String Cheese
Pre	15.4%	69.2%	15.4%	15.4%	7.7%	30.8%	38.5%
Post	8.3%	83.3%	16.7%	0.0%	25.0%	33.3%	33.3%



The graph indicates there was increased nutritional knowledge. Question 4 about dietary fat and heart disease had the greatest improvement in scores.

Figure 3



The last component of research was the staff survey. At the end of the program, which the staff member was able to sit in on, the staff member answered several questions regarding their perspective on the student participants' willingness to learn and change behavior. The staff member indicated that the time of day was effective; lessons were practical, and informative. The participant staff member also indicated that student participants seemed indifferent about the topic of nutrition and believed the student participants were not likely to make healthier food choices as a result of the lessons.

DISCUSSION

The study conducted tested the hypothesis that nutrition intervention will have a positive effect on snack choice behavior in the middle students participating in a specific after school program. After analyzing pre- and post-snack test data, results did not support the hypothesis. Knowledge assessment scores indicate that student participants did increase in nutritional knowledge, however the behavior was not put to action during the recorded snack tests.

There are several limitations that could have influenced these findings. An educator visited the school 6 times on the same day, at the same time once a week. The sessions were inclusive to all present students. This characteristic of the study allowed for students to participate in snack tests or sessions without having to have attended any previous sessions. Some students did not receive all the lessons, which could have resulted in missed knowledge. In addition to the variance in attendance, the afterschool setting may not have been the most ideal time of day. Students appeared restless and talkative during the programs and seemed to have a low level of interest in the topic.

The student participants' academic background may have also been a factor in the appropriateness or effectiveness of the lessons taught during the intervention. The school chosen for the study does not follow NCDPI Standard Course of Study competencies because it is a private institution. The competencies taught were grade and age appropriate for middle school students in a North Carolina public school. The health and nutrition curriculum for private institutions may be different than that of public institutions.

A possible reason for lack of interest could have been the infrequent use of visual aids. The staff member indicated on their survey that increased use of visual aids would improve the lessons for the students. In order to be effective for all student learners, lessons may have needed more components that adhered to the needs of visual or kinesthetic learners. The 20 minute lesson consisted mostly of lecture and discussion-style feedback, which adheres mostly to the needs of auditory learners.

One other component that plays a role, not only in student behavior, but human behavior is readiness to change. According to the transtheoretical model of behavior change, if the student participants were at the level of precontemplation, then they would have no

intention of acting on their nutritional knowledge.[32] While students may have been present and actively participating, they may not have taken ownership of the importance of nutrition for their own health. Until a student reaches the level of contemplation or preparation will they then change their behavior. The attitude of the student connects the knowledge with the behavior, if attitude is apathetic toward nutrition, knowledge will not affect behavior.

CONCLUSION

Against the findings of previous studies and background research, the results of this study suggest that nutrition intervention does not affect snack choice for middle school students participating in an after school program. These findings are not generalizable for all private middle school after school programs in North Carolina. This test may be useful in another setting or if students volunteered to participate. Nutrition intervention may be more effective with a population of students who realize nutrition is important for health or contemplating healthy behavior change. Matvienko[9] had great success with a very similar study with 6- and 7-year old children. This study found no change in snack choices as a result of nutrition intervention.

FUTURE RESEARCH

If done again in the future, this study could be improved with current curriculum, a better time of day, and a larger participant group. The lessons taught were modified because they were not up to date on the newly released dietary guidelines and *MyPlate* icon. Lessons could have also appealed to learning styles other than auditory; getting the student participants involved in the lesson may improve retention. Also, having the program at the end of the school day may not be as effective as incorporating it into a health or science class. Finally, having a larger participant group would help to make the data more accurate. With a larger participant group, lessons could be taught per grade and may result in better understanding and increased willingness to change.

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PARENTAL PERMISSION/CHILD ASSENT

for an undergraduate research study entitled

"What effect does nutrition intervention have on snack choice for middle school students in the Raleigh area participating in after-school programs?"

Your child is invited to participate in a research study to evaluate the effectiveness of nutrition education on snack choice in middle school students. Over 6-weeks between February and March 2012, voluntary middle school students participating in the after-school program at Raleigh Christian Academy will undergo a pre- and post-assessment, pre- and post-snack test, and 4 nutrition education sessions with snacks. Content analysis of snack choices will provide numerical data for evaluation and pre- and post-assessments will contain identical questions. All snacks will be coded and selected based on dietary restrictions of participants and nutritional value. The supervising faculty member will also undergo a pre- and post-intervention interview in order to triangulate the data. The study is being conducted by Caitlin Schryver under the direction of Dr. Beth Gankofskie in the Meredith College Department of Nutrition. Your child was selected as a possible participant because he or she is a middle school student participating the ESD program at Raleigh Christian Academy. Since your child is age 18 or younger we must have your permission to include him/her in the study.

What will be involved if your child participates? If you decide to allow your child to participate in this research study, your child will be asked to take a pre- and post-assessment, participate in a snack test, and attend nutrition sessions during ESD. Your child's total time commitment will be approximately 3 hours.

Are there any risks or discomforts? The risk associated with participating in this study is consumption of snacks containing possible food allergens. To minimize these risks, we ask that if you choose to permit your child to participate, that you write-in below any food allergies that your child has. Foods containing known allergens will be eliminated from the study.

Are there any benefits to your child or others? If your child participates in this study, your child can expect to receive about 2 hours of nutrition education, free healthy snacks, and knowledge on how to make healthy lifestyle choices. Participants will have the knowledge of how to make easy, healthy choices to improve their diet and quality of life.

Will you or your child receive compensation for participating? Students participating in the study will receive a free snack at every session.

Are there any costs? If you decide to allow your child to participate, you will not incur any costs from the study.

Parent/Guardian Initials_____

Participant Initials_____

If you (or your child) change your mind about your child's participation, your child can be withdrawn from the study at any time. Your child's participation is completely voluntary. If you choose to withdraw your child, your child's data can be withdrawn as long as it is identifiable. Your decision about whether or not to allow your child to participate or to stop participating will not jeopardize your or your child's future relations with Meredith College, the Department of Nutrition or Raleigh Christian Academy.

Your child's privacy will be protected. Any information obtained in connection with this study will remain anonymous. Attendance will be taken at each session to verify accuracy of data but no personal information will be taken or recorded. Names will only be used for attendance and making sure that only participants with proper consent are participating. Data obtained through your child's participation will be used in a group analysis as part of an undergraduate honors thesis.

If you (or your child) have questions about this study, please contact Caitlin Schryver at cschryver@tylernc.com or (919) 480-7743. A copy of this document labeled "Parent Copy" is attached for you to keep.

HAVING READ THE INFORMATION PROVIDED, YOU MUST DECIDE WHETHER OR NOT YOU WISH FOR YOUR CHILD TO PARTICIPATE IN THIS RESEARCH STUDY. YOUR SIGNATURE INDICATES YOUR WILLINGNESS TO ALLOW YOUR CHILD TO PARTICIPATE. YOUR CHILD'S SIGNATURE INDICATES HIS/HER WILLINGNESS TO PARTICIPATE.

_____		_____		_____	
Participant's signature	Date	Parent/Guardian Signature	Date	Investigator obtaining consent	Date
_____		_____		_____	
Printed Name		Printed Name		Printed Name	

Instructions: Please circle the best answer choice for each question below.

1) _____ are the major source of energy for the body and come in the form of sugar and starches. Most of these are found in fruits, vegetables, and grain products.

   A. Fats B. Carbohydrates C. Proteins

2) How many daily servings of fruits and vegetables are recommended by the Dietary Guidelines for Americans 2010?

   A. 1-3 servings B. 2-4 servings C. 5 servings

3) Which of the following items on a product package can help me figure out how much energy I will get from the food?

   A. Nutrition Facts label B. Serving size C. Ingredients list

4) Eating any type of fat increases one's risk for heart disease.

   A. True B. False

5) Having a snack in between meals is a bad habit and is not good for my body.

   A. True B. False

6) A serving of cheese is about the size of a deck of cards.

   A. True B. False

Instructions: Please circle the answer choice that pertains to you <u>most or all of the time</u>.

7) When choosing snacks to eat, I read the nutrition facts label to help guide my decision.

   A. Yes B. No

8) I believe that what I eat now can impact my overall health later on in life.

   A. Yes B. No

IRB File #_____

Meredith College Institutional Review Board
Application for Approval of Research with Human Participants for
Projects Requiring Expedited or Full Review

Project Title: *What effect does nutrition intervention have on snack choice for middle school students in the Raleigh area participating in after-school programs?*

Principle Investigator (for co-investigators, submit equivalent information on a separate sheet):

Amber Caitlin Schryver maheramb@email.meredith.edu

Printed name and email

2038 Turtle Point Drive Raleigh, NC 27604

Local mailing address

Signature and date

Faculty Supervisor (if PI is a student)

Beth Gankofskie gankofsk@meredith.edu

Printed name and email

Local mailing address

Signature and date

_X_ Check here if requesting an expedited review. This type of review is preferred for the categories of research identified by the Department of Health and Human Services in the *Federal Register* as eligible for an expedited review. Eligibility depends upon recognition of the research as belonging to a category involving no more than minimal risk. Expedited Review may also be conducted for consideration of minor changes in research that was previously approved, during the time period for which approval was granted. Submit three(3) copies of this form with attachments to the Office of the Undergraduate Research Program, SMB.

____Check here if requesting a full board review. Submit eight (8) copies of this form with attachments to the Office of the Undergraduate Research Program, SMB.

Follow Instructions on Reverse Page

Attach responses to each of the following:

Identify the participant population. Explain the rationale, report if the population includes a vulnerable group such as prisoners, children, the mentally disabled, or those whose ability to give informed consent may be in question.

Middle school students, grades 6-8, who are participating in the Extra School Day (ESD) after-school program at Raleigh Christian academy. Participants are part of a vulnerable group and are required to have informed parental consent in order to participate. Several studies have shown that nutrition education can be effective on eating behavior. The after-school setting is an opportunity to educate students about nutrition and provide them with an instant application: snack.

Describe and assess the likelihood and seriousness of any potential risks of a physical, psychological, social, occupational, financial or legal nature that may occur for participants.

The potential risk involved in this study is a food allergy. Only parent-approved snacks will be provided and choices will be recorded in this study, so any participant with a food allergy must inform the investigator on consent form.

Describe procedures, including confidentiality safeguards, for protecting against or minimizing potential risks.

Participant and parent/guardian names will not be used anywhere in the study report or data analysis. Intervention participant's data will be analyzed as a group, not individually. Names will only be used for attendance and making sure that only participants with proper consent are participating.

Consent form includes a space for parent/guardian to list food allergens that may cause an allergic reaction in their child. Foods containing or processed in a facility with any known allergens to any participants will be eliminated from the list of provided snacks and snack options. This action will minimize the risk of a child consuming a food containing a known allergen.

Assess the potential benefits to be gained by the individual participant, and/or benefits that may accrue to society as a result of the research; analyze the risk/benefit ratio.

By the end of this study, participants will have received about 2 hours of nutrition education, healthy snacks, and knowledge on how to make healthy decisions. For students with a food allergy, no matter what kind of food they eat, they will still have to inspect labels to insure they are eating a safe food. The healthy snacks chosen will not put them at risk for consuming allergens if the investigator has been properly informed of the allergy. Participants will have the knowledge of how to make easy, healthy choices to improve their diet and quality of life.

Compose a statement in layman's language explaining the project.

The purpose of this study is to evaluate the effectiveness of nutrition education on snack choice in middle school students. Over 6-weeks between February and March 2012, voluntary middle school students participating in the after-school program at Raleigh Christian Academy will undergo a pre- and post-assessment, pre- and post-snack test, and 4 nutrition education sessions with snacks. All snacks will be selected based on dietary restrictions of participants and nutritional value. Content analysis of snack choices during the snack test will provide numerical data for evaluation, pre- and post-assessments will contain identical questions for comparison, and the supervising faculty member will also undergo a pre- and post-intervention interview in order to provide the third data set to triangulate the data.

Enclose a copy of the Informed Consent document to be used in the research. Refer to the Operational Guidelines of the Meredith IRB for a full description of the elements of consent.

Application for IRB authorization [____is] [____ is not] approved.

Signature of IRB Chairperson_____

Date of decision _____, and if approved…

Approval expiration date_____