

NURSE AND TEACHER LED ADOLESCENT HEALTHY WEIGHT CLASSES TO
IMPROVE HEALTH BEHAVIORS

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ABSTRACT

Gary Dupart: Nurse and Teacher Led Adolescent Healthy Weight Classes to Improve Health Behaviors

(Under the direction of Diane Berry)

Problem Statement: Weight management is a public health problem affecting adolescents across the United States that negatively impacts their current and future physical, social, and behavioral health. Rapid implementation of efficient and sustainable interventions is necessary to manage the problem.

Purpose: The purpose of this study was to examine the feasibility and initial efficacy of using a weight management intervention that was school-based, evidence-based, and developmentally appropriate to help adolescents develop and maintain healthy nutrition and physical activity behaviors and improve their adiposity and weight status.

Methods: This feasibility and initial efficacy study used a single group repeated measures design. The sample consisted of African American, non-Hispanic white and bilingual Hispanic adolescents enrolled at the Just Right Academy in Durham, North Carolina. The participants received a healthy nutrition and physical activity education and exercise intervention. The intervention included a 7-week series of a 45-60 minute, nurse-led and classroom teacher assisted, evidence-based, and developmentally appropriate nutrition and physical activity education and exercise classes offered twice a week, for a total of 14 classes. Data were collected before the intervention started at Time 1 (baseline), at Time 2 (after completion of the intervention), and Time 3 (after three months without contact from the study staff). Data

collected included height, weight, body mass index (BMI) percentiles, and adiposity (waist circumference and triceps and subscapular skinfolds). Health behavior information and changes were collected using the Child Health Behavior Survey, physical activity logs, and parental and schoolteachers' interviews.

Analysis: Descriptive data analyses and correlations were conducted but interpreted conservatively, considering the small sample size and methodology as a feasibility and initial efficacy study. Paired t-tests were run on weight, adiposity, nutrition and physical activity data from Time 1 to Time 2 and Time 1 to Time 3 to examine changes in weight, adiposity and health behaviors across time.

Results: As expected participants mean height increased from Time 1 to Time 2. However, at Time 3 mean height decreased, which was most likely secondary to several students who were quite tall left the school, and we were unable to contact them for the Time 3 data collection.

There was a significant increase in weight and BMI percentile at both Time 2 and Time 3. The BMI percentile measurements indicated that during the Time 1 measurement 1 of 15 students was underweight, 6 of 15 students were normal weight, 4 of 15 students were overweight, and 4 of 15 were obese. During the Time 2 measurement 7 of 14 students were normal weight, 3 of 14 students were overweight, and 4 of 15 were obese. During Time 3 measurement 1 of 12 students was underweight, 3 of 12 students were normal weight, 3 of 12 students were overweight, and 5 of 12 were obese. There was no significant decrease in triceps or subscapular skinfolds at Time 2 or Time 3. There was a significant decrease in waist circumference at Time 2 and Time 3.

Interview feedback, low cost, and successful completion of all planned activities indicated that students, parents, and school staff believed that the project was beneficial and suitable for their school. The intervention faced no notable barriers and had no cost for the school. The cost for

the researcher included only printing (\$30) and assorted teaching materials (\$20).

Significance: The results of this study suggest that an evidence-based and developmentally appropriate weight management intervention is acceptable and feasible in a non-traditional school setting. Management of adiposity and weight in adolescents may improve their physical, social, and health behaviors and contribute to their overall wellness. Further study is needed to determine efficacy towards behavior change and weight management more accurately.

To my wife for all your patience and support throughout my latest academic journey.

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LIST OF ABBREVIATIONS AND SYMBOLS

BMI	Body Mass Index
CDC	Center for Disease Control and Prevention
CM	Centimeters
DDHS	Department of Health and Human Services
KG	Kilograms
MM	Millimeters
NC	North Carolina
US	United States
USDA	United States Department of Agriculture
WC	Waist Circumference
&	And
%	Percent
>	Greater than
<	Less than

CHAPTER 1: INTRODUCTION

Overweight and obesity in adolescents is a national public health concern. Within the United States (US), adolescents with overweight and obesity have increased dramatically over the last 30 years (Center for Disease Control and Prevention [CDC], 2015). North Carolina (NC) is ranked 23rd in the US for having the highest childhood obesity rates (Community and Clinical Connections for Prevention and Health, 2016). Durham County in NC is particularly affected (Angle & Sharpe, 2010; Child and Adolescent Health Measurement Initiative, 2012).

Adolescents with overweight and obesity are at a greater risk for physical, behavioral, and social health problems than their average weight peers (Black, Zhou, Takayanagi, Jacobsen, & Koebnick, 2013; Park, Falconer, Viner, & Kinra, 2012; Pulgaron, 2013).

Despite interventions developed at the state and national level, decreasing overweight and obesity remains challenging. Individual and cultural barriers to healthy eating and physical activity create obstacles that make it challenging for adolescents to achieve healthy adiposity and weight (Sallis & Glanz, 2006; Strasburger, Jordan, & Donnerstein, 2010). A review of dietary variables contributing to poor weight management demonstrated that unhealthy eating patterns such as high-calorie foods and low consumption of fruits and vegetables are important for adolescent weight management (Office of the Surgeon General, 2010; Sallis & Glanz, 2006). Also, low levels of regular physical activity and increased sedentary behaviors including video games and television watching have notably increased adolescents' risk of developing overweight and obesity (Office of the Surgeon General, 2010; Sallis & Glanz, 2006; Strasburger et al., 2010).

When a theoretical framework was applied to an adolescent obesity intervention, researchers found that strategies targeting the individual, family, and school environment appeared to have the greatest impact (Bloonpleng et al., 2013). Research suggests that school-based interventions may be the best approach for childhood obesity management, but few study designs have used nurse-led and evidence-based interventions (American Dietetic Association [ADA], 2006; Brown & Summerbell, 2009; Katz, O'Connell, Njike, Yeh, & Nawaz, 2008; Kelishadi & Azizi-Soleiman, 2014; Kriemler et al., 2011; Sun et al., 2013; Tucker & Lanningham-Foster, 2015).

Problem Statement

Weight management is a significant problem negatively affecting adolescents across the US. The prevalence of children and adolescents with overweight and obesity has increased from 14.7% in 1980 to 31.8% in 2012 (CDC, 2015). A total of 33% of adolescents aged 10-17 years in NC are currently overweight or obese (Child and Adolescent Health Measurement Initiative, 2012). Also, Durham County is ranked 52 out of 100 counties in NC for children with overweight and obesity (Eat Smart, Move More, NC, 2012a; Eat Smart, Move More, NC, 2012b). Overweight and obesity has negatively impacted adolescents by increasing their risk for metabolic and cardiovascular disease, bullying and stigmatization, and behavioral health concerns including body dissatisfaction (Puhl & Latner, 2007; Pulgaron, 2013; Wills, Backett-Milburn, Gregory, & Lawton, 2006).

Adolescents are experiencing high levels of overweight and obesity that may negatively impact their health and increase morbidity and mortality as they move into young adulthood. This trend has increased over the last three decades and is not expected to improve in the near future. If this trend continues the health of adolescents will continue to decline. Therefore,

innovative interventions that are immediately sustainable by embedding them in schools with teachers are needed. Accordingly, such an intervention should be appropriate for the school's population and easily deployed within the school's established operations (Smith & Petosa, 2016).

Purpose

The purpose of this study was to examine the feasibility and initial efficacy of a healthy nutrition and physical activity intervention to improve adiposity and weight management in adolescents using an evidence-based and developmentally appropriate intervention in the school setting and partnering with school educators to produce immediate implementation and sustainability. The specific aim was to examine weight status (body mass index [BMI] percentile), adiposity (waist circumference and triceps and subscapular skinfolds), and health behaviors (nutrition and physical activity) from Time 1 (baseline) to Time 2 (after completion of intervention) and from Time 1 (baseline) to Time 3 (after 3 months without contact from the study staff).

Clinical/Practice Question

Will the use of an evidence-based series of healthy nutrition and physical activity classes delivered within a school setting, develop and sustain healthy eating behaviors and physical activity in adolescents while managing adiposity and weight?

CHAPTER 2: REVIEW OF THE LITERATURE

Adolescent Health Risks

Adolescents with overweight and obesity have a greater risk of immediate and future physical, behavioral, and social health problems (Puhl & Latner, 2007; Pulgaron, 2013; Wardle & Cooke, 2005). Improvements in nutrition and physical activity may reduce these health risks by using evidence-based interventions that are appropriate for the developmental level and based in a school setting (American Dietetic Association, 2006; Bloonpleng et al., 2013; Brown & Summerbell, 2009; Katz et al., 2008).

Physical Health. Adolescents with overweight and obesity are at an increased risk for prediabetes, type 2 diabetes mellitus, hypertension, cardiovascular disease asthma, poor dental health, orthopedic disorders, and sleep apnea (American Diabetes Association, 2016; Black et al., 2013; Mozaffarian et al., 2016; Park et al., 2012; Pulgaron, 2013). Diabetes and cardiovascular disease in adults are associated with overweight and obesity in adolescence (CDC, 2015; Tirosh et al., 2011). Immediate physical health risks including prediabetes, diabetes, asthma, and orthopedic problems in adolescence are of urgent concern since there is limited data on the long-term consequences of overweight and obesity in adolescents (Black et al., 2013; Park et al., 2012; Pulgaron, 2013).

Behavioral Health. There is evidence suggesting that adolescents with overweight have lower body satisfaction, decreased self-esteem, increased anxiety, increased substance abuse risk, and more depressive symptoms compared to their average weight peers (Cortese et al., 2009; Loth, Mond, Wall, & Neumark-Sztainer, 2010; Petry, Barry, Pietrzak, & Wagner, 2008). An

increased risk for depression and suicide was found in adolescents with obesity and extreme obesity, with markedly lower risk for adolescents with overweight (Boutelle, Hannan, Fulkerson, Crow, & Stice, 2010; Hoare, Skouteris, Fuller-Tyszkiewicz, Millilar, & Allender, 2014; Zeller, Reiter-Purtill, Jenkins, & Ratcliff, 2013). These outcomes indicate a significant difference in potential risk for depression and suicide among adolescents with overweight and obesity. Further evidence demonstrated that the higher the BMI category, the higher risk for the overall poor current health, prevalence of chronic conditions, sleep problems, and difficulties with behavioral health (Wake et al., 2013).

It is important to distinguish overweight from obesity due to the presence of some risk factors that exist only for those adolescents who fall in the obese category. However, it is also worth noting that the trajectory of adolescents with overweight is toward future obesity that will ultimately bring them into the higher risk category (Krebs, Himes, Jacobson, Nicklas, Guilday, & Styne, 2007). More research is needed that distinguishes overweight from obesity and clarifies the direction of causality between adolescent weight and depression (Hoare et al., 2014; Mühligh, Antel, Focker, & Hebebrand, 2016; Peirson et al., 2015).

Researchers have identified that increased BMI, weight-based teasing, and weight and image concerns were associated with higher suicide risk in obese individuals (Goldfield et al., 2010; Pompili, Girardeau, Tatarellia, Rubertoa, & Tatarellia, 2006). Remarkably, research is lacking to support the widespread belief that adolescents with overweight are significantly more depressed than average weight peers when obesity is differentiated from overweight (Boutelle et al., 2010; Petry et al., 2008; Wardle & Cooke, 2005). Furthermore, supporting evidence linking obesity with suicide remains controversial with some research finding no proof of the relationship (Heneghan, Heinberg, Windover, Rogula, & Schauer, 2012; Magnusson,

Rasmussen, Lawlor, Tynelius, & Gunnell, 2006). Despite the mixed findings, suicide remains a threat to be taken seriously in an already vulnerable population. Several eating disorders also place adolescents at an increased risk for suicide and have shared risk factors with obesity (Haines & Neumark-Sztainer, 2006; Neumark-Sztainer et al., 2006; Pompili et al., 2006).

Social Health. Adolescents with overweight and obesity also experience a higher risk of body dissatisfaction with an increased related risk of unhealthy eating behaviors (Puhl & Latner, 2007). In a study by Danielsen and colleagues (2012), children with overweight reported lower levels of confidence and self-assurance related to appearance, athletic ability, and social status. It is likely that the combination of social and internal pressures contributes to decreased feelings of self-worth among adolescents with overweight. Poor self-image has also been linked to bullying (Wills et al., 2006).

Adolescents with obesity have been subjected to more bias, stereotyping, discrimination, and ridicule than their average weight peers (Puhl & King, 2013). One study found that nearly half of adolescents with overweight or obesity reported being bullied or called derogatory names because of their weight (Wills et al., 2006). This same study indicated that these adolescents were subjected to regular criticism and experienced anxiety while eating, trying on clothes, and during social activities (Wills et al., 2006). These findings suggest that such repetitive denigration could result in poor outcomes for adolescents' self-concept and confidence. Therefore, implementing interventions that promote healthy eating behaviors and exercise could potentially decrease the risk for obesity, eating disorders, suicide, negative body image, and other social distress (Han, Lawlor, & Kimm, 2010; Penedo & Dahn, 2005; Stathopoulou, Powers, Berry, Smits, & Otto, 2006; Wake et al., 2013).

Dietary Factors

Management of overweight and obesity in adolescents requires a balance between nutrition and physical activity (CDC, 2011a). Unhealthy eating practices such as fast food, lack of fruit and vegetables, and oversized portion sizes contribute to the development of obesity (Office of the Surgeon General, 2010; Sallis & Glanz, 2006). Adolescents gain weight when they consume more calories in their diet than they are able to expend by their physical activity (CDC, 2011a).

Improvements in healthy eating behaviors in adolescents support overweight and obesity prevention (Office of the Surgeon General, 2010). However, most adolescents within the US do not eat the recommended daily servings of fruits and vegetables (US Department of Agriculture, 2010). The recommended daily amount of fruit for adolescents is 1.5-2 cups with 2-3 cups of vegetables (US Department of Agriculture, 2015). However, the median consumption of fruits and vegetables for high school students was only 1.2 servings daily; therefore, they did not meet the recommended daily allowance (CDC, 2011a). The CDC (2011b) report found that 28.5% of high school students consumed a serving of fruit less than one time daily, and 33.2% of the students consumed a serving of vegetables less than one time daily. Far fewer students achieve or exceed the recommendations with only 16.8% of high school students consuming a serving of fruit at least four times a day and 11.2% of students consuming a serving of vegetables at least four times a day (CDC, 2011a). Educating adolescents using proven teaching strategies could improve their fruit and vegetable consumption. Experiential learning is one approach that has been found to be an effective method to promote positive changes in nutrition knowledge and behaviors in adolescents (Dudley, Cotton, & Peralta, 2015).

A healthy diet is an important component in maintaining a healthy body weight and body composition (CDC, 2011b; Ho et al., 2013; Office of the Surgeon General, 2010). A study in Saudi Arabia found that weight gain and inadequate nutritional intake was higher for adolescents who began eating a “Western style diet,” fast food and snacks high in calories and low in nutrients, compared to those eating the traditional Arabic diet (Washi & Ageib, 2010). The typical US adolescent diet consists of a low level of fruits and vegetables combined with energy-dense snacks, fast food, and sugar-sweetened beverages, which results in an increased risk of developing obesity (CDC, 2011b; Ebbelling et al., 2012; Office of the Surgeon General, 2010; Washi & Ageib, 2010). To promote healthy weight in adolescents, interventions should provide education on both healthy eating and physical activity (CDC, 2011a).

Physical Activity Factors

Physical activity is another essential component in creating an energy balance to manage and prevent overweight and obesity in adolescents (Office of the Surgeon General, 2010; CDC, 2011a). Sedentary behaviors such as television watching, video games, and playing on the computer are all risk factors for developing overweight and obesity (Office of the Surgeon General, 2010; Sallis & Glanz, 2006). Also, sedentary behaviors were found to be negatively associated with fruit and vegetable consumption and positively related to energy dense snacks and increased fast food consumption (Pearson & Biddle, 2011). The poor outcomes and increased risk related to the increasingly common sedentary behaviors in adolescents indicate a need for an intervention increasing physical activity. Researchers have found that brief interruptions of sedentary activity as short as 30 minutes a day could improve metabolic function (Belcher et al., 2015). Therefore, an intervention able to increase adolescents’ physical activity at least 30 minutes daily could decrease several barriers to achieving a healthy weight.

The increased use of technological devices in homes, schools, and at work, has also decreased daily physical activity (Ng & Popin, 2012; Office of the Surgeon General, 2010; Strasburger et al., 2010). Obesity prevention efforts should include reducing the amount of sedentary behavior and increasing physical activity. Increasing physical activity in adolescents can be accomplished by reducing electronic screen time, encouraging outdoor play, and incorporating more walking into daily routines (CDC, 2011; Johnson, Kremer, Swinburn, & De Silva-Sanigorski, 2012; Sallis & Glanz, 2006). To reduce inactive media time and support additional outdoor activity, interventions should engage adolescents with developmentally appropriate concepts and evidence-based teaching strategies.

Evidence-Based Interventions

A focused literature review was completed to examine which components were necessary to include in an intervention developed for adolescents that would most likely be well received. The studies included were primarily conducted in the US and contained results using only adolescents' ages 13-19, or mixed age ranges that included teenagers. The research, from the last ten years, included systematic reviews, randomized control trials, case-control studies, semi-experimental designs, and descriptive surveys. The studies selected described the best environment for interventions, types of physical activity for adolescents, appropriate duration of interventions, strategies to improve dietary habits, and plans to encourage maintenance of the behavioral modifications.

Physical Activity Interventions. Research findings suggest that the best environment to improve physical activity behaviors for adolescents is within school settings (Bloonpleng et al., 2013; Van Sluijs, McMinn, & Griffin, 2007). The findings of a systematic review of interventions to improve physical activity determined that adolescent physical activity could be

significantly increased with multicomponent interventions (American Dietetic Association, 2006; Van Sluijs et al., 2007). Multicomponent interventions including diet, physical activity, and behavior were specifically identified as being effective in reducing weight status and adiposity (American Dietetic Association, 2006). Also, several studies have identified that adolescents are more willing to participate in exercise and physical activity that was perceived as enjoyable (Hill & Cleven, 2005; Schneider, Dunn, & Cooper, 2009).

Based on the evidence, an effective intervention to improve physical activity in adolescents should include multifaceted and enjoyable exercises within a school setting. Hill & Cleven (2005) identified a range of activity preferences that should be incorporated into interventions designed to be fun for adolescents. Adolescent's preferences included competitive and group activities and individual and non-competitive activities (Hill & Cleven, 2005; Silva Filho, Tani, Correia, & Correa, 2012; Wilson, 2007). Successful interventions for a mixed gender group should include a variety of activities that best accommodate most preferences.

Diet and Nutrition Interventions. The evidence on interventions to improve dietary habits suggests the importance of emphasizing portion control and restriction of high-calorie foods (American Dietetic Association, 2006). An intervention in the US that reduced only sugar-sweetened beverages in adolescent's diet demonstrated reductions in their BMI (Ebbeling et al., 2012; Ebbeling, Feldman, Osganian, Chomitz, Ellenbogen, & Ludwig, 2006). To improve knowledge of caloric content and encourage the restriction of higher calorie foods, nutrition information should be presented in a way that is personally relevant and easily understandable (Bleich, Herring, Flagg, & Gary-Webb, 2012; Evans et al., 2015). Use of a physical activity energy equivalent for the caloric content of foods has been identified as a useful strategy for

teaching adolescents nutrition information (Bleich, Herring, Flagg, & Gary-Webb, 2012; Evans et al., 2015).

To promote adolescent's selection of healthier food choices, interventions should encourage food preparation skills and focus on the social context of their food consumption (Husby, Heitmann, & O'Doherty Jensen, 2009; Wrieden et al., 2007). Strategies to accomplish this with adolescents include teaching basic cooking skills, encouraging healthy packed meals, and eating within social groups (Husby et al., 2009; Wrieden et al., 2007). Use of a participative cooking class within the school setting should include these techniques and have previously demonstrated efficacy (Fisher, Nicholas, & Marshall, 2011). The participative design of the cooking classes and activities provides an opportunity to apply the experiential learning theory in an accessible and authentic learning environment.

CHAPTER 3: THEORETICAL FRAMEWORK

Developmental theory, ecological systems theory and experiential learning theory provide partial explanations for many adolescent dietary and exercise habits (Erikson, 1994; Bronfenbrenner, 1979; Kolb, 1984).

Developmental Theory

Healthy behaviors and weight control are often influenced by the current developmental stage of adolescents (Salvy, De La Haye, Bowker, & Hermans, 2012). The Identity versus Role Confusion stage is a time that adolescents begin establishing their sense of self with more independence and less identification as their parent's child (Block, 2011; Erikson, 1994). The shift toward egocentrism and identity searching often results in adolescents' relying on peers and "teen idols" for values while rejecting parental standards (Block, 2011). However, parental responses to their teen's increasing autonomy may influence the degree of resistance received and the establishment of a secure identity (Koepke & Denissen, 2012; Kroger, 2008).

These developmental changes suggest that adolescent eating and exercise habits will be less influenced by parental advice than by peers, media, and teen heroes. Research findings suggest that social influences, mainly perceived cultural norms for eating and physical activity, affecting adolescents' diet and activity levels are high during adolescence (Salvy et al., 2012). Also, interventions using popular culture references will engage adolescents at their developmental level while encouraging interest and participation in learning (Patino, Kalcheva, & Smith, 2011; Petrone, 2013). Parental modeling of healthy eating remains important because adolescent food

intake is also influenced by environmental variables including parental behaviors, food exposure, and portion sizes (Golan, 2013; Johnson et al., 2012).

Ecological Systems Theory

Ecological systems theory describes the impact of different environmental systems on child development (Bronfenbrenner, 1979). This theory facilitates an understanding of how environmental contexts may influence adolescents struggling with weight management and assist researchers with identifying key environmental contributors (Bloonpleng et al., 2013; Davison & Birch, 2001). A fundamental component of this theory is the five nested environments (Bronfenbrenner, 1979). The nested environments concept works well to explain the various environments and how they impact adolescent development (Bronfenbrenner, 1979). A model of these nested environments provides a visual aid in the understanding of how the multiple interacting environments contribute to obesity in adolescents.

A model of the nested environments includes the microsystem, mesosystem, exosystem, macrosystem, and chronosystem (Bronfenbrenner, 1979). The microsystem is closest to the developing person and includes groups that the developing person comes in direct contact with (Bronfenbrenner, 1979). Examples of microsystem groups include family, school, neighborhood, and peers and relationships among these groups are bi-directional. The mesosystem includes the interconnections or relationships between microsystem components (Bronfenbrenner, 1979). The exosystem is the connection between social settings, for the microsystem participants and the developing person's direct situation (Bronfenbrenner, 1979). The macrosystem is the larger cultural environment in which the individual lives and includes social norms, cultural values, and political systems (Bronfenbrenner, 1979). The chronosystem

includes events that occur throughout a person's lifetime and includes sociohistorical changes, environment and other transitions over the lifespan (Bronfenbrenner, 1979).

The ecological systems theory provides ways to comprehend the multiple interconnected variables that may influence a multifaceted problem like adolescents with obesity. The multiple environmental contexts evaluated by this theory provide a wide area of consideration when choosing targets for interventions for adolescent weight management. Applying this theory to adolescent weight management, interventions can be developed to target adolescent perception and behaviors in both their school and home environments. Key people from critical environments, such as parents, teachers, and peers, can then be included in various parts of the interventions. The school setting provides a routinely accessible and convenient setting for an intervention targeting adolescents. However, low levels of adolescent and parent participation and low use of take-home activities may limit the potential efficacy outside of the school setting and consequently reduce the weight management impact. These limitations were addressed in the project by using evidence supporting the school environment as having the greatest potential impact on weight management based on the ecological systems theory (Bloonpleng et al., 2013).

Experiential Learning Theory

Kolb's (1984) experiential learning theory provides a strong foundation for designing interventions to reduce obesity in adolescents. The experiential learning model focuses on how each learns through their personal experimentation, experience, reflection, and conceptualization (Kolb, 1984). This type of learning requires an actively involved participant to explore and self-reflect while instructors primarily function as a facilitator (Kolb, 1984).

Experiential learning has been proven to be an effective method to promote positive changes in nutrition knowledge and behaviors in adolescents (Dudley et al., 2015). One study

found that hands-on learning, engaging concepts, and motivation can produce effective results in teaching adolescents (Miller, Rule, & MacEntee, 2008). The development of the adolescent obesity problem can be well assessed by developmental, environmental, and experiential learning theories and interventions applying these theories may offer a greater potential for success.

CHAPTER 4: METHODOLOGY

This feasibility and initial efficacy study used a one group repeated measures design. The sample consisted of African American, non-Hispanic white and bilingual Hispanic adolescents enrolled at the Just Right Academy in Durham, NC. The group of adolescents received a healthy nutrition and physical activity education and exercise intervention. The adolescents received a series of nurse-led and classroom teacher assisted, evidence-based, and developmentally appropriate nutrition and physical activity education and exercise classes. These classes were 45-60 minutes in length and offered twice a week, for a total of 14 classes across 7-weeks. The classes were based on evidence that interactive tasks engage adolescents and that home and social interventions provide the best settings for weight loss (Bloonpleng et al., 2013; Davison & Birch, 2001). Data were collected at Time 1 (before the classes started), Time 2 (after completion of the classes), and Time 3 (after three months on their own). Data collected included height, weight, BMI percentiles, adiposity (waist circumference and triceps and subscapular skinfolds), and health behaviors using the Child Health Behavior Survey (Department of Health and Human Services (DHHS), 2004; Appendix A) with parent and teacher interviews, and physical activity logs (Appendix B). The University of North Carolina at Chapel Hill Institutional Review Board approved the study.

Setting

The Just Right Academy is located in Durham, NC and is a small private school for children who need more structure, consistency, positive reinforcement, and other learning

strategies that are difficult to accommodate in the public school system (Just Right Academy, 2015). The researcher and Doctor of Nursing Practice Project Chair met with the school administrator and teacher of the adolescent classroom to discuss and plan the intervention. They expressed interest in providing the healthy nutrition and exercise intervention to the adolescent class since the overweight and obesity rate among these adolescents was anecdotally reported as high. The site administration described their environment as flexible and willing to make reasonable adjustments for the intervention as needed. In the future, they would like to expand this program to the majority of their classrooms.

Sample

This convenience sample included fifteen adolescents primarily from one classroom, with two students from another class. Two weeks before the enrollment period the researcher and school administrator distributed a letter and a flyer explaining (Appendix C) the classes along with parental consent forms (Appendix D) and adolescent assent forms (Appendix E). The letter explained the study, the intervention classes, and the need for both parent consent and adolescent assent to participate in the study. Parents and adolescents who were interested in participating were asked to meet at the school to learn more about the study and intervention from the Doctor of Nursing Practice student researcher, the Doctor of Nursing Practice Project Chair, and the high school teachers. After the study was explained, risks and benefits of participation and all questions were answered, if the parents and adolescents were interested in participating, parents were asked to sign the consent form and adolescents were asked to sign the assent form signifying their agreement to participation in the study.

Inclusion criteria included participants who were able to speak, write and read in English and ranged from 14 to 18 years of age. Adolescents were excluded if the teacher recommended

that the format of the intervention was a poor match for a student and would have prevented their participation in-group nutrition and exercise education classes in the school.

Intervention Classes

The healthy eating and exercise education classes for the study were developed in collaboration with the Doctor of Nursing Practice Project Chair and are based on evidence-based strategies. The best evidence indicates that healthy eating and exercise is essential to healthy weight maintenance and should be fun (Han et al., 2010; Schneider et al., 2009; Schneider & Cooper, 2011). The classes were interactive and used food models, cooking, games, and popular culture references to engage the adolescents (see Table 1). The classroom sessions lasted approximately 45-60 minutes and began and ended with goal setting. The intervention content was designed to accommodate an appropriate developmental level with consideration for the unique learning needs of each participant. The classes were taught by a certified pediatric registered nurse with experience in nutrition and exercise education and co-taught with three high school teachers at Just Right Academy. The lead high school teacher had been with Just Right Academy for five years and also serves as the assistant director for the school. The lead high school teacher has a bachelor of science in chemistry with a minor in biology and worked as a developmental scientist before to her teaching career.

Table 1. Nutrition and Exercise Education Classes for Adolescents

Classes	Topics
1. Exercise Education	Exercise Can Be Fun
2. Nutrition Education	Packing a Power Lunch
3. Exercise Education	Just Right Academy Fitness: Outdoor Challenge
4. Nutrition Education	Just Right Academy Chef: Tasty and Health Cooking

5. Exercise Education	Just Right Academy Fitness: Field Day
6. Nutrition Education	Try This... Not That... Jeopardy
7. Exercise Education	Just Right Academy Fitness: Indoor Challenge
8. Nutrition Education	Sugar? No Thanks, I'm Sweet Enough
9. Nutrition Education	Just Right Academy Chef: Fruit and Vegetable Competition
10. Exercise Education	Video Presentations/ Field Day II
11. Exercise Education	Talent Show/ Scavenger Hunt
12. Nutrition Education	Just Right Academy Chef: Potluck and Nutrition Review

Class 1. Exercise Education: Exercise Can Be Fun

“Exercise Can Be Fun” provided exercise ideas and hobbies that adolescents may perceive as “fun” to encourage regular physical activity (Hill & Cleven, 2005; Schneider et al., 2009). The first class included information about how “fun” physical activity is good for your health and a discussion of ideas including swimming, dance, martial arts, team sports, walking while with friends and family, and other ideas that the students came up with (Hill & Cleven, 2005). This class was used for goal setting including a personal weekly exercise goal and a collaborative walking challenge. The walking challenge was designed so that each participant could convert their steps into miles and use a map to show how far they made it towards their destination, with a goal of 1-2 miles a week. Each participant’s physical activity was recorded using the activity log provided; however, at week three the teachers developed their tracker to help the students monitor their progress. This was done due to the routinely incomplete activity logs received and to integrate the practice into their school routine outside of the temporary intervention. Also, the teachers incentivized the students to walk or run laps during recess with a

reward of eating outdoors on Fridays for completing the laps. This strategy resulted in sustainable physical activity changes for the high school health class beyond the scope of this project.

To encourage the students to pursue physical activity at home, they were assigned a project to either make a video or participate in an exercise talent show to be presented in the final two exercise classes (Van Sluijs et al., 2007). This project could have been done individually or as a group. A newsletter was distributed to each participant with a description of the take home part of the intervention.

Class 2. Nutrition Education: Packing a Power Lunch

“Packing a Power Lunch” was designed to teach students how to pack healthy lunches using evidence of the link between high-calorie food and drink consumption and obesity (Husby et al., 2009). This class specifically addressed the avoidance of soda and high-calorie snacks (Ebbelling et al., 2006; Ebbelling et al., 2012; Washi & Ageib, 2010). Content also considered the social context of snacking amidst food sharing, while encouraging the selective inclusion of “junk food” for special occasions as opposed to routine inclusion (Husby et al., 2009).

The healthy lunch packing ideas were inspired by United States Department of Agriculture (USDA) recommendations with resources from ChoseMyPlate.gov. As a group, participants applied knowledge of the food groups to design several balanced lunches using a participative learning activity that involved putting a balanced plate together and snack swapping. The game designed was played using the National Dairy Council’s Food Model Cards #0012N (Washington State Dairy Council, 2016). The students were provided with a stack of 12 cards and played a game similar to “go fish” where they had to fill a plate based on

the model form at ChoseMyPlate.gov. Teachers and the researchers reviewed the students' plates and discussed nutrition information.

Class 3. Exercise Education: Just Right Academy Fitness: Outdoor Challenge

This game used a scavenger hunt format that was compared to "The Amazing Race" competition. The students completed an outdoor scavenger hunt challenge in three teams. Their teacher chose teams based on ability to promote fairness. To complete the challenges quickly, jogging or running was encouraged between clues. The challenges required a physical activity component to be met as a team in order to access the next clue. The teachers and researchers determined if the challenge was completed appropriately and demonstrated the exercises if they are unfamiliar. Identification card lanyards served as clue markers as well as rewards for completing the activity.

Class 4. Nutrition Education: Just Right Academy Chef: Tasty and Healthy Cooking

"Just Right Academy Chef: Tasty and Healthy Cooking" was designed to follow a cooking show format to teach a simple recipe, identify unprocessed foods and food groups used in the recipe. The recipe came from a healthy cookbook that has an accompanying free recipe blog with nutrition information (Higgins, 2015). The project researcher was in the Head Chef role, and one of the classroom teachers was the Sous Chef. Students helped put the recipe together in kitchen assistant roles, were provided resources for healthy recipe ideas, and tasted the completed recipe (Wrieden et al., 2007). The potential for Just Right Academy students to benefit from this intervention was supported in an intervention that took place in a school in the United Kingdom for students requiring extra teaching support (Fisher et al., 2011). The United Kingdom's school students were able to become finalists in a nationally supported cooking

competition that was developed to provide practical food-based activities in the classroom setting.

Class 5. Exercise Education: Just Right Academy Fitness: Field Day

This class was based on research evidence on adolescent gender activity preferences and findings that adolescents are willing to increase their exercise time and engage in regular physical activity that they find pleasurable (Hill & Cleven, 2005; Schneider et al., 2009; Wilson, 2007). Consideration of gender preferences led to the researcher to purposely include game-based and competitive activities based on male and female preferences and social and individual activities in each exercise activity (Hill & Cleven, 2005; Silva Filho, Tani, Correia, & Correa, 2012; Wilson, 2007). Within this class, students participated in a mix of activities using both competition and an individual “beat your best” goals to encourage individuals to strive for personal records. There was a Mummy relay race, balloon sidesteps game, a tug of war, and a group physical activity mirror game (instructor led). At the end of the class, we briefly talked about how enjoyable it could be to incorporate fun physical activities into the participant’s free time.

Class 6. Nutrition Education: Try This... Not That...

“Try this...Not That...” was designed to discuss how to make healthier food and drink choices when grocery shopping and at restaurants. To engage the students and create a fun learning environment, Jeopardy was used to teach and apply the content learned (Simkin, 2013) Questions were asked in simple formats that have proven to reduce calorie intake including physical activity energy equivalents “how long would you have to run to burn the calories from a Big Mac?” and as a percent of daily value, “What percent of your daily fat is in two scoops of ice cream” (Bleich, Herring, Flagg, & Gary-Webb, 2012). Adolescents are regularly exposed to

foods that are high in fat, sugar, and sodium in advertisements, 89.4% of these advertisements are seen by adolescents, with 49.1% of the calories in the advertisements coming from sugar (Powell, Szczypka, Chaloupka, & Braunschweig, 2007). It is important that adolescents learned how to read nutrition labels and gain basic nutritional literacy to help them navigate the barrage of unhealthy food advertising.

Class 7. Exercise Education: Just Right Academy Fitness: Indoor Challenge

Class 7 was designed to mimic the “Biggest Loser” challenge format. The activities for this class were designed to reduce sedentary activity at home by providing fun indoor physical activities (Drenowatz, Kobel, Kettner, Kesztyus, & Steinacker, 2014; Simon et al., 2014; Van Lippevelde et al., 2014). The students were placed on the teams based on their individual ability. The individual efforts went towards their teams score to determine the winner of the challenge. These activities included Yoga (hold poses for 1 min) with 3 different poses, shuttle run w/lunge back twice, squats (maximum possible in 30 sec intervals with 20 seconds rest) three times, team ball toss where the next person in line increased the distance to catch the ball, and ball pass using feet and also with arms linked varying the activity with looking in versus out.

Class 8. Nutrition Education: Sugar? No Thanks, I’m Sweet Enough

This class required students to build sugar board displays. To encourage an interactive and participative learning experience, the students collaboratively made several sugar board displays (Wu, Martin-Briggers, Worobey, & Byrd-Bredbenner, 2012). They measured and described the quantity of sugar in snacks, beverages, or foods that they have brought in for lunch, or that were commonly consumed at home (Dudley et al., 2015). Students created the displays using a poster board, measuring spoons and cups, Ziploc bags, and a few pounds of sugar. After

making the displays, we discussed weight gain, sugar content in common foods and drinks, and strategies to limit sugar to 10% of their daily calories (World Health Organization, 2015).

Class 9. Nutrition Education: Just Right Academy Chef: Fruit and Vegetable Competition

Class 9 was designed to use a cooking competition format similar to “Top Chef.” This participative cooking competition was supposed to encourage student teams to creatively combine healthy ingredients into a meal they would enjoy while increasing confidence and positively influencing food choices (Wrieden et al., 2007). Ideas of simple meals were provided, and the students were able to prepare and combine ingredients while the teachers facilitated the experiential learning environment. Research has shown how experiential learning is one of the best methods to promote positive changes in nutritional knowledge and behaviors in adolescents (Dudley et al., 2015).

Class 10. Exercise Education: Video Presentations

Class 10 was designed as an alternative activity for students who preferred to do a video presentation rather than participate in a talent show. Students were scheduled to watch each other’s video presentations, and discuss how similar activities could be used in meeting their weekly exercise goals. However, due to the distress that public presentations caused the students, the researcher privately viewed the videos. To make the best use of this scheduled class a second field day was held using the student’s favorite activities and new ones that encouraged communication and teamwork. A guided discussion following these activities focused on how many calories were burned (in activity calorie equivalents), and ideas of how these exercises could be done as part of a regular weekly routine.

Class 11. Exercise Education: Talent Show

This class was taught in a talent show format similar to the “America’s Got Talent”

reality TV show. The students were to perform their routines, and a panel of judges (their teacher, another student representative, and the researcher) was to evaluate the performances. However, a limited number of students wanted to participate in a talent show format, so the remaining time was spent completing a new scavenger hunt game. In the scavenger hunt game, the students were asked questions about calorie equivalents, macro, and micronutrients. The final newsletter distributed to participants reminded them of the upcoming potluck and provided them with recipes ideas and a brief summary of concepts learned throughout the classes.

Class 12. Nutrition Education: Just Right Academy Chef: Potluck and Nutrition Review

This was a review class for the nutrition information that was learned over the course of the intervention. Students were encouraged to bring in their favorite healthy recipe to create a healthy eating potluck. The adolescents ate their meals while discussing the nutritional content using concepts learned in previous classes including physical activity equivalents, percent of daily value, and the amount of sugar. This class was conducted over their lunch break to provide time to enjoy the meals with the last 30 minutes used for nutrition lesson review.

Variables and Their Measurement

Table 2 shows the variables and measures to be used in the study, the data source, and measurement times. Data were collected before the intervention started at Time 1 (baseline), at Time 2 (after completion of the intervention), and Time 3 (after three months without contact from the study staff).

Weight Outcomes

Height. Height was measured on available adolescents in street clothes without shoes, using a stadiometer, which was calibrated in 1/8-centimeter (cm) intervals. Height was measured twice and averaged.

Weight. Weight on adolescents was measured in a private room in street clothes without shoes to the nearest 0.1-kilogram using a Tanita WB-110A Digital Scale. The WB-110A has a maximum capacity of 270 kilograms (600 pounds) and measures in graduations of 0.1 kilograms. It weighs 11 pounds and is portable. The WB-110A self-calibrates before each weight to 0. Weight was measured twice and averaged.

Table 2. Summary of Measures

Variables and Their Measurement	Respondent	T1	T2	T3
Weight				
Height	Adolescent	X	X	X
Weight	Adolescent	X	X	X
Body Mass Index Percentile Calculation	Adolescent	X	X	X
Adiposity				
Waist Circumference	Adolescent	X	X	X
Triceps and Subscapular Skinfolts	Adolescent	X	X	X
Health Behaviors				
Child Health Behavior Survey	Adolescent	X	X	X
Activity Logs	Adolescent	X	X	X

T1 = Time 1 (baseline); T2 = Time 2 (after completion of the intervention); T3 = Time 3 (after three months without contact from the study staff)

Body Mass Index Percentile. For adolescents, BMI percentiles were calculated twice by a computer by entering height, weight, age, and gender. Adolescents with a BMI below the 5th percentile are underweight, those greater than 5th and less than 85th percentile are normal weight, those greater than 85th and less than 95th percentile for age and gender are overweight, and those at or above the 95th percentile are classified as obese (Krebs et al., 2007).

Adiposity Outcomes

Waist Circumference. The Doctor of Nursing Practice Project Chair, who had training and previous experience taking anthropometric measurements measured waist circumference in the adolescents. In a private area of the room, each participant was asked to stand erect on both feet, and the measurement was taken over a single layer (t-shirt) of clothing. A decision was made by the Doctor of Nursing Practice student researcher and Doctor of Nursing Practice Project Chair to do the measurements consistently over a t-shirt, as many of the students were very sensitive to touch and shy about allowing a researcher to measure them who they had not met previously. Standing on the adolescent's right side, the researcher placed the measuring tape around the trunk in a horizontal plane at the level equal to the opposite side of the trunk. The researcher ensured that the tape was parallel to the floor and was snug but did not compress the skin. The measurement was made at the end of normal expiration and was measured to the nearest 0.1 cm and then recorded (McDowell & National Center for Health Statistics (US), 2008). All measurements were performed three times and averaged according to the National Health and Nutrition Examination Survey procedures.

Triceps and Subscapular Skinfolds. Skinfolds were measured in adolescents on the right side of the body using Lange skinfold calipers three times and averaged. The triceps and subscapular skinfolds were measured three times and averaged. The triceps site was determined using a tape measure to locate the midpoint between the acromion and olecranon processes with the elbow bent at 90 degrees. The subscapular measurement was taken diagonally 1 cm below the inferior angle of the scapula, following the natural fold of the skin. The individual was trained to gently grasp the skin and underlying subcutaneous adipose tissue between his/her left thumb and index finger. The skinfold was held with the thumb and forefinger 2.0 cm above

where the measurement was taken, and the jaws of the calipers were placed perpendicular to the length of the fold. The skinfold was measured to the nearest 1 mm while the fingers continued to hold the skinfold for about 3 seconds after the caliper tension was released and then recorded. The measurement was taken three times, averaged, and interpreted according to guidelines.

Health Behaviors

Child Health Behavior Survey. The Child Health Behavior Survey (20 items) was used to collect information on usual food and drink intake (DHHS, 2004). Answers are scored from zero (none) to 5 (on most or all days of the week) with 3 unhealthy choices and 2 healthy choices. All answers were recoded as a 1 to reflect a healthy choice or a 2 as an unhealthy choice.

Activity Logs. Activity logs were given to the adolescents, and they were asked keep them in the classroom so that they could be reviewed and feedback given by the researcher and the classroom teacher. By week 3 the original activity logs were replaced with an activity-tracking sheet maintained by the high school teachers and intended for use beyond the end of the intervention.

Data Analysis

Descriptive data analyses and correlations were interpreted conservatively, considering the small sample size and design methodology. Before performing analyses, descriptive statistics were calculated. All data were entered into an SPSS database and checked for inaccuracies and corrected against raw data. Paired t-tests were run on weight, adiposity, nutrition and physical activity data from Time 1 to Time 2 and Time 1 to Time 3 to examine differences across time. Parent and schoolteacher interviews were transcribed and reviewed for statements relevant to the study's purpose.

CHAPTER 5: RESULTS

Parent's Demographics

The parents' mean age was 48 (Range = 37-59; SD \pm 6.4) years old; the majority were female, married, and employed full time (see Table 3). The majority of parents (46.7%) reported their education level as a graduate or professional degree. The majority of the parents were non-Hispanic white (80.0%) according to the self-reported demographic survey. A total of 40.0% of parents reported an income range of \$20,000-\$40,000. However, 33.3% of the respondents reported making over \$80,000, which was greater than the median family income of \$68,426 reported by the US Census Bureau (2015). The majority of the parents (60.0%) reported being in "good" health, and 86.7% reported themselves as being the child's biological parent. Most of the parents reportedly made decisions about daily dietary intake (86.7%) and physical activity (73.3%) for the adolescent participants.

Student's Demographics

The students' mean age was 15.7 (Range = 14-18; SD \pm 1.2) years old. The majority were male (80.0%), non-Hispanic white (80.0%), and the firstborn child (40.0%). The most common education level was 9th grade, which was attained by 46.7% of the respondents. All of the students lived with their parents. There was a wide range of adolescent health concerns including two with students with Autism, two students with an anxiety disorder, one student with a brain tumor, and several other students with disorders such as food allergies, cyclic vomiting syndrome, and unspecified digestive problems.

Table 3. Demographic Data

Parent's Demographics		
Parent Age		
Range	37-59	
Mean	48.2	
Standard Deviation	+/- 6.4	
Parent Gender	Percentage	Frequency
Female	66.7%	10
Male	33.3%	5
Marital Status		
Married	73.3%	11
Widowed	6.8%	1
Divorced/Separated	6.7%	1
Living with Significant Other	13.3%	2
Parental Employment		
Full Time	53.3%	8
Part Time	33.3%	5
Homemaker	6.7%	1
Unemployed	6.7%	1
Parental Education Level		
Completed High School or GED	6.7%	1
Completed some college or	26.7%	4

associates degree		
Completed baccalaureate degree	20.0%	3
Completed graduate or professional degree	46.7%	7
Parent Ethnicity		
Hispanic or Latino	20.0%	3
Not Hispanic or Latino	80.0%	12
Parent Race		
Black or African American	20.0%	3
White	80.0%	12
Parent Annual Income		
\$20,000-\$39,000	40.0%	6
\$40,000-\$59,000	6.7%	1
\$60,000-\$79,000	6.7%	1
\$80,000-\$99,000	13.3%	2
≥ \$100,000	20.0%	3
Do not wish to respond	13.3%	2
Parent Health Status		
Excellent	6.7%	1
Good	60.0%	9
Fair	13.3%	5

Are you the biological parent		
Yes	86.7%	13
No	13.3%	2
Student's Demographics		
Adolescent's Age	In years of age	
Range	14-18	
Mean	15.7	
Standard Deviation	+/- 1.2	
Adolescent's gender	Percentage	Frequency
Male	80.0%	12
Female	20.0%	3
Adolescent's Education Level		
8 th Grade	6.7%	1
9 th Grade	53.3%	8
10 th Grade	26.7%	4
11 th Grade	13.3%	2
Adolescent's Ethnicity		
Hispanic or Latino	6.7%	1
Non-Hispanic or Latino	93.3%	14
Adolescent's Race		
Black or African American	20.0%	3

White	80.0%	12
Adolescent's Birth Order		
First Born	40.0%	6
Second Born	33.3%	5
Third Born	6.7%	1
Fourth Born	13.3%	2
Other	6.7%	1
Lives with parents		
Yes	100.0%	15
Does the parent make decisions about food purchased and served?		
Yes	86.7%	13
No	13.3%	2
Does the parent make decisions how much physical activity the adolescent participates in daily?		
Yes	73.3%	11
No	26.7%	4

Weight and Adiposity Results

As expected participants mean height increased from Time 1 to Time 2. However, at Time 3 mean height decreased, which was most likely secondary to several students who were quite tall left the school, and we were unable to contact them for the Time 3 data collection (see Table 4 and Table 5). There was a significant increase in both weight and BMI percentile at both Time 2 and Time 3. The BMI percentile measurements indicated that during the Time 1 measurement 1 of 15 students was underweight, 6 of 15 students were normal weight, 4 of 15 students were overweight, and 4 of 15 were obese. During the Time 2 measurement 7 of 14 students were normal weight, 3 of 14 students were overweight, and 4 of 15 were obese. During the Time 3 measurement 1 of 12 students was underweight, 3 of 12 students were normal weight, 3 of 12 students were overweight, and 5 of 12 were obese. There was no significant decrease in triceps or subscapular skinfolds at either Time 2 or Time 3. There was a significant decrease in waist circumference at both Time 2 and Time 3.

Table 4. Weight and Adiposity Data

Height	Time 1	Time 2	Time 3
Range	149.8-184.8 cm	151.4-186.1 cm	151.5-185.1 cm
Mean	171.7 cm	173.0 cm	171.8 cm
Standard Deviation	+/- 9.7	+/- 9.9	+/- 9.8
Weight			
Range	55.0-95.0 kg	57.8-97.3 kg	55.1-98.3 kg
Mean	73.9 kg	76.9 kg	77.5 kg
Standard Deviation	+/- 12.3	+/- 14.2	+/- 14.3

BMI Percentile	Time 1	Time 2	Time 3
Range	2.6-98.9	7.0-99.0	2.7-98.9
Mean	78.0	78.2	80.1
Standard Deviation	+/- 25.5	+/- 25.0	+/-28.4
Triceps Skinfolds			
Range	9.1-21.0 mm	8.5-21.9 mm	8.4-23.1 mm
Mean	13.0 mm	12.8 mm	13.2 mm
Standard Deviation	+/- 3.5	+/- 3.8	+/- 4.2
Subscapular Skinfolds			
Range	8.9-24.5 mm	8.1-24.3 mm	8.8-25.5 mm
Mean	13.0 mm	12.9 mm	13.6 mm
Standard Deviation	+/- 4.5	+/- 4.7	+/- 5.1
Waist Circumference			
Range	72.5-114.1 cm	69.4-113.1 cm	69.0-112.7 cm
Mean	92.0 cm	89.4 cm	90.8 cm
Standard Deviation	+/- 10.9	+/- 11.4	+/- 12.5

Table 5. Weight and Adiposity Paired T-Tests

Height (cm)	Difference in Means	Difference in Standard Deviation	t value	p value
T1-T2	-0.98	.64	-5.70	0.01
T1-T3	-1.38	0.92	-5.19	0.01

Weight (kg)	Difference in Means	Difference in Standard Deviation	t value	p value
T1-T2	-2.85	3.32	-3.09	0.01
T1-T3	-2.96	3.89	-2.63	0.02
BMI Percentile				
T1-T2	-0.36	0.61	-2.19	0.04
T1-T3	-0.53	1.21	-1.52	0.16
Triceps (mm)				
T1-T2	0.21	0.54	1.47	0.17
T1-T3	0.15	.91	0.57	0.58
Subscapular (mm)				
T1-T2	0.08	.52	0.56	0.58
T1-T3	0.04	.71	0.20	0.84
Waist Circumference (cm)				
T1-T2	2.58	2.07	4.65	0.01
T1-T3	2.23	2.41	3.22	0.01

Health Behavior Results

At Time 1, 13 of the 20 questions were reported as healthy behaviors by over 50% of the class. At Time 2, 16 of the 20 questions were reported as healthy behaviors by over 50% of the class. At Time 3, 11 of 20 questions were reported as healthy behaviors by over 50% of the

class. At the Time 3 data collection significantly fewer students ate breakfast every day which may have been related to the fact that they had just come off summer vacation.

Table 6. Health Behavior Survey Data

Healthy Behaviors	Time 1	Time 2	t	p	Time 1	Time 3	t	p
Drinks <1 glass of soda per day	93.3%	100.0%	-1.00	.33	93.3%	80.0%	1.00	.34
Drink <1 glass of sweet drinks per day	53.3%	60.0%	-1.00	.33	53.3%	66.7%	-0.80	.44
Drinks <8-12oz of soda or sweet drinks per day	66.7%	53.3%	1.47	.16	66.7%	73.3%	-1.00	.34
Drink 3 glasses of milk a day	6.7%	13.3%	-0.56	.58	6.7%	6.7%	----	----
Drink skimmed, nonfat, ½% or 1% milk	33.3%	33.3%	----	----	33.3%	13.3%	1.00	.34
Drink >4 glasses of water per day	53.3%	73.3%	-1.87	.08	53.3%	46.7%	----	----
Drink water or unsweetened drinks when thirsty	80.0%	80.0%	----	----	80.0%	73.3%	----	----
Eat >4 servings of vegetables per day	0.0%	6.7%	-1.00	.33	0.0%	26.7%	----	----
Eat 1-2 servings of fruit per day	26.7%	20.0%	0.56	.58	26.7%	40.0%	-1.00	.34

Eat <1 servings of French fries or chips per day	93.3%	93.3%	----	1.0	93.3%	73.3%	1.00	.34
Eat fast food <1 time per week	53.3%	66.7%	-1.00	.33	53.3%	80.0%	-2.69	.02
Supersize drinks or food never or sometimes	80%	86.7%	-1.00	.33	80%	86.7%	-1.47	.17
Eat fruit, vegetables, low fat cheese for a snack	60%	53.3%	0.44	.67	60%	33.3%	1.39	.19
Buy extra food/drink <3 times per week at school	100%	100%	----	----	100%	93.3%	----	----
Eat breakfast 5-7 times a week	100.0%	100.0%	----	----	100.0%	66.7%	2.28	.04
Eat whole wheat or dark bread	53.3%	60.0%	-0.56	.58	53.3%	60.0%	-1.00	.34
Eat unsweetened breakfast cereal	40.0%	53.3%	-1.47	.16	40.0%	46.7%	-0.43	.67
Do not prepare fried foods at home	46.7%	53.3%	-1.00	.33	46.7%	26.7%	1.39	.19
Eat fried foods at home <1 time per week	86.7%	86.7%	----	----	86.7%	86.7%	-1.00	.34
Eat home baked goods	86.7%	80.0%	1.00	.33	86.7%	80.0%	----	----

at home <1 time per week								
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Feasibility and Systemic School Changes

The school made systemic changes over the course of the study that has continued beyond the end of the project. These changes included the initiation of a “salad club” for teachers and administration, tracking and rewarding students’ physical activity with positive reinforcement, the director embarking on a personal weight loss journey, and an adaptation of this intervention that will be integrated into their regular curriculum.

The salad club has continued into the following school year and has expanded to include more of the staff with “increased enthusiasm and competition to create fancier salads” according to the school’s director. The students’ activity tracker for laps walked or ran during the school day has also continued with the rewards offered including “Just Right Academy Bucks” that could be spent at the school store and outdoor lunch days. The Just Right Academy director has continued her weight loss journey with significant weight loss and credits the partnership with helping her achieve these goals. The lead high school teacher has been adapting the nutrition and physical activity class series for regular use in one of their life skills programs.

The students expressed their acceptance of the project by remarking that the researcher was “cool” and that they liked that he was in the military. To reward the students completing the project and further connect with them, the researcher wore his military uniform during final measurement and discussed various military topics of interest for the students. The students verbalized enjoying the experience and teachers expressed that many of the students looked to the researcher as a role model.

The teachers stated that many of the parents were pleased with the classes and appreciative of the project. The teachers also reported that the project was beneficial for the students, the students learned new concepts, the students enjoyed the activities, and that the content was delivered well. During the interviews with parents, students, and teaching staff, many comments suggested behavioral changes that were not captured by the survey. One parent mentioned that their child was “reading nutrition labels” and that they “had a discussion about vitamin D and Doritos,” commenting that that was a new interest. Another parent mentioned, “Their child was “trying to make better choices” and was “open to grilled chicken,” which he had not previously enjoyed. In general, the parents described their adolescents’ new interest in nutrition information, desire to eat “healthier” foods, and seeking recognition when they ate healthier foods as new behaviors.

The school administration also expressed how important it was for the staff and students to enjoy working with the researcher and specifically mentioned how it contributed to a healthier Just Right Academy environment. The local school similarly demonstrated that they valued and accepted the researcher by inviting him to assist with a forest field trip seven weeks into the intervention. The school staff also asked the researcher to help with activities for a field day during the school year following the completion of the final measurements. The school has exhibited a continued commitment to a healthier culture by encouraging fun physical activity and maintaining the activity tracker and rewards for physical activity milestones. During the field day, the researcher and students talked about continuing to do regular physical activity, eating better, and how their school year was going resulting in further relationship building with the local school.

Notably, the cost of the project was minimal with the only expenses being the cost of

printing (\$30) and teaching materials (\$20) paid for by the primary researcher. There were no costs for the local school, parents, or students.

Process Evaluation of the Intervention and Lessons Learned

Class 1. Exercise Education: Exercise Can Be Fun

This class served as an icebreaker to get to know the students and to acquaint them with the new “teacher/researcher” through conversation and discussion of their interests. However, the classroom management became difficult with many students talking at once. A verbal turn-taking strategy such as a “talking stick” should be used for this type of class to help encourage an organized discussion. A variety of specific topics or talking points should also be prepared in advance to keep the conversation moving. Many of the students were shy, and others would interrupt timid students causing minor disruptions to the discussion. Having their regular teachers as co-teachers for this project was critical to managing the classroom environment. Later in the class series, it was observed that many students were not reliably documenting their activity on the initial activity-tracking sheet. The teachers developed a tracking log that included all students in the health class and were put onto the classroom wall, which resulted in the consistent recording of weekly activity performed during the school day. This strategy led to more consistent measurement and disseminated the activity-tracking concept into their regular high school health curriculum. This change also encouraged more sedentary students to move more as it was incentivized with the outdoor eating reward.

Class 2. Nutrition Education: Packing a Power Lunch

This class was run with less disruption and more engagement than the first class. One of the co-teachers complemented the methods used and verbalized that she felt like she spent a lot less time with classroom management this time. The activities kept the students’ attention, and

they asked questions about the game, portion sizes, and what counted as a vegetable. While trying to fill their plates, some students inquired about which combination foods counted for each food group and demonstrated non-facilitated inquiry and conceptualization regarding the concepts taught. For example, one student felt strongly that pizza was not a vegetable and was willing to remove it from his points toward winning to keep other students from believing that pizza was a vegetable.

This activity transitioned well to the conversation at the end of class about plates at home and how many students felt they ate enough vegetables daily. This format was useful for learning, encouraging inquiry, and maintaining interest in a nutrition education class. One of the teachers noted that the difficulty fulfilling the vegetable requirement could have been a message to eat more vegetables. In future classes fewer cards will be used, 18 cards went to each student this time; instructors should purposely leave out more vegetables and other food groups that are typically neglected. This activity could also be adjusted for cognitive ability by having students meet a minimum number of cards requirement in each food group in place of obtaining all of the serving equivalents. For example, students would have to collect a set number of vegetable cards to instead of having to calculate serving sizes to make it easier or use actual serving sizes by ounces, cups, or size equivalents to make it more challenging.

Class 3. Exercise Education: Just Right Academy Fitness: Outdoor Challenge

This course was adapted on site for the varied developmental, motor, and cognitive abilities of the students. This lesson was also adjusted to reduce the number of outdoor activities to fit the allotted class time. This class required instructors to accurately estimate how long students would require accomplishing tasks and leaving five to seven minutes for questions and conclusions. The interactive format of this course worked well to engage the adolescents and

keep their interest. One of the teachers commented that when she previously tried a similar outdoor scavenger hunt, there were many “tears and meltdowns.” She believed that this lesson was a success and noted that the students appeared to be enjoying themselves.

The majority of the students appeared to enjoy the physical exercise in between the questions. The students were able to find the answers to the activities within five minutes using the graphic charts provided and solved the “more complicated” calorie math well with the teachers’ assistance. As “prizes” for finding the scavenger hunt clues, retractable reel ID badge holders were given out at each correct answer location. It was difficult to assess how well they retained the course content but there were able to identify how long it would take to burn off everyday foods using different physical activity equivalents in their groups of five.

Class 4. Nutrition Education: Just Right Academy Chef: Tasty and Healthy Cooking

This class was challenging to organize due to the students’ varied levels of ability and limited workspaces. Clear direction and visual aids were instrumental in organizing the various group keeping the students engaged. This class required a lot of teacher intervention and redirection due to the multiple tasks being accomplished simultaneously, such as cutting foods and preparing ingredients for the meal, which required direct supervision. This activity demonstrated that the level of independence for many of these students might not have been the best fit for some of the planned cooking activities. The teacher and I noticed that it was necessary for only certain students to be given jobs such as dicing fruit and similar potentially dangerous tasks. The students who completed their duties first also needed additional jobs to be kept busy.

This class would have worked better in a traditional high school setting without some of the behavioral concerns of this population. However, for children with special support needs, a

setting like Just Right Academy was essential to provide the amount of teacher supervision required to make this work. This lesson could be improved with a better-defined action plan for each of the students as well as a learning activity for those who finished their assignments first or were waiting to assist. One possible idea for younger students would be to practice cutting Playdough or clay with butter knives to improve knife skills. At the completion of this lesson, the students verbalized that they enjoyed the taste of the “healthy” dessert, used fruit and whole grains, as well as performing the basic cooking techniques practiced.

Class 5. Exercise Education: Just Right Academy Fitness: Field Day

This class started off with some difficulty due to the student’s unfamiliarity with the activities. However, one of the teachers quickly suggested that we, the teachers and researcher, demonstrate the activities as a model for the students. The activities maintained all of the students’ interest and kept them moving throughout the entire class. The length of the class, 40 minutes, was sufficient to get all of the activities completed. The activities were completed in two groups that were chosen by the teachers for fairness. There was a mix of group and individual activities, and no score was tracked for winning teams or individuals.

One of the teachers verbalized that the socialization to a team format was excellent for this particular group of students. Also, she mentioned that many had gone beyond their typical comfort zones and appeared to be enjoying themselves. All students participated in all activities with minimal resistance. During the students’ debrief, they collectively voiced enjoying the tug-of-war game with mixed ratings of the cardio class and balloon exercise. The school’s assistant director said that she thought it “went well and that we should do more activities like this.” To improve this class, every activity should begin with a demonstration to help the students understand unfamiliar games. I would also suggest that teachers unfamiliar with the students

seek guidance in forming teams to minimize problematic social dynamics and ensure that the teams are equally matched.

Class 6. Nutrition Education: Try This... Not That...

This class required an understanding of each student's academic abilities. Arriving early and discussing the plan with one of the co-teachers resolved the schedule and activity details. She first suggested that they are given specific concepts to explore. She then suggested modeling the students' exploration by bringing a food model with nutrition label up to the front of the room and discussing learning goals. The first activity involved demonstrating how to read a nutrition label and discussion of serving sizes. The class was broken into three groups of five for small group discussion with one teacher at each table. The room was occasionally loud, and some of the students required redirection to keep them engaged when they were not speaking about the food item they were describing. However, the lesson appeared to keep the majority of the students involved as they handled the containers and read the nutrition labels.

The "Jeopardy" game was also completed in groups of five. Using the same groups as before, the students appointed a spokesperson and had to reach a consensus on the group answer within one minute. The overall class response to a question facilitated assessment of their ability to answer the questions and they were accordingly provided hints and explanations as needed. There was also an informative nutrition handout that the students were given to assist with the game. There was a discussion at the end, and some of the students expressed interest in learning about the difference in unsaturated and saturated fats. A suggestion for future classes would be to play the game longer and explore the food packages briefly for the sake of time. This lesson should have also included a brief description of macronutrients and where they commonly are found in various foods.

Class 7. Exercise Education: Just Right Academy Fitness

This class will be redesigned to make it more engaging and active for the students. The original plan required unanticipated adjustments due to a school store occupying the indoor space that had been previously discussed for use. Consequently, the location changes caused some activities to have more disruption and noise than was anticipated. However, the staff helped maintain order and verbalized that these types of situations happen commonly within their school setting. The teachers felt that the activities went well and the teachers were instrumental in helping with the classroom management on this day. The students were asked to verbalize what they liked or activity that they would have preferred for indoor exercise. Many of the male students liked the lunges, one of the female students liked the yoga poses, and several from both genders enjoyed the ball game. The students were generally in a good mood following the activity and appeared to have had fun during the games. In the future, the teamwork and circle activities will be designed better so that the objectives are more clearly understood. Instructors should also verify that the planned indoor location remains available closer to the class date to prevent disruptive adjustments due to lack of indoor space.

Class 8. Nutrition Education: Sugar? No Thanks, I'm Sweet Enough. Process Evaluation

The sugar board activity engaged the students, encouraged them to ask questions about sugar content, and provided them with hands-on activities that minimized boredom. A demo sugar board was prepared before class with low sugar items and hand-drawn art for the display model. Worksheets were also with a list of 4 food/drink items per team and corresponding amounts of sugar in grams and teaspoons. Students were divided into three groups (student-teacher ratio 5:1), and provided four Ziploc bags, one teaspoon and one-half teaspoon measuring scoops, a white poster board, art supplies, and five worksheets per group. The groups were also

each provided with an empty container of selected food and drink items with nutrition labels attached.

On the worksheets, there was one item that did not have the sugar content listed and students were asked to figure out how many teaspoons of sugar were in a single serving size. The students worked together well and were able to create the sugar boards using the supplies provided and teacher oversight. When one or two students in the group were not busy, they were tasked with listing their five favorite foods or commonly eaten foods and arranging by highest sugar content to lowest. They were then asked to estimate how much sugar was in each item and discuss their thoughts on the quantity. These strategies facilitated additional discussion and inquiry about appropriate sugar consumption.

At the end of class, each group was asked to present their findings with specific instructions to identify the highest and lowest amounts of sugar and anything interesting they learned. The presentations encouraged additional questions, and the students appeared to have learned more content than in the previous nutrition class. With the remaining time there was a review of macronutrients in the form of discussing sugar as a carbohydrate and what proportion of calories in selected foods were from sugar.

Class 9. Nutrition Education: Just Right Academy Chef: Fruit and Vegetable Competition

This cooking class was adapted to meet the developmental needs and cooking abilities of the participating students. The teachers assisted in selecting students assigned to cut vegetables for the soup, help rinse the canned beans and season them, and make the quesadillas. The students chosen to cut the vegetables were able to perform their task without difficulty and minimal supervision. The small kitchen space became a distraction for students performing the other duties, as there was not room for everyone to work. The nutrition information discussed

included the benefits of whole grains, the quantity of fiber and protein in beans, and cooking methods such as using butter in a skillet compared to a non-stick Panini press for quesadillas.

The students were encouraged to return to the classroom when their task was completed and was provided with the finished foods to taste. They verbalized that they enjoyed the quesadillas with some who were undecided about the taste of the whole-wheat tortillas. Also, there was one student who did not want to taste the roasted chickpeas but eventually relented and verbalized enjoying the “healthier” snack. We also reviewed nutrition content from the last class with questions about macronutrients, calories per gram of macronutrients, and the amount of sugar in some of the snacks they frequently ate. This class would work better with more defined tasks for individual students, a larger workspace, and learning activities planned for students not actively participating in the cooking.

Class 10. Exercise Education: Video Presentations

This class was designed to maintain a fun environment for physical activity education in a field day format. The activities used today focused on teamwork, communication, and motor skills. The games were enjoyed with one incident in which two students were upset during the blindfold communication game. Each of the students was able to cool down and resume the game with minimal problems. Having the teachers around for incidents like this was important in an intervention using unfamiliar guest instructors.

Feedback from the students suggested that most students enjoyed all activities despite the minor frustration experienced by the two students. Also, the students were very active during this activity and were able to run continuously for 10-15 minutes during the water relay. The “fun” and semi-competitive nature of the game appeared to encourage the students who were

normally more reluctant to run. By then end of the relay, the students were all smiling and sweating. These activities could be used again with no adjustments.

Class 11. Exercise Education: Talent Show

This class was organized using a scavenger hunt and field exercise format. However, the beginning of class started with a demonstration of a fun physical activity. The students were asked throughout the semester to think of a physical activity that they felt was fun and model it for the class or send a video to the instructor. Most of the students choose to send in their submission electronically. A few of the students had not prepared anything, and one of the teachers assisted them in their demonstration of jumping rope and running a lap around the parking lot as a group. This activity was not widely embraced but there was an appreciation of “fun” physical activity from students who were previously very reluctant to do any form of exercise.

Following the brief demonstration, the game was started. The game format was similar to an activity previously done, so the instructions required were minimal. The students seemed to enjoy the activities despite some of the scavenger hunt questions challenging them. They demonstrated a reasonable knowledge of content covered in previous classes but still required teacher assistance with harder questions. By the end of the class, the students had all participated in a moderate amount of physical activity. This activity could have been improved with more advance preparation for the water balloon portion of the game.

Class 12. Nutrition Education: Just Right Academy Chef: Potluck and Nutrition Review

This class was a good review for some of the nutrition information and provided the students an opportunity to show what types of healthy foods they enjoy. The potluck also provided a low-pressure environment for the last day that included an open question and answer

session. Questions were asked regarding what was learned about nutrition during the class series and what parts of the project they enjoyed the most. Many of the students verbalized being more aware of the sugar content in common foods and some verbalized evaluating the nutrition information of foods they typically eat.

One of the students also mentioned that she was not aware that Kentucky Fried Chicken offered grilled chicken before the class series and that she really enjoyed the taste. There was also a general agreement that the class was fun and that they enjoyed having me teach the class. The teachers encouraged the students to try new foods during the potluck by offering them “Just Right Academy Bucks” that could be used for the school store. The students all tried at least one new food, and many of them discovered that they enjoyed the “healthy” options brought in. This was a great format for a final class as it ended the series with a fun review of all concepts and a participative component in the form of the healthy potluck.

CHAPTER 6: DISCUSSION

Overweight and obesity continues to be a problem causing a variety of serious health concerns for American adolescents (Black et al., 2013; CDC, 2015; Park et al., 2012; Pulgaron, 2013). Interventions that are evidence-based, rapidly deployable, low cost, designed to be fun, and able to be implemented in a school setting with minimal disruptions are needed. There are not many recent studies that fit most of these criteria despite the prevalence of many wide-ranging school-based studies. This intervention tested whether a healthy nutrition and physical activity intervention to improve weight management in adolescents using an evidence-based and developmentally appropriate intervention in the school setting was feasible and efficacious. The findings of this initial study suggest that the intervention may need adjustments to see real weight management and adiposity changes. However, it was well received in the school setting with positive systemic school changes, a strong researcher-school partnership, and a strong potential for sustainability.

Weight and Adiposity

The outcomes of the weight and adiposity data analysis showed primarily neutral and negative changes in BMI percentiles; most notably following the summer break. However, analysis of the BMI percentiles revealed a decrease in BMI percentiles greater than 85th (overweight and obese) from Time 1 (53%) to Time 2 (50%); however, there was a subsequent increase to 62% by Time 3. It should be noted that two of the students who left the study by Time 3 had BMI percentiles under the 85th percentile respectively for the first two measurements and may have negatively impacted the results by leaving the school before the Time 3

measurement.

These findings are similar to the results of both a similar school-based, nurse-led, adolescent obesity study and a systematic review that found no significant differences in BMI or other physical health measures (Dobbins, Husson, DeCorby, & LaRocca, 2013; Pbert et al., 2016). The researchers from those studies suggested that interventions solely aimed at the individual level were not sufficient to reduce BMI and obesogenic behaviors and that most school-based interventions have little effect on BMI or physical health measures (Dobbins et al., 2013; Pbert et al., 2016).

This study establishes that the intervention initially correlated with some improvements in weight and skinfold measurements in the immediate post-intervention period, but the effect was lost on return from summer break. This is consistent with existing evidence indicating that adolescents typically have increased weight gain over summer breaks, with the greatest gains seen in overweight adolescents (Baranowski et al, 2014; Franckle, Adler, & Davison, 2014). Summertime weight management interventions on youth with a higher risk for weight gain can lead to significant trends toward improved BMIs and weight (Barr-Anderson, Singleton, Cotwright, Floyd, & Affuso, 2014; George, Schneider, & Kaiser, 2016). In the future, it may be beneficial to consider an intervention to maintain and build upon the positive changes made in the post-intervention period throughout the summer.

Health Behavior Changes

The health behavior surveys suggested mild improvements from unhealthy to healthier behaviors, although the statistical significance was small. The physical activity logs showed small increases and maintenance for many of the students over the eight weeks, following the addition of lasting systemic incentives to keep the students active during the school day.

Existing research has established that positive reinforcement using appropriate incentives is a useful strategy to encourage specific healthier behaviors in adolescents (Laska, Pelletier, Larson, & Story, 2012). However, there was no continued incentive or specific health goals for summer break when weight gain is usually greater (Baranowski et al., 2014; Franckle et al., 2014).

A future addition to the intervention should be to create health goals with a strategy to maintain accountability over the summer break. Researchers investigating adolescent self-discipline found that mental contrasting with implementation intentions improve adolescent self-regulation and correspondingly decrease unhealthy snacking (Duckworth, Grant, Loew, Oettingen, & Gollwizer, 2011; Stok et al., 2015). A systematic review of computer and web-based interventions found that they were effective in increasing physical activity in adolescents over brief periods of time (Hamel, Robbins, & Wilbur, 2011). In future interventions, researchers should consider teaching adolescents evidence-based self-regulation strategies to set healthy eating goals in conjunction with a computer-based intervention to increase physical activity to overcome the weight gain associated with summer break.

The results of the Child Health Behavior Survey suggest that there were positive behavioral changes for many of the questions from Time 1 to Time 2. Importantly, many of the existing healthy behaviors at Time 1 did not decrease by the post-intervention measurement, which affected the number of behaviors that could be positively changed. In addition, the behavioral changes from Time 1 to Time 3 indicated worsening health behaviors based on the Child Health Behavior Survey. Studies examining this effect suggest that summer weight gain may be caused by increases in sedentary behavior, decreased time doing light and moderate physical activity, unstructured schedules, and increased access to unhealthy snacks over summer breaks (Franckle et al., 2014; McCue, Marlatt, Sirard, & Dengel, 2013; Moreno, Johnston, &

Woehler, 2013). The results of the post-intervention surveys were consistent with the other results exposing that the intervention initially made positive changes, but that the effect diminished over the summer break.

There was no evaluation of the role that family support and behavior might have had on behavior change. However, greater parental involvement and particular parenting strategies have not demonstrated significant improvements in their child's weight (Faith et al., 2012). Also, a review of recent research supports focusing on the intervention within the school setting to optimally improve physical activity behaviors and weight management for adolescents (Bloonpleng et al., 2013; Van Sluijs et al., 2007).

The teachers described an increase in activity with more students walking and jogging during recess. This observation was supported by the intermittently recorded increases in walking, running, and jogging recorded on the physical activity logs. Due to the gaps in recording and the switch to the school maintained walking, jogging, and running logs, some of the data was missing. These findings are consistent with a systematic review of school-based obesity reduction studies reporting that changes to a school's curriculum to promote physical activity and school-based physical activity interventions have led to increases in students' physical activity during the school day (Dobbins et al., 2013).

Feasibility and Systemic School Changes

The partnership with the school and relationship that resulted has been remarkable. The students, parents, and school staffs' acceptance and appreciation of the researcher were expressed verbally and in their invitations to continue working with the school outside of the scope of the project. Developing a trusting relationship between the school and researchers is important to meet the schools' needs and complete the researcher's project (Schoeppe, Oliver,

Badland, Burke, & Duncan, 2014; Smith & Petosa, 2016). The research shows that a trusting relationship between the research and partners in the local school helps create sustainable outcomes, potential spin-off projects, and systemic changes (Jagosh et al., 2015).

There were several sustainable positive changes and spin-off developments within the school system following this study. The school administration and teaching staff embraced the healthy nutrition and physical activity intervention and began working on a “healthier” Just Right Academy culture. A study examining partnerships between researchers and communities suggest that it was likely accepted so well due to the partnership and communication between researchers and the school that resulted in a culturally appropriate project that considered school’s desires, needs, and logistics (Jagosh et al., 2012).

Specific sustainable changes included the “salad club” promotion for teachers and administration, tracking and rewarding students’ physical activity, the director’s personal weight loss, and the adaptation of the nutrition and physical activity intervention for their routine curriculum. Current research on school-based interventions indicates that modification and intended future use of the intervention are essential to the sustainability of this project and is often desired by school stakeholders in partnerships with researchers (Smith & Petosa, 2016). These sustainable changes made within the school reveal the acceptance, successes, and sustainability of the project in this setting.

The low cost of the project was also beneficial as it enabled the local school, parents, and students to incur no cost with minimal cost for the researcher. The use of an in-class physical activity session compared to after school was one way that costs and disruption to normal school function were kept down by preventing teachers or volunteers from having to stay after regular hours (Babey, Wu, & Cohen, 2014). The low cost also increases the chances that components of

the intervention will be sustained, as they will consequently require fewer resources to maintain (Grow et al., 2013). A study on school partnerships with researchers recommends building trust with the local school, minimizing disruptions to the normal school function, and demonstrating a degree of sustainability beyond the short-term project, to prevent the partnership from being seen as one-sided and unfavorable for the school (Smith & Petosa, 2016).

Plan to Sustain

The design of these classes did not require any advanced training in health care and was constructed with the intent of continued use beyond the end of this project. Also, all classes had an interactive component to go with Just Right Academy principles and utilized Kolb's experiential learning theories. Social cognitive theory and developmental theories were also considered in the development of these classes. Many of the reality TV references and class designs were based on adolescent developmental theory and used popular culture to engage and maintain the interest the students for continued use of learned concepts.

It was important that the teacher was a part of the intervention to facilitate the transition of the program to Just Right Academy staff following intervention completion. This project was designed with a "train-the-trainer" component to provide a system model that is sustainable and translatable for the school personnel. The high school teachers were provided detailed descriptions of the classes and all resources created by this intervention. The researcher discussed the lesson plans and collaborated with the teachers to best-fit lesson ideas to the needs of the students. Additionally, the teachers were encouraged to take an active role in the classes and work with the researcher before and after classes to clarify any questions about how to run the intervention. While an essential part of this intervention is that it is "nurse-led," it is also important that it is co-taught with a teacher or teachers.

The students benefited from the comfort and security of their teacher's familiar face throughout the intervention. The teacher presence was also vital for the continuity to resume use of these classes once the project ends. Also, transitioning the intervention to other grade levels within this school is one of the sustainability goals of this project. This pilot project also revealed barriers and achievements that will help in transitioning this plan into other schools to potentially benefit a wider range of students.

Limitations

Limitations of this study include the sample being restricted to a majority homogenous (White not Hispanic) population with mostly male adolescents' ages 14-18 years old. This study was also limited to a single private school for children who need more structure and positive reinforcement due to various behavioral challenges and consequently utilized a small sample. The small sample limited the power to examine statistically significant differences. Also, the intervention materials were developed to be developmentally appropriate for adolescents in a school setting. Therefore, the findings from this study may not be fully generalizable.

Conclusion

This study found that using evidence-based and developmentally appropriate intervention to improve weight management and adiposity in this school setting was clearly accepted and feasible for teachers, students, and researchers. This finding is not surprising considering the multitude of studies done in school settings to improve child and adolescent weight management. Notably, the students did not have significant improvements in weight management. However, the students had mild improvements in healthy behaviors during the immediate post-intervention period, based on the Child Health Behavior Survey and anecdotes from parent and teacher interviews.

This study also demonstrated that this intervention could be done in a non-traditional private school for children with special behavioral support needs. Also, the partnership with the school resulted in sustainable, healthy systemic changes within the school. Even without the improvements in adiposity, the acceptance by the school staff, students, and parents as well as healthy changes within the school suggests that the intervention had a positive impact.

In future directions, the intervention design will be revised to reflect changes realized following the discussions with the teachers, feedback from the students, and lessons learned from the pilot study. However, it is important to consider how these changes will affect the partnership with the school and families and try to avoid imposing more time on the school day and home environment. Considering the level of feasibility and acceptability of the pilot intervention, a potential next step would be to try testing the efficacy with a larger sample size and the changes proposed above.

APPENDIX A: CHILD HEALTH BEHAVIOR SURVEY

ID Number _____

Data Time Point _____

Date _____

Food Frequency Questionnaire Child Health Behavior Survey

This survey is about health behavior. It has been developed so you can tell us what you do that may affect your health. The information you give will help us understand health behaviors in adults and to develop better programs.

Completing this survey is voluntary. If you are not comfortable answering a question, just leave it blank. However, the answers you give are very important and we hope that you will choose to answer all of the questions. The answers you give will be kept private.

After you read each question and its possible answers, choose the one best answer based on what you really do. Don't pick an answer just because you think that's what someone wants you to say.

Several of the questions (3, 4, 6, 8, and 9) ask about servings of drinks and food. Please refer to the Serving Size Chart on the next page to answer those questions.

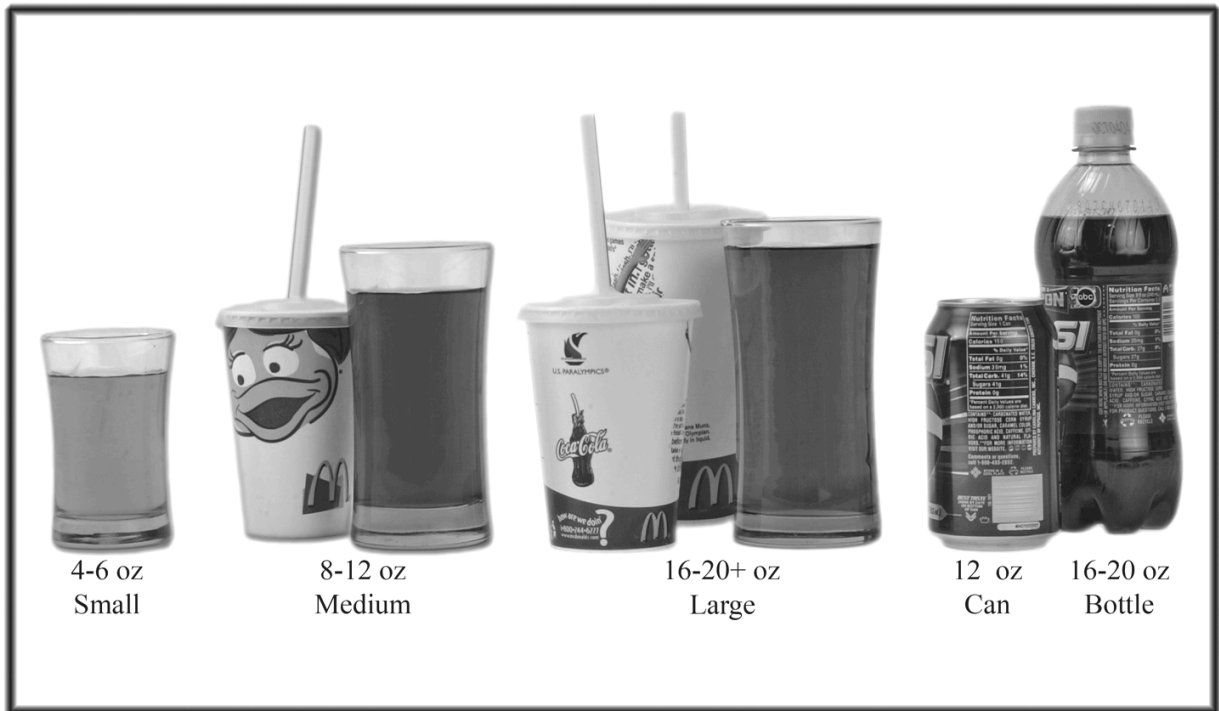
Please circle your answer choice. If you would like to change your answer, please erase completely.

Thank you very much for your help!

ID Number _____

Data Time Point _____

Date _____

Serving Size Chart**Question 3:****Questions 4 and 6:**

- Refer to medium glass in picture above. The liquid in the glass equals 8 oz.

Question 8:

Vegetable*	Serving Size	Comparison
100% vegetable juice	$\frac{3}{4}$ cup (6 oz)	Small glass in picture
Raw, cooked, frozen or canned vegetables	$\frac{1}{2}$ cup	Small computer mouse or large egg
Cooked, canned or frozen peas and beans	$\frac{1}{2}$ cup	Small computer mouse or large egg
Raw leafy vegetables (salad greens)	1 cup	Fist or tennis ball

Question 9:

Fruit*	Serving Size	Comparison
100% fruit juice	$\frac{3}{4}$ cup (6 oz)	Small glass in picture
Raw, cooked, frozen or canned (in 100% juice) fruit	$\frac{1}{2}$ cup	Small computer mouse or large egg
Dried fruit	$\frac{1}{4}$ cup	Golf ball or small egg
Piece of fruit	1 medium	Tennis ball

*** Source: United States Department of Agriculture Food and Nutrition Service**

ID Number _____

Data Time Point _____

Date _____

PLEASE CIRCLE ONE ANSWER FOR EACH QUESTION

1. On a typical day, how much soda do you drink? Do not count diet soda.

- a. None
- b. Less than 1 glass
- c. 1 glass
- d. 2 glasses
- e. 3 glasses
- f. 4 or more glasses
- g. Don't know / not sure

2. On a typical day, how many sweetened beverages such as sweet tea, punch, Kool-aid, sports drinks or fruit drinks do you drink? Do not count 100% fruit juices.

This does not include sodas/soft drinks. Also, don't include artificially sweetened beverages such as Crystal Light.

- a. None
- b. Less than 1 glass
- c. 1 glass
- d. 2 glasses
- e. 3 glasses
- f. 4 or more glasses
- g. Don't know / not sure

3. How much soda or other sweetened beverage do you typically drink each time?

Use the serving size chart. Do not include 100% fruit juice. Choose "a. Small glass" for drink boxes and pouches. If you drink less than a small glass of beverage, choose "f. Don't typically drink soft drinks or soda".

- a. Small glass (4 - 6 ounces)
- b. Medium glass (8 - 12 ounces)
- c. Large glass (16 - 20+ ounces)
- d. 1 can (12 ounces)
- e. 1 bottle (16 - 20 ounces)
- f. Doesn't typically drink soft drinks or soda
- g. Don't know / not sure

4. On a typical day, how many glasses of milk do you drink?

Use the serving size chart. A glass is the same amount in a small carton at school or an 8-ounce drinking glass (medium glass in the picture). Include any milk you have with cereal. This does not include soymilk or calcium fortified juices, but does include Lactaid.

- a. None
- b. Less than 1 glass
- c. 1 glass
- d. 2 glasses
- e. 3 glasses
- f. 4 or more glasses
- g. Don't know / not sure

5. What type of milk do you usually drink?

If you drink different types of milk at home and school, choose the type of milk you drink most often.

- a. Skim or non-fat
- b. Low fat (1/2 – 1%)
- c. Reduced fat (2%)
- d. Whole
- e. Flavored low fat or skim
- f. Flavored 2% or whole
- g. None
- h. Don't know / not sure

6. On a typical day, how many glasses of water do you drink?

Use the serving size chart. A glass is 8 ounces (medium glass in the picture).

- a. None
- b. Less than 1 glass
- c. 1 glass
- d. 2 glasses
- e. 3 glasses
- f. 4 or more glasses
- g. Don't know / not sure

7. When you are thirsty what do you usually drink?

Pick only one answer.

- a. Diet soda, unsweetened tea, or artificially sweetened beverage**
- b. Juice**
- c. Milk**
- d. Non-diet/regular soda, sweet tea, or another sweetened drink (Kool-aid, punch)**
- e. Sports drink (Gatorade, PowerAde)**
- f. Water**
- g. Don't know / not sure**

8. On a typical day, how many servings of vegetables do you eat? Do not include French fries.

Use the serving size chart. Include vegetables eaten at home and at school.

- a. None**
- b. Less than one serving**
- b . 1 serving**
- c. 2 servings**
- d. 3 servings**
- e. 4 or more servings**
- f. Don't know / not sure**

9. On a typical day, how many servings of fruit do you eat?

Use the serving size chart. Include 100% fruit juice. Include fruit and juice consumed at home and at school.

- a. None**
- b. Less than one serving**
- c. 1 serving**
- d. 2 servings**
- e. 3 servings**
- f. 4 or more servings**
- g. Don't know / not sure**

10. On a typical day, how many times do you eat French fries or chips? Chips are potato chips, tortilla chips, cheetos, corn chips or other snack chips.

- a. None**
- b. 1 time**
- c. 2 times**
- d. 3 times**
- e. 4 times**

- f. 5 or more times
- g. Don't know / not sure

11. How many times a week do you eat food from a fast food restaurant like Burger King, Chick-Fil-A, Bojangles, Hardees, McDonalds, Wendy's or Pizza Hut?

This includes breakfast, lunch, or dinner eaten at a fast food restaurant.

- a. Less than once a week
- b. Once a week
- c. 2 times a week
- d. 3 to 5 times a week
- e. More than 5 times a week
- f. Don't know / not sure

12. When you eat at a restaurant that offers different sizes of food or drinks, how often do you order the large, "super size" or "biggie size"?

- a. Always
- b. Almost all of the time
- c. Some of the time
- d. Never
- f. Don't know / not sure
- g.

13. When you are hungry and want a snack, what do you usually eat?

Pick only one answer.

- a. Candy
- b. Chips
- c. Cereal
- d. Cookies, cake, Pop-Tarts
- e. Fruit
- f. Vegetables
- g. Yogurt, ice cream, pudding or cheese
- h. Some other snack: _____
- i. Don't know / not sure

14. Besides your lunch, how often do you buy extra food or drinks at school?

This means buying individual items or food and drinks from vending machines at school during school hours.

- a. Every day
- b. 1 - 2 times per week

- c. 3 - 4 times per week
- d. Never buy anything extra
- e. Don't know / not sure

15. How many days per week do you eat breakfast?

This can be breakfast at home or school.

- a. None
- b. 1 day
- c. 2 days
- d. 3 days
- e. 4 days
- f. 5 days
- g. 6 days
- h. 7 days
- i. Don't know / not sure

16. What type of bread do you usually eat?

- a. white bread
- b. whole wheat or dark bread
- c. about half and half
- d. I don't eat bread.

17. If you eat cold breakfast cereal, what type do you eat?

- a. sweetened (eg. Apple Jacks, Captain Crunch)
- b. Unsweetened (eg. Corn Flakes, Wheat Chex)
- c. High fiber (eg. All Bran)
- d. Don't know / not sure

18. Do you eat fried food at home?

- a. yes
- b. no
- c. Don't know / not sure

19. If yes, how often?

- A. Less than once per week
- B. 1 – 3 times a week
- C. 4 – 6 times a week
- D. Everyday

20. How often do you eat home-baked goods?

- a. Less than one time a week**
- b. 1 – 3 times a week**
- c. 4 – 6 times a week**
- d. Everyday**
- f. 4 or more servings**
- g. Don't know / not sure**

APPENDIX B: PHYSICAL ACTIVITY LOG

Just Right Academy Exercise Log

date	description	minutes or sets/ reps	notes

APPENDIX C: RECRUITMENT FLYER

Healthy Eating and Exercise Classes



2016

Lead Instructors

Gary F. Dupart Jr, RN, BSN
Doctor of Nursing Practice
Student at UNC and Certified
Pediatric Nurse

Marion Houser, BS
Assistant Director and High
School Teacher for Just Right
Academy

Setting

All classes and activities will be held at Just Right Academy during the school day. The only take home components will be the fun exercise activities to do at home and encouraged healthy cooking ideas

We will be conducting a research study with 12 Weeks of interactive classes to learn about nutrition and physical activity in a fun learning environment. Will learn basic cooking skills, healthy lunch packing ideas, play indoor and outdoor games, and use food models and visual displays.

Who can participate?

Students enrolled in Just Right Academy's High School for the Spring 2016 semester ages 13-20.

What is involved?

This research study will involve a 12-week series of healthy nutrition and physical activity classes.

This educational series will have games and assorted fun activities to help students learn about nutrition and exercise.

Students will have a take home project that encourages them to decrease inactive time at home. Creativity will be used to make either a video or perform in a talent show to show how fun physical activity can be done outside of school settings.

ORGANIZATIONS

Just Right Academy partnership with
UNC School of Nursing

What information will be collected?

Height, weight, BMI Percentile, waist circumference, and triceps and subscapular skinfolds and nutrition and physical activity data will be examined.

Interviews will be conducted during the third data collection.

Time of data collection

- Time 1 Data (baseline)
- Time 2 Data (12-weeks; post-intervention)
- Time 3 Data (24-weeks; post-intervention)

Health data collected will be subject to privacy practices and not shared.

Consent and Assent will be requested from parents and adolescents.

EMAIL

afgaryd@email.unc.edu

Please email me any questions or concerns

APPENDIX D: PARENTAL CONSENT FORM

University of North Carolina at Chapel Hill

Parental Permission for a Minor Child to Participate in a Research Study

Consent Form Version Date: 02/25/2016

IRB Study # 16-0487

Title of Study: Nurse and Teacher Led Adolescent Healthy Weight Classes to Improve Health Behaviors

Principal Investigator: Gary Dupart

Principal Investigator Department: School of Nursing

Principal Investigator Phone number: 410-858-3091

Principal Investigator Email Address: afgaryd@email.unc.edu

Faculty Advisor: Diane Berry

Faculty Advisor Contact Information: (919) 843-8561

What are some general things you and you child should know about research studies?

You are being asked to allow your child to take part in a research study. To join the study is voluntary.

You may refuse to give permission, or you may withdraw your permission for your child to be in the study, for any reason, without penalty. Even if you give your permission, your child can decide not to be in the study or to leave the study early.

Research studies are designed to obtain new knowledge. This new information may help people in the future. Your child may not receive any direct benefit from being in the research study.

There also may be risks to being in research studies.

Details about this study are discussed below. It is important that you and your child understand this information so that you and your child can make an informed choice about being in this research study.

You will be given a copy of this consent form. You and your child should ask the researchers named above, or staff members who may assist them, any questions you have about this study at any time.

What is the purpose of this study?

The purpose of this research study is to determine if a nurse and teacher led series of nutrition and exercises classes can help adolescents improve their eating and exercise behaviors to manage their weight.

Your child is being asked to be in the study because they are 13-20 years old and enrolled at the Just Right Academy.

Are there any reasons your child should not be in this study?

If your adolescent cannot speak, read, or write in English or are not 13-20 years old. Also if their teacher recommends that the format of the intervention is a poor match for the students and will prevent participation in-group nutrition and exercise education classes in the school.

How many people will take part in this study?

There will be approximately 15 people in this research study.

How long will your child's part in this study last?

Your adolescent will be asked to be in the study for 12 weeks. Each class will last 45-60 minutes and there will be a follow up interview 12 weeks following the intervention.

What will happen if your child takes part in the study?

After you consent and your child assents we will collect data, which includes height, weight, body fat percentage, and questionnaires asking about your health behaviors. We will collect the same data three times over the course of the study.

Your adolescent will attend the class for 60 minutes at a time, once a week, over 12 weeks. The data will be collected at the start of the class series, at the 12 week conclusion of the series, and a follow up interview will be conducted 12 weeks following the conclusion of the series (after the summer break).

What are the possible benefits from being in this study?

Research is designed to benefit society by gaining new knowledge. The benefits to your child from being in this study may include learning about how to eat healthier and exercise to manage your weight. The Just Right Academy is also offering this series as part of a Health Education course.

What are the possible risks or discomforts involved from being in this study?

There may be uncommon or previously unknown risks. There are no long-term physical, psychological, and social risks/discomforts to attending class, exercising, or filling out questionnaires. You should report any problems to the researcher.

What if we learn about new findings or information during the study?

You and your child will be given any new information gained during the course of the study that might affect your willingness to continue your child's participation in the study.

How will information about your child be protected?

We will protect your privacy and confidentiality by removing your adolescents name and any identifying information from the data and assigning a code number. Identifiable data will be stored on an excel spreadsheet in a secure, electronic folder on password encrypted private computer, which only Gary Dupart will have access to. A printout with the same information will be kept in the faculty advisor's locked office. De-identified data will be shared via email

amongst the research team. None of your private health data will be shared amongst school students or staff. Only general results will be provided to the school.

Participants will not be identified in any report or publication about this study. Although every effort will be made to keep research records private, there may be times when federal or state law requires the disclosure of such records, including personal information. This is very unlikely, but if disclosure is ever required, UNC-Chapel Hill will take steps allowable by law to protect the privacy of personal information. In some cases, your child's information in this research study could be reviewed by representatives of the University, research sponsors, or government agencies (for example, the FDA) for purposes such as quality control or safety.

What will happen if your child is injured by this research?

All research involves a chance that something bad might happen. This may include the risk of personal injury. In spite of all safety measures, your child might develop a reaction or injury from being in this study. If such problems occur, the researchers will help your child get medical care, but any costs for the medical care will be billed to you and/or your insurance company. The University of North Carolina at Chapel Hill has not set aside funds to pay you for any such reactions or injuries, or for the related medical care. However, by signing this form, you and your child do not give up any of your legal rights.

What if you or your child wants to stop before your child's part in the study is complete?

You can withdraw your child from this study at any time, without penalty. The investigators also have the right to stop your child's participation at any time. This could be because your child has had an unexpected reaction, or has failed to follow instructions, or because the entire study has been stopped.

Will your child receive anything for being in this study?

Your child may receive grades as part of their Health Education course for being in this study. They may also learn about how to eat healthier and exercise to manage their weight.

Will it cost you anything for your child to be in this study?

It will not cost anything to be in this study.

What if you or your child has questions about this study?

You and your child have the right to ask, and have answered, any questions you may have about this research. If there are questions about the study, complaints, concerns, or if a research-related injury occurs, contact the researchers listed on the first page of this form.

What if there are questions about your child's rights as a research participant?

All research on human volunteers is reviewed by a committee that works to protect your child's rights and welfare. If there are questions or concerns about your child's rights as a research

subject, or if you would like to obtain information or offer input, you may contact the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu.

APPENDIX E: ADOLESCENT ASSENT FORM

University of North Carolina at Chapel Hill Assent to Participate in a Research Study Adolescent Participants age 15-17

Consent Form Version Date: 02/25/2016

IRB Study # 16-0487

Title of Study: Nurse and Teacher Led Adolescent Healthy Weight Classes to Improve Health Behaviors

Principal Investigator: Gary Dupart

Principal Investigator Department: School of Nursing

Principal Investigator Phone number: 410-858-3091

Principal Investigator Email Address: afgaryd@email.unc.edu

Faculty Advisor: Diane Berry

Faculty Advisor Contact Information: (919) 843-8561

What are some general things you should know about research studies?

You are being asked to take part in a research study. Your parent, or guardian, needs to give permission for you to be in this study. You do not have to be in this study if you don't want to, even if your parent has already given permission. To join the study is voluntary. You may refuse to join, or you may withdraw your consent to be in the study, for any reason, without penalty.

Research studies are designed to obtain new knowledge. This new information may help people in the future. You may not receive any direct benefit from being in the research study. There also may be risks to being in research studies.

Details about this study are discussed below. It is important that you understand this information so that you can make an informed choice about being in this research study. You will be given a copy of this consent form. You should ask the researchers named above, or staff members who may assist them, any questions you have about this study at any time.

What is the purpose of this study?

The purpose of this research study is to determine if a nurse and teacher led series of nutrition and exercises classes can help adolescents improve their eating and exercise behaviors to manage their weight.

You are being asked to be in the study because you are aged 13-20 and enrolled at Just Right Academy.

Are there any reasons you should not be in this study?

If you cannot speak, read, or write in English or are not 13-20 years old. Also if their teacher recommends that the format of the intervention is a poor match for the students and will prevent participation in-group nutrition and exercise education classes in the school.

How many people will take part in this study?

There will be approximately 15 people in this research study.

How long will your part in this study last?

You will be asked to be in this study for 12 weeks with one follow up interview 12 weeks after the conclusion of the study.

What will happen if you take part in the study?

After you consent we will collect data, which includes height, weight, body fat percentage, and questionnaires asking about your health behaviors. We will collect the same data three times over the course of the study.

- You will attend the class for 45-60 minutes at a time, once a week, over 12 weeks.
- The data will be collected at the start of the class series, at the 12 week conclusion of the series, and a follow up interview will be conducted 12 weeks following the conclusion of the series (after the summer break).

What are the possible benefits from being in this study?

Pilot studies are designed to examine the feasibility of an approach that is intended to ultimately be used in a larger scale. You may also expect to benefit by participating in this study by learning about how to eat healthier and exercise to manage your weight. The Just Right Academy is also offering this series as part of a Health Education course.

What are the possible risks or discomforts involved from being in this study?

There may be uncommon or previously unknown risks. There are no long-term physical, psychological, and social risks/discomforts to attending class, exercising, or filling out questionnaires. There may be uncommon or previously unknown risks. You should report any problems to the researcher.

How will information about you be protected?

We will protect your privacy and confidentiality by removing your adolescents name and any identifying information from the data and assigning a code number. Identifiable data will be stored on an excel spreadsheet in a secure, electronic folder on password encrypted private computer, which only Gary Dupart will have access to. A printout with the same information will be kept in the faculty advisor's locked office. De-identified data will be shared via email amongst the research team. None of your private health data will be shared amongst school students or staff. Only general results will be provided to the school.

Participants will not be identified in any report or publication about this study. Although every effort will be made to keep research records private, there may be times when federal or state law requires the disclosure of such records, including personal information. This is very unlikely, but if disclosure is ever required, UNC-Chapel Hill will take steps allowable by law to protect the privacy of personal information. In some cases, your information in this research study could be reviewed by representatives of the University, research sponsors, or government agencies for purposes such as quality control or safety.

What if you want to stop before your part in the study is complete? You can withdraw from this study at any time, without penalty. The investigators also have the right to stop your participation at any time. This could be because you have had an unexpected reaction, or have failed to follow instructions, or because the entire study has been stopped

Will you receive anything for being in this study?

You will be receiving credit for a health education course in coordination with Just Right Academy educational requirements.

Will it cost you anything to be in this study?

It will not cost you anything to be in this study.

What if you have questions about this study?

You have the right to ask, and have answered, any questions you may have about this research. If you have questions about the study, complaints, concerns, or if a research-related injury occurs, you should contact the researchers listed on the first page of this form.

What if you have questions about your rights as a research participant?

All research on human volunteers is reviewed by a committee that works to protect your rights and welfare. If you have questions or concerns about your rights as a research subject, or if you would like to obtain information or offer input, you may contact the Institutional Review Board at 919-966-3113 or by email to IRB_subjects@unc.edu.

Participant's Agreement:

I have read the information provided above. I have asked all the questions I have at this time. I voluntarily agree to participate in this research study.

_____	_____
Your signature if you agree to be in the study	Date

Printed name if you agree to be in the stud

_____	_____
Signature of Research Team Member Obtaining Assent	Date

Printed Name of Research Team Member Obtaining Assent

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