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MAKING HEALTHY CHOICES: ADOLESCENT PREFERENCE RATINGS OF SCHOOL-BASED HEALTH INTERVENTION

by

Nicholas G. Baird

A thesis submitted in partial fulfillment
of the requirements for the degree

of

EDUCATIONAL SPECIALIST

in

Psychology
(School Psychology)

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2009

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ABSTRACT

Making Healthy Choices: Adolescent Preference Ratings of

School-Based Health Interventions

by

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Utah State University, 2009

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Department: Psychology

This study investigated the effect of a Making Healthy Choices lesson on junior high school students' preference rankings of items used to motivate students to increase academic performance. Results indicated that the lesson resulted in increased ranking scores on healthy items. This study used an assessment procedure that may be used to identify healthy rewards that may motivate students to increase academic performance as well as practice healthy decision making to prevent obesity.

(73 pages)

CONTENTS

Page

ABSTRACT iii

LIST OF TABLES vi

LIST OF FIGURES vii

CHAPTER

I. INTRODUCTION 1

II. LITERATURE REVIEW 4

Prevalence of Pediatric Obesity 4
Negative Effects of Pediatric Obesity 4
Etiology 6
Interventions to Enhance Healthy Choices 7
School-Based Interventions to Increase Healthy Lifestyle Choices 8
Choosing Reinforcers to Motivate Students with Performance Deficits 11
Preference Assessments 13
Purpose and Objectives 18

III. METHODS 21

Setting 21
Participants 21

IV. RESULTS 29

Ranking Scores on Preference Assessment 32
Accuracy Scores on Making Healthy Choices Quiz 39

V. DISCUSSION 41

Limitations 46
Summary 47

REFERENCES 49

Page

APPENDICES 55

Appendix A: Assent Form 56
Appendix B: Student Demographic Form 59
Appendix C: Instructions on Multiple-Stimulus-Without-Replacement..... 61
Appendix D: Planet Health Outline 63
Appendix E: Quiz on Making Healthy Choices 65

LIST OF TABLES

Table		Page
1.	Participant Demographic Information	22
2.	Mean Rank Scores, Standard Deviations, and Ranges on the Healthy Food, Activity, and Total (Food + Activity) Items for Students in the Control and Lesson Experimental Conditions	29
3.	Mean Rank Scores on Specific Items for Students in the Control Experimental Conditions	30
4.	Mean Rank Scores on Specific Items for Students in the Lesson Experimental Conditions	34
5.	Results of Mixed Between-Within Subjects Analysis of Variance for Lesson Group by Time for Food Activity and Total Items	40
6.	Mean Test Scores and Standard Deviations on the Lesson Pre and Post Quiz for Students in the Control and Lesson Experimental Conditions	40

LIST OF FIGURES

Figure Page

1. Mean ranking score for all healthy items of students in control and lesson group 35

2. Mean ranking score for healthy food items of students in control and lesson group 36

3. Mean ranking score for healthy activity items of students in control and lesson group 36

CHAPTER 1

INTRODUCTION

Pediatric obesity has become an epidemic in our society with rates tripling over the past two decades (Strauss & Pollack, 2001). According to Ogden and colleagues (2006), 17.1% of children and adolescents were overweight in 2003-2004 based on body mass index (BMI) criteria scores. Children who are overweight are at an increased risk for multiple negative effects. Biological problems can include: cardiovascular complications, diabetes, glucose intolerance, hypertension, sleep apnea, gallstones, liver disease, and an increased risk of cancer (Chan, Rimm, Colditz, Stampfer, & Willett, 1994; Freedman, Dietz, Srinivasan, & Berenson, 1999; Mallory, Fiser, & Jackson, 1989; Wabitsch, 2000). Childhood obesity can also affect a child's emotional adjustment and has been related to depression, anxiety, and low self-esteem (Miller & Downey, 1999).

Obesity and being overweight is the result of an intake of more calories than is being used by the body. Children who consume foods that are high in calories and fat but low in fiber, fruits, and vegetables have a greater risk of being overweight (Swimburn, Caterson, Seidell, & James, 2004). In addition, children who consume sweet drinks are at an elevated risk of being overweight (Welsh et al., 2005). Another variable that has been linked to children being overweight is a sedentary lifestyle of playing videos games and/or watching television. Children often eat snack foods while they are watching television and there are many food advertisements that are for unhealthy foods (Lowry, Wechsler, Galuska, Fulton, & Kann, 2002).

To treat or prevent pediatric obesity, children need to learn and use proper eating

habits along with physical activity (Nemet et al., 2005). Because children are at school for a significant part of the day, schools are increasingly providing education and activities to help prevent children from becoming overweight or to help children reduce their weight if they are obese or overweight. As part of the education process, the schools need to teach children how to make healthy food and activity choices. Several studies that have implemented nutrition education programs have demonstrated lower percentages of overweight and obese students and higher percentages of students with healthier diets and more physical activity than students in schools without nutritional programs (Gortmaker et al., 1999; Veugelers & Fitzgerald, 2005).

School settings can also provide students opportunities to practice healthy decision making. For example, positive reinforcement procedures to increase appropriate behaviors are commonly used with students refusing to complete academic work (Dunlap et al., 1994). However, teachers often use high-calorie snacks to reinforce increased work or correct behavior in class because students often prefer to earn these types of rewards (Berkowitz & Martens, 2001). Although these types of reinforcers may increase positive behavior, this practice also adds to the unhealthy behaviors being taught to children. Yet, it is important that teachers motivate students to complete important academic tasks when students are not performing as expected in the classroom. Thus, teaching students to select powerful but healthy reinforcers may result in effective behavioral programming while decreasing the likelihood of childhood obesity. Preference assessments are one method that has been shown to accurately predict reinforcer effectiveness for behavior change with student populations (Northup, George, Jones, Broussard, & Vollmer, 1996).

This present study aims to investigate the effects of a nutritional lesson on making healthy choices by determining student preference ratings of healthy classroom food and activity items that may be used to reinforce work productivity.

CHAPTER II

LITERATURE REVIEW

Prevalence of Pediatric Obesity

The rate of overweight children has seen a significant, steady increase since 1980 (Strauss & Pollack, 2001) such that the prevalence of childhood obesity has tripled over the past three decades. According to Ogden and colleagues (2006), 17.1% of children and adolescents were overweight in 2003-2004 based on BMI criteria scores. Based on this study, the prevalence of overweight female children and adolescents was 13.8% in 1999-2000 and increased to 20.0% in 2003-2004. Similarly, obesity rates in male children and adolescents increased from 14.0% to 18.2% in the same time span. The Practice Partner Research Network also estimated that 18-20% of children are overweight and that the percentage of children at-risk for becoming overweight is 34-36% (Gauthier, Highner, & Ornstein, 2000).

Negative Effects of Pediatric Obesity

The increased focus on obesity prevention and intervention strategies in the literature is due to studies reporting numerous adverse effects related to being overweight or obese during childhood. Overweight children and adolescents are at an increased risk for multiple negative health effects that result from being overweight. Adverse health effects of obesity can include glucose intolerance, which may contribute to diabetes (Chan et al., 1994); hypertension (Freedman et al., 1999); sleep apnea (Mallory et al.,

1989); orthopedic problems, weaker immune system, gallstones, skin altercations, physical handicap, and liver cholecystolithiasis (Wabitsch, 2000). As overweight children become adults, they have an increased susceptibility to the same health risks and cancer (Wabitsch).

Childhood obesity has also corresponded with emotional adjustment or mental health issues (Dietz, 1998). Overweight children are at higher risk for depression, anxiety, and low self-esteem (Miller & Downey, 1999). To date, it is uncertain if these psychosocial correlates contribute to or are a result of obesity (Dietz). Nevertheless, overweight youth do report using disordered eating behaviors (binge eating, purging, taking laxatives, or diuretics) more frequently than nonoverweight youth. Neumark-Sztainer, Story, Hannan, Perry, and Irving (2002) found that as many as 12% of overweight males and 21% of overweight females reported the use of these unhealthy behaviors. Girls are more likely to mature earlier if they are obese at a young age and that can lead to body dissatisfaction, which can also cause depressive symptoms and eating disorders (Ohring, Graber, & Brooks-Gunn 2002).

Overweight children have also reported more frequent and severe appearance-related teasing than nonoverweight peers. Peer victimization is also negatively related to physical activity (Storch et al., 2007). Furthermore, higher reports of weight-related teasing were positively correlated with higher reported rates of loneliness, depression, anxiety, bulimic behaviors, body dissatisfaction, and enjoyment of sedentary isolated activities (Hayden-Wade et al., 2005).

These undesirable consequences of obesity are compelling reasons to place

childhood obesity as a high priority for prevention and treatment. Moreover, interventions targeting childhood obesity should focus on choices that lead to healthy weight rather than a focus on weight loss strategies that may exacerbate the frequency of problem eating behaviors.

Etiology

Obesity and being overweight occurs when more calories are taken in than are metabolized (Lyman & Hembree-Kigin, 1994). Diets that include foods that are high in calories and fat, but low in fiber, fruits, and vegetables have been linked to an increased chance of becoming overweight (Swimburn et al., 2004). The consumption of sweet drinks has also been linked to overweight behavior. Children who were under the 85th percentile in the BMI on average drank less than one sweet drink a day. Children who were between the 85th and 95th percentile on the BMI and drank between one and two sweet drinks a day were two times more likely to become overweight (Welsh et al., 2005).

The efficiency at which the body metabolizes calories depends on a number of factors such as social, genetic, behavioral, and hormonal levels (Lustig, 2001). For example, twin studies have demonstrated that obesity may be genetically inherited. Moreover, children whose parents are overweight have a higher chance of becoming overweight. Thus, obesity is a result of a combination of genetics and environmental effects (Barsh, Farooqi, & O'Rahilly, 2000).

In addition to caloric intake and genetic influence, the level of physical activity

along with the associated energy expenditure influences obesity. Although the number of studies is limited, data suggest that promoting physical activity can reduce weight among overweight young people (Sherry, 2005). Based on a 15,000-subject study that analyzed data from the 1999 National Youth Risk Behavior Survey, an environmental factor that may be associated with being overweight is watching more than two hours of television a day. Television viewing may increase weight in individuals because it is a sedentary activity or because many people eat in front of the television and advertisements on the television often promote unhealthy foods rather than nutritious foods (Lowry et al., 2002).

Interventions to Enhance Healthy Choices

Whenever treating children who are overweight or obese or preventing child obesity, research has clearly indicated that it is important to consider the daily food and activity choices children make. Obese children often choose to be sedentary when given the option of being active (Worsely, Coonan, Leitch, & Crawford, 1984) and report physical activities as less reinforcing or enjoyable than sedentary activities (Epstein, Smith, Vara, & Rodefer, 1991). One of the best possible ways of increasing physical activity in obese children is by making the activity itself a reinforcement to them so that they choose to be more active (Gortmaker et al., 1996).

When people make unhealthy food choices, they are more likely to be overweight as opposed to those who make healthy food choices (Lowry et al., 2000). A combination of the two critical choices (physical activity and proper nutrition) demonstrated weight

loss in obese children in a study conducted by Nemet and colleagues (2005). Twenty-four participants between the ages of 8 and 14, along with their parents, attended four lectures about a therapeutic nutritional approach. The participants and their parents also met with a dietitian six times during the 3 months to learn how food intake influenced obesity and how to eat a balanced diet. To increase physical activity, children were asked to exercise two times a week for 1-hour sessions during a 3-month program. The physical exercises were activities that could be completed at school during physical education class. In a 1-year evaluation, the participants started out at an average BMI of 27.7 (*SD* = 3.6), which slightly decreased 1 year later to an average BMI of 26.1 (*SD* = 4.7). The activity rate also increased and the BMI decreased 1 year after the onset of the study.

School-Based Interventions to Increase Healthy Lifestyle Choices

Given that students are at school for a significant part of the day, schools can play a significant role by teaching about proper nutrition and encouraging physical activities while supporting healthy choices throughout the school day. School programs that promote skills for a healthy lifestyle also have the potential to reach a wide range of overweight children who may be at risk for developing obesity (Pyle et al., 2006). For example, the types of foods that are provided in school cafeterias or by school site vendors are often high in fat, sodium, and calories (Lin, Guthrie, & Frazao, 2001). Providing students with a healthy diet at school can help them decrease their chances of cancer, diabetes, stroke, and cardiovascular diseases (Frazao, 1999). School-based programs that teach about the benefits of being active and eating healthy foods may

provide social benefits, enhance healthy eating during important growth periods, lower the risk of heart disease in adulthood, and establish healthy behaviors that may lead to healthy habits (Baranowski et al., 2000). Because of the high prevalence and serious consequences of obesity, school-based support in combination with home-based support provides a broader spectrum of prevention or intervention strategies across settings and time.

Although there are a limited number of studies that have evaluated the effects of school-based nutrition or exercise programs on weight problems, results from a few school-based intervention studies are promising. For example, Veugelers and Fitzgerald (2005) examined the effects of a school-based program that provided information about eating healthy and encouraging the students to engage in physical activity. The Annapolis Valley Health Promoting Schools (AVHPS) program was implemented with 133 students in seven fifth-grade classes. Changes in excess body weight, diet, and physical activity of students participating in the AVHPS program were compared to 73 fifth-grade classes participating in a school that offered healthy menu alternatives and 199 fifth-grade classes that did not participate in either the AVHPS program or the cafeteria program. The results of the study demonstrated that the students participating in the AVHPS program had lower percentages of overweight and obese students relative to students given the nutritional program or given no intervention. In addition, a higher percentage of students participating in the AVHPS reported healthier diets and more physical activity than students in schools without the AVHPS program.

Research has indicated that youth are receptive to the idea of school-based

interventions for managing weight. Neumark-Sztainer and Story (1997) conducted interviews with 61 adolescents who were either overweight or obese from an inner-city high school. During the interviews, the adolescents were asked about their perceptions of school-based interventions for obesity at school. The adolescents were receptive to an obesity treatment in school as long as it was provided in a supportive environment, confidentiality was kept, the treatment was enjoyable, and the treatment program was tailored to their needs. The participants of the study also desired the treatment program to be during their time at school with group leaders who also had been overweight or had struggled with weight issues. In a second study, by Neumark-Sztainer, Martin, and Story (2000), 203 interviewed adolescents reported that they wanted a weight loss program that was enjoyable, at school, tailored to the needs of the participants, offered many aerobic exercise options, and that was designed for the whole school not just the overweight or obese students.

Planet Health is another school program created to teach students about proper nutrition and exercise. It also includes lessons about spending less time in front of the TV. In a study conducted by Gortmaker and colleagues (1999), the Planet Health program was implemented in a randomized controlled study with 1,295 sixth- and seventh-grade public school students. Study results revealed that the implementation of Planet Health was effective at reducing obesity in girls but not boys. TV viewing was reduced and fruit and vegetable consumption was increased after implementation of the Planet Health Program for males and females. Surveyed teachers also reported that the program Planet Health is cost effective and feasible to implement in the school system

(Wang, Yang, Lowry, & Wechsler, 2003; Wiecha et al., 2004).

Choosing Reinforcers to Motivate Students with Performance Deficits

Because of the negative consequences of obesity, school programs or activities need to be thoughtfully developed in schools whenever educators have the opportunity to support children in making healthy choices. In general, eating and physical habits are difficult to change (Sallis, Pinski, Grossman, Patterson, & Nader, 1988); thus, consideration of choices in these two areas of children's lives is more likely to produce lasting lifetime effects. One important issue in school that is related to choices is the use of strategies to motivate at-risk students to learn. A primary mission in schools is to enable and motivate students to learn skills by completing work. There are two common reasons why students do not complete work. Incomplete work may be due to a skill deficit when a child does not have the correct support or skills to do the required work. Alternatively, incomplete work may be due to a student being able to do a task but for some reason choosing not to perform the task as expected.

A study conducted by Bramlett, Murphy, Johnson, Wallingsford, and Hall (2002) questioned 370 school psychologists about the types of referrals they received. Bramlett and colleagues reported that 24% of the referrals received were from teachers who reported the school-aged student lacked sufficient motivation to complete school assignments. Other studies indicate that some students exhibit combined skill and performance deficits (Eckert, Ardoin, Daisey, & Scarola, 2000). For example, Daly, Persampieri, McCurdy, and Gortmaker (2005) assessed the effect of reading interventions

in conjunction with rewards on reading performance for students experiencing reading difficulties. For one of the participants rewards alone were sufficient enough to increase reading fluency. For the other participant, the reading intervention along with the reward was enough to raise his reading fluency.

Although a skill deficit problem suggests a change in instructional strategies and work level, a performance deficit could be helped by strategies to motivate a student to work as expected. For example, Duhon and colleagues (2004) showed that when an instructional intervention and a contingency-based intervention were alternatively implemented with five low-achieving students, three students benefited most from an instructional intervention, whereas two students benefited when given a reward contingent on increases in work performance. A student exhibiting a performance deficit or combined deficit can be supported by providing a reward that a student chooses to earn for increased work. However, identifying the properly defined reinforcer item is not a simple task when schools are balancing what is feasible and what is a healthy option for a reward that students would like to earn. Berkowitz and Martens (2001), for example, found differences between preferred school-based reinforcers that teachers were willing to provide and reinforcers students wanted to earn. Thirty-one elementary and secondary teachers who ranked a list of school-based reinforcers ranked teacher praise and attention as the highest reinforcers that they were willing to provide students. The lowest ranked categories for teachers were escape from schoolwork and edible snacks. Alternatively, the students' highest ranked reinforcers were edible items such as candy and also escape from work. This mismatch suggests that (a) teachers may not reliably select effective

reinforcers for students, and (b) students are selecting unhealthy choices.

Preference Assessments

Preference assessments have been useful in identifying what types of activities, edibles, or tangible items students would like to earn to help them be motivated to reduce maladaptive behavior, increase on-task behavior, and increase academic performance (Northup et al., 1996; Paramore & Higbee, 2005). Researchers have investigated the degree of accuracy with which different types of reinforcer assessments predict the child's preferred reinforcer that leads to behavior change in the child's daily environment. An easy and quick method to find out what types of reinforcers can increase task completion for students who have a performance deficit is by asking the teacher for suggestions of reinforcers. Another method has been to simply ask the student what he/she prefers for a reinforcer. However, both methods have been shown to unreliably select a reinforcer that effectively changes behavior (Resetar, 2006).

One of the early methods of assessing more complex but reliable preference assessments was conducted by Pace, Ivancic, Edwards, Iwata, and Page (1985) with six children with profound mental retardation. Their reinforcer system, the Pace procedure, consisted of 20 trials or presentations of different types of potential reinforcers (e.g., toys, edibles). During each trial, five items were presented one at a time. If an item was approached within the first 5 seconds, it was considered preferred. If the item was not approached within the first 5 seconds, the item was considered unpreferred. Each item was presented 10 times amongst a group of different items during the 20 trials. Items

approached 80% or more of the times were considered to be items that are most likely to be reinforcing to the child and therefore change behavior in the child's environment over time. Following this reinforcer assessment, a student's identified preferred item was presented contingent upon a desired behavior change that was selected to replace the targeted problem behavior. For most of the participants, the desired behavior change occurred when the preferred reinforcer was contingently presented over time.

One limitation of the Pace and colleagues (1985) procedure was that the students almost always approached the item that was presented to them making differentiation between item preferences difficult. One possible reason for this is that no other items are present thus making the presented item more appealing. To examine the effect of an alternative forced-choice procedure, Piazza, Fisher, Hagopian, Bowman, and Toole (1996) used a forced choice stimulus assessment to investigate if the higher preferred items would illicit more compliance than those items that were rated as low preference items. During the assessment, each of the 12 to 20 items were paired once with every other stimulus. When a child approached one of the items, the unapproached items were removed and the child was allowed 5 seconds access to the item before the next trial began. The researchers found that high-preference reinforcers functioned reliably as reinforcers for behavior change for all four participants with severe to profound mental disabilities. Middle-preference reinforcers only functioned with two of the clients and only when paired against the low-preference reinforcers.

To investigate a more efficient process for children with normal cognitive development, Paramore and Higbee (2005) used multiple-stimulus-without-replacement

(MSWO) with three boys who were diagnosed with emotional-behavior disorders. MSWO is when the participant is presented with more than two items and instructed to select their favorite item. Once the item has been selected the participant is then told to select the next favorite item. The process continues until all of the items that were presented have been selected by the participant. The results demonstrated that the selected high-preference reinforcers were likely to motivate the students to perform on-task behavior better than less-preferred items.

Although there are several options to determine effective reinforcers to motivate students to perform desired behaviors such as work completion, time and resources needed are important factors to consider when implementing reinforcer assessments in school settings. To identify the most accurate and simple method, several studies have compared the effects of the various reinforcer assessment procedures. Fisher and colleagues (1992) compared the effectiveness of the Pace procedure to the forced-choice procedure with four students who were diagnosed with profound mental retardation. The results of the study showed that the forced-choice procedure was better than the Pace procedure at differentiating between items that would increase compliant behavior in the student (Fisher et al.), even for the items selected 60% of the time during the reinforcer assessment procedure. However, the forced-choice procedure was more time-intensive than the Pace procedure due to a greater amount of stimulus paired comparisons that were required (i.e., 120 pairs presented to each student).

To simplify the number of item trials, Roane, Vollmer, Ringdahl, and Marcus (1998) conducted a free-operant preference assessment by allowing free access to an

array of 10 or more reinforcers for 5 minutes. The amount of time that a reinforcer was manipulated by one of the 10 children diagnosed with developmental disabilities was recorded. When this method was compared to the use of the paired-stimulus method, results demonstrated that administration time was shorter for the free access method with fewer maladaptive behaviors from the participants during the administration of the preference assessment (Roanne et al.).

DeLeon and Iwata (1996) compared three methods of identifying reinforcers for seven students diagnosed with severe mental disabilities: paired stimulus (PS), multiple-stimulus-with-replacement (MSW), and MSWO. The MSW is when an array of items is presented at the same time and the student is asked to select their most preferred item. When the item has been selected, then the item is put back on the table as an option to be selected again. The MSWO is similar to the MSW procedure but instead of replacing the item back on the table, the item is removed so the student will choose his/her second most preferred item. Results indicated that the MSWO and the PS identified nearly the same items as being most preferred with the PS being slightly more accurate. To conduct five sessions, the MSW lasted an average of 20.5 minutes, MSWO 21.8 minutes, and PS 53.3 minutes (Deleon & Iwata). All of these sessions lasted longer than the typical time that a teacher has to determine what types of reinforcers students would prefer. In addition, by multiplying any of those sessions by 25 students, it will take longer than a day to administer to the whole class. No teacher has that amount of time.

In summary, results from comparative studies indicate that forced choice more accurately identifies reinforcers that change behavior relative to the free access

procedure. MSW and PS both identified reinforcers, but multiple-stimulus-with-replacement had less administration and decision time that also accurately identified rewards that were used to decrease behavior problems.

One simple method is the pictorial assessment where pictures of items are presented to a child for selection. To assess what type of item presentation most effectively identifies potent reinforcers, Northup et al. (1996) compared the effect of three forced choice reinforcer preference assessment methods when used on four students diagnosed with attention-deficit/hyperactivity disorder (ADHD) for promoting work completion. First, items were presented by having a researcher verbally read items from a list as the student rated the items as not at all liked, a little liked, or a lot liked. The second assessment was when the students were presented with two items on a verbal stimulus-choice questionnaire and asked what they would "work hard to get." The final assessment administered was the pictorial stimulus choice where the examiners presented two pictures of items at a time and asked the students to choose the reinforcer they most preferred. To measure the effectiveness of each reinforcer strategy on work completion, the researchers asked students to complete a coding procedure similar to the coding subtest in the Wechsler Intelligence Scale for Children III. The results showed that the verbal and pictorial stimulus-choice assessments were better at discerning the high and low preferences within a category for increasing work completion, while the verbal survey was better at identifying multiple categories the student preferred. In addition, the pictorial stimulus-choice assessment came up with the least amount of false positives.

Time consuming and complex reinforcer assessment surveys would be difficult to

conduct in a regular education setting when time spent on academic materials is substantially decreased. MSW and PS appear to be equally effective in identifying effective reinforcers to change behavior, while MSW clearly takes less time to administer. To determine effective reinforcers, the researched reinforcer assessments thus far have been conducted on an individual basis, which is time consuming. Due to the accuracy of the pictorial and written questionnaire in the Northup et al. (1996) study, it may be advantageous to represent items as pictures with verbal descriptions to a group of children when identifying effective reinforcers.

Purpose and Objectives

A school's primary mission is to promote academic performance. At least 20% of the students in American schools are experiencing academic problems that commonly worsen without intervention. Research has shown that many students may not be able to complete work due to a performance deficit that may be combined with a skill deficit. For these children, the current classroom consequences (teacher praise, grades) are not enough motivation to practice tasks that require more time and effort than their peers. Motivational strategies with instructional support help students overcome past histories of academic failure by initially highlighting successful attempts with salient rewards for correct work completion. Thus, effective motivational strategies are critically needed to address the increasing number of children who are not meeting academic standards.

A positive reinforcer is a stimulus that occurs after a response and serves to increase the likelihood of that response occurring again (Cooper, Heron, & Heward,

1981). However, when provided with choices for potential reinforcers, students tend to select unhealthy rewards such as snacks or sedentary escape from work (Berkowitz & Martens, 2001). This creates a problem for educators who are seeking effective ways to motivate children in a healthy manner. Childhood obesity has reached epidemic status in the United States indicating that many children are not making healthy choices regarding food selection and activities, two factors that influence weight, in an effective manner (Kelder, Perry, Klepp, & Lytle, 1994). Thus, to deter obesity and its associated health risks while decreasing low achievement, it is important to teach children to actively select healthy reinforcers as rewards for work. Although school-wide programs that teach children about proper nutrition and physical activities report modest change in students' eating habits or weight, no study has investigated the effects of educational lessons about healthy choices on student choices of reinforcer items that teachers or parents can use to motivate students to complete work as expected.

This study aims to evaluate the effect of Making Healthy Choices nutritional lessons on reinforcer preferences when junior high students rated their most- to least-preferred food and activity items that may be used as rewards to increase classroom work completion. For the current study, one 50-minute lesson that focused on the importance of making healthy choices specifically in regards to food and activity items were taught to the junior high students from the program Planet Health (Gortmaker et al., 1999). A brief multiple-stimulus without replacement reinforcer-preference assessment was given pre- and postintervention to assess student rankings of 40 items with 10 items in each of the four categories: unhealthy food, healthy food, high-energy activities, and sedentary

activities (see Appendix C for instructions). During each assessment, students were asked to rate 30 of the 40 items that they would be willing to earn for completing academic work. Measures of student rankings were obtained at pre- and post-in-service intervention. Using a pre-/ posttreatment/control group design, this study attempted to answer the following research questions:

1. Is there an increase in junior high students' total mean ranking scores of all healthy items following participation in a Making Healthy Choices nutrition lesson?
2. Is there an increase in junior high students' mean ranking scores of healthy activity items following participation in a Making Healthy Choices nutrition lesson?
3. Is there an increase in junior high students' mean ranking scores of healthy food items following participation in a Making Healthy Choices nutrition lesson?
4. Is there a significant difference between students' mean ranking scores rankings of healthy food and activity items?
5. Is there a significant increase in students' knowledge on making healthy choices following participation in a Making Healthy Choices nutrition lesson?

CHAPTER III

METHODS

Setting

Participating students were recruited from one public junior high school (seventh through ninth grades) located in an urban district in a western state. The school district consisted of 89% Caucasian, 9% Latino/a, 1% American Indian/Alaskan Native, <1% Asian, and <1% African American. Also 34% of the students were eligible for the free or reduced lunch program. Experimental procedures with students were administered by the author (see procedures below) in the regular education classroom while participating students and their classmates were at their desks. The students' teacher was also present. Approximately 35 students were enrolled in each class.

Participants

Students (N = 120) attending one of six physical education classes of a teacher who volunteered to participate in the study were recruited to participate in the study (see recruiting procedures below). Although 126 students were in the classes, six students' data were not included because these students were absent on one or more days when the following study procedures were conducted. Before the students participated in the study they were asked to complete a questionnaire that asked questions about their age, gender, and grade (see Appendix B). Reported demographic characteristics of the participating students derived from this questionnaire are presented in Table 1.

Table 1

Participant Demographic Information

	Total sample (N = 120)		Control (no lesson) (n = 66)		Lesson (n = 54)	
Variable	*n*	%	*n*	%	*n*	%
Disabilities						
Yes	7	6	2	3	5	9
No	113	94	64	97	49	91
Grade						
7rd	34	28	15	23	19	35
8th	22	18	14	21	8	15
9th	64	53	37	56	27	50
Free lunch						
Yes	42	35	28	42	14	26
No	78	65	38	58	40	74
Ethnicity						
Latino/a	10	8	3	5	7	13
White	103	86	59	89	44	81
Native American	4	4	2	3	2	4
African American	1	1	0	0	1	2
Asian	2	2	2	3	0	0

Materials

Reward cards and reinforcers. Reward cards (2”x 2”) were used in this study to present reward options to the students. Each card presented a picture of a food item or an activity with a name of the food or activity explaining the picture at the bottom of the card (i.e., girl jump roping). Several phases were followed in the selection of specific items that were presented on the reward cards. First, a literature review was conducted to obtain potential reinforcers that have been used by other researchers who have used food or activity reinforcers to change behavior with elementary and junior high students. The next phase of collecting possible reinforcers was to conduct an internet search of multiple

web sites where teachers have reported using various reinforcers. The search was not exhaustive but continued until a number of reinforcers were being repeated. Two hundred twenty-nine items were identified following this process.

From this sample of potential reinforcers, food items were sorted as healthy or unhealthy choices. According to the United Stated Department of Agriculture (USDA, 2005), healthy foods include but are not limited to foods that contain vitamins, magnesium, fiber, potassium, calcium, folic acid, and iron. A registered dietician reviewed the list and placed each food item into one of two categories, healthy or unhealthy. For this study a healthy food item was defined as a low calorie item of 100 calories or less with consideration of "a variety of healthy nutrient-dense foods within and among the basic food groups that limit the intake of saturated and trans fats, cholesterol, added sugars and salt" (Oliveri, 2007; USDA).

Similarly, activity items were sorted as healthy or unhealthy choices. A high-energy activity item was considered to be healthier than a sedentary activity in this study. A high-energy activity was defined as some type of activity that allows the student to move around (e.g., get out of chair, exercise, walk). Alternatively, a sedentary activity is an activity conducted with little body movement done while either sitting or standing in one place.

Next, 100 items that could be administered in a classroom were selected for each category: healthy food, unhealthy food, healthy activity, and unhealthy activity. After the final draft of the reinforcer preference survey was created, the list was then reviewed by an expert with a degree in nutrition and physical exercise to confirm whether the

reinforcers were healthy or unhealthy.

To select the final items, a list of 80 food and activities items was presented to 27 students in Grades 7 through 9 who were not to be involved in the study. These students were asked to select any items on the list that they would like to earn at school for learning and completing academic work at school. The survey consisted of a column for reinforcers and a column listing yes or no next to each item. Of the 80 reinforcers, approximately 20 items were identified for each of the four categories and were presented in random order on the survey. Students circled yes for items that they would like to earn and no for each item they would not like to earn. This list of potential reinforcers was also presented to four teachers in a junior high school. The teachers were asked to select all reinforcers that they would allow their students to receive in class for increased academic productivity that would cause minimal disruption. Both the student and teacher endorsed items were tallied in combination for each item. The top 10 most endorsed items from each category comprised the 40 items that were administered to the students. A second review of the selected 40 items by the health expert reconfirmed the final categories of healthy or unhealthy items.

Quiz. Student knowledge about making healthy choices was also monitored on the quiz administered before and after a nutrition lesson to evaluate student learning on the lesson on making healthy choices (see Appendix E). Eight multiple-choice questions on the quiz were based on what was taught during the health lesson.

Procedures

Recruitment. Student recruitment procedures began after obtaining study approval

from the Institutional Review Board (IRB) at Utah State University, the school district, and the principal at the participating junior high. Both physical education teachers were contacted about participating in the study and one of them wanted to be part of the study. Prior to the study, all students were given an assent form (see Appendix A) providing information about the study to be given to parents. Given that this program was provided to all students and student information remained anonymous, this form was provided to the parents so they would know what the health lesson was going to be about and how the data would be used. At the onset of the study, all students in the participating teacher's classes were presented with the option to participate in the study after given verbal and written details about the study or to work in the library on a class assignment. All students in all classes opted to participate.

In-class preference assessment prior to making healthy choices lesson. The study began with the *in-class preference assessment* administered on the school day prior to a *making healthy choices* lesson. The preference assessment was given to all students (control and experimental group) in the study. A preference assessment session began with the author telling students that they would be shown 40 different reward card pictures before they were asked to rate the rewards according to which they would be the most to least willing to earn for accurately completing work in class. Students' desks were cleared and each student was given an envelope containing 40 reward cards. Students were instructed to take out the materials from the envelope and lay out each of the cards in a horizontal row according to the number on the front of the card. Thus, the students lined up their cards in random order to help prevent potential order effect on

reward preference ratings.

After students had the reward cards lined up on their desks, students were told that each card represented a possible reward that they could earn for improved academic performance. The item would be given to them by either their parent or a teacher. Then instructions were given to the students to first select their favorite reinforcer. The students were then told to select their next favorite item. The process continued in this manner as students selected their most to least favorite reward cards writing number 30 for the most preferred and number 1 for the least preferred. If the student was no longer interested in the remaining items, then they could write a "0" on the back of the card. This preference assessment took at least 20 minutes to complete. Only one assessment trial was administered due to increase efficiency. Further, Carr, Nicholson, and Higbee's (2000) prior findings showed a high correspondence of rating between a first, second, and third assessment trial (Spearman rank correlation r = .72 to .89). Finally, the quiz was also given to students in both groups to assess student knowledge on making healthy choices prior to the lesson.

Making healthy choices nutrition education lesson. Within one school day after the preference assessment, the author and physical education teacher taught a lesson on the subject of making healthy choices to the experimental group. The lesson from the Planet Health Program was used to teach students about making healthy food choices. The lesson used in this study was 50 minutes long and consisted of several activities (see Appendix D). The lesson was taught to three of the classes in the seventh to ninth grades at the participating schools. Topics taught in the lesson included the benefit of healthy

activities as opposed to unhealthy activities. In addition, the topic of nutrition was taught along with examples of which foods are healthy and which foods are not healthy. The goal of the health lesson was to make the students aware that they are making choices each day that affect their health. The health lesson was administered to three of the six health classes, while the remaining three classes served as the control group and did not receive the lesson during the study.

Post lesson preference assessment. Within two schools days of the implemented health lesson, students were administered a second preference assessment. This assessment was conducted using the same procedure and reward cards as those described for the in-class preference assessment prior to the nutrition lesson. As in the pre lesson reinforcer preference assessment, the post lesson assessment was administered with students in the control and experimental groups. Finally, the quiz was also given to students in both groups to assess student knowledge on making healthy choices after the lesson.

Dependent Variable

Preference ranking score. During each of the two preference assessments, student preference response for each item was scored as a ranked number ranging from 30 to 0 with a score of 30 as the most preferred item. A score of 0 was given if students chose not to rank an item as a preferred item. Three preference-ranking scores were calculated using the item ratings. First, scores for all healthy food and activity items were summed to calculate each participant's total preference ranking score for all healthy items. Second, scores for all healthy food items were summed to calculate each participant's

preference ranking score for healthy foods. Third, scores for all healthy activity items were summed to calculate each participant's preference ranking score for healthy activities.

Quiz accuracy score. Eight items on the *s*tudent-administered quizzes on making healthy choices were scored as correct if an accurate answer was given or incorrect for wrong answers or no answers. Total quiz score was percentage correct on an 8-item quiz. Percentage correct was calculated by dividing the number of correct items by 8 and multiplying by 100.

CHAPTER IV

RESULTS

Mean and standard deviation scores for the control and lesson group were calculated in order to measure the magnitude of the differences for ratings of healthy food and activity items between groups (see Table 2). A "0" rating score indicates that no item in a class of reinforcers was preferred whereas higher rating scores indicate greater preference for items in a class of reinforcers. Table 3 presents the mean score for all items on the pre- and postpreference assessment for the control and experimental groups.

To determine if there were differences in demographic characteristics between the lesson experimental group and no lesson control group, students in each of the two groups were compared for differences in grade, socioeconomic status (SES; i.e., free lunch), special education classification, and ethnicity using chi-square analysis. There

Table 2

Mean Rank Scores, Standard Deviations, and Ranges on the Healthy Food, Activity, and Total (Food + Activity) Items for Students in the Control and Lesson Experimental Conditions

	Control (*N* = 66)						Lesson (*N* = 54)					
	Pre			Post			Pre			Post		
Variable	Mean	*SD*	Range	Mean	*SD*	Range	Mean	*SD*	Range	Mean	*SD*	Range
Total	184.91	40.60	106-305	188.31	40.50	116-280	194.79	46.00	88-285	208.93	42.80	112-304
Food	120.39	48.32	14-232	119.65	48.41	27-206	128.76	39.71	50-210	141.06	44.69	45-211
Activity	64.51	33.11	7-140	68.67	39.15	6-177	66.04	39.10	10-223	67.87	40.49	13-212

Table 3

Mean Rank Scores on Specific Items for Students in the Control Experimental Conditions

	Mean		*SD*	
Items	Mean	*SD*	Mean	*SD*
Healthy food				
Strawberries	15.94	9.53	16.68	8.73
Fruit juice	15.26	8.43	13.31	8.78
Beef jerky	14.92	10.41	13.96	10.03
Grapes	13.72	9.04	15.58	8.54
Apples	13.39	9.29	12.97	9.25
Oranges	13.13	9.25	13.22	9.11
Pretzels	12.10	9.22	10.95	9.08
Yogurt	10.64	8.77	9.59	9.19
Cherries	7.12	8.40	8.54	8.50
Cranberries	3.41	6.50	4.01	6.84
Unhealthy food				
Soft drinks	19.27	9.18	17.80	9.39
Candy	19.22	8.02	16.95	8.64
Chocolate	17.59	9.81	17.74	8.83
Ice cream	16.58	9.14	16.95	8.81
Doughnuts	14.51	10.55	16.81	9.98
Chocolate milk	14.09	9.58	13.44	9.18
Popsicles	13.22	9.13	13.97	9.43
Banana bread	12.12	9.42	12.91	10.20
Cupcake	10.64	8.96	11.91	8.85
Healthy activity				
Field trips	14.44	9.65	13.13	9.31
Play game with friend	10.95	8.49	10.41	9.69
Competitive games	10.85	9.89	13.01	105.3
Extra recess	9.41	8.46	10.41	10.06
Gym time	8.44	9.76	9.33	10.30
Help in the library	2.97	7.22	3.06	6.89
Build a model	2.91	5.66	4.03	6.54
Help decorate classroom	2.85	6.07	2.96	6.38
Clean chalkboard	.91	3.13	1.86	5.30
Help custodian	.68	3.16	.44	2.26

(*Table continues*)

	Mean		*SD*	
Items	Mean	*SD*	Mean	*SD*
Unhealthy activity				
Movie tickets	17.36	10.75	16.48	10.67
Extra credit	17.15	9.32	15.03	10.44
Talking with friend	15.70	9.76	14.45	10.49
Movie in class	14.69	9.49	14.62	9.67
Choose where to sit in class	12.34	9.49	11.80	9.97
Sit with friend and work	10.44	9.25	11.75	10.25
Use the internet	10.34	9.61	10.27	9.01
Drawing	8.84	9.86	8.50	10.11
Computer games	6.62	8.61	8.24	9.67
Pick study groups for class	7.88	9.14	7.03	9.19

was no significant difference between the two groups regarding grade, $\chi^2 = (1, N = 120) = 2.49$, $p = .29$; SES, $\chi^2 = (1, N = 120) = 2.86$, $p = .09$; special education classification, $\chi^2 = (1, N = 120) = 1.12$, $p = .29$; and ethnicity, $\chi^2 = (4, N = 120) = 5.64$, $p = .23$.

A preliminary analysis was also conducted to examine potential differences in healthy choices at the onset of the study before the lesson plan using the Wilcoxon rank-sum test for independent groups. Results indicated that there was no difference between preranking scores for all healthy items (*Wilcoxon W* = 3776.50, $N_1 = 66$, $N_2 = 54$, $p = .25$), for healthy food items only (*Wilcoxon W* = 3814.50, $N_1 = 66$, $N_2 = 54$, $p = .35$), and for the healthy activity items only (*Wilcoxon W* = 3241.50, $N_1 = 66$, $N_2 = 54$, $p = .89$).

Another preliminary analysis was conducted to examine differences between healthy and unhealthy items at the onset of the study to determine if the student preferred unhealthy items at the onset of the study. Results of a Wilcoxon rank-sum tests between the two groups on the prelesson rankings of unhealthy items indicated no

significant difference between the two groups rankings of the unhealthy food items (*Wilcoxon W*= 3164.00, N_1 = 66, N_2 = 54, p = .59) , activity items (*Wilcoxon W*= 3547.50, N_1 = 66, N_2 = 54, p = .90), and total items (*Wilcoxon W*= 3019.50, N_1 = 66, N_2 = 54, p = .19). Alternatively, a Wilcoxon matched-pair signed-ranks test between the healthy and unhealthy ranked scores revealed a significant difference for food (z = -3.63, N-Ties = 119, p = .01), activity (z = -8.66, N-Ties = 120, p = .01), or all items (z = -47.45, N-Ties = 119, p = .01). This indicates that the mean ranking score of the unhealthy items food (M = 142.41, SD = 50.70), activity (M = 118.41, SD = 37.68), or all items (M = 260.81, SD = 47.30), was significantly higher than the mean ranking score of the healthy item food, activity, or all items prior to the lesson.

Finally, a preliminary analysis was conducted to examine potential differences in knowledge of healthy choices at the onset of the study. For this analysis, an independent t test was conducted comparing the mean pre quiz score for the control group (M = 4.13, SD = 1.10) with the treatment group (M = 4.33, SD = 0.93). The results of the independent t test indicated no significant difference between the control group and the experiment group in regards to questions they scored correctly on the quiz t (118) = -1.04, p = .30.

Ranking Scores on Preference Assessment

Results on the research questions regarding whether junior high students who receive a lesson on healthy choices are more likely to make healthy choices on a reinforcer assessment than students who do not receive a lesson are presented in this

section. The first three research questions important to the current study inquired about change in junior high students' mean ranking scores of all healthy items, food only items, and activity only items before and after a Making Healthy Choices nutrition lesson. In order to investigate significant differences between the preference ranking scores for healthy items pre- and postlesson, a series of mixed ANOVA statistical tests were used. A two (lesson vs. no lesson) by two (Time 1 pretest and Time 2 posttest) ANOVA was performed with the pre and post total ranking scores for food, activity, and total items serving as the within-subjects variable and lesson or no lesson as the between variable. Table 4 and Figures 1-3 show the results of the three analyses.

The first research question specifically inquired about change in junior high students' mean ranking scores of all healthy items before and after a Making Healthy Choices nutrition lesson. Using an alpha level of .05, results of the mixed ANOVA for all healthy choices showed significant main effects for group and time but no significant interaction.

Although no significant interaction was found, a series of follow-up tests were also conducted to further explore significant main effects for food only items. The results of a Wilcoxon matched-pair signed-ranks test showed a significant difference between the pre- and postranking scores only for the students who received the nutritional lesson, $z = -2.94$, N-Ties = 53, $p = .02$, but no difference between scores for the students in the control group, $z = -1.07$, N-Ties = 65, $p = .29$. Thus, only students in the lesson group had higher posttest rankings on the healthy food items relative to the pretest. Follow-up tests for significant group result on the posttest were conducted using the Wilcoxon rank-

Table 4

Mean Rank Scores on Specific Items for Students in the Lesson Experimental Conditions

	Mean		*SD*	
Items	Mean	*SD*	Mean	*SD*
Healthy food				
Grapes	17.92	8.82	18.68	8.69
Orange	17.42	8.98	17.48	9.23
Strawberries	15.90	9.80	18.92	9.05
Fruit juice	14.14	8.86	15.27	8.59
Apple	13.35	9.17	13.81	10.37
Beef jerky	13.20	10.70	14.16	10.34
Yogurt	11.50	9.17	12.26	9.34
Pretzels	10.22	8.95	12.26	9.71
Cherries	9.72	10.82	11.30	10.27
Cranberries	5.35	7.93	6.88	8.75
Unhealthy food				
Chocolate	18.31	10.76	19.15	9.01
Ice cream	16.83	8.32	15.28	9.45
Candy	15.94	10.07	15.35	9.56
Soft drinks	15.02	10.99	16.09	10.11
Popsicles	14.88	8.78	15.74	8.21
Doughnuts	13.37	10.45	14.77	11.09
Chocolate milk	12.98	9.22	14.48	9.98
Cupcake	11.87	10.13	12.76	9.79
Fruit snacks	11.44	8.90	11.88	9.76
Banana bread	10.85	10.30	14.26	10.21
Healthy activity				
Field trips	11.31	9.03	11.66	9.49
Extra recess	11.04	8.91	9.48	9.98
Competitive games	9.98	10.89	10.90	11.05
Play game with friend	9.33	7.63	9.61	8.80
Gym time	7.85	10.52	8.88	9.85
Help in library	4.77	8.85	4.72	7.92
Help decorate classroom	3.79	6.03	6.00	8.50
Build a model	3.39	8.08	3.61	7.68
Clean chalkboard	2.19	6.18	2.26	6.36
Help custodian	1.42	5.30	1.65	5.59

(*Table continues*)

	Mean		*SD*	
Items	Mean	*SD*	Mean	*SD*
Unhealthy activity				
Talking with friend	17.31	10.44	13.98	8.32
Choose where to sit in class	14.96	8.31	10.35	7.37
Movie tickets	14.05	10.39	13.15	9.86
Extra credit	12.96	9.84	13.48	9.78
Use the internet	12.39	10.69	9.44	9.46
Drawing	10.68	10.68	8.85	9.07
Movie in class	10.66	8.13	10.00	8.53
Sit with friend at work	8.03	8.36	10.31	7.71
Pick study groups for class	7.81	8.87	5.31	7.51
Computer games	7.24	8.93	6.23	9.37

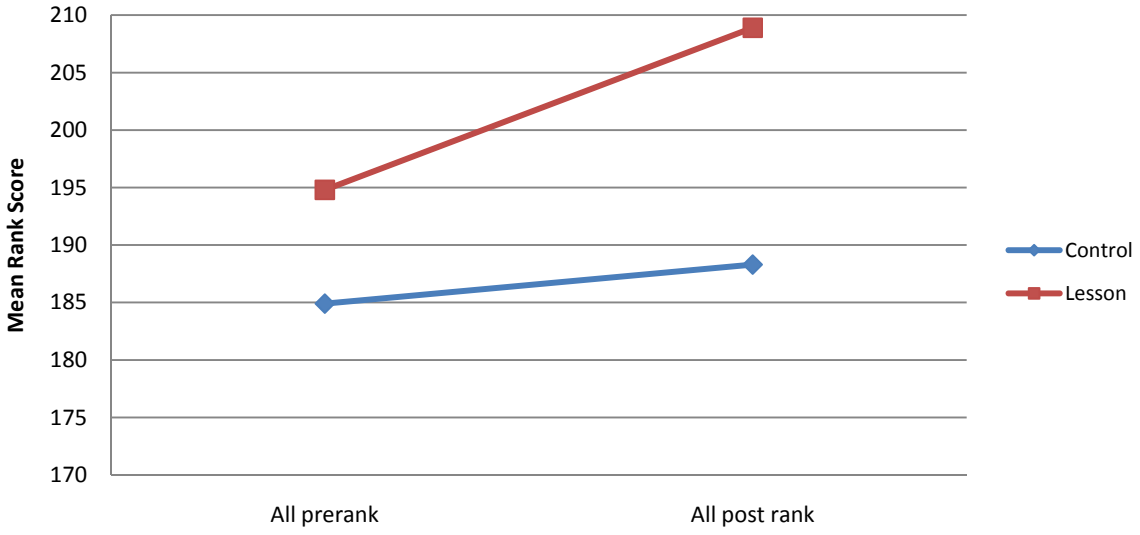

Figure 1. Mean ranking score for all healthy items of students in control and lesson group.

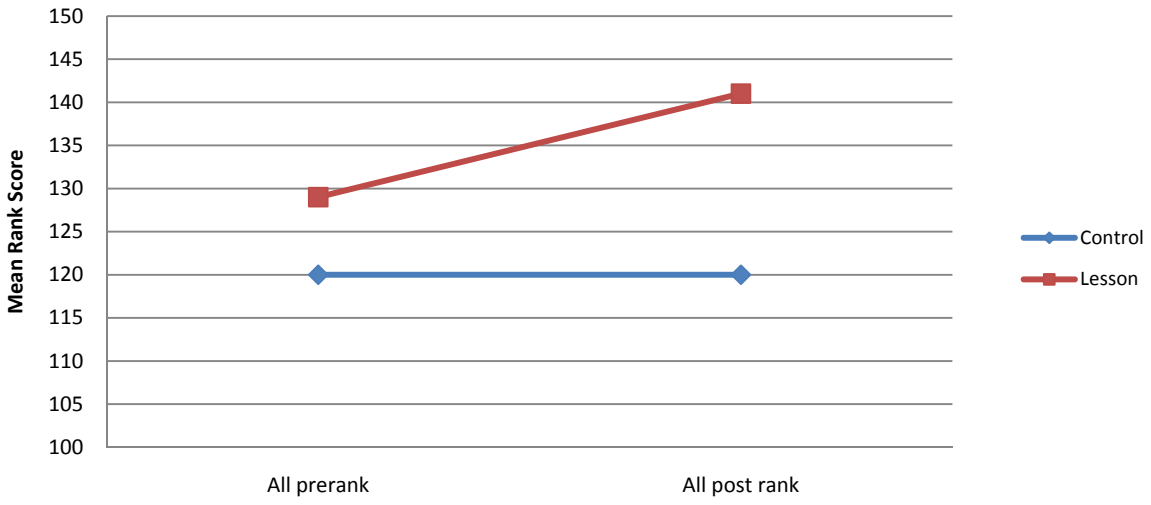

Figure 2. Mean ranking score for healthy food items of students in control and lesson group.

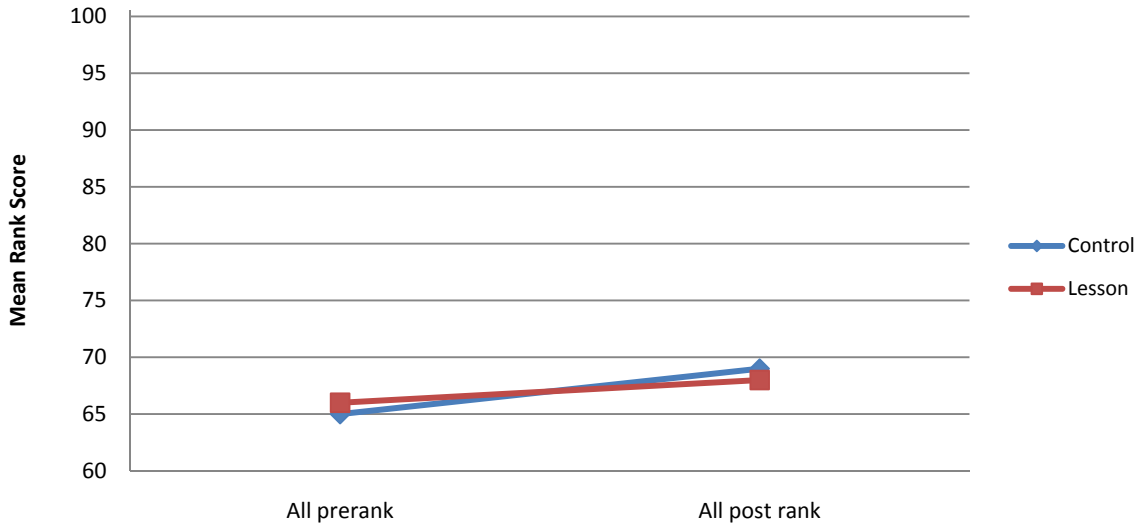

Figure 3. Mean ranking score for healthy activity items of students in control and lesson group.

sum test for independent groups. Follow-up tests for significant results indicated a significant difference between the students in the control group and the students in the lesson group on the postranking scores (*Wilcoxon W* = 3491.50, N_1 = 66, N_2 = 54, p = .01, one-tailed). That is, the students who received the lesson had higher ratings of the healthy items than students in the control group on the posttest although ranks did not differ between the two groups on the pretest.

The second research question inquired about change in junior high students' mean ranking scores of food only items before and after a Making Healthy Choices nutrition lesson. The results of the mixed ANOVA that examined differences in ranks only for the food items indicated no significant main effect across time indicating no overall difference in the pre- and posttask scores. A significant main effect for Group was obtained. Rank scores for the Group given the lesson were significantly higher than the control group. However, a significant Time x Group interaction was also obtained. Examination of the cell means and graph indicated that although there was not a large increase in ranking scores across time, the lesson group had higher rankings of healthy items than did the control group and this difference between the groups was much greater after the lesson. Follow-up tests for significant group results were conducted using the Wilcoxon rank-sum test for independent groups. Follow-up tests for significant results indicated a significant difference between the students in the control group and lesson group on the postranking scores (*Wilcoxon W* = 3547.50, N_1 = 66, N_2 = 54, p = .02).

The third research question inquired about change in junior high students' mean ranking scores of activity only items before and after a Making Healthy Choices nutrition

lesson. The results of the mixed ANOVA for only the activities items indicated no significant main effects for group and time and no significant interaction.

Finally, a fourth research question was to examine differences between healthy and unhealthy items in addition to healthy food and activity ranked items. Interestingly, results of a Wilcoxon matched-pair signed-ranks test between the food and activity ranked items showed that the students' mean rankings of the food items were significantly higher than the activity items on the pretest, $z = -4.96$, N-Ties = 66, $p = .01$, and posttest, $z = -4.45$, N-Ties = 66, $p = .01$, for the control group, as well as on the pretest, $z = -5.13$, N-Ties = 53, $p = .01$, and posttest , $z = -5.08$, N-Ties = 53, $p = .01$, for students in the lesson group.

Data were also analyzed to examine differences between healthy and unhealthy items at the onset of the study to determine if the student continued to prefer unhealthy items after the lesson. Results of a Wilcoxon rank-sum tests between the two groups on the postlesson rankings of unhealthy items indicated a significant difference for activity items (*Wilcoxon* $W = 2731.00$, $N_1 = 66$, $N_2 = 54$, $p = .05$) and total items (*Wilcoxon* $W = 2573.00$, $N_1 = 66$, $N_2 = 54$, $p = .01$). This indicates that the mean ranking score of the unhealthy food items after the lesson for students in the control group was significantly higher for food items and all items as compared to ranking scores of students in the lesson group. For the food items, a Wilcoxon matched-pair signed-ranks test revealed a significant difference, $z = -4.46$, N-Ties = 65, $p = .01$, between the healthy and unhealthy ranked scores for the students in the control group but not for students in the lesson group ($z = -.93$, N-Ties = 54, $p = .35$). For all items, a Wilcoxon

matched-pair signed-ranks test revealed a significant difference, $z = -6.00$, N-Ties = 65, $p = .01$, between the healthy and unhealthy ranked scores for student in the control group and the lesson group, $z = -3.17$, N-Ties = 54, $p = .01$. For all significant differences, the mean student ranking score of the unhealthy items was significantly higher than the mean ranking score of the healthy activity items after the lesson.

Results indicated no significant difference between the two groups rankings of the unhealthy food items (*Wilcoxon* $W = 3205.50$, $N_1 = 66$, $N_2 = 54$, $p = .55$). For the activity items, a Wilcoxon matched-pair signed-ranks test between the healthy and unhealthy ranked scores revealed a significant difference, $z = -7.46$, N-Ties = 119, $p = .01$. This indicates that the mean student ranking score of the unhealthy activity items ($M = 109.4$, $SD = 45.60$) was significantly higher than the mean ranking score of the healthy activity items after the lesson.

Accuracy Scores on Making Healthy Choices Quiz

The final research question inquired about the increase in students' knowledge on making healthy choices following participation in a Making Healthy Choices nutrition lesson. Students' gains in knowledge on content given on the Making Healthy Choices Nutrition Education lesson before and after the lesson were also analyzed using the paired *t* test to examine differences in pre- and postquiz scores. Thus, the dependent variable is the number of questions the students answered correctly after receiving the lesson. The quiz consisted of eight questions on the content discussed during the 45-minute lesson. Table 5 presents the mean and standard deviation for each class's scores

on the quiz. A paired *t* test indicated a significant difference between the pre- and postquiz t (53) = -9.20 p = .01. This score demonstrates that the students in the study learned content that was presented during the lesson (Table 6).

Table 5

Results of Mixed Between-Within Subjects Analysis of Variance for Lesson Group by Time for Food Activity and Total Items

Source	*df*	Mean square	*F*	*p*	Partial η^2
Healthy all choices time	1.00	4567.96	1.97	0.1**	0.01
Group	1.00	13809.64	4.74	0.03*	0.04
Healthy All * group	1.00	1706.71	2.53	0.11	0.14
Healthy food choices time	1.00	1982.36	3.43	0.06	0.03
Group	1.00	2524.62	4.37	0.04*	0.04
Healthy food * group	1.00	13160.29	3.65	0.05*	0.04
Healthy activity choices time	1.00	531.90	1.09	0.30	0.01
Group	1.00	7.82	0.01	0.95	0.00
Healthy activity * group	1.00	79.80	0.16	0.69	0.00

* $p < 0.05$

** $p < 0.01$

Table 6

Mean Test Scores and Standard Deviations on the Lesson Pre- and Postquiz for Students in the Control and Lesson Experimental Conditions

	Control (N = 66)	Lesson (N = 54)	
	Prequiz	Prequiz	Postquiz
Mean	4.13	4.33	6.00
SD	1.11	.93	1.323
Range	1 to 6	2 to 6	2 to 8

CHAPTER V

DISCUSSION

There is substantial support in the literature indicating that positive behavioral supports that provide the opportunity for students to earn rewards contingent on performance of desirable behaviors effectively increase academic performance and decrease behavior deficits (Sugai & Horner, 2008). Although many students are in need of this type of intervention support, one concern is that some rewards such as food and activities that have served to motivate students to increase desired behaviors may also have negative implications on health issues such as obesity. Over the past two decades, pediatric obesity has tripled turning it into an epidemic in our society (Strauss & Pollack, 2001). Adolescents who are overweight or obese are at an increased risk for numerous negative effects that include biological problems such as heart disease (Chan et al., 1994), and emotional problems such as depression, anxiety, and low self-esteem (Miller & Downey, 1999). When adolescents learn how to make healthy choices at a young age, they are more likely to be in the normal weight range than those who make unhealthy choices (Lowry et al., 2000). Because student health influences educational performance (Van Landeghem, 2003), schools are increasingly becoming more involved in prevention of obesity by teaching students about proper nutrition and encouraging healthy activities as a part of their daily lives (Baranowski et al., 2000; Pyle et al., 2006). Giving students the opportunity to select rewards that are healthy choices allows students to practice these important decision-making skills in the school setting. Thus, the main objective of the study was to evaluate the effects of a lesson based on selecting healthy choices in regards

to student ratings of healthy and common unhealthy school-based rewards used to motivate students to perform appropriate academic or social behaviors in school settings.

Similar to prior studies, the results of the current study demonstrated that teaching students in the classroom about making healthy choices resulted in differences between the two groups after the session such that the group receiving the lesson had higher ranking scores on healthy food items than the control group (Baranowski et al., 2000; Gortmaker et al., 1999; Veugelers & Fitzgerald, 2005; Wang et al., 2003; Wiecha et al., 2004). However, students' mean scores who received the lesson on the postlesson rankings were greater than the prelesson rankings for the lesson group, which was greater but was not large enough to produce a significant positive change in student preferences towards healthy foods. No gains over time were obtained despite the fact that the greater scores on the postquiz confirmed that the students participating in the treatment group learned the objectives of the lesson and this knowledge may have influenced higher rankings of healthy items as a reward option. The findings of the current study are important because childhood obesity is on the rise and schools should take steps such as consideration of types of foods offered in school to reduce this epidemic. However, rewards that are both healthy and functional as positive reinforcers are needed to obtain positive academic and social behavior change for students who benefit from additional motivational strategies.

Prior research indicates that actual behavior change related to diet is difficult (Sallis et al., 1988). Moreover, even though intensive programs, such as Planet Health, have been shown to be beneficial in actual behavior change in eating and exercise habits

of junior high students (Gortmaker et al., 1999), this study confirms that a single lesson is not enough to change student reported preferences for healthy items as a potential reward to increase academic performance. There are generally two types of students in the classroom who fail to make progress, those who have a performance deficit and those who have a skill deficit. After ruling out whether a student has a skill deficit, an assessment for reinforcer items can be administered to the student. Once the correct reinforcer item has been identified then the student will be more likely to complete schoolwork (Duhon et al., 2004). When a proper and effective reinforcer is identified, the teacher can expect a student who is exhibiting a performance deficit to complete more assignments and possibly receive better grades on tests. This type of program should be considered not only an intervention but also a prevention of future health problems. An important first step is to start this type of decision making across various types of healthy choices when students are young and before fluent unhealthy choices are developed. Thus, this study specifically targeted the effect of the lesson on the selection of healthy reinforcers that may be used in a school setting. Although students tended to select more unhealthy items, there were some healthy items that were ranked highly. Clearly, additional future studies need to further evaluate the effect of the selected healthy rewards on behavior change for students exhibiting performance deficits or combined skill and performance deficits in the school setting. Given that school psychologists have the responsibility of helping students to develop academically, socially, and physically, student efforts should be applauded and reviewed with the student to emphasize good decisions.

The current study of preferential assessment of junior high students contributes to the research literature by combining two different but effective methods to measure preference assessment. Reinforcers were identified on the basis of student choice responses rather than on student self-report to increase the accuracy of assessment results with subsequent behavior change. The preference assessment method included a preference assessment based on a system previously used by Northup et al. (1996), which presented the students with pictorial stimulus choices in order to better represent reward options that are a written list of choices. The method also employed the time-efficient MSWO approach previously used by Paramore and Higbee (2005), where the students were asked to select their favorite items from an array of multiple choices simultaneously. In this study, students simultaneously reviewed item cards that consisted of a picture of the reinforcer item with the name of the reinforcer below it. After reviewing the cards, the students ranked their favorite items from most preferred to least preferred forcing them to select and rank their favorite items. This procedure was selected based on prior findings that have demonstrated choice procedures to be a more accurate measure of item preference than questionnaire methods (Northup et al.). Comparison studies also reveal that the MSWO and PS are almost equally effective at selecting the most preferred reinforcers, but the PS procedure takes twice the amount of time to administer and requires more resources (DeLeon & Iwata, 1996). Although the purpose of this study was not to evaluate the utility of this type of assessment, some aspects of this method may be noteworthy to practitioners in school settings. In general, this assessment format was reasonably efficient, because this assessment was conducted in 12

minutes per class. A second advantage of this type of assessment is that the assessment method could be used by administering the assessment to the entire class at one time instead of administering individual preference assessments. Although prior studies have typically administered the preference assessment individually with children with disabilities, extending the administration of the assessment to the entire class would help to find items most preferred by all or most of the students and that may be effectively used as class-wide positive reinforcer for rule compliance (i.e., a movie in class). Because student preference often changes, this procedure is simple and quick enough to use multiple times during the school year. However, it is important to note that no data were collected on the effects of the highly ranked items on behavior change. Thus, additional research is needed to determine if this assessment is an effective method to identify stimuli that actually function as reinforcers for individuals. Additional research is also needed to confirm the accuracy of this process relative to more time intensive (e.g., PS) assessments to select one or more rewards for highly cognitive functioning students.

Interestingly, a discrepancy in ranks between the two categories, food and activities, was found. Specifically, food items, as a class of reinforcers, seemed to be more potent than the activity items. Although school may be limited on types of high energy activities that can be feasibly provided as a reward, student were given viable options that burned more calories (e.g., extra gym time) than others (e.g., computer game) that teachers rated as an acceptable reward that can be earned by students for good school work. This discrepancy between food and activities might be partially attributable to the combination of both food and leisure items leading to a greater ranking of food

items at the expense of activity items that may also function as a positive reinforcer. Alternatively, the selected activity items on the assessment simply were not items that the students found reinforcing. Given that choices on physical activity are just as critical as eating habits for maintaining a healthy weight, a more intensive lesson or other strategies may be needed to generalize healthy decisions making to more than one lifestyle aspect that influences obesity.

Limitations

The results of the present study offer useful information on the effectiveness of a healthy lesson at increasing the preference of healthy foods and healthy activities in junior high students; however, there are a few limitations that influence study conclusions and may guide future research. First, generalization of the study results to other populations is limited given that participants were primarily white female students in an urban school setting. Future research should also measure maintenance over a significantly longer period of time with various populations. Teaching the health lessons and scheduling booster sessions throughout the school year may help the effects carry over longer periods of time possibly leading to changes in behavior.

Second, procedures used to administer the pre- and posttest may have influenced results. First, the postpreference assessment and postquiz were administered the day after the lesson was given so the results of the study may reflect the recentness of the lesson. This relatively short period prevents conclusions about the long-term effects of the health lesson. Second, the posttest was given only to the students participating in the lesson.

Although knowledge was similar on the pretest for both groups and the students in the treatment increased scores on the test, it is unknown if students in the control group would also have increased scores due to practice effect.

Furthermore, procedures used to administer the assessment test may have influenced results. First, throughout the preference assessment the students were able to sit next to their peers. There was not a rule against talking during the assessment so the students may have influenced each other's results by discussing possible favorite items. Second, after the preference survey the students were able to go back to their physical education class, which may have motivated the students to work faster than they would have normally. Third, during the assessment survey the list for healthy and unhealthy items may not have been exhaustive. This may affect the results of the study because students may have selected more preferred healthy items if the items they preferred were on the list rather than selecting the unhealthy items that were included in the list. Fourth, position biases or fatigue may have influenced consistent effort in reviewing and ranking the array of items.

Summary

In conclusion, an important aspect of a school-based obesity prevention program is to increase a child's healthy activities or decrease unhealthy activities to help maintain a healthy weight. Furthermore, students' health is positively related to educational performance (Van Landeghem, 2003). Given that this type of behavior change has proven to be difficult to change and maintain over time, it is necessary for school psychologists

to consider school-based supports and interventions that further help to promote healthy behavior across all tasks. Based on the data presented in the study, students selected some healthy items after a lesson using a brief MSWO preference assessment but unhealthy items were still more preferred both before and after the lesson. For practitioners who develop interventions in school settings, the administration of a preference assessment that consists of potential healthy reinforcer options combined with education on healthy decision making may be a useful strategy to use when developing effective interventions that motivate desirable academic and social behavior change as well as maintain healthy habits to prevent obesity.

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APPENDICES

Appendix A

Assent Form

Assent Form

Making Healthy Choices

Introduction:

The purpose of this study is to learn about your child's attitude towards activities and foods. Your child will be working with Nicholas Baird, a graduate student, under the direct supervision of Donna Gilbertson, a psychology professor, to assess what your student's preferences are in regards to food and activities. We will then teach your child what healthy choices are and how they can affect them.

Procedures:

Your child will be asked to complete a survey about his/her food and activities preferences. Your child will do this by ranking 30 cards with various items on them. Your child will complete this activity twice.

Risks:

There are no known risks associated with this study.

Benefits:

Through completing the survey, your child may become more aware of what types of preferences he/she has for foods and activities. Furthermore, findings on this topic could lead to more research that could help schools more effectively choose reinforcers for children.

Voluntary nature of participation and right to withdrawal at any time:

Participation in this study is completely up to you and your child. You or your child may withdraw from this study at any time without consequence. If you do not want your child to participate in the study please notify Nicholas Baird at Payson Junior High.

Confidentiality:

Any information about your child's preferences will be kept confidential and only available to those working on the study. Your child will be given a numerical code and this code will be entered on the computers so there will be no way of identifying your child. The data will be kept locked in a file cabinet and only those involved with the study will have access to the data. The code list will be separate from the data. The data will be kept until the studies results are published in a journal. The data will then be destroyed.

IRB Approval Statement:

The institutional Review Board (IRB) for the protection participants at Utah State University has reviewed and approved this study. You can contact the IRB at (435) 797-1821 if you have any further questions.

Donna Gilbertson, Ph.D.
Principal Investigator
(435) 797-2034

Nicholas Baird
Graduate Researcher
(801) 465-6015
nick.baird@nebo.edu

Appendix B

Student Demographic Form

Student Demographic Form

Gender: [ ] Male [ ] Female

Grade: [ ] 7th [ ] 8th [ ] 9th

Ethnicity (check one)

[ ] Latino/a [ ] African American [ ] Caucasian
[ ] Asian [ ] Native American [ ] Other: _____

Lunch Plan: [ ] Free lunch [ ] Reduced lunch [ ] No free/reduced lunch

Do you receive special education services? [ ] Yes [ ] No
If yes, under what category

Do you receive English as a second language services? [ ] Yes [ ] No

Appendix C

Instructions on Multiple-Stimulus-Without-Replacement

Instructions on Multiple-stimulus-without-replacement

1. Pass out envelopes with 40 reward card to each student
2. Tell students to open up the envelope and put the reward cards on your desk in any order in a horizontal row
3. Tell the students to choose the reward card you would like to have or do the most and write the number 30 in the bottom right hand corner of the card
4. Put the card you just wrote on back in the envelope
5. Out of all the remaining cards choose the one you would most like to have or do the most and write a number 29 in the bottom right hand corner of the card
6. Put the card you just wrote on back in the envelope
7. Out of all the remaining cards choose the one you would like to have or do the most and write a number 28 in the bottom right hand corner
8. Put the card you just wrote on back in the envelope
9. Out of all the remaining cards choose the one you would like to have or do the most and write a number 27 in the bottom right hand corner
10. Put the card you just wrote on back in the envelope
11. Out of all the remaining cards choose the one you would like to have or do the most and write a number 26 in the bottom right hand corner
12. Put the card you just wrote on back in the envelope
13. Out of all the remaining cards choose the one you would like to have or do the most and write a number 25 in the bottom right hand corner and put back in the envelope
14. Out of all the remaining cards choose the one you would like to have or do the most and write a number 24 in the bottom right hand corner and put back in the envelope
15. Out of all the remaining cards choose the one you would like to have or do the most and write a number 23 in the bottom right hand corner and put back in the envelope
16. Out of all the remaining cards choose the one you would like to have or do the most and write a number 22 in the bottom right hand corner and put back in the envelope
17. Out of all the remaining cards choose the one you would like to have or do the most and write a number 21 in the bottom right hand corner and put back in the envelope
18. Now that you understand how to do this continue on choosing your favorite reward
    card and numbering them until you get to number 1 and then raise your hand

Appendix D

Planet Health Outline

Planet Health Outline

I. A brief introduction to physical fitness

A. Being fit means you have energy
B. To get fit you need to be physically active
C. Any physical activity is better than none

1. Dancing
2. Jumping rope
3. Swimming

D. Discuss the positive effects of physical fitness

1. Long-Term health benefits
2. Physical activity recommendations for adolescents

II. What could you do instead of watching TV

A. TV cuts down on time to be active
B. Watching too much TV can make you less fit

1. It may also be harmful for your health

III. Choosing healthy foods

A. Explain the types of food that are healthy

1. Tell why the foods are healthy

B. Students have many choices
C. Smart snacks

1. Any ‘bad’ foods that need to be avoided
2. Why do you eat snacks

Appendix E

Quiz on Making Healthy Choices

Quiz on Making Healthy Choices

1. How many food advertisements does the average child see each year?
   a. 120
   b. 1300
   c. 19,000
   d. 200,000

2. What percentage of advertisements on television are for unhealthy food items?
   a. 10%
   b. 20%
   c. 50%
   d. 95%

3. How much money does McDonalds spend each year in advertising?
   a. $10,000
   b. $120,00
   c. $1.4 billion

4. How much money does the government spend each year for the five a day program?
   a. 200,000
   b. 2 million
   c. 2 billion

5. How many hours per day does the average person watch TV, play video games, and play on the computer?

   a. 1-2 hours
   b. 2-3 hours
   c. 4 hours
   d. 6-7 hours

6. The more TV that someone watches the more likely they are to being overweight.
   a. True
   b. False

7. People who watch more TV are more likely to eat unhealthy foods.
   a. True
   b. False

8. What percentage of Americans eat at a fast-food restaurant on any given day?
   a. 10%
   b. 20%
   c. 50%