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Effects of the Healthmpowers Exercise DVD Program on the Behavior of Disruptive Students in a Fourth Grade Classroom

Christine Brooks



THE FLORIDA STATE UNIVERSITY

COLLEGE OF EDUCATION

EFFECTS OF THE HEALTHMPOWERS EXERCISE DVD PROGRAM ON THE
BEHAVIOR OF DISRUPTIVE STUDENTS IN A FOURTH GRADE CLASSROOM

By

CHRISTINE BROOKS

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The members of the committee approve the dissertation of Christine Brooks defended on February 14, 2011.

Thomas Ratliffe
Professor Directing Dissertation

Sandra Lewis
University Representative

Diana Rice
Committee Member

Tom Welsh
Committee Member

Approved:

Jeffrey James, Chairperson, Department of Sports Management, Recreation Management, and Physical Education

The Graduate School has verified and approved the above-named committee members.

DEDICATION PAGE

I dedicate this dissertation to my husband and my beautiful son. Glenn, I am so glad that you support my dreams to go back to school. Thanks for reminding me to eat when I became lost in writing. To my mother: thank you for helping with Graham so that I could make my deadlines and for proofreading when I needed a fresh pair of eyes. Tammy Greenway: thank you for stepping in and helping whenever it was needed. You are a great friend. Thank you Dr. Bennett for all of your encouragement when I felt tired and worn out. You are a wonderful boss.

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TABLE OF CONTENTS

List of Tables	vii
List of Figures	viii
Abstract	ix
Chapter 1. INTRODUCTION	
Purpose of the Study	2
Research Questions	2
Research Hypotheses	3
Significance of the Study	3
Assumptions	3
Limitations	4
Definitions	4
Chapter 2. REVIEW OF LITERATURE	
Disruptive Behavior and Learning	5
Impact of Exercise on the Brain	7
Influence of Physical Activity on Disruptive Behaviors	10
Teachers' Beliefs About Physical Activity and Classroom Behavior	11
Effects of Physical Activity on Children with ADHD	13
Effects of Physical Activity on Children with Autism	14
Overview and History of HealthMPowers Classroom Exercise Program	16
Chapter 3. METHOD	
Participants	18
Teacher	18
Students	18
Setting	19

Dependent Variable	19
Independent Variables	19
HealthMPowers Exercise Program	20
Head Down Control Procedure	20
Within Subjects Research Design	21
Procedures	22
Data Collection	23
Teacher Discipline	24
Teacher and Student Social Validity Questionnaires	25
Inter-observer Reliability	25
Pilot Project.....	26
 Chapter 4. RESULTS	
Interobserver Reliability	27
Research Questions One and Hypotheses One and Two	27
Primary Results	28
Social Validity	34
Teacher Discipline	35
 Chapter 5. DISCUSSION	
Recommendations.....	38
 APPENDICES	
A. MEDICAL INFORMATION FORM	40
B. PARENTAL CONSENT FORM	41
C. STUDENT ASSENT FORM	42
D. IRB APPROVAL LETTER.....	43
E. TEACHER CONSENT FORM.....	44

F. DECISION LOG	45
G. CODING FORM.....	46
H. TEACHER SOCIAL VALIDITY QUESTIONNAIRE	48
I. STUDENT SOCIAL VALIDITY QUESTIONNAIRE	50
J. RELIABILITY CHECK FORM.....	53
REFERENCES	54

LIST OF TABLES

1	Intervention Participation Chart	21
2	Rotation of Students When Coding.....	24
3	Reliability Means for Each Student.....	27
4.	Median Scores for Student Social Validity Questionnaire	35

LIST OF FIGURES

1. Percentage of intervals in which off-task behavior was observed for Participant N during the first 20 minutes of math class (top axis) and during the second 20 minutes of math class during baseline conditions and following either a 2-minute intensive exercise session or a 2-minute head-down rest.29

2. Percentage of intervals in which off-task behavior was observed for Participant T during the first 20 minutes of math class (top axis) and during the second 20 minutes of math class during baseline conditions and following either a 2-minute intensive exercise session or a 2-minute head-down rest.30

3. Percentage of intervals in which off-task behavior was observed for Participant C during the first 20 minutes of math class (top axis) and during the second 20 minutes of math class during baseline conditions and following either a 2-minute intensive exercise session or a 2-minute head-down rest.31

4. Percentage of intervals in which off-task behavior was observed for Participant L during the first 20 minutes of math class (top axis) and during the second 20 minutes of math class during baseline conditions and following either a 2-minute intensive exercise session or a 2-minute head-down rest.32

5. Percentage of intervals in which off-task behavior was observed for Participant L during the first 20 minutes of math class (top axis) and during the second 20 minutes of math class during baseline conditions and following either a 2-minute intensive exercise session or a 2-minute head-down rest. This student was not identified as disruptive.33

ABSTRACT

The purpose of this study was to investigate the effects of a classroom exercise video program on the behavior of fourth grade students who displayed disruptive behaviors in the classroom. Six students, 5 identified as consistently off-task, and their 23-year old female student teacher were participants. An Alternating Treatments Experimental Design (Cooper, Heron & Heward, 2007) was used to investigate the effects of a classroom exercise program called HealthMPowers on the off-task behavior of selected students during a regularly scheduled morning math class. Two interventions were used on alternate days during this study: a) exercising for approximately 2-minutes to a clip from the HealthMPowers exercise DVD program and b) a control procedure—placing the head down on the desk.

Baseline measurements were conducted until the level of off-task behavior during the math class stabilized for most of the participants (no conspicuous trending up or down). At that point, the whole class in which the participants were enrolled received one of the two interventions (exercise with video or head down) on an alternating schedule with one intervention each day. Visual analysis was used to assess the degree of consistency and magnitude of the effect. Observations were made using a 10-second interval recording procedure and interobserver reliability averaged 94% for occurrence reliability and 96% for total reliability.

Results indicated that off-task performance stabilized for most students during the third week of baseline and decreased by an average of 13% during the seven weeks that the exercise and head-down interventions were in use. Although the mean decrease in off-task behavior for the exercise intervention was slightly greater, it was not notably different from the head-down procedure.

CHAPTER ONE

INTRODUCTION

Physical activity has many benefits, including improved cardiorespiratory fitness, muscular strength and bone health, favorable body composition, and reduced symptoms of depression (Centers for Disease Control, 2008). Research is revealing additional benefits nearly every day. These benefits include greater student focus on studies/academics, improved behavior, and higher student alertness (Evenson, Ballard, Lee, & Ammerman, 2009), higher self-esteem and body size satisfaction (DeBate, Gabriel, Zwald, Huberty, & Zhang, 2009) and gains in motor skill, speech/language fluency, phonology and working memory, as well as a significant reduction in the symptoms of inattention (Reynolds & Nicolson, 2007). New technology and noninvasive techniques, such as magnetic resonance imaging (MRI), are being used to reveal important changes in the brain due to exercise (Berg, 2010). It is thought that exercise might enhance cognitive functioning, enhance learning, and improve emotional state.

According to research cited by the HealthMPowers classroom exercise program (2008), physical activity helps improve alertness, increase energy levels, and improve ability to concentrate. Physical activity has been associated with better classroom behavior and can facilitate an optimal classroom environment (HealthMPowers, 2008). These statements may be accurate, but are not supported with peer reviewed data-based research. There is a need for objective, reliable evidence that supports the notion that exercise breaks in classroom settings have positive effects on students' behavior.

Although the benefits of exercise are well known, the lack of physical activity is a growing problem in the United States and it starts in childhood. The Centers for Disease Control and Prevention (CDC) National Youth Risk Behavior Survey (2007b) reports more than sixty-five percent of youth do not achieve the amount of physical activity that is recommended. Thirty-five percent of students report watching television three or more hours per day on the average school day, and 25% report playing video games or use of a computer for nonschool related activities for three or more hours per day on the average school day (CDC, 2007a).

Children should accumulate at least 60 minutes, and up to several hours, of age-appropriate physical activity on all, or most days of the week (CDC, 2007b). This period should include moderate and vigorous physical activity, with the majority of the time being spent in activity that is intermittent in nature (National Association for Sport and Physical Education, 2004). Children should avoid long periods of sedentary behavior. Appropriate activities for children include

lifestyle activity, such as walking, doing chores, playing on the playground, and active aerobics (running, biking) and recreation opportunities. Classroom teachers could contribute to the amount of physical activity for children by using active breaks during the school day. If physical activity breaks can be shown to promote better student behavior, then classroom teachers may be more likely to plan these breaks into their schedule.

Disruptive behavior in the classroom has been shown to inhibit learning, with disruptive behavior being described as aggression, noncompliance, defiance and inattentiveness (Baker, Clark, Maier, & Viger, 2008; Giannopulu, Escolano, Cusin, Citeau, & Dellatolas, 2008). Balderson and Sharpe (2005) found that among the most consistent concerns voiced by teachers are discipline and classroom management. Studies show that exercise may be an effective strategy to keep students on-task and focused on their work (Bass, 1985; Field, Diego, & Sanders, 2001; Prupas & Reid, 2001). It has also been shown through studies that exercise can improve the behavior of children who are diagnosed with attention deficit/hyperactivity disorder and autism (Azrin, Ehle, & Beaumont, 2006; Azrin, Vinas, & Ehle, 2007; Prupas & Reid, 2001; Putnam & Copans, 1998; Rosenthal-Malek & Mitchell, 1997). Although there are some data in support of using physical activity to promote on-task behavior, there is a need to demonstrate this relationship in a classroom setting.

Purpose of the Study

The purpose of this study was to investigate the effects of HealthMPowers, a classroom exercise video program, on the off-task behavior of fourth grade students during a regularly scheduled morning math class. An applied behavior analysis research design was used to investigate the effects of exercise and non-exercise interventions on the off-task behavior of selected students.

Research Questions

Evaluating the effects of an exercise video program was guided by the following questions:

1. Did the off-task behaviors of disruptive students decrease after an exercise video program was used in the classroom?
2. What were the views of the teacher about the use of the HealthMPowers exercise video program during the school day?
3. What were the views of all of the students about the use of the HealthMPowers exercise video program during the school day?

Research Hypotheses

The following hypotheses were investigated in this study:

1. The use of the HealthMPowers exercise video program will result in a decrease of the disruptive behaviors of the six students being observed as measured by visual analysis.
2. The head down intervention will have no effect on the disruptive behaviors of the six students being observed as measured by visual analysis.

Significance of the Study

Exercise has been shown to have many benefits, one of which may be a decrease in off-task behavior of school age children (Putnam, Tette, & Wendt, 2004; Sandford, Duncombe, & Armour, 2008). There have been some studies on the connection between physical activity and behavior in children. These studies show that exercise can improve some types of behavior of children with AD/HD and autism (Azrin et al., 2006; Kiluk, Weden, & Culotta, 2009). Most of these studies agree that activity must be at a moderate to high level to see improvement, with most studies using running or aerobic exercise as the physical activity (Bass, 1985; Prupas & Reid, 2001). There is a lack of evidence of the effects of brief activity breaks on the behavior of students in a classroom setting.

Some schools in the state of Georgia are using a new program called HealthMPowers. Resources provided include school assemblies, staff development, classroom lessons, staff health risk appraisals and fitness testing, and newsletters for students and staff (HealthMPowers, 2008). This program consists of exercise DVDs and is intended to increase healthy choices that students make throughout the day. One resource this program provides is exercise videos for the classroom. If exercise does help improve concentration and decrease off-task behavior in students, these videos can be an option for a classroom teacher to use to help students learn more effectively. This study provided objective data to help investigate the effects of short exercise breaks on the behavior of children in a fourth grade classroom.

Assumptions

1. It was assumed that the fourth grade children at the elementary school in this study represented a typical population.
2. It was assumed that the teacher selected for this study continued to teach and discipline her students in the same manner that she had before the study was introduced to her class.
3. It was assumed that the children and teacher selected for this study answered all questionnaires honestly.

Limitations

1. The study was limited to six students from one fourth grade elementary school.
2. The study was conducted with one fourth grade teacher's class during a 45 minute period over several months.

Definitions

Off-task Behavior. Breaking eye contact with task materials for greater than three seconds.

Playing with Objects. Touching any object that is not associated with an assigned task.

Out of Seat. The child's full body weight not being supported by a chair for at least three seconds.

Inappropriate Vocalizations. Any vocal noise or verbalization that was not preceded by the child's raised hand and acknowledgement by an adult.

Head Down. A two minute intervention where students put their heads on their desks with hands on the desk or in their laps; the students cannot talk nor hold any objects while participating in head down.

CHAPTER TWO

REVIEW OF LITERATURE

Disruptive Behavior and Learning

When students are off task in the classroom, learning is affected. Baker et al. (2008) used the Behavior Assessment System for Children-Teacher Rating Scale (BASC TRS-C) to rate the frequency of disruptive behaviors of the 98 participants in a study at an elementary school. Thirty-nine of the students displayed high externalizing behavior problems, while 59 of the students displayed average behavioral adjustment. The high externalizing group was described as displaying extreme, pervasive, acting-out types of behaviors. These children showed deficits in developmental areas including in social skills, and were rated almost two standard deviations above the mean on the BASC TRS-C, which uses a 4-point Likert scale to rate the frequency of problem and adaptive behaviors on 148 items. The researchers used a coding scheme that was based on the Behavioral Assessment System for Children – Student Observation System (SOS) to observe students’ engagement with academic tasks. They specifically looked at off-task and on-task behaviors. Off-task behaviors included failing to pay attention, disrupting the class, and not being actively engaged with the academic task. Classified as on-task behaviors were attending to instruction and actively learning the task. The researchers found that the academic engagement of students with behavior problems was lower than for those students who exhibit average behavioral adjustment. They also found that students who exhibited high levels of aggression, noncompliance, and defiance had more difficulty participating in academic tasks and were at a greater risk for academic failure.

Giannopulu et al. (2008) assessed 265 students for two years of schooling. The students were age five or six the first year and were six or seven the second year. The first year, the students were assessed on phonological awareness, vocabulary, non-word repetition, oral comprehension, rapid naming of pictures, letter recognition, letter reading, sentence repetition, digit memory, verbal fluency, figure reproduction, and rhombus reproduction. The second year, they were assessed on reading text comprehension and reading words and non-words. The teachers were given a questionnaire that asked them to rate students on four factors: hyperactivity, inattention, conduct problems and unsociability. The researchers found that children aged five to seven who are reported by their teachers to show “inattention” tend to have lower scores on cognitive test performances. “Inattention” was described as the child not paying attention, being inattentive, or

not concentrating. Results also showed that those students whose teachers reported inattention for the first year exhibited poorer performances on reading tasks the next year.

Bulotsky-Shearer, Fantuzzo, and McDermott (2008) studied behavior and learning in 3,799 Head Start children. They found those students who had problems sitting/listening during teacher-directed activities, engaging in circle time, or sitting and working with their hands to create artwork experienced a higher disconnection from peers, as well as lower classroom learning competencies on the Child Observation Record (COR), a 30-item evaluation instrument used to measure classroom learning competence in children aged two and a half to six.

Arnold (1997) also studied children from an early age, including some as young as three, who attended a daycare facility. He looked at boys who displayed externalizing behaviors in the classroom. These behaviors included hitting, pushing, grabbing a toy, and ignoring a teacher's request. Arnold also examined on-task and off-task behaviors. He found that the average scores on four academic tests of the boys who displayed disruptive/off-task behaviors were .7 to 1.7 standard deviations below national norms. The tests used were the Expressive One-Word Picture Vocabulary Test to assess expressive vocabulary skills, the Peabody Picture Vocabulary Test-Revised to assess receptive vocabulary skills, the Illinois Test of Psycholinguistic Ability to assess expressive language ability and the Developing Skills Checklist to assess letter recognition.

Agostin and Bain (1997) found that positive social skills and social emotional factors were significant in predicting academic achievement. When looking at the three instruments used in the three year study (Social Skills Rating System: Teacher Form-Elementary Level or SRSS, Early Prevention of School Failure or EPSF, and the Stanford Achievement Test or SAT), the researchers found that the variables that best coincided with children who were promoted to the next grade level and those who were retained and/or were placed in assistance classrooms were SSRS Cooperation, EPSF Fine Motor, SSRS Self-Control, and EPSF Receptive Language. These variables were found to coincide each year in the study. SSRS Externalizing Behaviors and SSRS Internalizing Behaviors were also found to highly coincide with promotion and/or intensive assistance classroom placement two of the three years of the study. Unfortunately, the generalization of these findings is limited, since the researchers did not define or explain what is meant by intensive assistance classroom placement.

Spira, Bracken, and Fishel (2005) found that reading achievement in first graders was strongly linked to linguistic and behavioral attributes that were measured in kindergarten.

Children who showed more improvement in reading were those who had strength in phonological awareness, oral language, print knowledge, letter-word identification, and classroom behavior while in kindergarten. It was emphasized that the kindergarten behavior of students was measured before the students were given any formal reading instruction. The researchers felt that the lack of prior reading instruction made it unlikely that the behavior problems were caused by frustration with reading difficulties, but rather the difficulties with behavior were interfering with literacy learning.

Impact of Exercise on the Brain

Recent research is providing evidence that exercise benefits the cognitive and motor processes of the brain (Hillman, Buck, Themanson, Pontifex, & Castelli, 2009; Hillman, Pontifex, Raine, Castelli, Hall, & Kramer, 2009; Hillman, Snook, & Jerome, 2003; Hillman, Weiss, Hagberg, & Hatfield 2002; Sibley, Etnier, & Le Masurier, 2006). Hillman, Buck et al. (2009) studied the flanker task results of 38 children between the ages of 8 and 11. A flanker task is a task that is used to examine an individual's ability to inhibit task-irrelevant information in a stimulus environment. The participants in a flanker task must differentiate between central (target flankers) and peripheral (nontarget flankers) letters that are presented within an array (Hillman, Buck et al. 2009). The children in the study (Hillman, Buck et al., 2009) were placed into either a higher or lower fitness group based on the aerobic capacity of the child. Nineteen children were placed in the higher-fit group and 19 children were placed in the lower-fit group. The children were asked to complete the Eriksen flanker task. This task requires them to respond to letters on a computer screen as quickly as possible using their left or right thumbs. Congruent trials had the target letter flanked by the same letter (i.e. HHHHHH or SSSSSS) while incongruent trials had the target letter flanked by the opposing response letter (i.e. HHSHH or SSHSS). The researchers used Neuroscan Stim software to measure stimulus presentation, timing, and task performance. The results show that the higher-fit participants responded more accurately than the lower-fit participants across task conditions. The researchers took an electroencephalogram recording (EEG) and found larger P3 amplitude for higher fit participants over the central and parietal regions of the brain. P3 amplitude may reflect allocation of attention and context updating of working memory resources and may benefit executive control function (Hillman, Buck et al., 2003).

Hillman, Pontifex et al. (2009) found similar results when flanker tasks were taken after a 20 minute aerobic session on a treadmill compared to a 20 minute session of seated rest. The

participants had to keep their heart rate at 60% of their maximum heart rate for the 20 minutes while on the treadmill. Data were collected over two sessions. Twenty preadolescent children were randomly divided into two groups. One group participated in seated rest followed by the flanker task while the second group participated in an exercise session followed by the flanker test. The conditions were then reversed. The participants who exercised participated in seated rest for the second session and those who participated in seated rest for the first session now exercised. Both did the flanker task after their 20 minute session. EEG activity was recorded for this study. Response accuracy on the flanker task and P3 amplitude were increased after exercise, and remained the same after rest. The participants also completed the Wide Range Achievement Test 3rd edition (WRAT3) to assess academic achievement. Reading comprehension scores on this test were significantly better following exercise.

These results are comparable to a study by Hillman et al. (2003). In this study, 20 participants took a flanker task and then exercised on a treadmill for 30 minutes. When their heart rate returned to within 10% of pre-exercise levels, the participants took the flanker test again. An EEG was used to measure brain activity. P3 levels were also measured for this study and increased after exercise, as did performance on the flanker task, which suggests that cardiovascular exercise may be beneficial to cognitive functioning.

Hillman et al. (2002) found similar results using the same methods, but with an S1-S2-S3 paradigm instead of the flanker tasks. In this paradigm, two bars are shown and the participants must decide which bar is taller. The difficulty level of this task gets progressively harder. The researchers collected data based on age and fitness levels. The 48 participants were placed in one of four groups: older aerobically trained, older sedentary, younger aerobically trained, and younger sedentary. Data were also collected using an EEG. Results of this study indicated that physical fitness may reduce the cognitive decline in older individuals and may also be associated with a greater economy of motor preparation for all participants.

Sibley et al. (2006) studied the performance after a period of rest and after a 20 minute bout of self-paced moderate-intensity exercise on a treadmill for 39 male and 37 female participants, ranging in age from 19 to 35. A Stroop color-word test was given after 20 minutes of rest and after 20 minutes of exercise, over a period of two sessions. Participants were randomly selected to start with exercise or rest for their first session. The Stroop test has three conditions. The first shows a string of letters, and the participants must identify the color that the letters are written in. This condition is called the color naming test. Next, participants view color names that are

written in colored ink. The ink color and color name do not match. The participants are asked to verbally identify the color of the ink for each test item in what is called the color-word inference test. Finally, a negative priming test is given, in which the color of the ink for each word is the same as the color word for the previous item. For example, if blue was the color word for the previous item, then the current item's ink color would be blue. Results showed an improvement in scores after exercise for the color-word inference task, but no change for the simple color naming task or the negative priming task, which suggests that executive functioning was impacted by exercise but cognitive inhibition was not influenced.

A study conducted by Pontifex, Hillman, and Polich (2009) specifically studied the effects of exercise on the brain with regards to P3a and P3b. P3a is thought to be associated with focal attention while P3b is said to represent stimulus evaluation and classification speed (Pontifex et al., 2009). Forty-eight participants were separated into higher-fit and lower-fit groups and were given an oddball task and a three-stimulus task to complete. For the oddball task, the participants had to respond to a randomly occurring target as quickly and accurately as possible in the presence of no other stimuli. The oddball task was used to elicit a typical P3b response. For the three-stimulus task, participants responded to the randomly occurring target while ignoring other stimuli, which was used to produce a typical P3a response. An EEG was used to record brain activity. Results of this study showed that the higher-fit participants yielded larger P3b component amplitudes as well as required a shorter response time to complete the task. The P3a component did not change.

As more research is conducted on the effects of exercise on the brain, it appears that exercise does stimulate functional changes (Berg, 2010). Among the changes are increased productions of a protein in the nerve cells or neurons called brain-derived neurotrophic factor (BDNF). This protein enhances growth and repair of synapses and neurons to improve cognitive functioning. Exercise-induced BDNF enhances levels of key nerve transmitters to improve mood, energy levels, and motivation (Berg, 2010).

Gomez-Pinilla, Ying, Opazo, Roy, and Edgerton (2001) studied the effects of treadmill running on the brain in adult rats. Fifty-six male rats exercised on a treadmill for 30 minutes a day. Twenty-nine rats were assigned to a control group and did not exercise. The rats were trained for either one or five days and were killed within six hours of their last training session. The brains were analyzed to determine the levels of BDNF protein. The researchers found a

nonsignificant increase in BDNF levels after one day of treadmill running, but found a significant increase after five days of treadmill running.

The scientific evidence indicates that exercise changes brain chemistry. How this occurs and to what degree are questions that still need more study.

Influence of Physical Activity on Disruptive Behaviors

Studies have shown that students who exhibit off-task behavior often improve their behavior with exercise. One such study (Bass, 1985) was conducted on students with learning disabilities who were involved in a running program. Bass hypothesized that students with learning disabilities would have greater attention spans on running days. Six students, ages 8 to 11, were the subjects in this study. Four of the students were male and two were female. All of the students were of the lower socioeconomic class. The researcher had the students alternate running days and non running days in what Bass calls a B-A-B-A design. The B condition was the running day, while the A condition was the non running day. The students were observed for two hours a day with two days each week being running days and two days each week being non running days. Students ran for 45 minutes. Data collection ran for four weeks. A 10-item checklist was used to measure attention span and impulse control. Bass found that students who ran displayed disruptive behaviors less often on running days than on non-running days. She also found that children with learning disabilities had greater attention spans toward classroom tasks when it was a running day.

Field et al. (2001) found that students who exercised at a high level had better relationships with their parents, less depression, less drug use, and had higher grade point averages than those students who had a low level of exercise. The subjects were 89 suburban high school seniors, with 52 being female and 37 being male. A 5-point Likert scale was used to assess exercise levels. The scale consisted of rarely (1), sometimes (2), once a week (3), three or more times a week (4) and daily (5). Sports involvement was also assessed using a 3-point Likert scale, with a range from less than two hours per week (1) to seven or more hours per week (3). The criterion for a 2 on this scale was not given, and the authors did not define what is considered a high level of exercise. The Center for Epidemiological Studies Depression Scale (CES-D) was used to measure adolescent depression. A 5-point Likert scale was used to assess the quality of relationships with parents and friends, with the scale ranging from not at all to very much. The full scale was not given. A 4-point Likert scale was used to measure maternal and paternal depression, as well as drug and alcohol use. The scale ranged from never to regularly. The full

scale was not given. Grade point average was also assessed on a 4-point Likert scale ranging from A to D. The higher exercise group reported better relationships with parents as well as more family support. They also reported less depression and a lower level of drug use. The researchers cautioned that it is not known if students who are less depressed choose to exercise or if the exercise itself helped alleviate depression.

Teachers' Beliefs About Physical Activity and Classroom Behavior

A study by Morgan and Hansen (2008) investigated teachers' beliefs about how physical education affects learning. The researchers sent questionnaires to 316 teachers in 38 schools in New South Wales, Australia. Of these teachers, 189 responded to the questionnaire. In addition to the questionnaire, 31 of the teachers were interviewed by telephone. These interviews were audio-taped. The teachers who completed the telephone interview had a median age of 46 to 50 years, with 78.5% percent being female and 21.5% being male. The teachers answered questions about their perceptions of physical education and its benefits. A 6-point Likert scale was used to assess teachers' perceived success of physical education programs. The scale ranged from very unsuccessful to very successful. A 6-point Likert scale, which ranged from strongly disagree to strongly agree, was used to indicate whether the teachers taught physical education on a regular basis. A 6-point Likert scale was also used to determine how the teachers felt about physical education, with the scale ranging from strongly disagree to strongly agree. Most teachers felt that physical education was essential to children's social development, which included the areas of sportsmanship, teamwork and life skills. Most also felt that physical education affected learning and behavior in a positive way and could often see a negative impact on behavior when children did not have physical education. Many of the teachers felt their students were more ready to learn after physical education and that the students were able to retain more and had better concentration after activity.

Sandford et al. (2008) found an increase in attendance and a decrease in the number of behavior referrals after students participated in HSBC/Outward Bound and Youth Sport Trust/Sky Living for Sport, two youth physical activity programs. HSBC/Outward Bound was a five year program that financed outdoor adventure activities with the goal to develop the skills of team building, communication, and responsibility (Sandford et al., 2008). HSBC was the bank chain in London that funded the program. Youth Sport Trust/Sky Living for Sport was a program that also financially supported schools to facilitate activity, allowing them to choose

from different activities, including climbing, abseiling, horseback-riding, skiing, tennis, football, martial arts, aerobics, and circus skills (Sandford et al.,2008).

Similar findings were described by Putnam et al. (2004), who reported on TeamWalk at D. W. Merritt School in Maine. This walking program targeted students in kindergarten through eighth grade. Students walked with teachers and staff members daily and logged miles on a map of the United States. Children who walked 25 miles or more in a 10-week period received a t-shirt. Teachers reported an improvement in alertness, behavior, attitude, and physical health of the students.

Eldar (2008) found that learning and behavior change can occur during physical activity, but speculated that participation in physical activities serves as a context for the change in behavior, not the cause for the change. Eldar emphasized the enjoyment factor associated with physical activity in support of this speculation. Students find activity as a break from the classroom, and are more inclined to learn when they are enjoying themselves. Physical activity also provides the context to learn behaviors because it allows for challenges and learning opportunities in a fun setting and the level of difficulty can be modified to allow for correction and improvement of behaviors (Eldar, 2008).

A study by Budde, Voelcker-Rehage, Pietrabyk-Kendziorra, Ribeiro, and Tidow (2008) showed that exercise may improve concentration and attention in adolescents. Ninety-nine students age 13 to 16 were assigned to an experimental group or a control group. In the experimental group, the students completed five stations that involved sports skills and exercises from the Munich Fitness Test. An example of a station would be to control a soccer ball with one foot, while controlling a volleyball with one hand. Students in the control group were asked to exercise at a moderate intensity. The teachers told the students to exercise at the same level as the experimental group, but gave no specific motor coordination instructions. The students took a d2-test while at rest and again after exercise. The d2-test is a letter-cancellation test used to measure focus and attention. Students are instructed to mark the letter “d” within a string of the letters “d” and “p,” and to only mark the letter when two dashes are above or below the letter. Results of the study showed an improvement in d2-test scores for both the experimental group and the control group, with the experimental group showing the most gain. The researchers hypothesized that the coordinative nature of the stations for the experimental group was responsible for the higher gain in test scores, because neuronal structures like the cerebellum and

the frontal lobe are responsible for coordination and cognition. The children's heart rate was the same for both groups, which further supported this hypothesis.

Effects of Physical Activity on Children with ADHD

Some of the links between exercise and behavior have focused on children with attention and hyperactivity disorders. The Individuals with Disabilities Education Act (IDEA) defines ADHD as a neurodevelopmental disorder characterized by inattentiveness, impulsiveness, and hyperactivity. Three distinct forms of ADHD have been identified, among which are attention deficit hyperactive disorder predominantly inattentive, attention deficit disorder predominantly hyperactive-impulsive, and attention deficit disorder combined (American Psychiatric Association Diagnostic and Statistical Manual of Mental Disorders, 2000). Azrin et al. (2006) found that using vigorous physical activity in the form of playing on an outside playground, along with verbal praise, was a reinforcer for positive behavior for an AD/HD child. The playground had various types of equipment, including slides, ladders, swings, and climbing structures, and the researchers reported that the child in the study engaged in continuous play on the equipment. In this study, physical activity and verbal praise were both used alone and together as a reinforcer for a child with ADHD; however, when physical activity or verbal praise was used alone, neither was as effective as a reinforcer for positive behavior as when used in combination.

Azrin et al. (2007) found that the use of vigorous physical activity as a reinforcer for positive behavior resulted in improved behavior in students with AD/HD. The type of physical activity was the opportunity to play with equipment, which was not otherwise specified. The researchers used "shaping" with the subjects. Shaping involved expecting the subjects to remain calm and attentive for a period of time before allowing the subjects to go to the recreational play area for vigorous activity. Descriptive praise was also used with the subjects. The original reinforcer was a token economy that was not effective until vigorous activity was added. Azrin et al. (2007) also found that the behavior of a student who was receiving medication for AD/HD greatly improved when activity in the form of playing with equipment was used in addition to the medication. The researchers did not distinguish whether the vigorous activity or verbal praise or a combination of the two resulted in the improved behavior, but explained that the previous study (Azrin et al., 2006) found that both must be present for improvement.

Kiluk, Weden, and Culotta (2009) found that children with AD/HD ages 6 to 14 who participated in three or more sports exhibited fewer symptoms of depression and anxiety than

those who did not. The researchers used the Child Behavior Checklist (CBCL) to measure anxiety-depression as the main variable because they felt the core characteristics of inattention, impulsivity, and hyperactivity had limited variability. The researchers warned that future studies must take place to examine the benefits of physical activity in relation to anxiety and mood symptoms. They stated that physical activity should always be encouraged because of the health benefits, but also because including physical activity in the treatment of children with ADHD may help lessen the symptoms of anxiety and depression.

Shaywitz, Yager, and Klopfer (1976) examined the connection between dopamine and behavior. Dopamine is a neurotransmitter, which is a chemical that nerves use to communicate with one another (Putnam & Copans, 1998). Shaywitz et al., explained the effects of dopamine and norepinephrine on hyperactivity. They found that the rats who displayed lower dopamine and norepinephrine levels displayed more hyperactive behaviors. The rats who had a lesser depletion of dopamine and norepinephrine behaved similarly to the control rats. Shaywitz et al. (1976) administered 6-hydroxydopamine (6-OHDA) to baby rats. On nine occasions, the rats were observed for an hour with the observer recording information about the behavior of the rats each minute. The observer was unaware of which rats were given the 6-OHDA and which were not. The rats that had been administered the 6-OHDA became significantly more active than the controls and continued to be more active until around four weeks of age, when the rats reached maturity. They also found that although the rats' hyperactivity disappeared, they continued to have cognitive, perceptual, and emotional difficulties. These behaviors were measured by testing the animals in a shuttle box. The box was split into two compartments and the rats were given five seconds to avoid being shocked by jumping into the safe compartment. They were tested until they avoided the shock for five times consecutively. The researchers recorded the number of trials before the rats completed the task. The rats were decapitated at 35 days of age, and dopamine and norepinephrine were extracted from the brain. The 6-OHDA administration resulted in an accelerated and profound reduction of dopamine in the brain. Norepinephrine was also reduced although not as rapidly or profoundly.

Effects of Physical Activity on Children with Autism

Studies have also been conducted regarding exercise and children with autism and the results have been similar to studies concerning exercise and children with ADHD. Rosenthal-Malek and Mitchell (1997) studied the effects of exercise on five adolescent males who were diagnosed with autism. Each exercise session started with warm-up stretches followed by 20 minutes of

jogging. The students started the exercise session at the beginning of the school year to control for the chance that the effects were because of a change in routine rather than from exercise. Data were collected for a month. The researchers found that following moderate exercise for 20 minutes, self-stimulatory behavior in children with autism decreased. These behaviors included body rocking, spinning, hand-flapping, head-nodding and object-tapping.

Six adults who were diagnosed with autism were the subjects in a study by Elliott, Dobbin, Rose, and Soper (1994). The participants were assigned to one of three conditions: nonexercise (table top activities), general motor training activities (heart rate elevated between 90 and 120 beats per minute or bpm), and vigorous aerobic exercise (heart rate elevated to 130 bpm). Each session was 20 minutes. Behavior, such as loud vocalizations, rocking, aggression, and grimacing, significantly improved following the vigorous, aerobic exercise session. Little improvement was seen after the general motor training session or the nonexercise session.

This finding is similar to the results of a study by Celiberti, Bobo, Kelley, Harris, and Handleman (1997). They compared walking to jogging and the effects of each on the autistic behaviors of a five year old boy. Each session lasted for six minutes, with the student either walking or jogging around the perimeter of the school. The student often engaged in behaviors of nonfunctional hand movements, such as banging, clapping, and hitting, as well as visual self stimulation, which consisted of squinting or peripheral staring. He also engaged in out of seat behavior. The researchers observed the student for these behaviors using 10 second intervals for 40 minutes. Findings of this study showed a decrease in physical self stimulation and “out of seat” behavior for the jogging condition. These behaviors did not decrease for the walking condition.

Prupas and Reid (2001) also studied the effects of walking and jogging on stereotypical behaviors of four children ages five to nine who were diagnosed with autism. In this study, a single frequency exercise treatment and a multiple frequency exercise treatment were used. The single frequency exercise treatment involved a 10-minute walk or jog session. The multiple frequency exercise treatment consisted of three 10-minute walk or jog sessions that were used throughout the day. The student’s behavior was assessed using 15 second intervals for 15 minutes. The results of the study showed that exercise must be moderate to vigorous in intensity, which they defined as 65%-85% of the individual’s maximum heart rate, to be effective. They also found that a multiple frequency exercise treatment (several times a day) was more effective than a single frequency exercise treatment (once a day).

Four males age 6 to 16 were the subjects in a study by Bachman and Fuqua (1983). Behaviors observed for each student were inappropriate vocalizations, repetitive movements and student off task for Student 1; inappropriate use of hands, off task behavior and repetitive movements in students 2 and 3, and visual off task, motor off task, and inappropriate vocalizations for student 4. The intervention used was jogging and participants engaged in both exercise and non exercise days. Three phases were used in this study. The first alternated a daily warm up/jogging session for a distance of .98 miles with a non-exercise session. The second phase involved two, daily alternating conditions. These were jogging for 1.47 miles and non-exercise. For the third phase the students jogged each day at the same rate as phase two. No non-exercise day was used. Students one and three had a decrease in inappropriate behaviors for the first phase. Students one, three, and four had a decrease in inappropriate behaviors during the second phase and the decrease was slightly higher than for phase one. The level of inappropriate behaviors declined the most for students one, three, and four during the third phase, in which jogging occurred every day. Inappropriate behaviors didn't change much for student two throughout the study.

Overview and History of HealthMPowers Classroom Exercise Program

A program called HealthMPowers (HealthMPowers, 2008) has been introduced to a number of specific Georgia schools to help enhance fitness levels. It was founded in 1999 and incorporated in 2000 by Andy Isakson and Mary Johnson. This program is a nonprofit, Atlanta based, in-school initiative for grades kindergarten through eighth grade. Sponsors of this program include the Centers for Disease Control and Prevention (CDC), Children's Healthcare of Atlanta, the Atlanta Classic Foundation, The Rollins School of Public Health at Emory University, Tenet Healthcare, Park Springs Retirement Community, Blue Cross Blue Shield, Piedmont Healthcare, Isakson Barnett, Northside Hospital and Promina Health System. The HealthMPowers program uses strategies that the CDC has outlined to improve the health, physical activity and healthy eating of children in Georgia schools.

The HealthMPowers mission is "to promote health enhancing behaviors among students, school staff, and families to improve the quality of health and academic achievement of young people" (HealthMPowers, 2008). This mission is accomplished by providing in-class and school-wide extension activities, school health council development training and technical assistance, staff development, resources and family newsletters. HealthMPowers also conducts parent seminars.

Two exercise DVDs are also provided as a classroom resource. A pamphlet is included in each of these DVDs that includes a justification for using the exercise DVDs during the school day. Both pamphlets state that during long periods of sitting, blood will pool in the lower body and groin area. The result is less oxygen to the brain, which can inhibit learning, because increased blood flow to the brain helps students to concentrate and to learn. The pamphlet accompanying the *Mind in Motion* DVD states that “physical activity has also been associated with better classroom behavior which facilitates an optimal classroom environment” (HealthMPowers, 2008).

Thirty-three schools serving over 22,000 students across 11 counties in Georgia are currently using the HealthMPowers program. Of these, 26 schools have reported some information about the implementation of the program. Each teacher at the participating schools is asked to track what activities are being taught and used in the classroom. A simple tracking form is completed each month and sent to HealthMPowers. Teachers track when students are being physically active, as well as when health related topics are integrated into other subject areas. The reporting on these forms indicates a 92% increase in physical activity among students during the school day and an increase of integration of physical activity into other core subject instruction by 46% (HealthMPowers, 2008). Sixteen schools reported using the exercise DVD.

Periodically, teachers are given surveys that ask about the benefits of the program. Eighty-eight percent of the teachers who completed these surveys found an increase in family engagement in student health and fitness improvement. Sixty-nine percent of the schools using the DVD reported that it improved student concentration, while 75% reported improved student behavior and reduced student stress (HealthMPowers, 2008). Although this anecdotal data is impressive, more objective, reliable independent evidence was needed to show the effects of short exercise breaks on classroom behavior.

CHAPTER 3

METHOD

The purpose of this study was to investigate the effects of HealthMPowers, a classroom exercise video program, on the off-task behavior of fourth grade students during a regularly scheduled morning math class. This chapter will describe the participants, dependent variable, independent variables, within subject research design, procedures, data collection, and inter-observer reliability procedures. A brief description of the pilot project will also be included in this chapter.

Participants

Teacher

The teacher in this study was a 23-year old undergraduate student earning her Bachelors degree and completing her student teaching internship. During her years as an undergraduate, she had engaged in four practicum experiences with each practicum lasting three full weeks. During these practicum classes, the teacher also had to visit a school two times a week for a semester. She had also participated in the Teach to Work program at a local high school and she worked with a kindergarten class for half a day every day for one semester. She agreed to cooperate with the researcher.

Students

The regular teacher identified five students who were consistently off-task and disruptive in her room. The students were all white and 10 years old, with four being male and one being female. The researcher chose one student who was not identified by the teacher as being disruptive. Only the researcher and the primary coder knew the identity of this student. Data were collected on this student to compare with the other five students. This student was a 10 year old, white female. The results of five of the six participants selected for this study are included in this analysis of the results. One student moved after seven weeks from the start of the study so his results were not included.

The researcher did not have access to the student's IEP's. A medical information form (see Appendix A) was sent home to the parent of each student to attempt to collect the information that would otherwise be found in a student's IEP. Of the twenty-six forms sent home, eleven were returned to the researcher, two of which belonged to the participants in the study. Two of the male participants in this study were identified as having ADD/ADHD and asthma.

Before starting the data collection, the Institutional Review Board and the school administration approved all procedures (Appendix D). A consent form was signed by the teacher prior to starting the study (see Appendix E). Parents of all children in the class signed a permission consent form for their child (see Appendix B). The researcher read and explained the assent form to the students and checked for understanding before asking them to sign. All students in the class signed an assent form (see Appendix C). The students and parents did not know which specific students were being observed for this study.

Setting

The school in this study is a rural school located in South Georgia. It is one of seven elementary schools in the county school district. This district also has three middle schools and one high school. The school in this study has 655 total students, 346 males and 309 females. At the time of the study, there were 424 Caucasian, 151 African American, 41 Hispanic, 34 multiracial, and 5 Asian students. There are 57 teachers and 14 paraprofessionals employed at this school. Class size ranges from 20 to 26. There were 26 in this fourth grade classroom.

Dependent Variable

For this study, the primary dependent variable was off-task behavior. Off-task behavior was defined as breaking eye contact with task materials for greater than three seconds (Northup, et al., 1999), and included playing with objects, which was defined as touching any object that was not associated with an assigned task, out of seat behavior, which was defined as the child's full body weight not being supported by a chair for at least three seconds, and inappropriate vocalizations, which were defined as any vocal noise or verbalization that was not preceded by a child's raised hand and acknowledgement by an adult (Northup, et al., 1999).

A decision log (see Appendix F) was kept in a notebook available to both coders to keep track of any decisions related to coding that were discussed by the coders to clarify the definitions of behaviors. The log was a record of any decisions made because of confusion or disagreement over how to code a behavior.

Independent Variables

Two interventions were used on alternate days during this study. The interventions were a) exercising for approximately 2-minutes to a video clip from a HealthMPowers exercise DVD and b) a control procedure—placing the head down on the desk for two minutes.

HealthMPowers Exercise Program

The exercise video was supplied by HealthMPowers. The video, *Classroom Exercises for the Body and Brain*, depicts children leading aerobic and strength exercises that can be done in the classroom. The *Classroom Exercises for the Body and Brain* DVD has six short exercise clips. The clips used were Chair Aerobics (time 2:27), Air Step Aerobics (time 2:16), Pretend Jump Rope (time 1:40), and Mind in Motion (time 1:52). Desktop Stretching and Canned Food Exercises were not be used because the resulting exercise was not vigorous. Each video is led by elementary school students and most have the students moving beside their desk. Chair aerobics depicts the students doing aerobic movements while sitting in a chair. Air step aerobics uses movements commonly done on an exercise step, but without the equipment. Pretend jump rope has students jumping without a rope while doing various jump rope skills.

The teacher played one exercise clip from the *Classroom Exercises for the Body and Brain* on alternate days during the study. The teacher was welcome to choose any clip. The exercise video was used at 9:05 AM for this study.

Head Down Control Procedure

A second intervention, head down, was used as a control procedure. This intervention was used to help distinguish if it was the exercise session, a break from their math lesson, or some other uncontrolled variable that affected disruptive behavior. Every other day, the students put their heads on their desks for a break. Head down was defined as the students putting their heads on their desks with hands on the desk or in their lap. The students could not talk or have any objects in their hands or on their desks while they participated in a head down session. Head down lasted for two minutes to approximate the length of the exercise video clips. If an intervention could not be used for any reason, it was used the next available day.

The primary observer and secondary observer (reliability coder) checked to ensure all of the students were participating in each intervention, once a week. They wrote in the date of the intervention check and watched the intervention session together. They observed and recorded the number of students who were not participating and then calculated a percentage of participation (see Table 1).

Table 1

Intervention Participation Chart

Date	Intervention Used	Percent Participation
10/6/10	HealthMPowers	95%
10/7/10	Head Down	100%
10/11/10	Head Down	95%
10/13/10	HealthMPowers	100%
10/18/10	Head Down	100%
10/27/10	HealthMPowers	100%
11/1/10	Head Down	100%
11/2/10	HealthMPowers	100%
11/9/10	Head Down	100%
11/10/10	HealthMPowers	100%

Within Subject Research Design

The methods used in this study followed the research protocols of applied behavior analysis (ABA) (Bailey & Burch, 2002; Cooper, et al., 2007). In this type of research, the number of subjects is often small, and they are observed directly and repeatedly for an extended period of time (Bailey & Burch, 2002). Behaviors are measured during a baseline condition to determine the operant level of performance. An intervention procedure is then introduced to the target behavior and the effects of the procedure are studied. Many variations of this basic procedure have been created and other researchers have defined specific procedures required when using ABA methodologies (Bailey & Burch, 2002, Cooper, et al., 2007; Hersen & Barlow, 1976).

Applied behavior analysis is an effective method for observing behaviors in an educational setting. ABA works at the level of the individual and produces interventions that can be used in an educational setting as well as in treatment, rehabilitation or corporate settings (Bailey & Burch, 2002). Visual analysis is used to assess the degree of experimental control exerted by the independent variables on the dependent variables and to determine the clinical significance by

observing patterns within the graphically displayed repeated measurements. Baseline data is collected until a stable trend is evident. Then an intervention is started and data points are compared to the baseline. Experimental control is demonstrated when the data reveal a distinguishable difference in mean level or trend with a minimum of overlap across conditions.

An Alternating Treatments Experimental Design (Cooper, et al., 2007) was used to assess the influence of exercise to the HealthMPowers videos and head down procedures on off-task behavior during a math study period for the six students who participated in this study. Baseline measurements were conducted until the level of off-task behavior during math stabilized for most of the participants (no conspicuous trending up or down). At that point, the whole class in which the participants were enrolled received one of the two brief interventions (exercise with video or head down) on alternating days. Experimental control was demonstrated if the mean performance for each of the alternating conditions became differentiated. Visual analysis was used to assess the degree of consistency and magnitude of the effect. It was anticipated that off-task behavior would decrease by approximately 20% for the video exercise group while little or no change was expected for the head down group.

As an additional control, off-task performance was measured during the 20-minutes immediately preceding the intervention. These data provided an indication of daily variation in off-task behavior. It was not expected that this measure would change systematically with either intervention since these measurements were taken prior to the intervention each day.

Procedures

One fourth grade classroom teacher and her class of 26 students were chosen for this study. A student teacher was assigned to the class and she agreed to participate in the study. The regular classroom teacher was out of the room for the duration of the study. The student teacher and researcher discussed the protocol for the study and identified an appropriate area in the classroom to set up the video camera used to record student behavior. A practice session was recorded to ensure that off-task behavior for each student involved in the study could be seen on the recording.

The data collection period was for 45 minutes each day during math instruction from 8:45 to 9:30 AM. Off-task behavior for the 6 students was collected for 20 minutes, 8:45 to 9:05 AM. Either the HealthMPowers exercise video clip or the head down procedure was implemented each day from 9:05 to 9:10 AM. Then off-task behavior was collected for another 20 minutes, from 9:10 to 9:30 AM. The class was videotaped for both of the 20 minute sessions.

At 8:45, the teacher turned on the video camera and set the timer for 20 minutes to start the math lesson. The timer beeped when it was set, which served as the cue for the observer to start coding the behavior when she watched the video. The timer beeped again at the end of the 20 minute session, at which time the teacher used either the HealthMPowers or head down intervention. She said the name of the video and which exercise clip was being used into the camera when the HealthMPowers DVD was used. Once the intervention was concluded, the teacher reset the timer for 20 minutes, and continued the math lesson. The beep of the timer cued the observer to start coding the second 20 minute session when she was watching the video. When the timer beeped at the end of the second 20 minute session, the teacher turned off the video camera. The researcher downloaded the video onto a computer. This computer belonged to the researcher and only she and the primary observer watched the video. The primary observer watched the video and coded both 20-minute sessions sometime before the school day ended.

Data Collection

Data for this study were collected by viewing video recordings of each daily 40-minute session. The ABA procedure used in this study was interval recording, since this procedure is the best system to use to estimate the percentage of time that a behavior is occurring (Bailey & Burch, 2002; Barlow & Hayes, 1979). In interval recording, an observer counts the number of intervals during which a behavior occurs at least once. The observer recorded behaviors occurring during the two 20-minute sessions for a total of 40 minutes (Alberto & Troutman, 2006). After each 20-minute period of collecting data, the percentage of off-task behaviors was determined ($\text{intervals off-task} / \text{intervals in session} \times 100$) and that result was used as one data point for each period.

Continuous observation with partial interval recording was used to collect data for this study. This involved marking a behavior as occurring if it occurred at any time during the interval, and regardless of how long the behavior lasted (Bailey & Burch, 2002). A behavior could only be marked once during an interval. To ensure that the data are representative, the intervals were kept short (10 seconds). A behavior could only be marked if it occurred during the interval where the student was being observed. To ensure the primary coder and reliability observer were watching the same students during coding; the student teacher set a timer. The beep of the timer could be heard on the video and signaled the observers when it was time to start coding. The reliability observer would look at the top of the form of the primary coder to ensure the students

were observed in the same order. The data was covered with a sheet of paper to ensure the reliability observer could not see how the behaviors were coded, and once the reliability observer added the student's initials to her paper, the primary coder's form was put away.

In this study, the observer recorded data using a 10-second (10-s) interval recording design (see Appendix G). The observer observed one student for 10 seconds and recorded the off-task behaviors that took place during the interval. Once the first 10-s interval was recorded, the observer observed the second student for the next 10 seconds. This process continued until all six students had been observed so that each student was observed for 10-seconds each minute. The observer watched each student for 20, 10-s intervals before and after each intervention. The interventions lasted approximately 2 minutes and alternated each day between the HealthMPowers exercise video and the head down procedure. Each day, the observer started coding with a different student. Table 2 shows how the primary coder rotated which student to watch first, second and so on. If any off-task behavior occurred in an interval, it was counted as an interval with off-task behavior.

Table 2

Rotation of Students When Coding

1 st Rotation	Student 1	Student 2	Student 3	Student 4	Student 5	Student 6
2 nd Rotation	Student 2	Student 3	Student 4	Student 5	Student 6	Student 1
3 rd Rotation	Student 3	Student 4	Student 5	Student 6	Student 1	Student 2
4 th Rotation	Student 4	Student 5	Student 6	Student 1	Student 2	Student 3
5 th Rotation	Student 5	Student 6	Student 1	Student 2	Student 3	Student 4
6 th Rotation	Student 6	Student 1	Student 2	Student 3	Student 4	Student 5

Teacher Discipline

The observer recorded any events that could influence student behavior. In addition, to get an indication of the occurrence of teacher discipline, the observer noted each time the teacher spoke to one of the six students being observed. This information was collected to examine whether the amount of discipline from the teacher diminished or increased after the interventions were

introduced. The observer recorded these data on the same form while recording data on the off-task behavior of the six students (Appendix G). If the teacher addressed the class, the observer marked TG for Teacher Group. If the teacher addressed one of the six students being observed, the observer marked TI for Teacher Individual. The observer also wrote in the interval number where the discipline took place. An example would be to mark TI4 if the teacher discipline occurred to an individual during the fourth interval.

Teacher and Student Social Validity Questionnaires

Social validity is a measure of consumer satisfaction (Wolf, 1978) and is now widely used in applied behavioral research (Bailey & Burch, 2002). Several measures of social validity were collected at the conclusion of the study. The teacher and students rated their responses to seven questions on a Likert scale questionnaire to evaluate the importance of the exercise breaks, the appropriateness of the video and head down procedures, and satisfaction with the results. These qualitative data were collected in the form of a teacher questionnaire (Appendix H) and a student questionnaire (Appendix I). All students in the class were given the student questionnaire regardless of whether or not they were one of the six students whose off-task behavior was being observed for the study.

Inter-observer Reliability

The researcher taught the primary observer how to observe the recordings. The training began with the primary and secondary observers watching videos together. These videos were of the fourth grade class used in the pilot study. They watched the students for 10-second intervals and discussed each behavior seen to establish the meaning of each definition and to ensure that each coder interpreted the definition the same way. Next, the observers watched the video while in the same room, but did not share decisions until each 20-minute session was complete. They discussed any disagreements with each other. Lastly, the observers watched the videos separately and reliability checks were completed. As the training was being conducted, a decision log was developed to help provide better reliability and observer agreement. If a question arose about the definition of a behavior, or how to code the behavior, a decision was made about how to code it and the decision was added to the log (see Appendix F).

Training continued until the reliability observer achieved an IOA of at least 80% using a recording made during a pilot study. Calculations were based on the Occurrence Reliability method (i.e., intervals with no response are not scored as agreement) and the Total Reliability method (intervals with no response are counted as well as intervals with responses).

Interobserver agreement (IOA) was maintained by having the secondary observer code the same video tapes as the primary observer for every third session during the study. The researcher, as secondary observer, coded independently and separately from the primary observer. A coding form (see Appendix J) was used to determine the percent of inter-observer agreement. The criterion for agreement was set at 80%. If this level was not achieved at any time during the study, then the two observers repeated the training process to find and correct the problems using pilot videos. Results were not discussed with the primary observer unless the 80% criterion was not achieved and training had to be reintroduced. Data that are below 80% reliability had to be coded again. The 80% criterion was met throughout the study data collection phase.

Pilot Project

The researcher tested these same data collection procedures in an extensive pilot study lasting several months prior to this study. Two other fourth grade teachers and classes were used in the pilot study. During the pilot study, procedures were tried and modified to provide the most reliable information using the applied behavior analysis procedures. The researcher met bi-weekly for eight weeks with faculty and students in an applied behavior analysis research seminar led by Dr. Jon Bailey, an applied behavior analysis expert. The researcher also corresponded with Dr. Bailey and other faculty through email. Data were graphed by the researcher and analyzed by participants in the research seminar. Reliability procedures were developed and established for the dissertation study.

CHAPTER FOUR

RESULTS

Interobserver Reliability

Occurrence reliability for all participants averaged 94%. Total reliability for all participants averaged 96%. See Table 3 for each participant's reliability mean number.

Table 3

Reliability Means for Each Student

Student Initial	Mean for Occurrence Reliability	Standard Deviation for Occurrence Reliability	Mean for Total Reliability	Standard Deviation for Total Reliability
N	93%	7.09	96%	4.04
T	95%	7.61	97%	4.25
C	92%	7.26	96%	4.50
L	94%	6.79	96%	5.39
P	95%	7.89	98%	4.47

Note: Reliability substantially exceeded the minimum levels expected for observations of this type.

Research Question One and Hypotheses One and Two

Data used to answer research question one and hypotheses one and two were collected daily using an Alternating Treatment Experimental Design (Cooper, et al., 2007). Data were collected for twenty minutes before and after one of the two interventions (HealthMPowers video or head down procedure) were administered. The data were graphed and analyzed daily.

Experimental control was demonstrated if the mean performance for each of the alternating conditions became differentiated. Visual analysis was used to assess the degree of consistency and magnitude of the effect. It was anticipated that off-task behavior would decrease by approximately 20% for the video exercise group. Little or no change was expected for the head down group

Primary Results

The results for each participant are presented in Figures 1 through 5. To facilitate explanation, the results for one representative student, Participant N (see Figure 1), will be described in detail.

Baseline data were collected daily for two twenty minute segments until a stable baseline (trend) was established. Baseline stabilized by the fourteenth day of observation for both the first and second twenty minutes. Participant N had most off-task behavior with data points between 60% and 80% for the first and second twenty minutes. When HealthMPowers exercise was introduced, off-task behavior began to decrease and trended downward the remainder of the study. Similar patterns were observed for head down and the daily pre-intervention control condition. Off-task behavior averaged 43% during the exercise intervention, 46% during head down and 56% during the 20 minutes before intervention.

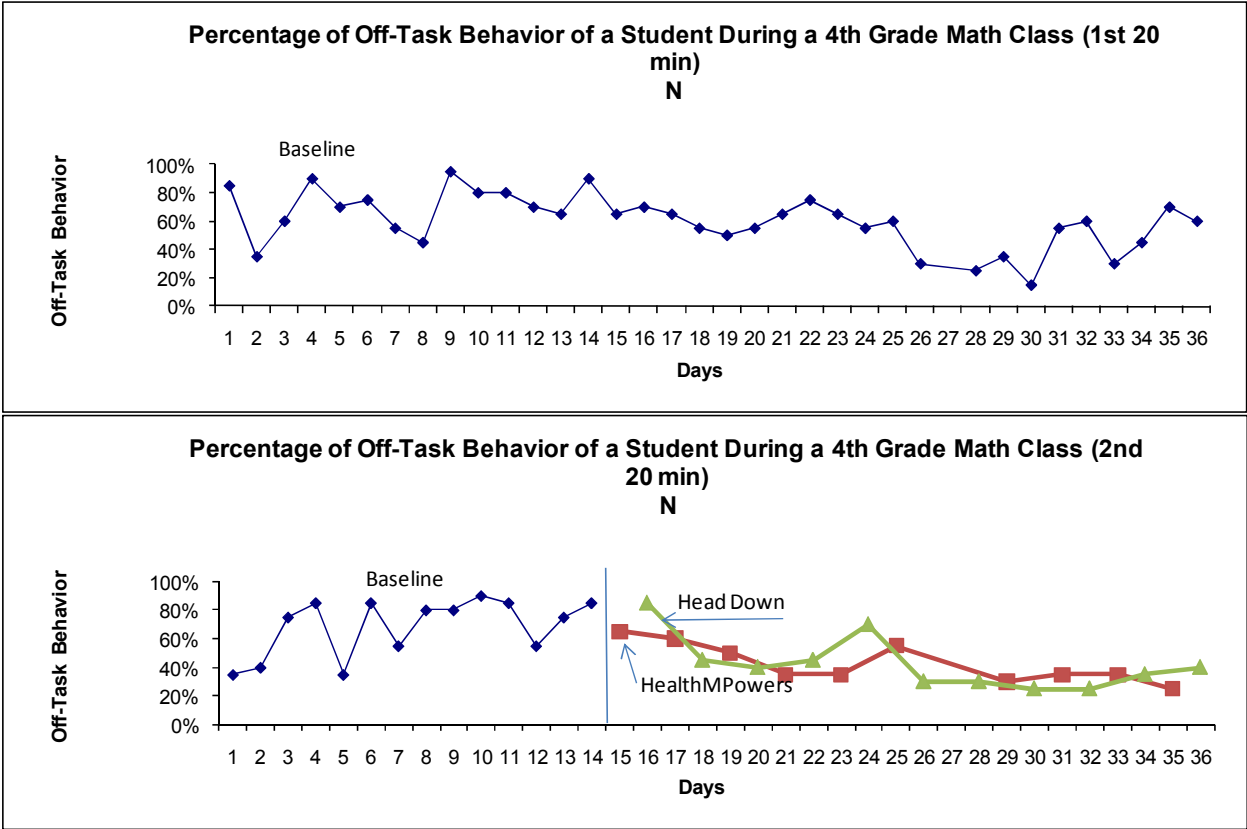


Figure 1. Percentage of intervals in which off-task behavior was observed for Participant N during the first 20 minutes of math class (top axis) and during the second 20 minutes of math class during baseline conditions and following either a 2-minute intensive exercise session or a 2-minute head-down rest.

The pattern of effect was similar for most of the other participants (See Figures 2 through 5). Student L saw no change in off-task behavior. Her percent off-task behavior was similar during baseline and both interventions and is shown in graph Figure 4.

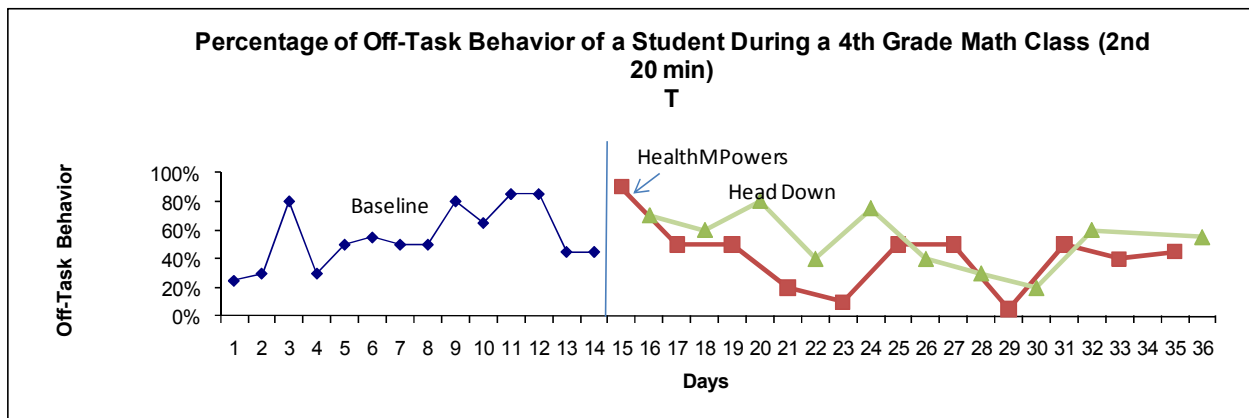
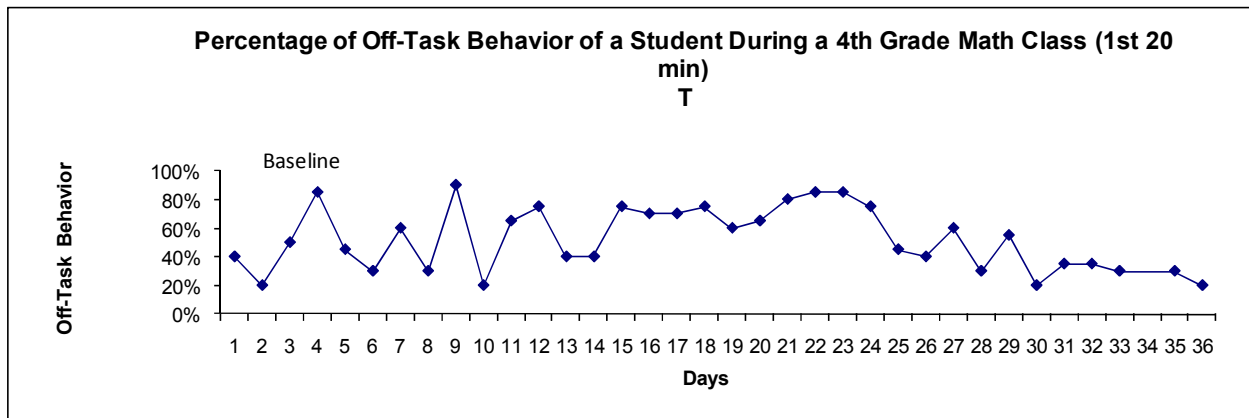


Figure 2. Percentage of intervals in which off-task behavior was observed for Participant T during the first 20 minutes of math class (top axis) and during the second 20 minutes of math class during baseline conditions and following either a 2-minute intensive exercise session or a 2-minute head-down rest.

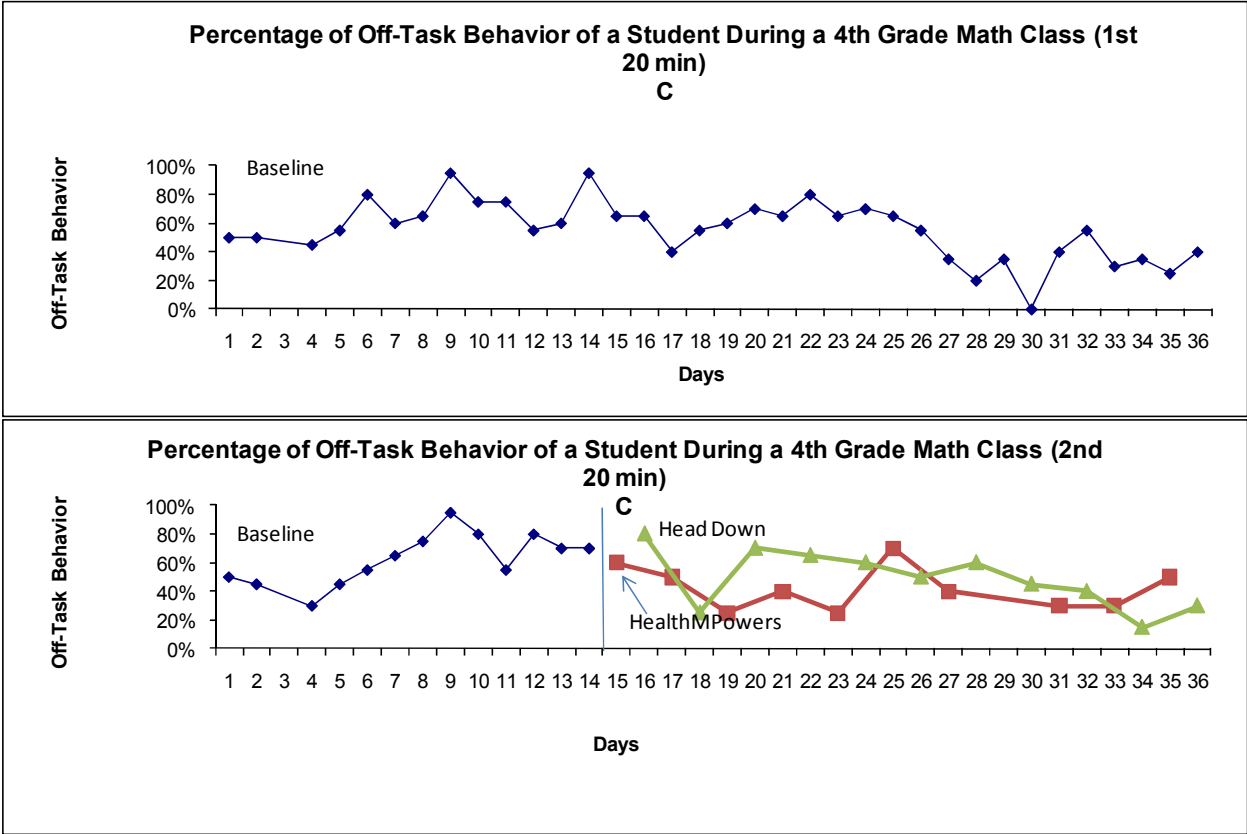


Figure 3. Percentage of intervals in which off-task behavior was observed for Participant C during the first 20 minutes of math class (top axis) and during the second 20 minutes of math class during baseline conditions and following either a 2-minute intensive exercise session or a 2-minute head-down rest.

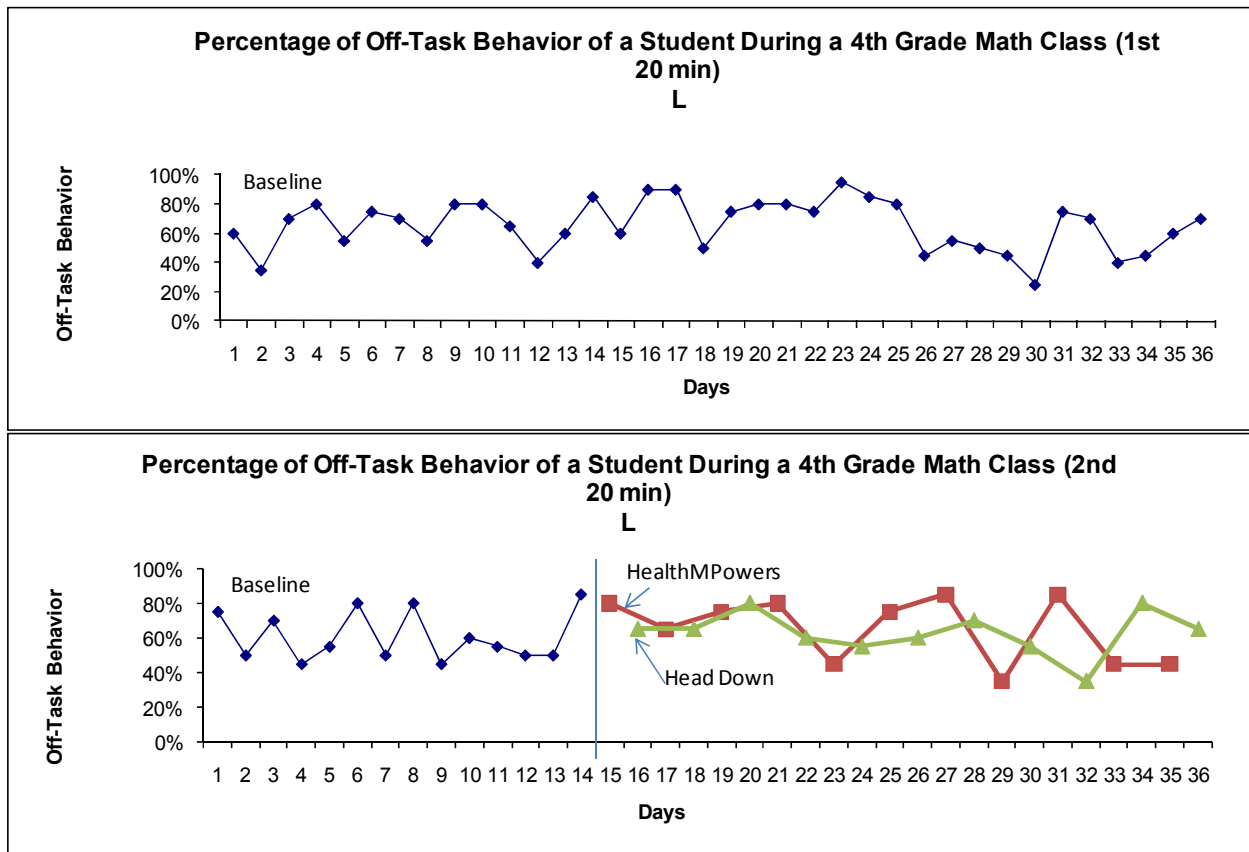


Figure 4. Percentage of intervals in which off-task behavior was observed for Participant L during the first 20 minutes of math class (top axis) and during the second 20 minutes of math class during baseline conditions and following either a 2-minute intensive exercise session or a 2-minute head-down rest.

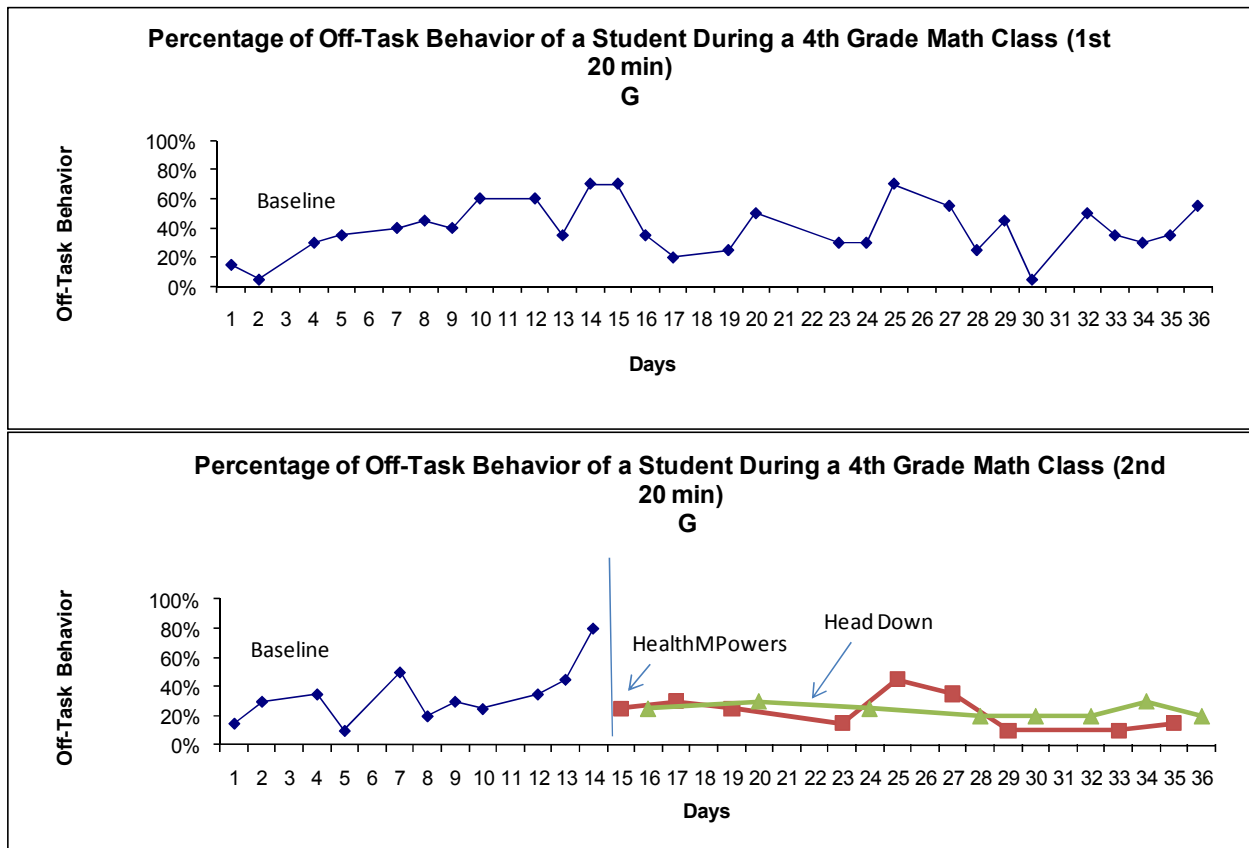


Figure 5. Percentage of intervals in which off-task behavior was observed for Participant G during the first 20 minutes of math class (top axis) and during the second 20 minutes of math class during baseline conditions and following either a 2-minute intensive exercise session or a 2-minute head-down rest. This student was not identified as disruptive.

Off-task behavior decreased an average of 13% after the HealthMPowers video intervention and decreased an average of 10% after the head down intervention. This number was calculated by subtracting the total mean score from HealthMPowers data and head down data from the total mean score from the second twenty minutes of baseline.

During baseline, off-task behavior was observed in an average of 56% of the intervals. On days when the HealthMPowers exercise was performed, off-task behavior during the 20 minutes immediately following exercise was observed in an average of 43% of the intervals. On days when the head-down procedure was used, off-task behavior was observed in an average of 46% of the intervals. A conspicuous downward trend was observed throughout the intervention condition on both HealthMPowers and head-down days.

As a secondary control, off-task behavior was also observed during the first 20 minutes of math class. On the days prior to any intervention, off-task behaviors were observed in an average of 58% of intervals. After the alternating interventions (HealthMPowers and head down) were initiated, off task behavior was observed in 43% of the intervals for the HealthMPowers intervention and 46% for the head-down intervention. Most participants showed similar patterns of off-task behavior, with Participant N showing the greatest reduction in off-task behavior (26%) and Participant L showing the least (4% increase with HealthMPowers and 2% increase with head down).

Hypothesis one predicted the use of the HealthMPowers exercise video program would result in a decrease of the disruptive behaviors of the six students being observed as assessed by visual inspection. Therefore, hypothesis one is rejected. Off-task behavior of disruptive students did not decrease. Hypothesis two predicted the head down intervention would have no differential effect on the disruptive behaviors of the six students being observed as measured by visual analysis. Hypothesis two was accepted.

Social Validity

The teacher and students were given a Likert scale questionnaire at the end of the study, to rate the importance of exercise breaks, the appropriateness of the video and head down procedures, and the satisfaction with the results. Students rated the enjoyment of the brief exercise breaks as median of 5 on a 5-point scale, but rated the head down alternative only a median of 3. Most students wanted to continue exercising after the study was completed with a median score of 5 on a 5-point scale and rated the head down a median of 2. Students rated a median of 3 on a 5-point scale when asked if the exercise breaks helped them focus on work.

Teacher ratings generally paralleled the student’s ratings. The results of the teacher questionnaire are provided in Appendix H. The results for the student social validity questionnaire are presented in Appendix I. See Table 4 for the median scores.

The results of the social validity questionnaires completed by the teacher and students at the conclusion of the study revealed that both the teacher and students found exercise to be fun and beneficial.

Table 4

Median Scores for Student’s Social Validity Questionnaire

Do you think it is important to have exercise breaks during the school day?	4.5
Do you like doing the HealthMPowers video exercise breaks?	5
Do you like doing the head down breaks?	3
Do you think the exercise breaks helped you to focus better on your work?	3
Would you like to continue doing the video exercise breaks?	5
Would you like to continue doing the head down breaks?	2

Teacher Discipline

To get an indication of the occurrence of teacher discipline, the observer noted each time the teacher spoke to one of the six students being observed. This information was collected to examine whether the amount of discipline from the teacher diminished or increased after the interventions were introduced. Each day of data collection the researcher calculated the percent of time spent engaged in teacher discipline. Teacher discipline remained the same throughout the study with an average 6% (mean score) during collection of baseline data and 4% (mean score) during collection of intervention data.

CHAPTER FIVE

DISCUSSION

This study investigated the effects of the HealthMPowers classroom video program on the off-task behavior of five 4th grade students who were identified as regularly disruptive by their teacher, as well as the behavior of a student who was identified as not disruptive. The results show that off-task behavior decreased for most participants throughout the intervention period independent of the condition in effect. No special influence on off-task behavior can be claimed for brief exercise sessions on the basis of these results.

HealthMPowers is a private educational program developed to improve the health of students, school staff and families in Georgia (HealthMPowers, 2008), and has been adopted by many schools in the state. The classroom exercise DVD video programs are one part of the educational package given to each school. Each of the DVDs gives an overview, explaining why they are relevant for the classroom. The following benefits of exercise are claimed; controls body fat and weight, builds strong bones and muscles, decreases the risk of type 2 diabetes, improves alertness, increases energy levels, and improves ability to concentrate (HealthMPowers 2008). Since focusing student's attention in the classroom is one of the asserted benefits, the purpose of this study was to examine the effects of the HealthMPowers video on the off-task behavior of five 4th grade students during their daily math class. The data in this study indicated that using the HealthMPowers DVD had inconsistent effects on off-task behavior of students in this classroom setting. A head down procedure was implemented as a control procedure and also indicated no consistent changes in off-task behavior. Four of the five students showed a downward trend in off-task behavior during the 20-minute math sessions following the HealthMPowers exercise sessions and one student had a slight increase in off-task behavior. The lack of clear separation in the level of off-task performance between the video exercise sessions and the head down interventions argues against any meaningful differential effectiveness for the HealthMPowers intervention. The downward trend in off-task behavior during the 20-minute observations made immediately before either of the interventions reduces the evidence of a beneficial effect by either treatment. It can be assumed that other variables that were not assessed in this study, suppressed the off-task behavior of students in this study.

Prior research has shown that off-task behavior may negatively effect learning (Agostin et al., 1997; Arnold, 1997; Baker et al., 2008; Bulotsky-Shearer et al., 2008; Giannopulu et al., 2008; and Spira et al., 2005) and exercise may decrease off-task behaviors (Azrin et al., 2007; Bass,

1985). This is the first study to experimentally analyze the effects of a brief intensive exercise session on subsequent classroom behavior. Prior to this study, research projects have used longer bouts of exercise of twenty minutes or more and used jogging as the exercise (Bass, 1985; Elliott et al., 1994; Hillman et al., 2003; Hillman, Pontifax et al., 2009; Rosenthal-Malek et al., 1997; Sibley et al., 2006). Classroom teachers do not normally have the time for students to participate in longer bouts of physical activity. Although this study did not show any differential reductions in off-task behavior when the exercise videos were used, the short exercise breaks did not increase disruptive or off-task behavior for most participants.

There were some limitations to this study. Only one teacher's class was used and this teacher was a student teacher. Although the teacher's responses on the social validity questionnaire were positive, there was no way to make the teacher's responses to the questionnaire anonymous and therefore, no way to ensure that demand characteristics did not bias her answers to the questions, despite the researcher's assurance that she did not have a preference in how the questions were answered. The small mean increase in off-task behavior for Participant L when the exercise program was implemented suggests the possibility that some students might actually become less focused after brief exercise in the classroom. More research will be needed to assess that possibility.

Research is providing evidence that there may be an increase in attention or alertness after participation in bouts of vigorous exercise for twenty minutes or more (Bass, 1985; Budde et al., 2008; Putnam et al., 2004). There was very little effect on the off-task behavior of the five subjects in this study with exercise breaks that averaged two minutes in duration. This finding may mean that exercise must be longer in duration to have a practically important effect. It is possible that the measure of off-task behavior used in this study was not sensitive enough to pick up more subtle, systematic changes in the behavior of students. It is also possible that brief, video-directed exercise, like that used in this study, has only a mild beneficial influence that is easily overcome by other, more salient variables influencing classroom performance. Pilot research conducted on these same variables suggested that the exercise program produced moderately beneficial effects for students in a different classroom, but those benefits were compromised when the students engaged in a 2-month-long, school wide fund-raising program. It seems clear that brief exercise breaks do not have dramatic effects on the off-task behavior of students in a classroom setting. Future research might seek to determine the conditions under which a program such as HealthMPowers might yield beneficial effects. Further research might

also address the possibility that there is a minimum threshold in terms of time or intensity for exercise to influence off-task behavior in classroom settings. The methodology and procedures developed for the current study could facilitate research addressing these issues.

While the results do not reveal systematic reductions in off-task behavior following the brief exercise sessions for the students selected for participation in this study, it is possible that students in other classrooms with different teachers would respond differently. The use of a student teacher instead of a more experienced teacher may have influenced the results. More research is warranted before efforts are made to apply the results of this study to other classrooms.

The median scores for the students and the teacher on the Social Validity Questionnaires show that both the students and the teacher felt the brief exercise sessions led by the commercially-produced video were beneficial. Some of the students reported the exercise sessions helped them focus on their work. One student commented that she felt ready for a test whenever she exercised in class while another reported that the video helped him to wake up the mind. One student said that it gets all of her “hyperness” out. Several commented that the video helped to wake them up. The teacher felt that exercise breaks are important, stating “Children should not have to sit in a classroom all day. They have a lot of energy and should be given the chance to exert this energy occasionally.” The teacher and most of the students reported that they would like to continue exercising to the DVDs. Although the data did not show a practically important decrease in off-task behavior, the students and teacher felt the video exercise was helpful in providing a break in the classroom routine. The video clips are engaging and do not take up a lot of class time and can offer beneficial physical activity throughout the school day.

Recommendations

As a result of conducting this study, the use of the HMP video sessions in elementary classrooms is recommended. Students and teacher enjoyed the exercise sessions and all expressed satisfaction in the short breaks from other routines. Although the results of this study appeared to offer no practical advantage over the head-down procedure in reducing off-task behavior, other benefits of short bouts of physical activity can be productive.

The following recommendations are offered for future research:

- 1) Investigate the effects of brief exercise in classrooms with teachers who have different experience and management styles;

- 2) Investigate the effects of brief exercise with highly disruptive, off-task students;
- 3) Evaluate a longer duration exercise intervention;
- 4) Assess additional dependent variables such as mental acuity or use measures of brain activity;
- 5) Use within-subject research designs to conduct these evaluations.

APPENDIX A

Medical Information Form

My name is Christine Brooks and I am one of the Physical Education teachers at Moulton-Branch Elementary. I recently sent a consent form for your child to participate in a research study that I am doing for my doctorate at Florida State University. I need additional information about your child for this study. Your participation is voluntary. Your decision whether or not to give this information will not affect your current or future relationship with Moulton-Branch Elementary or myself. All information given will be kept confidential.

Does your child have/ever had

ADD/ADHD _____

Autism _____

Asthma _____

Other Medical Condition (Please Specify) _____

Please enter your child's name and sign below.

Your child's name _____

Your signature _____ Date _____

APPENDIX B

Parental Consent Form

My name is Christine Brooks and I am one of the Physical Education teachers at Moulton-Branch. I am also a doctoral student at Florida State University. Your child is invited to be in a research study about the effect of exercise on behavior. We are asking that your child take part because his/her teacher volunteered to be a part of the study. We ask that you read this form and ask any questions you may have before agreeing to allow your child to take part in this study.

The Study: The purpose of this study is to see if exercise will help student behavior in the classroom. If you agree to allow your child to take part, he/she will have nothing extra to do. Your child is being asked to participate in this study because he/she is in a certain teacher's class and not because he/she is known to use off task behavior. The exercise video being used is one that the Lowndes County School system wants all children to engage in; therefore your child will perform the exercises whether or not they are participating in the study. I am only asking your permission to observe your child. Your child may also be video taped for observation purposes.

Risks and Benefits: There are no risks in this study, and your child may benefit from an improved environment for learning in the classroom.

Confidentiality: The records of this study will be kept confidential, to the extent permitted by law. The form used will include your child's name, but the data used will not include this information. It will not be possible for anyone, other than me, the classroom teacher, and the other PE teacher to identify your child. The data collected will be kept in a file cabinet in my home. This cabinet will be kept locked.

Voluntary Participation: Your child's participation in this study is completely voluntary. Your decision whether or not to allow your child to take part will not affect your current or future relationship with Moulton-Branch Elementary. You are free to withdraw your child at any time without affecting your relationship with Moulton-Branch.

The researcher for this study is Christine Brooks. You may reach me at (xxx)xxx-xxxx, or xxxxxxx@xxxxxxx.xx.xx.xx. The major professor is Dr. Thomas Ratliffe. He may be contacted by email at tratliffe@fsu.edu or phone 850-644-7588. The FSU Institutional Review Board (IRB) may be contacted at 850-644-8633 or at their website at <http://www.fsu.research.edu>.

Please feel free to ask any questions you have now, or any point in the future. You will be given a copy of this consent form for your records if you request one.

Please enter your child's name and sign below if you give consent for your child to participate in this study.

Your child's name: _____

Your signature: _____ Date: _____

APPENDIX C

Student Assent Form

I have been informed that:

1. Mrs. Christine Brooks, who is the Physical Education teacher at Moulton-Branch Elementary School and a student at Florida State University, has requested my participation in a research study at Moulton-Branch Elementary. The advising professor at Florida State is Dr. Thomas Ratliffe.
2. Mrs. Christine Brooks can be contacted at xxxxxxx@xxxxxxx.xx.xx.xx or xxx-xxx-xxxx. Dr. Thomas Ratliffe can be contacted at tratliffe@fsu.edu or phone, 850-644-7588. The FSU Institutional Review Board (IRB) may be contacted at 850-644-8633 or at their website at <http://www.fsu.research.edu>.
3. My participation will involve doing the HealthMPowers exercise video at least once a day. My teacher will play the video in class. I understand that all classes at the school must participate in the video. Mrs. Brooks is only asking permission to video tape and observe me during the school day.
4. Possible benefits are better classroom behavior and improved learning in the classroom.
5. The results of this research study may be published, but my name or identity will not be revealed. In order to maintain my confidentiality of my records, Mrs. Christine Brooks will keep the collected data in a locked safe in her home.
6. I will not be paid for my participation.

Signature _____

Date _____

APPENDIX D

Office of the Vice President For Research
Human Subjects Committee
Tallahassee, Florida 32306-2742
(850) 644-8673 · FAX (850) 644-4392

RE-APPROVAL MEMORANDUM

Date: 1/14/2010

To: Christine Brooks

Address: xxxx xxxxxxxxxxxxxxxx xxxxxxxx, xx xxxxx

Dept.: SPORT MANAGEMENT/PHYSICAL ED.

From: Thomas L. Jacobson, Chair

Re: Re-approval of Use of Human subjects in Research

Does exercise improve behavior in elementary age children

Your request to continue the research project listed above involving human subjects has been approved by the Human Subjects Committee. If your project has not been completed by 1/12/2011, you are must request renewed approval by the Committee.

If you submitted a proposed consent form with your renewal request, the approved stamped consent form is attached to this re-approval notice. Only the stamped version of the consent form may be used in recruiting of research subjects. You are reminded that any change in protocol for this project must be reviewed and approved by the Committee prior to implementation of the proposed change in the protocol. A protocol change/amendment form is required to be submitted for approval by the Committee. In addition, federal regulations require that the Principal Investigator promptly report in writing, any unanticipated problems or adverse events involving risks to research subjects or others.

By copy of this memorandum, the Chair of your department and/or your major professor are reminded of their responsibility for being informed concerning research projects involving human subjects in their department. They are advised to review the protocols as often as necessary to insure that the project is being conducted in compliance with our institution and with DHHS regulations.

Cc:

HSC No. 2009.3771

APPENDIX E

Teacher Consent Form

I understand that I will be tape recorded by Christine Brooks. These tapes will be used to observe my students' behavior. The tapes will be kept by Christine Brooks in a locked file cabinet in her home. I understand that only the researcher will have access to these tapes and that they will be destroyed by July 31, 2012. Christine Brooks can be contacted at xxx-xxx-xxxx or xxxxxxx@xxxxxxx.xxx.xx.xx. Dr. Thomas Ratliffe is the advising professor. He may be contacted at tratliffe@fsu.edu or phone 850-644-7588. The FSU Institutional Review Board (IRB) may be contacted at 850-644-8633 or at their website at <http://www.fsu.research.edu>.

The Study: The purpose of this study is to see if exercise will help student behavior in the classroom. The exercise video being used is one that the Lowndes County School system wants all children to engage in; therefore your students will perform the exercises whether or not they are participating in the study. I am only asking your permission to observe and record your class.

Confidentiality: The records of this study will be kept confidential, to the extent permitted by law. Confidentiality ensures that neither you nor I can talk to others about the data collected. This data will be kept in a file cabinet in my home. This cabinet will be kept locked.

Risks and Benefits: There are no risks in this study, and possible benefits include better class behavior and increased learning in the classroom.

APPENDIX F

Decision Log

DATE	PROBLEM	DECISION	INITIAL
11/11/09	What if the student is taking too long to get out books/supplies	Yes	
11/19/09	Should the coder still code if someone interrupts the class?	Yes	
8/31/10	Should we count cheating as off-task?	Yes	

APPENDIX G

Coding Form

Date _____ Intervention Used _____

Time Start _____ Time End _____

Observer _____ Setting _____

Behavior- Off Task

any vocal noise or verbalization that was not preceded by the child's raised hand and acknowledgement by an adult; touching any object that was not associated with an assigned task (e.g. watches, clothing) ; breaking eye contact with task materials for greater than 3 seconds; the child's full body weight not being supported by a chair for at least 3 seconds

Before Intervention Name:	1 st 10- second interval	2 nd 10- second interval	3 rd 10- second interval	4 th 10- second interval	5 th 10- second interval	6 th 10- second interval	Teacher Discipline TG=Teacher Group TI=Teacher Individual
1'							
2'							
3'							
4'							
5'							
6'							
7'							
8'							
9'							
10'							
11'							
12'							
13'							
14'							
15'							
16'							
17'							
18'							
19'							
20'							

After Intervention NAME	1 st 10- second interval	2 nd 10- second interval	3 rd 10- second interval	4 th 10- second interval	5 th 10- second interval	6 th 10- second interval	Teacher Discipline TG=Teacher Group TI=Teacher Individual
1'							
2'							
3'							
4'							
5'							
6'							
7'							
8'							
9'							
10'							
11'							
12'							
13'							
14'							
15'							
16'							
17'							
18'							
19'							
20'							

Comments (be sure to include any different or unusual events during the school day or during the data collection period _____

Comments?

The beginning was challenging. Once the class got in the habit the videos began to feel worth the effort.

4. How likely is it that you will continue the video exercise sessions when this study is finished?

Very likely 5 4 3 2 1 Not at all

Why?

The kids are already used to the exercise and I believe it will help them stay on schedule.

5. How likely is it that you will continue the head down procedure when this study is finished?

Very likely 5 4 3 2 1 Not at all

Why?

The kids look forward to the exercise days more than the head down days.

(open-ended)

6. Which exercise video programs seemed to work the best for your class? Why?

Air step aerobics; it seems to provide a variety of exercises and the kids don't get extremely worn out.

APPENDIX I

Student's Social Validity Questionnaire

Please circle a number to indicate your rating & add any comments that may clarify your ratings.

1. Do you think it is important to have exercise breaks during the school day?

Extremely important 5 4 3 2 1 Not important at all

Median: 4.5

Comments ?

1 - Feels good

1- Good for you

2. Do you like doing the HealthMPowers video exercise breaks?

Yes, loved them! 5 4 3 2 1 No, hated them!

Median: 5

Why ?

9 - Get to exercise

7 - Fun

4 - Helps me focus on work

2 – Makes me tired

1 - Get's energy out

1 - Boring

1 – Keeps me awake

3. Do you like doing the head down breaks?

Yes, very much! 5 4 3 2 1 No, not at all!

Median: 3

Why ?

4 - Do nothing

4 – Like a break

3 – Need to move

3 – Get to relax

2 – Doesn't help me focus

2 – Boring

1 – Have to be quiet

1- Fun

1 – Helps me think

1 – Feels good

1 – Makes me tired

4. Do you think the exercise breaks helped you to focus better on your work?

Helped a lot 5 4 3 2 1 Did not help at all

Median: 3

Why?

11 – Feel ready to learn/feel good

3 – Makes me tired

1 – Not fun

1 – Can't focus

1 – Feel the same

1 – Like the break

5. Would you like to continue doing the video exercise breaks?

Yes 5 4 3 2 1 No

Median: 5

Yes (score of 4 or 5) – 20

No (score of 1 or 2) - 4

6. Would you like to continue doing the head down breaks?

Yes 5 4 3 2 1 No

Median: 2

Yes (score of 4 or 5) – 12

No (score of 1 or 2) - 13

(open-ended)

7. Which exercise video programs did you like the best? Why?

9 – Air Step Aerobics

3 – Fun

1 – Works muscles

1 – Helps me focus

9 – Pretend Jump Rope

3 – Get a lot of exercise

3 – Like to jump rope

2 - Fun

2 – Mind in Motion

1 – You get moving

APPENDIX J

Reliability Check Form

Date _____

Agree ()
 Disagree (X)
 No Behavior (—)

	Student 1	Student 2	Student 3	Student 4	Student 5	Student 6
Interval 1						
Interval 2						
Interval 3						
Interval 4						
Interval 5						
Interval 6						
Interval 7						
Interval 8						
Interval 9						
Interval 10						
Interval 11						
Interval 12						
Interval 13						
Interval 14						
Interval 15						
Interval 16						
Interval 17						
Interval 18						
Interval 19						
Interval 20						

Formula:

Agreements/agreements + disagreements x 100=percent of agreement

Occurrence Reliability Method

Student 1 =

Student 2 =

Student 3 =

Student 4 =

Student 5 =

Student 6 =

Total Reliability Method

Student 1=

Student 2=

Student 3=

Student 4=

Student 5=

Student 6=

Occurrence Method (Do not score those intervals with no response)

Total Reliability (Score all intervals including those with no response)

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BIOGRAPHICAL SKETCH

Christine Brooks is an elementary physical education teacher in Lowndes County, Georgia. She earned her bachelor's degree at Valdosta State University in health and physical education. Her master's degree is in school counseling and was also earned at Valdosta State University. She was born in Endicott, New York on February 13, 1971. She won Teacher of the Year at her school for the 2006-2007 school year. She serves on various committees for her school including member of the wellness committee, Chair for the Relay for Life committee, and member of the safety committee. For many years she has volunteered as counselor for the annual local Hospice Grief Camp for children.