

The Effect of Exercise on the Behavior of Elementary School Students

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## **Abstract**

The purpose of this study was to discover if a moderate to vigorous physical activity program would have an impact on the behavior of elementary school students. The measurement tool was the number of formal behavior referrals during the two hour time period after the intervention was given. This study involved use of a pretest and posttest design to measure the behavior referral data that was collected. Results showed no significant difference between student referrals prior to the intervention and student referrals after the intervention. Research in this area should continue as there is very little information available regarding participation in physical activity programs and their effects on behavior.

# **CHAPTER I**

## **INTRODUCTION**

### **Overview**

Poor behavior has become an increasingly difficult obstacle that teachers and administrators must overcome to ensure the success of all students. This problem exists at every grade level and at virtually every school across the United States. Classroom disruptions, off-task behavior, student conflict, disrespect, problems attending to instruction, and not following through on instructions are all behavior issues that interfere with overall student success and student achievement.

As a physical education teacher, the researcher has taken interest in the positive effects of movement and physical exercise. Harlacher, Merrel, & Roberts (2006) indicate that exercise has many health benefits which include: helping reduce the chance of heart disease and stroke, helping reduce stress levels, increasing muscular strength and endurance, and improving sleep patterns. The researcher's interests in the positive effects of exercise extend beyond health benefits and include whether or not exercise can help certain individuals learn. If student behavior and attention levels improve after boys and girls participate in moderate to vigorous physical exercise, the positive effect on student achievement will be invaluable. If research can identify a positive link between exercise and student achievement, teachers can help their students learn by incorporating movement activities into traditionally sedentary learning experiences and throughout the school day.

### **Statement of the Problem**

The purpose of this investigation is to discover if a moderate to vigorous physical activity program will have an impact on the behavior of elementary school students.

## **Hypothesis**

A before-school exercise program for targeted individuals will have no impact on the amount of formal behavior referrals that are accumulated during the first two hours of school.

## **Operational Definitions**

The independent variable in this study is *moderate to vigorous physical activity*. The individuals involved will be a target group of 10 students in grades 4 and 5. They will be provided with various exercise opportunities for 15 minutes prior to the start of the school day. The specific type of exercise that the participants will perform will vary from day to day for a period of three weeks.

The dependent variable will be *student behavior* as measured by formal behavior referrals during the first two hours of the school day. As a result, the dependent variable covers a range of student behaviors. It may be defined as insubordination, disrespect, eloping (leaving the classroom/assigned area without permission), physical aggression, verbal aggression, peer conflict, or any other behavior or act that would result in a formal behavior referral. The number of formal behavior referrals during the 3 weeks prior to the intervention will be compared to the number of formal behavior referrals during the intervention.

## CHAPTER II

### REVIEW OF THE LITERATURE

This literature review examines the effects of moderate to vigorous physical activity on student behavior in elementary school. Included in this review is a description of the importance and relevance of student behavior in schools. It also illustrates what positive behavior looks like in the elementary school setting, discusses reasons why students struggle with behavior, and reports what happens when student behavior is not as it should be. Some possible interventions that could improve student behavior are discussed, with an emphasis on the intervention of moderate to vigorous physical activity.

#### **The Importance and Relevance of Student Behavior in School**

According to Good (2008), positive student behavior in school creates an environment that supports and facilitates both academic and socio-emotional learning. Student behavior is important and relevant in schools because it is closely related to effective learning from both the student's and the teacher's perspective. When the classroom is free of disturbances, students can use the maximum amount of classroom time for learning activities. Learning occurs in classrooms when the time allotted for instruction is used for teaching, skill practice, and positive peer interactions through collaboration and problem solving (Fletcher-Janzen & Reynolds, 2007). When time is used interacting with students' whose behaviors are not focused on the lesson, less time is available to learn.

One student's behavior can affect other student's learning time by distracting them or by taking the teacher's time away from the lesson. In many instances, the majority of students in the class are on task, but a single student or a small group of students can be responsible for disturbing the flow of the lesson. When the entire classes' behavior meets expectations, then

learning can be maximized (Good, 2008). As a result, it should be a priority for teachers and administrators to create learning environments that are free of disruptions and distractions that may be caused by poor student behavior.

By being proactive in regard to behavior management, teachers can develop a climate and culture that increases the chance that learning will take place (Good, 2008). The preparations that teachers make will increase the likelihood that students will know what to expect. These preparations can be organized into three areas: (1) proactive actions teachers take before students arrive, (2) proactive interactions teachers plan once the students arrive, (3) and proactive reactions teachers prepare when students misbehave. Each of these actions creates a system of proactive classroom management that minimizes disruption, distraction, and interference with students' academic and social-emotional learning (Good, 2008).

If researchers can provide evidence that various interventions can improve student behavior, teachers will be more likely to implement those interventions. Classrooms are dynamic systems that must adjust to reflect the developing needs of their members (Good, 2008). As teachers get to know their students and develop meaningful working relationships with them, they will be better versed in choosing the interventions that work best. A high level of confidence in the intervention will help teachers take the appropriate proactive actions that are necessary to develop a classroom learning environment that is free of distractions and disruptions, maximizing the learning that can take place.

### **Positive Student Behavior**

Positive student behavior in the elementary school setting can be described in a variety of ways. According to Mulrine, Prater, & Jenkins (2008), when student behavior is at its most desirable, there are high levels of attention, time on task, engagement, and participation.

Students' stay in their assigned areas and class disruptions are at a minimum. In addition, schoolwork and other assignments are consistently completed. A classroom with positive behavior does not generate formal behavior referrals, and relationships with peers are positive and appropriate. Good sportsmanship is displayed during exercise, recess, and sport activities (Medcalf, Marshall, & Rhoden, 2006). Lastly, when student behavior is as it should be, respect and honesty is shown toward teachers and integrity is demonstrated throughout the school day.

### **Reasons Students Struggle with Behavior**

Students struggle with behavior for many different reasons. The cause may be related to a specific disability that is biological, psychological, or social in nature. Some examples include but are not limited to: oppositional defiant disorder, attention deficit hyperactivity disorder, conduct disorder, separation anxiety disorder, autism spectrum disorder, or learning disability. Students with these disabilities experience significant academic, social, and behavioral difficulties in the school setting, and often require some type of intervention in order to be successful (DuPaul, 2007).

Other reasons for behavior problems may be a result of a lack of teacher preparation, or the development of a learning environment that lacks student motivation and interest. In addition, Harlacher et al. (2006) explain that when there are not enough movement experiences incorporated into classroom activities, students become restless and tend to misbehave.

Lastly, students may not have been taught how to behave in appropriate ways by their parents or caregivers. Often, when students enter school, they lack the skills that are necessary to become active and effective participants in a classroom environment. That responsibility is ultimately left up to the teacher, and they must determine the best way to manage student misbehavior (Fletcher-Janzen et al., 2007).

## **Consequences of Negative Student Behavior**

When negative student behaviors take over the classroom, many factors can be affected. As stated earlier, poor behavior disrupts learning not only in the student that is exhibiting the behavior, but in other students in the class as well. According to Mahar (2011), student inattentiveness results in decreased academic learning time for individual students, which negatively affects academic achievement. Good (2008) discusses the fact that frequent classroom disruptions affect the academic learning time of all students in the class, so similar deficits in standardized test scores can be expected.

Another consequence of negative student behavior is that social connections with peers may be negatively affected. Sandford, Armour, & Warmington (2006) explain that disaffected youths that exhibit poor behavior in school have difficulty forming lasting relationships with peers. Moreover, when these disaffected young people are not re-engaged socially, they are more likely to continue with detrimental acts and behaviors throughout adolescence and into early adulthood.

Teacher frustration levels are likely to rise in classrooms where student behavior is a major challenge. Teachers who become burned out or highly frustrated due to poor student behavior may be less sympathetic towards students, may have a lower tolerance for frustration in the classroom, and may plan less often and therefore less effectively. Elevated teacher frustration also has a significant impact on recruitment, retention, and performance of teachers (Good, 2008). Each of these factors will contribute to poor academic achievement regardless of grade level, ethnic background, gender, or race.

## **Possible Interventions to Improve Student Behavior**

Even the most effective teachers cannot prevent all behavior problems. A system must be in place that addresses the needs of students so that a culture of growth and learning can exist. Some interventions are implemented throughout entire school systems and others are developed by individual teachers in their classrooms. One intervention that some schools (and some school systems) use in an attempt to improve student behavior is Positive Behavioral Interventions and Support (PBIS). According to Coffey and Horner (2012), PBIS is a school-wide system of support that includes proactive strategies for defining, teaching, and supporting appropriate student behaviors in order to create a positive school environment. Instead of using a case-by-case approach to student behavior, PBIS is a continuum of positive behavior support for all students within a school that includes classroom and non-classroom settings.

Individual teachers can implement a variety of behavior management strategies and interventions in an attempt to improve student behavior. Some possible interventions may include rewards and punishments. Rewards are things like stickers, candy, lunch with a teacher, computer time, etc. that teachers give to students when desired behaviors are displayed. Punishments usually involve withholding a student privilege or taking something away. Not being allowed to play at recess, no TV time at home, video games taken away, or not being allowed to play on a sports team are all possible punishments. Cameron and Sheppard (2006) argue that using punishment as a behavior intervention doesn't work and often does more harm than good. These researchers go on to explain that punishment teaches fear, aggression, and avoidance and that when students are punished, they don't learn to stop the behavior; instead, they learn not to get caught next time.

Student support teams may conduct a formal behavioral assessment (FBA) and develop a formal behavior intervention plan (BIP) for individuals that struggle with behavior. Teachers may create informal behavior charts in an attempt to change behavior. In addition, creating an engaging and motivating classroom environment and modeling positive behavior are also among strategies teachers can use to improve student behavior.

### **Physical Activity Interventions**

According to Mulrine et al. (2008), implementing exercise activities throughout the school day can help improve academic performance and reduce disruptive classroom and social problem behaviors. Exercise helps students cope more effectively with stress and promotes positive self-image, clearer thought, and improved memory. These researchers go on to explain that exercise increases activity in the parts of the brain involved in memory, attention, spatial perception, language, and emotion. Given these findings, students will be less likely to exhibit negative behaviors in the classroom when they are given opportunities to exercise at moderate to vigorous levels throughout the day. They will be more on-task, attentive, and confident in their schoolwork.

Medcalf et al. (2006) examined the relationship between student behavior and activity in students with emotional behavioral difficulties. The study focused on on-task and off-task behavior of targeted students before and after physical education (P.E.) lessons. The results indicated that each participant was able to increase their on-task behavior in the lessons following physical education experiences by varying amounts. The greatest improvement showed an increase of 23% more time spent on-task in the lesson following physical education. These findings suggest that physical education is having a positive impact on student behavior in individuals with emotional behavioral difficulties. What is unclear is whether or not it is the

exercise itself that is causing the behavioral change. There are numerous variables that could be possible explanations for the change in behavior. Content of the P.E. lessons, content of the post P.E. lessons, teachers involved, other external behavioral triggers etc. are all factors that could have an effect on the results of this study.

Bartholomew and Jowers (2011) conducted a similar study to the one done by Medcalf et al. (2006). This study also measured time on task, but the physical activity intervention was done in the classroom while core content learning was taking place. The control consisted of lessons that were sedentary from beginning to end. Time on task in that group went from 83% at the beginning of the lesson to 72% at the end of the lesson. For lessons that were not sedentary and included some type of exercise, time on task went from 86% at the beginning of the lesson to 89% at the end of the lesson. This increase in time on task has clear implications for classroom behavior and provides strong potential to enhance teacher motivation to implement these types of active, academic lessons.

Gapin, Labban, and Etnier (2011) found that acute and chronic physical activity has the potential to mitigate many of the symptoms of attention deficit hyperactivity disorder (ADHD). Their research concluded that physical activity benefits children with ADHD because it positively impacts many of the same neurobiological factors that are implicated in ADHD. These factors include but are not limited to: increased blood flow to the brain and an increase in the availability of dopamine and norepinephrine. In addition, there is greater brain activity within regions associated with behavioral conflict and attention control processes. (Gapin et al., 2011). These findings suggest that physical activity may be an effective supplement to medication for students with ADHD to reduce behavior impairments that may interfere with

learning. Moreover, physical activity may also be used for those children that do not respond to medication or for those who wish to seek an alternative form of treatment (Gapin et al., 2011).

Tomporowski, Lambourne, & Okumura (2011) conducted a study that reviewed the effect of physical activity on the mental function of children. Mental function was considered to be executive functioning. Executive functioning is a set of mental processes that helps connect past experience with present action. People use it to perform activities such as planning, organizing, strategizing, paying attention to and remembering details, and managing time and space (Tomporowski et al., 2011). The research indicated that physical activity improves each aspect of executive functioning, particularly planning and attention. These areas have important implications for education, and should encourage teachers and schools to implement exercise and activity interventions to improve student behavior and academic achievement.

### **Summary**

This literature review examines the topic of physical activity and its relationship to student behavior. The health benefits of physical activity are numerous. The idea that physical activity can also improve student behavior is an exciting and worthwhile concept for parents, teachers, administrators, school systems, and communities alike. Student behavior in schools is important and relevant because it creates an environment that supports and facilitates both academic and socio-emotional learning.

When student behavior is as it should be, class disruptions are at a minimum and there are high levels of attention, time on task, engagement, and participation. Poor student behavior, even if it is only one student, has serious negative implications for the learning time that is available for all students in the class. When learning time decreases, so does student achievement.

Much research has been done in the past ten years that focuses on whether or not exercise improves brain function, cognitive performance, and academic achievement in children. Even more recent research has concentrated on the possibility that exercise can improve student attention levels, time on task, conduct, and overall behavior. The literature in this review presents the concept of physical activity and exercise improving student behavior. However, many researchers have the same opinion that more studies need to be conducted in order to determine what type of exercise is most effective, what is the proper duration of activity, how often throughout the day exercise should be performed, and how long the benefits of exercise will last once the activity time ends.

## **CHAPTER III**

### **METHODS**

#### **Design**

The purpose of this investigation was to discover if a moderate to vigorous physical activity program would have an impact on the behavior of elementary school students. This study utilized a pre-test, post-test, single group design, was pre-experimental in nature, and was based on a convenience sample of ten students. The independent variable in this study is moderate to vigorous physical activity and the dependent variable is student behavior. The pre-test data (baseline) consisted of determining the number of behavioral referrals prior to the onset of the physical activity intervention. The post-test data consisted of the number of behavioral referrals following the physical activity intervention program. A comparison of the baseline data to the post-test data will determine whether the null hypothesis can be supported.

#### **Participants**

The group of participants in the research study consisted of 10 boys, 6 of the boys were in 4<sup>th</sup> grade and 4 were in 5<sup>th</sup> grade. At the time the study was conducted, 4 of the boys in 4<sup>th</sup> grade were formally diagnosed with Attention Deficit Hyperactivity Disorder (ADHD). Eight of the participants were Caucasian and 2 were African American. The participants were selected based upon the recommendation of school administrators, the behavior interventionist, and the researcher. Factors that were considered during recommendation were students that had a history of behavioral difficulties and discipline referrals, and students whose behavior could benefit from moderate to vigorous movement opportunities prior to the start of the school day. The study participants were required to be at school 15 minutes prior to the first bell, and

therefore could not be bus riders unless their parents provided transportation. None of the participants in this study were bus riders.

### **Instrument**

Baseline data regarding the number of behavioral referrals for the participant group (N=10) was gathered based on school behavior logs. The intervention of moderate to vigorous physical activity was implemented for a period of fifteen minutes prior to the beginning of school each day for a period of three weeks. The post-test comparison was based on the number of behavioral referrals occurring during the three-week research period. The comparison of the pre-test baseline data to the data gathered during the three-week intervention period determined whether the null hypothesis was supported.

### **Procedure**

Participants were selected based upon the recommendation of school administrators and the behavior interventionist. In addition, the convenience sample was selected based on the availability of the students to be at school fifteen minutes early for the three-week research period.

Once potential participants were identified, the researcher made contact by phone or face-to-face with the parents or guardians of each student to explain the nature of the research, the planned intervention, and to obtain permission for each student to participate. The explanation to the students was that this three-week period before school was part of a morning exercise program that each student was being invited to attend.

Prior to the start of the three-week research period, the number of behavioral referrals for the prior three-week period was determined for each student. The physical activity intervention

was planned so that the activities would be motivating and engaging for the participants. Activities included the partner P.A.C.E.R. test (Progressive Aerobic Cardiovascular Endurance Run), indoor soccer, jump rope, tag, and scooter basketball. These activities were repeated during each week of the research period. During the three-week research period, the number of behavior referrals was determined for each student. The pre-test and post-test data was compared.

## CHAPTER IV

### RESULTS

The purpose of this investigation was to discover if a moderate to vigorous physical activity program would have an impact on the behavior of elementary school students. The frequency of formal behavior referrals for the intervention group resulted in a significant loss of instructional time. This decrease in instructional time is believed to have a negative impact on academic achievement. The average number of formal behavior referrals for the pretest for the targeted group during the first two hours of the school day was 2.0, and for the posttest was 1.7 (See Table 1). The reasons for referrals had a wide range that included insubordination, disrespect, eloping, physical aggression, verbal aggression, and peer conflict. Table 1 shows the average referrals for the first 2 hours of the school day for the group before and after the intervention.

**Table 1**

**Average Referrals Pre- and Post-Intervention for the First 2 Hours Post-Treatment**

<b>Pretest Referrals</b>	<b>Posttest Referrals</b>
2.00 (2.00)	1.70 (1.49)

A dependent *t*-test was run on students' number of referrals to see if any significant differences existed. Results showed no significant difference between student referrals prior to the intervention and student referrals after the intervention,  $t(9) = .322, p > .05$ . The null hypothesis was supported. The intervention did not significantly reduce the number of referrals for the group. These results and their implications will be discussed in the next chapter.

The average number of formal behavior referrals for the pretest for the remainder of the school day was 2.8, and for the posttest it was 2.7 (See Table 2). The reasons for the referrals for the remainder of the school day were the same as the reasons during the first 2 hours of the school day: insubordination, disrespect, eloping, physical aggression, verbal aggression, and peer conflict. Table 2 shows the average referrals for the remainder of the school day for the group before and after the intervention.

**Table 2**

**Average Referrals Pre- and Post-Intervention for the Remainder of the Day**

<b>Pretest Remainder of Day Referrals</b>	<b>Posttest Remainder of Day Referrals</b>
2.80 (2.15)	2.70 (2.11)

A dependent *t*-test was run on students' number of referrals to see if any significant differences existed. Results showed no significant difference between student referrals prior to the intervention and student referrals after the intervention for the remainder of the school day,  $t(9) = .111, p > .05$ . The null hypothesis was supported. These results and their implications will also be discussed in the next chapter.

## **CHAPTER V**

### **DISCUSSION**

The null hypothesis, a before-school exercise program for targeted individuals will have no impact on the amount of formal behavior referrals accumulated during the first two hours of school, was supported in this study.

#### **Implications of Results**

The implications of the results for this study indicate that a before school exercise program does not have a significant impact on the behavior of elementary school students. The intervention in this study was conducted for 15 minutes prior to the start of the school day. The amount of formal behavior referrals during the first two hours of the day, and for the remainder of the school day was measured. Neither measurement produced results that were significant. The researcher can conclude that even though the exercise intervention and program may be beneficial for the health and overall wellness of the students, it cannot be expected to improve the behavior of the targeted group.

#### **Theoretical Consequences**

Many educators believe in the benefits of physical activity and exercise, not only for health reasons but as a way to manage behavior as well. Related to this belief, teachers often act on the theory that short periods of exercise can help their elementary school students “get the wiggles out.” Other than scheduling a time for outdoor recess, teachers often allow their students to get up out of their chairs and run in place, do jumping jacks, stretch, or follow along to a brief online movement activity. These are all ways that teachers attempt to help their students regain focus, increase attention to task, and improve overall behavior in the classroom. The results of this study may negate this theory. As a consequence, teachers that read the results

of this study may choose not to devote time during the school day to movement opportunities for their students in an effort to manage behavior.

### **Threats to the Validity**

In this study, there are many threats to both internal and external validity. Internal validity refers to the degree to which a causal relationship can be made between the exercise intervention and the measured results. The data being used were the number of formal behavior referrals. It was extremely difficult to determine the reasons why students were exhibiting the behaviors that resulted in the referrals. If the reasons for the behaviors were because of attention issues, lack of interest, lack of motivation, or boredom, it could be argued that an exercise intervention may have more significant results. However, the targeted group had potentially many other reasons for exhibiting the behaviors. Those reasons include but are not limited to: ADHD, conduct disorder, and social/emotional disturbances. In addition, some of the students in the intervention group come from poverty. As a result, many of them are dealing with everyday difficulties like hunger, neglect, abuse. Given the extensive number of reasons why the students may exhibit behaviors that result in formal referrals, it is extremely difficult to conclude that an exercise intervention would cause a change in behavior and a significant decrease in referrals.

External validity refers to the extent to which the results can be generalized to be held true for different students, places, and/or times. The intervention group in this study consisted of all boys, so the results cannot be generalized to include girls. In addition, the group consisted of 4<sup>th</sup> and 5<sup>th</sup> grade students only, so the results cannot take the broad view of the entire elementary school aged population. Since the intervention group was chosen based on the fact that the students already had behavior concerns, it cannot be considered representative of the typical school population. The entirety of this study was completed at one Baltimore County Public

School, so the results may not be indicative of similar studies that are performed in more urban or more rural areas of the state. Finally, the intervention was only conducted in the morning, before school began. Trials were not held at different times of the school day, which can be considered a threat to the validity of this study.

### **Connections to Previous Studies/Existing Literature**

Several of the studies referred to in the Literature Review chapter of this research paper have similarities to the study conducted by the researcher. Each of them involved using exercise as an intervention, but they all measured something different that the exercise affected. Mulrine et al. (2008) gave students the opportunity to exercise at various times throughout the school day, and the results concluded that academic performance increased and classroom disruptions decreased. Bartholomew and Jowers (2011) conducted a similar study that provided physical activity throughout core content lessons, and then measured time-on-task. These studies were similar to that of the researcher's because they examined an aspect of student behavior, but they differed because students were provided movement opportunities throughout the school day instead of before school only.

Medcalf et al. (2006) examined the behavior of students with emotional behavioral difficulties after physical education lessons. Results found that students were able to increase time-on-task by 23% after physical education class. Gapin, Labban, and Etnier (2011) studied the effects of physical activity on the symptoms of students with ADHD. Their results concluded that exercise interventions benefit children with ADHD because it positively impacts many of the same neurobiological factors that are implicated in ADHD. These studies are similar to the one conducted by the researcher because they specifically target two of the same disabilities (emotional behavioral difficulties and ADHD), and they examine the effects of an

exercise intervention on those students. These studies are different from that of the researcher because they produced results that were positive and significant in nature whereas this research did not generate significant results.

### **Implications for Future Research**

The results of this research study have many implications for future similar research that may be conducted. Among the items to consider, a future researcher may want to include both boys and girls in the study. This could be accomplished by having two research groups, one with boys and one with girls, or to have a co-ed targeted group. In addition to adding girls to the study, primary (KG-2) and a secondary (3-5) or specific grade level intervention groups should be formed. It would better represent the effects of exercise on the various age groups present in elementary schools. Future research may also benefit if a random sample of students is selected for the study. It would better represent the typical population of a school, instead of only including student that have been identified as having specific disabilities or behavior difficulties. Lastly, if possible, identical studies should be conducted at various schools around the country. Carrying out studies in rural, urban, and suburban school settings would permit more definitive results.

### **Conclusions/Summary**

Student behavior and the management of classrooms is a priority in our schools. It is closely related to the safety and security of our students and the level at which they can achieve. Behavior has become an increasingly difficult obstacle for teachers and administrators to overcome in order to ensure the success of all students. The prevalence of this problem has become overwhelming. Classroom disruptions, insubordination, off-task behavior, student

conflict, disrespect, and problems attending to instruction are all behavior issues that interfere with overall student success and student achievement.

As a result, teachers and school officials are continually looking for different ways to effectively manage behavior – not only for specific individuals, but for the class and/or school as a whole. The health benefits of exercise and physical activity are well documented and contribute to the wellness of our students. However, there is a limited amount of research and evidence that movement opportunities can improve student behavior. The results of this research study did not produce a significant difference in behavior after a morning exercise program. However, more research needs to be conducted. The researcher believes that if more controlled and more specific research studies are carried out, the results will show that exercise opportunities can improve the behavior of elementary aged students. As a result, teachers will be encouraged by their administrators to implement exercise and activity throughout the school day, therefore improving the health, well-being, and behavior of all students.

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