

The Effects of Physical Activity and Regular Activities on Student On-Task Behavior for

Students with Autism

Cody Metcalf

Milligan College

Spring 2017

Abstract

The purpose of the study was to examine the effects of physical activity and regular activities on student on-task behavior for students with autism. The sample consisted of a male student, age 11, with autism from a selected intermediate school. The target behaviors of the study were responding appropriately when given assignments, appropriate interactions with students and teachers, following directions, and participation in classroom activities. Data were collected through observations and interventions using ABAB design. A baseline was established after one week of observations. An intervention using physical activity, twice a day for 30 minutes each session, was introduced for one week and target behaviors were examined and results tallied. During the following week, the interventions were withdrawn and target behaviors were examined and results tallied. The intervention, was again, introduced after one week of withdrawn. The target behaviors were observed and results tallied. The results indicated a significant difference in the student's on-task behavior before and after interventions as measured by the number of times the student was not on target. The results suggest that the use of physical activity for increasing on-task behavior is beneficial to students that have autism.

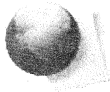
Keywords: physical activity, regular activities, on-task behavior, autism



Institutional Review Board Decision Tree

Based on your responses, you do not need approval from the IRB.

It looks like your study is exempt because it does not meet the definition of a research activity. Therefore, it does not require approval by the IRB. However, you should follow ethical practices even when just practicing or demonstrating research.



[Refer to 45 CFR 46.102\(d\)](#)

Student researchers may benefit from going through the IRB process even if they are only collecting data to learn techniques.

[Return to Beginning](#)

Table of Contents

Abstract.....	4
Chapter 1 Introduction.....	5
Statement of the Problem.....	8
Purpose of the Study.....	8
Significance of the Study.....	8
Limitations.....	9
Definition of Terms.....	9
Overview of the Study.....	10
Chapter 2 Review of the Literature.....	12
Autism in Children.....	13
Autism and On-Task Behavior.....	16
Effects of Autism on Schooling and Academics.....	18
Effects of Physical Activity on the Body and Brain.....	20
Effects of Physical Activity on Children with Autism.....	22
Chapter 3 Methodology and Procedures.....	27
Population.....	27
Sample.....	27
Data Collection.....	28
Procedures.....	29

Research Question and Related Hypothesis.....	29
Chapter 4 Data Analysis.....	31
Collection of Data.....	31
Research Question and Related Hypothesis.....	31
Graph 1.....	34
Graph 2.....	34
Graph 3.....	35
Graph 4.....	35
Chapter 5 Findings, Recommendations, and Implications.....	36
Summary of Findings.....	36
Recommendations.....	38
Implications.....	39
References.....	40

Chapter 1

Introduction

Behaviors tend to be different among all students. Some behaviors can become distractions and can be difficult to manage in the classroom. This can be extremely true in students that fall on the autism spectrum. These students need certain services provided to them in order for them to be able to cope with and manage their disorder. A major problem encountered with autistic children is their characteristic self-stimulatory behavior, which frequently interferes with on-task responding and other appropriate behaviors (Kern, Koegel, Dyer, Blew and Fenton, 1982). Students with autism also have issues with social behavior, such as communicating and forming relationships with other students. So this is not only an issue in the classroom, but can also be an issue in environments where the students participate in physical activity, such as physical education classes, recess and other classroom activities.

In helping students with autism manage their behaviors, it has been said that physical activity can lead to more appropriate behaviors among these students. The problem is that students with autism sometimes present a challenge in getting them to do the physical activities. This is mainly because they have issues with communicating and working with other peers and get frustrated with themselves to the point where they do not want to participate. This can lead to not only inappropriate behaviors, but also a problem for their overall physical health. According to Chien-Yu Pan and Georgia C.

Frey, “Youth with autistic spectrum disorders may be at risk for inactivity, due to social and behavioral deficits often associated with the condition, such as difficulties understanding social cues, making eye contact, playing imaginative and social games, engaging in sharing/turn-taking and reciprocal conversation, and making friends” (Pan, & Frey, 2006, p.597). This leads one to believe that students with autism have a hard time participating in physical activity settings.

Physical activity is any bodily movement produced by skeletal muscles that requires energy expenditure. This can be done in a classroom setting, but most of the time done in a physical education class or during down time, such as recess. Physical education classes provide the most time for students to be physically active during the school day. Now for students with autism, physical education classes can often be a scary and difficult time for these students. For many years, this has been overlooked in students that fall on the autism spectrum. But the benefits of physical activity in these classes can be extremely positive for the students with autism. Teri Todd and Greg Reid both say that “Motor functioning of individuals with autism spectrum disorder has been a neglected area despite the fact that participation in physical activity has been shown to have multiple benefits, including reduction of stereotypic behavior, increased appropriate responding, and the potential for social interaction” (Todd, & Reid, 2006, p.167). But these benefits are not getting to be used because the students with autism are not

participating in the physical activities. The reason for this is because most of the lessons taught in a physical education classes require complex motor skills (e.g., soccer, golf, baseball) and are mostly team activities. So in order to get more participation out of the students with autism, teachers should look at physical activities that are not team environment or high skill leveled which may be more appealing to individuals that have autism (Todd, & Reid, 2006).

Not only does physical activity present an impact on autism behavior, but it also seems to have an impact on overall physical health and muscle functioning. Since students with autism tend not to participate as much in physical activity, compared to students that do not have autism, their chances of being overweight and obese is significantly higher. Children with autism are forty percent more likely to be overweight and obese compared to individuals that do not have autism (MacDonald, Esposito, & Ulrich, 2011). Unfortunately, these numbers are only going to increase over time if we can not get theses students with autism to participate more in physical activity. There has not been much research done on students with autism and health benefits, but one can figure that if someone does not participate in physical activity that their chances of being overweight and obese will only be greater than those of individuals that do participate in physical activity. MacDonald, Esposito and Ulrich do go on to say in their article that “Following bouts of physical activity, children with autism experienced decreases in

negative behaviors and increases in positive behaviors” (MacDonald et al., 2011, p.1). This shows that physical activity can have an impact on the behavior of students with autism.

Statement of the Problem

Through data and research, studies have shown that daily physical activity can increase physical well-being and decrease the chances of students being overweight and obese. This is a known fact for individuals who do not have autism, as well as those who do fall on the autism spectrum. But the main challenge in individuals with autism is their sporadic behavior in and out of the classroom. With autism spectrum disorders in children on the rise, knowing how to help students with autism cope with it and be able to control their behaviors has become a focus of many researchers and educators. Therefore, the problem of this study was to investigate the effects of physical activity and regular activities on student on-task behavior for students with autism.

Purpose of the Study

The purpose of the study was to examine the effects of physical activity and regular activities on student on-task behavior for students with autism.

Significance of the Study

This study will provide evidence to whether or not physical activity has an effect on children with autism. If this study provides evidence that physical activity does have an effect on children with autism, it could be beneficial to special education

classrooms and general education classrooms. It will provide the educators with information on how to help their students with autism cope and manage with their social and physical behaviors. Different levels of physical activity, moderate and vigorous, were also looked at in determining which level worked best on children with autism. Knowing which levels and what skills work best will provide physical education teachers with how to include students with autism into their lessons.

Limitations

The following were limitations encountered in this study:

1. The student may not be able to follow directions.
2. Whether or not the student took medication during the study.

Definition of Terms

1. Autism- a mental condition, present from early childhood, characterized by difficulty in communicating and forming relationships with other people and in using language and abstract concepts
2. Autism Spectrum Disorder (ASD)- refers to a range of neurodevelopment disorders that include the diagnoses of autism, Aspergers syndrome, and pervasive developmental disorders not otherwise specified (Lang et al., 2010)
3. Exercise- activity requiring physical effort, carried out especially to sustain or improve health and fitness
4. Moderate Physical Activity- requires a moderate amount of effort and

noticeably accelerates the heart rate; expends 3.5 to 7 calories per minute

5. On-Task Behavior- focusing on what is to be done

6. Physical Activity- any bodily movement produced by skeletal muscles that require energy expenditure

7. Physical Education- instruction in physical exercise and games, especially in schools

8. Regular Activities- activities done in the classroom that are not physical but more academic (e.g., math, reading, writing)

9. Special Education- a form of learning provided to students with exceptional needs, such as students with learning disabilities or mental challenges

10. Vigorous Physical Activity- requires a large amount of effort and cause rapid breathing and a substantial increase in heart rate; expends more than 7 calories per minute

Overview of the Study

The purpose of this study was to determine the effects of physical activity on children with autism. This thesis is comprised of five chapters. Chapter one consists of an introduction of the study, statement of the problem, statement of the purpose, significance of the study, limitations, definition of terms and concepts, and an overview of the study. Chapter two provides a review of the literature that is applicable to this study. Chapter three compiles the research methods used in the study. Chapter four

contains the data analysis, which includes the collection of data, as well as the research question and research hypothesis. Finally, chapter five contains the findings, recommendations, implications, and the conclusions of the research.

Chapter 2

Review of Literature

Autism is a mental condition, present from early childhood, characterized by difficulty in communicating and forming relationships with other people and in using language and abstract concepts. As stated, autism can be diagnosed in a child as early as eighteen months old. When diagnosing autism, there are no blood tests or medical tests to determine if autism is present in a child. Doctors can only look at behavior and development to see if a child may fall on the autism spectrum. This makes it challenging for doctors to diagnose and usually leads to a later diagnoses when the child reaches an older age. When a child enters school, more testing can be done to determine if the child has autism. The teacher and the school's diagnostician will decide if the student needs to be tested to determine if that student has autism. Finally, once a child is diagnosed as having autism, a plan will be put in place in order to provide the student with the best plan of action moving forward with that student's education.

Students with autism may not only have issues with academics in school, but may also have issues with on-task behavior, social skills, and motivation to live a healthy lifestyle. In the classroom setting, children with autism may have daily disruptions that can lead to a difficult environment for the student, the student's classmates, and the classroom teacher. On-task behavior becomes an issue when the student becomes bored or feels like he does not fit in with his classmates. The teacher becomes responsible for figuring out how to keep the student on-task and how to make him as successful as possible in school and in life. Some of the ways teachers have adapted to the behaviors of students with autism, is by allowing those students to

take sensory breaks and by getting them more involved in physical activities. The mind and the body work simultaneously together, which leads one to think that if students with autism are able to release all that pent up energy, that they will be able to stay on-task more in their academics and in the classroom. The current study will help strengthen data to address the effects of physical activity and regular activities on student on-task behavior for students with autism.

Autism in Children

The term “autism” was first originated by Eugen Bleuler, in 1908. This led to the first clinical research in 1943, by an American child psychiatrist, Leo Kanner. His study was the starting point in understanding children with autism. Though the study was very minimal at the time, more in depth studies would lead to a better understanding of autism in the late 1960s. These advances were made possible by the discovery and dissemination of early intensive behavioral intervention (EIBI) for young children with autism that created the impetus for early accurate diagnosis (Thompson, 2013). This led to a change on how children were being diagnosed with autism. The EIBI is capable of looking at the brain and focusing on the cerebral areas, which is the main cause for children to develop autism. It has become one of the best established treatments for Autism Spectrum Disorder (ASD) in children. The EIBI is a multiple year testing system that, first, helps the child deal with factors at home, before introducing them to factors in the classroom and the community setting. This testing system is still used world wide today.

In the late 1960s and early 1970s, more research was being done in order to help understand the effects of autism and how to help children cope with it. Still, with results coming in, some people refused to acknowledge the new research and continued to use the older

methods. “Some clinicians continued to follow mistaken advice and attempted to treat children with autism using psychoanalytic therapy, which was of very little value” (Thompson, 2013, p.81). As new studies kept pouring in, more and more clinicians were persuaded against psychoanalytic therapy, leading them in the direction of the new research and the EIBI. This led to several technology advances that would become increasingly more relevant in the early 1990s.

During the early 1990s through the early 2000s, two testing instruments were designed to help diagnose children with autism. The first test is called the Autism Diagnostic Interview-Revised (ADI-R) and it was established in 1994. This test is used by a clinician to determine whether or not a child has autism, as early as eighteen months, and can be used to help with treatment and educational needs. The test consists of 93 items covering areas of family background, developmental history, language, communication, social development, interests, and general behavior (McClintock, & Fraser, 2011). It can last two to three hours, but may not lead to a diagnosis of autism, even though the treatment plan can still be used to help the child. The second test is called Autism Diagnostic Observation Schedule (ADOS) and it was developed in the early 2000s. It is considered to be the sister research instrument to ADI-R. The ADOS is an observation measure designed to assess reciprocal social interaction and communication, play, and use of imagination (McClintock, & Fraser, 2011). Though it is used in observing children for play and task skills, it can still be used to help with the educational planning for the child. The introduction of the ADOS and training of a substantial cohort of test examiners revealed that a great many more children met the criteria for autism than had previously been recognized (Thompson, 2013). With this new testing instrument being recognized and being used on more

children, the diagnosis of autism would increase in children, who had not been diagnosed earlier with autism. These two testing instruments would become the turning point for diagnosing autism and are still used in today's practices. Both ADI-R and ADOS are being used together in the diagnostic process, helping doctors give treatment plans for children with autism, by helping them with their educational needs and with their every day life skills. The combination of ADI-R and ADOS has been deemed the "gold standard" for assessment on children with Autism Spectrum Disorders (McClintock, & Fraser, 2011).

When looking at children with autism, not only is the evaluation of socialization and behavior needed, but also the assessment of intellectual disabilities and the theory of the mind controls the body. Jessica M. Paynter says that "intellectual disabilities are observed in 30% of children with Autism Spectrum Disorders" (Paynter, 2015, p.105). This is one of the main reasons why children with autism may have other issues besides on-task behavior in the classroom. Autism can also cause a child to go through a world of other health issues caused by this disorder. These conditions can lead the child to have many medical conditions that are not first thought of when talking about autism. Paynter goes on to say that "children with autism may also have common medical conditions such as seizures/epilepsy, headaches and migraines, gastrointestinal problems and asthma" (Paynter, 2015, p.105). Autism is not only a disorder that affects the brain, but as stated, it can also cause common medical issues that are relevant in children that do not have autism. This is another reason why the diagnosis of autism can be a challenging process for the child, the parents, the teachers, and the diagnosticians.

Autism and On-Task Behavior

On-task behavior can be best described as when a person is given a task, that person stays focused and completes the task at hand. Children with autism have a hard time staying on-task mainly because of their disorder, but also because they view the task as being boring or that they do not comprehend what is being asked of them. Children with ASD are known to have difficulties attending to multiple cues simultaneously (Keen, & Pennell, 2015). This means that instead of giving a child with autism multiple cues at one time, that the child may stay focused more if only given one task. When there are other students in the classroom, this can make things difficult for the teacher because the student with autism can get left behind in the flow of the class. So how can teachers fix this problem? In handling of off-task behaviors, teachers tend to focus on tasks that the child may prefer in order for that child to stay focused longer in the classroom. Since autism is a disorder that effects the brain waves in a person, sensory items have been used as ways to help the child cope with the disorder and stay on-task. Research has shown that certain toys may give off sensory needs that the child may need in order to deal with off-task behavior. These toys can be things that the child prefers, but also can be things that the teacher thinks will help the child stay on-task. Understandably, toys that the child prefers can sometimes lead to increased problem behavior and can be an even bigger distraction for the rest of the class. So when Keen and Pennell did their research they looked at toys that were highly preferred, as well as toys that were moderately preferred by the children. They said that their research showed that “highly preferred sensory stimulating toys were associated with more problem behavior and solitary play, whereas developmentally oriented toys that were moderately preferred produced the most interactive play and fewer problem behaviors (Keen, &

Pennell, 2015, p.57). The moderately preferred toys engaged children in a way that not only was stimulating to them, but also helped them stay on-task. But toys are not the only items being used by teachers to help keep children with autism on-task.

In a research done by Amarie Carnett, Tracy Raulston, Russell Lang, Amy Tostanoski, Allyson Lee, Jeff Sigafoos, and Wendy Machalicek (2014), the use of positive reinforcements were looked at when dealing with on-task behavior in children with autism. They used a method called token economy intervention. Token economy intervention involves delivering small tangibles (e.g., tokens) contingent on the presence or absence of target behaviors and then providing an opportunity to exchange a preset number of these tokens for backup reinforcers (Carnett et al., 2014). So instead of giving the child a toy or other sensory item, tokens were used as positive reinforcements in order for the child to stay on-task. When the student is staying focused and following a specific task, the student is rewarded with a token. If ever the student becomes off-task, a token is taken away. This teaches the child that staying on-task is important and that being off-task will not be tolerated in the classroom. Once the student receives enough tokens, he may exchange them in for items that may be of more interest to him (e.g., drawing, computer time, recess). The study was done on a single subject, seven year old boy, that had autism. The testing was done in a special education classroom, as well as a inclusion classroom. In the results, they found that without the token economy intervention, that the boy stayed on-task 11% of the time in the special education classroom and 13% of the time in the inclusion classroom (Carnett et al., 2014). Once the token economy intervention was used, the boy's on-task behavior increased. Furthermore, their research showed that token economy interventions can be beneficial in helping children with autism stay on-task.

Effects of Autism on Schooling and Academics

When dealing with students who have autism, the first step is deciding whether the student would be better off in a special education classroom or in an inclusion class within the general education population. Studies have shown that most parents prefer their child to be in an inclusion classroom. The reason given for this is so that children with ASD experience both greater acceptance and increased exposure to typical language and social role models (McKenney, Stachniak, Albright, Jewell, & Dorencz 2016). Parents, of children with autism, feel that in order for their child to be successful at school, the other students need to be a part of their child's life, just like in the real world. They feel students that are put into a separate special education classroom become outcasts to the rest of the school, and that this can lead to their child being left behind in socialization and in academics. But they also tend to agree that it is not only beneficial for the children with autism, but also for the students that do not have autism. Students with ASD bring a unique perspective and presence, which can help to identify instructional concerns in the classroom (McKenney et al., 2016, p.319). This unique perspective can open doors for the other students and give them an inside look at what other people may be going through and how their ideas may be similar to their own. Even though the students with autism are in an inclusion general education classroom, this does not mean they are not provided with special educational services. In 1990, "autism" was added to the Individuals with Disabilities Education Act (IDEA), which states that these children have the rights to a free and equal appropriate education in the least restrictive environment, just like students who do not have disabilities. With autism being added to this law, students with ASD were provided with special services within an inclusion classroom. According to the 36th Annual Report to

Congress approximately 61.5% of children with disabilities spend at least 80% of their time in an inclusive classroom with typical peers (McKenney et al., 2016). But this does not answer the underlying question of “Does this have an impact on academics in children with autism?”.

Students with autism lack the cognitive ability to retain and hold information learned in a classroom and outside of the classroom. This is known to be true because students with autism have trouble staying on-task and using learning cues to better their understanding of what is trying to be taught to them. A student’s IQ quotient was once looked at as being the only testing instrument in knowing if a child was ready for schooling. But now Executive Functions (EF) are being targeted as more of a natural resource for letting educators know the readiness of a child. Tamara May, Nicole Rinehart, John Wilding, and Kim Cornish all say that “recent studies highlight that EFs are more strongly associated with school readiness than IQ quotient, serve as predictors of literacy and numeracy scores in pre- school through high school, and facilitate social inclusion and peer relationships (May, Rinehart, Wilding, & Cornish, 2013, p. 2147). The cognitive learning takes place at a young age, and if students with autism are left out, then it can have an enormous impact on an already compromised cognitive learning ability. It is important that these children are tested and diagnosed on time, so that doctors and educators can focus on their learning more and see what steps need to take place in order to help them.

Another problem that becomes an issue for parents and educators of children with autism, is that they show some of the same signs that would be present in students that suffer from Attention Deficit Hyperactivity Disorder (ADHD). There is a strong association between Attention Deficit Hyperactivity Disorder (ADHD) symptoms and ASD in approximately 50% of children with inattentive behaviors being more pervasive than hyperactivity levels (May et al.,

2013). With this being the case, it makes it difficult for educators to teach children with autism because not only are they having to deal with a lack of cognitive learning system, but also a deficit in attention needed in order for the student to stay on-task.

Effects of Physical Activity on the Body and Brain

Physical activity can be defined as any bodily movement produced by skeletal muscles that require energy expenditure. This energy expenditure can provide two positive benefits to a person's overall well-being. The first benefit is the main reason people chose to exercise and that is for better physical health. It can lead to a person avoiding medical risks, such as becoming overweight, obesity and cardiovascular diseases. The second benefit is not as well-known as the first, but still provides a necessary component to person's well-being. The benefit is that it can lead to better mental health and cognitive reflexes. When looking at children, physical activity can have an impact on their academic progress and can elevate stress levels in their classes, avoiding anxiety. Both benefits are necessary in achieving a healthy lifestyle.

When looking at physical activity, one is usually thinking about their overall physical health. A person chooses to exercise to try to lose weight, to gain muscle mass, or to just stay active. But since technology is advancing every day, children are becoming less active, which is causing an increase in childhood obesity. The prevalence of childhood obesity and related health problems is increasing in many Western countries and is anticipated to continue to increase (Sluijs, McMinn, & Griffen, 2007). This epidemic has been sweeping over the United States for years now, and has caused many children to become overweight and obese. Some

would say that this can be reversed once a child enters adulthood. This is not true, as most children who suffer from childhood obesity, will suffer the same fate as an adult. When a person becomes obese, this can lead to other harmful diseases that can limit a person's health and can even cause death. Physical inactivity among young people can lead to health risks, such as cardiovascular disease, cancer, and osteoporosis (Sluijs et al., 2007).

Equally as important as physical health, is a person's overall mental health. When a person's mental health becomes affected, it can have damaging effects on that person's cognitive abilities and can lead to stress and anxiety. This is common among children because at a young age, a child is learning academic concepts and life skills. But unfortunately, schools are focusing on more academic subject time and taking away more physical education time. "Although physical activity has beneficial effects on cognition and physical and mental health, there has been a worldwide tendency to reduce school-based physical education in favor of academic subjects" (Kall, Malmgren, Olsson, Linden, & Nilsson, 2015, p.704). The reason for this is because most schools are feeling the pressure of test scores and are ignoring the fact that more physical activity could actually help increase those scores. This is especially true for aerobic physical activities, where there is a direct link to academic performance. A systematic review of randomized controlled trials of the effect of aerobic exercise concluded that aerobic physical exercise is positively associated with cognition and academic achievement and with behavior and psychosocial function (Kall et al., 2015). But the determining factor is how much physical activity is needed for academic achievement?

When looking at how much physical activity time is needed, one must also look at how vigorous the physical activity is as well. In order to see the most improvement in academic

achievement, children need to be introduced to both moderate and vigorous activities. In a study published by James Sallis, Judith Prochaska, and Wendell Taylor, they “recommend 30 to 60 minutes of moderate to vigorous physical activity every day” (Sallis, Prochaska, & Taylor, 1999, p.963). This can be easily accomplished as long as the children are in an appropriate and successful physical education class on a daily basis. But many schools do not provide daily physical education, for reasons such as scheduling and over crowding. When a child does not have physical education on a daily basis, then it is up to the child to do physical activities on their own. As stated earlier, this can be a challenge because of the extraneous technology we have provided to our youth (e.g. cellphones, iPads, gaming systems, computers). In their study, Sallis, Prochaska, and Taylor concluded that about two-thirds of adolescent boys and one-quarter of adolescent girls report doing 20 min of sustained moderate to vigorous physical activity three times per week (Sallis et al., 1999). If this continues, academic achievement will not increase and childhood obesity will not be a risk, but will become the normal in children.

Effects of Physical Activity on Children with Autism

As stated in the previous section, physical activity has an effect on one’s physical and mental health. Studies have shown that without physical activity, a person may be more likely to develop health risks and cause damage to the cognitive system within the brain. Considering the effects of ASD on the brain, an increase in physical activity can provide benefits that help children with autism, by increasing their cognitive functioning and by helping eliminate potential risks of medical conditions. Chien-Yu Pan and Georgia Frey both say that it is “reasonable to assume that the general physical and mental health benefits of physical activity

would also extend to youth with ASD” (Pan, & Frey, 2006, p.597). By providing children with autism more physical activity time, the child’s thinking ability will be improved and medical conditions, that could lead to serious health problems down the road, can decrease over time.

When looking at the physical health of children with autism, there are two main components. Those components are motor functioning and decreasing the likelihood of developing health risks. Motor functioning can be described as the ability to perform complex muscle and nerve acts that produce movement. Motor functioning of individuals with ASD has been a neglected area despite the fact that participation in physical activity has been shown to have multiple benefits (Todd, & Reid, 2006, p.167). The reasons behind this is because children with autism lack the motivation to participate in physical activities. So when there is no motivation, children are not forced to participate in physical activities, which leads to decreases in their motor functioning in and out of the classroom. As a result of this, the overall physical health in children with autism is declining. But as more studies are being done, “educators and researchers are more and more recognizing that motor functioning is a deficit area for children with ASD” (Todd, & Reid, 2016, p.167).

Due to the fact that children with autism show a lack of motivation in participating in physical activities, serious health risks are on the rise among these individuals. These health risks include cardiovascular diseases, obesity, cancer, and osteoporosis. The main one that is sweeping through our country is childhood obesity. In 2016, a study was done by Chien-Yu Pan, Chia-Liang Tsai, Chia-Hua Chu, Ming-Chih Sung, Wei-Ya Ma, Chu-Yang Huang, which said that “although the prevalence of obesity in youth with ASD may not have surpassed the norms from the 2003–2004 National Survey of Children’s Health, statistics suggest that

youth with ASD are 40% more likely to be overweight and obese compared with their peers” (Pan et al., 2016, p.512). This suggests that children with autism are not participating in enough physical activity, which is causing them to become obese. With most of these children being in an inclusive physical education class, one would think that the children with autism would be getting enough physical activity. But as studies have shown, this is not true for students with autism. By the guidelines set by the U.S. Department of Human Services, it is recommended that all students be active in physical education classes at least 50% of the lesson time (2000). In studies looked at by Chien-Yu Pan, Chia-Liang Tsai, and Kai-Wen Hsieh, the studies showed that physical activity in students with disabilities revealed that their physical activity time in physical education tended to be far less than the recommended 50% of lesson time (Pan, Tsai, & Hsieh, 2011). This is unfortunate because it shows that students with autism and other disabilities are not being included in the activities that are taking place in physical education classes. But as the studies have shown, it may not all fall on the physical educator. It could also be due to the lack of motivation and socialization skills among these children.

In the same ways physical activity benefits physical health, it also effects the well-being of a person’s mental health. When a person’s mental health is stable, the brain can react in positive ways. But unfortunately, children with autism have trouble controlling the way they react in situations that involve communication and socialization, on-task behavior, and other situations where the child has to step outside of their comfort zone. In a systematic review done by Russell Lang, Lynn Kern Koegel, Kristen Ashbaugh, April Regester, Whitney Ence, and Whitney Smith, it is said that “the diagnostic characteristics of ASD include difficulty with social

interaction, delayed or limited development of communication skills, and restrictive patterns of behavior or interests” (Lang, 2010, p.566). When looking at this in a physical education class, one would see why a child with autism would struggle in this kind of environment. In a situation where communicating and socializing with other students is a requirement to accomplish a task, a child with autism may show no interest or have a lack of motivation to participate in such physical activities. As stated, this can cause the children to stray away from physical activity, which can lead to the decline of their mental health. So how can a physical educator or special education teacher get a child with autism to participate in their physical education classes? By providing the child with activities that are not too vigorous, and easing the child into situations where they have to communicate with other children. The child may have to be integrated into a class that has a smaller population size, that way the child does not get overwhelmed and avoids situations that could cause anxiety. Over time, the child can be integrated into a larger class, but still participate in moderate levels of physical activity. This may be a slow process, but the results on the child’s mental health will be extraordinary and could lead to benefits inside the regular classroom.

Another reason why it is important for children with autism to participate in physical activities is because there is a positive correlation between physical activity and on-task behavior. A child with autism spends most of his school day inside a special education or inclusion classroom. Similar to physical education classes, the child’s classroom can cause anxiety and poor behavior in children with autism, which can lead a child to become off-task. This is not what an educator wants and can lead to the child being unsuccessful with daily

activities and academics. But a way an educator can help children with autism, is by providing them with sensory breaks that involve physical activity. In an article published by Megan MacDonald, on physical activity patterns in children with autism, says “following bouts of physical activity, children with autism experienced decreases in negative behavior such as stereotypes and increased positive behaviors, such as time on task” (MacDonald, 2011, p.1). So if an educator wants to limit bad behaviors and time off-task, with their students who have autism, they have to find a way to include these breaks into their schedule. This will allow students with autism to be more successful inside the classroom.

Conclusion

In conclusion, the literature shows that physical activity can have effects on children with autism. The positive effects include increases in on-task behaviors, communication and socialization, academic performance, motivation, and mental health, while decreasing off-task behaviors, anxiety, and risks of developing long-term health conditions. By providing sensory breaks that involve physical activities to children with autism, these positive effects can take place in order to replace bad behaviors within the classroom. So by taking what has already been studied and applying it to the experiment, data can be updated to the research. This will help conclude the effects of physical activity on student on-task behavior in children with autism.

Chapter 3

Methodology and Procedures

This study focuses on the effects of physical activity in regards to the on-task behavior of a particular student with autism in a Comprehensive Development Classroom (CDC) at an Intermediate School, grades fifth and sixth. Students with autism have a significantly difficult time staying on-task. Will the student be able to effectively stay on-task after receiving physical activity? Will the student be able to participate in regular classroom activities after receiving physical activities? These are the questions that are addressed in this study.

Population

The study was conducted at Indian Trail Intermediate School, located in Johnson City, Tennessee. There were 1,184 children who attended the school. The school was made up of 74 percent white students, 14 percent African American students, 8 percent Hispanic students, and 4 percent Asian students. There was 190 students with disabilities, which made up 16 percent of the school population. The school was also made up of 52 percent economically disadvantaged students.

Sample

The sample from this study was selected from a Comprehensive Development Classroom at the Intermediate School. The Comprehensive Development Classroom at Indian Trail Intermediate School was made up of six female students with four of those students being in the sixth grade, while 2 of the students were in fifth grade. The classroom also had four male students, all of whom were in the sixth grade. The teacher of the class was female. The teacher

and students were assisted by one female assistant and one male assistant. This sample consisted of one student who was in the sixth grade, was male, and was eleven years old. This particular student was diagnosed with autism. The student was below average in all academic areas, including math, reading, and writing. The student was present amongst the other students in the Comprehensive Development Classroom, but had his desk in a separate area away from the other students due to violent outbursts. The student's participation with the rest of his classmates was minimal and he had a hard time staying on-task throughout the school day. The student showed acts of violence when interacting with other students or adults in the classroom. When trying to get this student to stay on-task his behavior became a distraction to the other students and their on-task behavior decreased. This presented a challenge for the teacher and the assistants.

Data Collection

Data were collected by observing and recording violent outbursts and off-task behaviors of the student. A baseline was established in the beginning of the study through observation of the target behaviors of the child while in the classroom. There were four different target behaviors observed, responding appropriately when given an assignment, appropriate interactions with other students and teachers, following directions, and participating in class activities. After baselines for these target behaviors were addressed, the intervention of physical activities were introduced and observed for one week. After one week, the interventions were withdrawn and the target behaviors were observed for one week. The interventions were then reintroduced and behaviors were observed for one week. Data were collected and analyzed using the ABAB design.

Procedures

Before the study began, permission was sought from the principal and the classroom teacher. After following the steps for permission, the subject was selected. The subject was selected from a Comprehensive Development Classroom, was male, and had been diagnosed with autism. After the subject was selected, the study began. During the first week of the study, week one, baselines were established. After the baselines were established in week one, the study moved into week two and this was where the researcher conducted daily, physical activity. The physical activity was broken down into two, thirty minute phases. The first phase took place during the morning time, while the second phase happened during the afternoon. In between the physical activities, the researcher observed and recorded behaviors, that took place in the classroom, by using tally marks. During week three, the physical activities were withdrawn and observations took place. During week four, the physical activities were reintroduced to the student and the researcher, again, observed and recorded the behaviors as outlined above. After week four, the tallies were taken and recorded, altogether, to establish the results.

Research Questions and Related Hypothesis

Research Question 1:

Is there a difference between student on-task behavior in children with autism when pre given physical activity and when not?

Research Hypothesis 1:

There is a difference between student on-task behavior in children with autism when pre given physical activity and when not.

Null Hypothesis 1:

There is not a difference between student on-task behavior in children with autism when pre given physical activity and when not.

Chapter 4

Data Analysis

The purpose of this study was to examine the effects of physical activity and regular activities on student on-task behavior for students with autism. On-task behaviors were measured by the number of the times the student did not exhibit the target behaviors.

Collection of Data

Data were collected from a single subject, at a selected school, who showed problems with violent outbursts and off-task behaviors due to autism. Target behaviors were identified as responding appropriately when given an assignment, appropriate interactions with other students and teachers, following directions, and participating in class. The design to collect data was ABAB. A baseline was established on target behaviors during Phase A. Phase A lasted approximately one week. An intervention was introduced during Phase B. The subject was provided with physical activity, two times a day, for one week while data were collected on target behaviors. The intervention was withdrawn during week three and data were collected. During week four, the intervention was reintroduced to the subject and data were collected. Data were analyzed using graphs.

Research Question and Related Hypothesis

The analysis of this research was guided by one research question. The research question states: is there a difference between student on-task behavior in children with autism when pre given physical activity and when not? A related hypothesis was established stating there is a difference between student on-task behavior in children with autism when pre given physical activity or when not. To find the answer to this question, data were collected, during

Phase 1, for one week to establish a baseline for the target behaviors. The target behaviors that were observed were appropriate responses, appropriate interactions with students and teachers, following directions, and participation in classroom activities. The results can be found in Section 1 (Baseline) of Graphs 1, 2, 3, and 4 in Figure 1, respectively.

After establishing a baseline, the intervention (Phase 2) of physical activity, two times per day, was introduced for one week and there was a compelling difference in the student's on-task behaviors. The subject participated in different fitness skills, such as flexibility (e.g., sit and reach box, stretching), cardiovascular (e.g., running on a treadmill), balance (e.g., balance beam, standing on one foot), and power (e.g., medicine ball, light weights). Also, the subject participated in a new sports related skill each day (e.g., throwing a football, shooting a basketball, throwing a baseball, kicking a soccer ball, throwing a Frisbee). The results showed that physical activity helped the student stay on-task and decreased his off-task time in the classroom. The results also showed that the student interacted with the other students and teacher more appropriately. The subject was more keen on following directions and participating in classroom activities. The results can be found in Section 2 (Intervention) of Graphs 1, 2, 3, and 4 in Figure 1, respectively.

During week three (Phase 3), it was apparent that the student reverted back to baseline status when the intervention was withdrawn. The results can be found in Section 3 (Withdrawn) of Graphs 1, 2, 3, and 4 in Figure 1, respectively. After the intervention was withdrawn in week three, the subject was reintroduced to the intervention during week four (Phase 4). This resulted in a significant difference in the student's on-task behaviors, interactions with peers and teachers, following directions, and classroom participation. The results can be found in Section 4 (Intervention) of Graphs 1, 2, 3, and 4 in Figure 1, respectively.

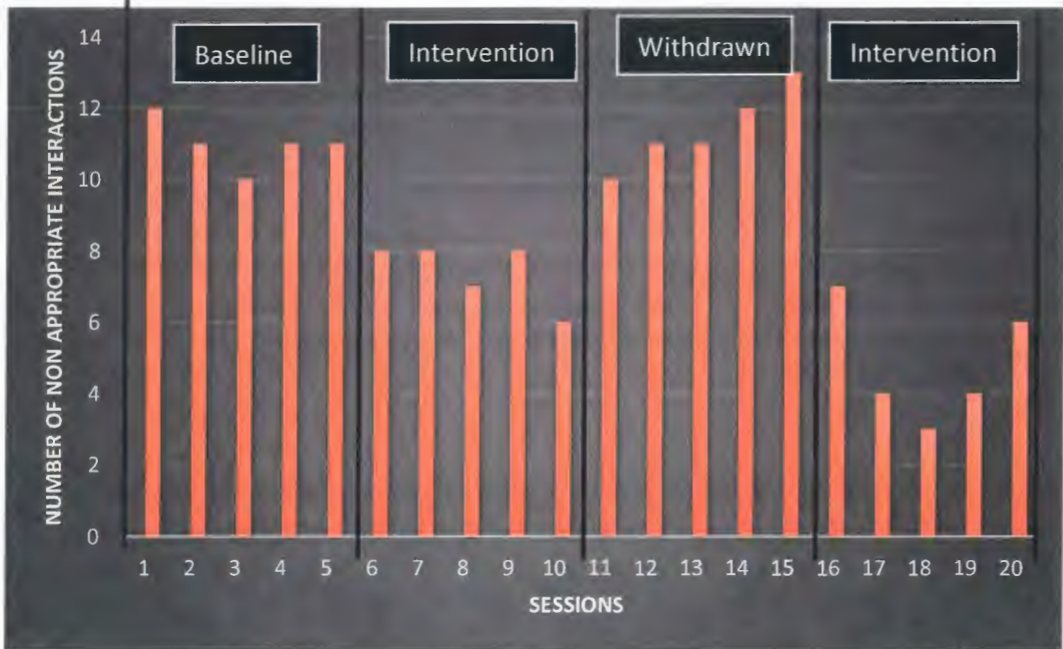
As a result of the findings, the null hypothesis has to be rejected. A graph for each of the four non target behaviors are displayed in Figure 1.

Figure 1 Non Target Behaviors: Non Appropriate Responses, Non Appropriate Interaction with Students and Teachers, Not Following Directions, Not Participating in Class

Graph 1: Non Appropriate Responses



Graph 2: Non Appropriate Interactions with Students and Teachers



Graph 3: Not Following Directions**Graph 4: Not Participating in Class**

Chapter 5

Findings, Recommendations, and Implications

This research project was conducted to determine if providing physical activity to a student with autism will result in increased on-task behavior of the student. This chapter consists of the Summary of Findings, Recommendations, and Implications.

Summary of Findings

In regard to the research question, is there a difference between student on-task behavior in children with autism when pre given physical activity or when not, a hypothesis was developed that states there is a difference between student on-task behavior in children with autism when pre given physical activity or when not. This research project was able to determine a significant decrease in off-task behaviors as measured by tasks completed for targeted behaviors when the intervention of physical activity was applicable. For this study, target behaviors were identified as responding appropriately when given an assignment, appropriate interactions with other students and teachers, following directions, and participating in classroom activities.

A baseline for the non target behaviors was first established for an entire week. The target behaviors were determined and the student's behavior was monitored for one week to establish the baseline. Then the intervention phase was implemented with the student receiving physical activity, two times per day for thirty minutes at a time. The student participated in physical activity for thirty minutes in the morning and then, again, for thirty minutes in the afternoon for an entire week. Each thirty minute session was different and the student

participated in a variety of fitness and sports skills. During the intervention phase, the amount of time the student had previously been off-task was decreased and the target behaviors for on-task was increased. The student was more focused during this time and showed less violent outburst than normal. During the withdrawn phase, the intervention was withdrawn for an entire week, the student's behavior appeared to return to the original baseline status. When the intervention was not given, the student demonstrated more off-task behaviors when given an assignment and experienced difficulties in interacting with other students and teachers. The student also presented negative responses to following directions and participating in classroom activities. Negative responses included the student not completing assignments, throwing objects at students and teachers, blurting out inappropriate language and threats, and becoming physical with teachers. During the last intervention phase, the student steadily returned to the same point where the intervention had stopped. The student would more often complete given assignments and interacted more positively with other students and teachers. Positive responses included completed assignments, appropriate language, participating more in classroom activities, and less violent outbursts.

On-task behaviors are critical to successful functioning in the classroom setting and in life. These behaviors enable us to complete assignments on time, follow directions, interact with our peers, and know when to respond at the appropriate time. Students with autism can sometimes have difficulties with on-task behaviors. This results in many challenges for the students in their classroom and also for their teachers and peers. Finding ways to help these students with their on-task behavior has become a continuous process for educators and doctors. There has not been much research done on whether or not physical activities can help with

on-task behaviors. But the research that has been done with physical activity has had some positive results. Shane K. H. Miramontez and Ilene S. Schwartz says that “A promising intervention for increasing appropriate on-tasks behaviors in children, including those with autism spectrum disorder, is physical activity or exercise” (Miramontez and Schwartz, p. 406). Physical activities and exercise are becoming more appealing because many require little training and fit well into the typical school day. These can be easy ways to help students with autism stay on-task more often throughout the entire school day.

In conclusion, results from this research reveal a significant difference in on-task behavior in children with autism when pre given physical activity and when not. It is evident that both on-task behavior and physical activity are essential for students with autism. On-task behavior is important to keep autism students from falling behind their peers and for maintaining a high learning environment in the classroom. Physical activity is crucial in helping keep students with autism on-task.

Recommendations

1. Future research should focus on other target behaviors that increase on-task behaviors, while decreasing off-task behaviors.
2. Future research should use two subjects instead of one to see whether same results occur.
3. Future research should use different gender to see if the same results occurred for males and females.

Implications

1. Educators should focus on implementing physical activities into their classrooms, so that on-task behaviors are increased.
2. Students should be taught appropriate on-task behaviors and when they are to be used.
3. When off-task behaviors become an issue in the classroom, educators should provide students with autism some form of a physical activity break.
4. Once the educator finds a physical activity the student enjoys, the educator can use that specific activity as a reward for the student being on-task.

References

- Bunketorp Käll, L., Malmgren, H., Olsson, E., Lindén, T., & Nilsson, M. (2015). Effects of a curricular physical activity intervention on children's school performance, wellness, and brain development. *Journal of School Health, 85*(10), 704–713. doi:10.1111/josh.12303
- Carnett, A., Raulston, T., Lang, R., Tostanoski, A., Lee, A., Sigafoos, J., & Machalicek, W. (2014). Effects of a Perseverative interest-based token economy on challenging and on-task behavior in a child with autism. *Journal of Behavioral Education, 23*(3), 368–377. doi:10.1007/s10864-014-9195-7
- Keen, D., & Pennell, D. (2014). The use of preferred items in a word-learning task: Effects on on-task behaviour and learning outcomes of children with autism spectrum disorder. *Australasian Journal of Special Education, 39*(01), 56–66. doi:10.1017/jse.2014.16
- Lang, R., Koegel, L. K., Ashbaugh, K., Regester, A., Ence, W., & Smith, W. (2010). Physical exercise and individuals with autism spectrum disorders: A systematic review. *Research in Autism Spectrum Disorders, 4*(4), 565–576. doi:10.1016/j.rasd.2010.01.006
- MacDonald, M., Esposito, P., & Ulrich, D. (2011). The physical activity patterns of children with autism. *BMC Research Notes, 4*(1), 422. doi:10.1186/1756-0500-4-422
- May, T., Rinehart, N., Wilding, J., & Cornish, K. (2013). The role of attention in the academic attainment of children with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 43*(9), 2147–2158. doi:10.1007/s10803-013-1766-2
- McClintock, J., Frazier, J. (2011). Diagnostic instruments for autism spectrum disorder. *Ministries of Health and Education, 1-27*.

- McKenney, E., Dorencz, J., Stachniak, C., Albright, J., & Jewell, J. (2016). Defining success for students with autism spectrum disorder: social academic behavior in secondary general education settings. *Education and Training in Autism and Developmental Disabilities*, 51(3), 318-327.
- Miramontez, S. K., & Schwartz, I. S. (2016). The Effects of Physical Activity on the On-Task Behavior of Young Children with Autism Spectrum Disorder. *International Electronic Journal of Elementary Education*, 9(2), 405-418. Retrieved March 4, 2017.
- Pan, C.-Y., & Frey, G. C. (2006). Physical activity patterns in youth with autism spectrum disorders. *Journal of Autism and Developmental Disorders*, 36(5), 597–606. doi:10.1007/s10803-006-0101-6
- Pan, C., Tsai, C., Chu, C., Sung, M., Ma, W., & Huang, C. (2015). Objectively measured physical activity and health-related physical fitness in secondary school-aged male students with autism spectrum disorders. *Physical Therapy*, 96(4), 511–520. doi:10.2522/ptj.20140353
- Pan, C.-Y., Tsai, C.-L., & Hsieh, K.-W. (2011). Physical activity Correlates for children with autism spectrum disorders in middle school physical education. *Research Quarterly for Exercise and Sport*, 82(3), 491–498. doi:10.1080/02701367.2011.10599782
- Paynter, J. M. (2015). Assessment of school-aged children with autism spectrum disorder. *Journal of Psychologists and Counsellors in Schools*, 25(01), 104–115. doi:10.1017/jgc.2015.2

- Sallis, J. F., Prochaska, J. J., & Taylor, W. C. (2000). A review of correlates of physical activity of children and adolescents. *Medicine & Science in Sports & Exercise*.
doi:10.1097/00005768-200005000-00014
- Sluijs, E. M. F., McMinn, A. M., & Griffin, S. J. (2007). Effectiveness of interventions to promote physical activity in children and adolescents: Systematic review of controlled trials. *BMJ*, 335(7622), 703–703. doi:10.1136/[bmj.39320.843947.be](https://doi.org/10.1136/bmj.39320.843947.be)
- Thompson, T. (2013). Autism research and services for young children: History, progress and challenges. *Journal of Applied Research in Intellectual Disabilities*, 26(2), 81–107. doi:10.1111/jar.12021
- Todd, T., & Reid, G. (2006). Increasing physical activity in individuals with autism. *Focus on Autism and Other Developmental Disabilities*, 21(3), 167–176. doi:10.1177/10883576060210030501