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Physical Activity Breaks Improve Student Learning

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**Sensory and Physical Activity Breaks Can Help Improve
Students' Academics and Learning in the Classroom**

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Literature Review Presented

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Abstract

The purpose of this literature review is to look at how physical activity or movement breaks impact students' academic achievement in the classroom. The literature provides several studies done by different researchers and the positive effects physical activity breaks have on students and their performance and behaviors in the classroom. Teachers are always looking for ways to keep students motivated and focused so they can perform well on tasks and assessments in schools. The literature that was reviewed shows how each of the studies reported positive results for brain and health development as well as increases in academics for students with and without disabilities. The researched literature also shows ways to help students improve their focus and behaviors by self-regulating as well as interventions or physical activities that can take place in the classrooms for teachers to incorporate physical activity or movement within their lessons or daily routine.

Keywords: Physical activity breaks, academic performance, intellectual disabilities

Sensory and Physical Activity Breaks Can Help Improve Students' Academics and Learning in the Classroom

Physical activity and movement have a huge impact on a child's growth and development and academic learning (Popeska et al., 2018). Benes et al. (2016) stated that even more so physical activity and movement can help improve a child's academic success, reading and math knowledge, behaviors in the classroom, concentration and motivation levels, and overall more positive learning experiences. Social skills and academic content are learned early in a child's schooling career. These skills are important to know as they move through school and beyond. Oftentimes, students may turn to behaviors, due to several reasons, that are self-stimulatory because they have problems with processing sensory (O'Donnell et al., 2012). This leaves students missing out on important content and the teacher possibly not knowing how to handle it or how to provide help to students. Perera et al. (2015) stated that when students participate in physical activity, their concentration, energy level, motivation, and interactions with their peers are greater.

When students are turning to behaviors that are self-stimulating to them it might be because they might not know any other strategies to help them refocus. O'Donnell et al. (2012) defined sensory processing as the way students receive, organize, or interpret stimuli by using at least one of the sensory systems. They reported that the way students respond to sensory stimuli can be unusual because they are over or under-stimulated by the environment they are in. When a teacher can teach and implement sensory, movement, or brain breaks in the classrooms, the student may be able to refocus themselves back to the learning and content at hand. Perera et al. (2015) defined sensory and brain breaks as a variety of activities that involve physical activity that can help students address their sensory or movement needs. They also discovered that the

outcome of these sensory and brain breaks is to help improve students' ability to focus on their learning and to help calm them.

The purpose of this literature review is to discuss how physical activity can benefit students' academic performances and to find sensory and movement interventions that are helpful to teachers and students so they can focus on the learning that needs to take place in the classroom. Perera et al. (2015) researched and found that if sensory or movement breaks are less than twenty minutes, they still provide enough stimulus to increase a student's physical activity level as well as their academic performance. Students cannot be expected to sit in their seats the whole school day without getting up and moving for a break. Perera et al. (2015) also found that after instruction is taught by the teachers, it is important that students take a sensory or movement break so that their brain can process and retain the information and content that was taught to them.

This literature review will provide information that pertains to sensory and movement breaks. It will also look at how it can help improve students' brain and health, their academic performance and motivation, ways for students with special needs to self-regulate to help them be successful, teachers' perceptions, as well as talking about different interventions at the end of this paper. Students need to be active and successful in their learning so finding ways to help them and how these sensory and movement breaks can be beneficial to them is something that will be looked into.

Literature Review

Studies have been done and research has proven that students should not be expected to sit in classrooms for long periods; instead, they should be able to participate in physical activities as that can help improve a student's learning abilities (Foran et al., 2017). Children need to receive at least sixty minutes of moderate to vigorous physical activity daily (Harvey et al., 2018). After No Child Left Behind was put into place, schools and classrooms started putting more focus on academics due to standardized testing and to make sure that students made yearly progress in their academics (Cosgrove et al., 2018). Cosgrove et al. (2018) also reported that 44% of public schools reduced students' physical activity and recess time to make more room in the day for academics. It is important for students to participate in a minimum of sixty minutes of moderate to vigorous activity, according to national guidelines, to help prevent and treat the risk of diseases (Castelli et al., 2014). Physical activity can in turn help with the academic success of students (Castelli et al., 2014). Popeska et al. (2018) found that when physical activity breaks happen daily, there are to be positive effects on students. They discovered some of the positive effects to be physical fitness, self-efficacy, interest level, and self-awareness. With all the positive effects physical activity has on students, Foran et al. (2017) suggest that physical activity should be promoted within schools. They found that physical activity impacted and improved students' growth and development and also their learning and performance in the classrooms. Kirk et al. (2014) discovered that physical activity breaks can help improve behavior in the classroom and keep students focused and on task.

Behavioral engagement is also an important part of a student's academic success (Harvey et al., 2018). Harvey et al. (2018) defined behavioral engagement as a student who is actively involved in classroom activities and who follows the rules and does not display any behavioral

problems. When students are behaviorally engaged and participate in physical activities throughout the day, their academics and behaviors can improve (Harvey et al., 2018). Through different research and studies over the last decade, it has been shown that physical activity breaks or movements have increased students' focus, performance, and behaviors in the classrooms.

History

The history of research on physical activity and how students perform in academics dates back to 1967 (Castelli et al., 2014). Between the years 1967 and 1979, Castelli et al. (2014) found three studies that were done where it presented results of students' scores on standardized testing had increased after exercise was done. Years later, in 1995, researchers began to examine how physical activity affected student outcomes in schools (Castelli et al., 2014). Castelli et al. (2014) research determined that in 1995 schools should start to add more activity during physical education classes because it would benefit students in the areas of health, performance, and behavior. During the modern education era, there was a link between physical activity in children and their health as shown in reviews by Castelli et al. (2014). Castelli et al. (2014) discovered that starting in the new millennium there was much more research being done that looked at the relationship between physical activity and students' performance. Within the new millennium years, the No Child Left Behind (NCLB) law was passed. Castelli et al. (2014) described this law as there being a need for more instruction time in the classroom, therefore causing schools to cut out opportunities for students to participate in physical activity.

In the middle to the late 2000s, six different research reviews were done. Castelli et al. (2014) found that they mentioned that physical activity time should increase from 30 to 45 minutes a couple of times a week to every day for at least 60 minutes. They also found that increasing activity for students would help with their performance and engagement in the

classrooms. Castelli et al. (2014) had gathered 20 different studies that looked at physical activity and how it benefited students. They discovered that all of the studies showed that students that participated in some kind of physical activity had increased their achievement and cognitive function in the classroom.

Multi-sensory environments (MSE) were created in 1970 and they were intended for leisure options or resource use in students with severe and profound disabilities (Stephenson & Carter, 2011). Stephenson & Carter (2011) discovered that the previous name of these environments was given the name *snoezelen*, but are referred to as multi-sensory rooms today. These MSEs are spaces that students can go to that have different objects to help provide students with sensory stimuli and therapeutic outcomes.

Knowing that schools play an important role in students' lives and promoting health and fitness, the Child Nutrition and Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) was passed in 2004 (Harvey et al., 2018). Harvey et al. (2018) found that this meant for all schools to have a program that focused on students' physical activity levels and their nutrition. In 2013, Harvey et al. (2018) also discussed that the American Alliance for Health, Physical Education, Recreation, and Dance has stressed to schools that they needed to have a program that focused heavily on physical activity. With this program, schools needed to have students participate in moderate to vigorous physical activity for at least 60 minutes per day (Harvey et al., 2018). Research reviews and studies dating back more than 50 years have shown positive outcomes between students who participated in some kind of physical activity and their academic success. More studies and reviews are being done in more current years to show that schools that focus on implementing more physical activity throughout a student's day increase students' engagement level and their health, physically and cognitively (Cosgrove et al., 2018).

Physical Activity on the Brain and Health

Meyer et al. (2014) discovered that results have shown important health effects when schools incorporate physical activity into the students' day. It was also discovered by Brittin et al. (2017) that when students participate in physical activity, their health now and in the future are impacted positively, causing their classroom behaviors and learning experiences to be greater. They also mentioned that when incorporating physical activity into a students' school day, it can help address the issues of childhood obesity and other diseases that are related to that. When schools spend more time focusing on academics in the school day and physical activity is decreased, it can affect a student's growth, development, and learning (Foran et al., 2017). In research that Foran et al. (2017) did, they discovered that a low number of students 13 to 15 years of age are meeting the recommended amount of 60 minutes of physical activity. When physical inactivity occurs, it is linked to coronary heart diseases, type 2 diabetes, and breast and colon cancers (Foran et al., 2017). In a study that Wadsworth et al. (2011) did, they discovered that obesity in students at a young age increased. This was a contributing factor to students not receiving enough physical activity in school (Wadsworth et al., 2011).

Health is a concern if students do not participate in enough physical activity at school or do not participate in their lives in general. Students' brains are an important part of learning. Cerrillo-Urbina et al. (2015) researched how physical activity impacts students and their brains when learning. They discovered that physical activity causes muscles and organs to react, which helps regulate brain functions. Cerrillo-Urbina et al. (2015) found that physical activity also affected intellectual functions and cognitive abilities. They recommended that to keep students' cognition and behaviors regulated, students should participate in physical activities regularly.

This will help students' physical fitness, psychological functioning, and mental health (Cerrillo-Urbina et al., 2015).

Silva et al. (2015) did a study on students to see how physical activity would affect them in the classroom. They discovered that students who don't receive physical activity have a decrease in concentration in the classroom. As researchers, Silva et al. (2015) suggested that students receive physical activity or exercise regularly to help the brain fight off diseases or injuries. The hippocampus is part of the brain where there are positive things that take place. If the hippocampus gets harmed, Silva et al. (2015) found that it can affect learning and memory in students. Also in the study that Silva et al. (2015) completed, they found that when students are being physically active, they release serotonin, dopamine, and norepinephrine. These neurotransmitters are important because they allow students to get excited about things that follow the times they are physically active (Silva et al., 2015).

In research that Bedard et al. (2019) completed on physical activity in the classrooms and how students enjoy learning, they found that when students are involved in aerobic exercise, their blood flow and neurochemical responses are greater. They also found that the increased blood flow was linked to changes in the brain causing cognitive functioning to take place. Another study done by Mead et al. (2016) showed that when students can sit on stability balls while in the classroom and throughout the school day, their vestibular, proprioceptive, and somatosensory systems are activated. When these systems are activated, they cause students to focus in the classroom (Mead et al., 2016). By allowing students to sit on stability balls in the classroom, it is something that would not disrupt their learning or the teacher's teaching.

Physical Activity Improves Academic Performance

Self-Esteem and Self-Image

The way students look at themselves in terms of self-concepts and self-esteem determines the choices they make and how hard they want to try in school (Cvencek et al., 2018). Cvencek et al. (2018) did a study on elementary school students to determine the link between their self-esteem and their academic performance. In the procedure test, students were asked to sort stimuli into four different categories quickly. Cvencek et al. (2018) said the students who had higher self-esteem should be able to sort them quickly and not second guess themselves. Cvencek et al. (2018) found the results of their study to be that the students had positive self-esteem. When looking to see which one, self-concept or self-esteem, related more towards academic performance, Cvencek et al. (2018) reported that self-esteem was related more towards positive academic success in students in grade K-2. This was the opposite for grades 3-5 where they had self-concept being more related to their positive academic success.

Another study done by Silva et al. (2015) determined that the intervention group had reduced anxiety levels after physical activity than the control group that did not receive any physical activity. They also found that when students participated in physical activity, their mood, self-esteem, and anxiety were better. When students have good self-esteem, they can think of themselves as better learners and can be successful academically (Silva, et al., 2015).

Motivation

Perera et al. (2015) discovered that for students to be motivated to participate in physical activity, it has to be engaging and easy to follow and understand. From the time students are young, self-efficacy and active engagement are some important factors to have for students to be motivated (Olivier et al., 2019). Self-efficacy, as defined by Olivier et al. (2019), is when

students can organize and carry out actions that are required of them to learn to complete and master tasks and assignments at a level where they can successfully meet the criteria for understanding them. Olivier et al. (2019) completed a study to see which framework would produce the best results of students' success after being introduced to the students. The self-efficacy theory was used so that students can see their perceptions of how well they are in different subjects in school (Olivier et al., 2019). They considered the self-system model and the expectancy-value theory to be similar in the fact that they both look at student achievement as well as behavioral and emotional engagement.

Olivier et al. (2019) had students take a questionnaire that was done on the computer. The students were asked questions about their self-efficacy, their engagement level in mathematics, and then teachers reported how the students did on assignments. Olivier et al. (2019) found that self-efficacy was positively correlated with student engagement and performance. They also found that the self-efficacy theory had greater effects on achievement over time. Olivier et al. (2019) also discovered that the self-system model and the expectancy-value theory did not produce positive results right away with achievement and engagement in students. Therefore, when students have self-efficacy, a prediction can be made that students will succeed in their academic work (Olivier et al., 2019).

Another study done by Popeska et al. (2018) was on the effects that brain break videos have on students who watch and do the activities with the videos. They looked at how the motivation and interest went up on school tasks after viewing these videos. They had two groups, a control group who did not receive any physical activity breaks and the intervention group that was able to participate in the brain break videos. The intervention group received the physical activity brain breaks every day for about 5 minutes a day. This allowed them to watch a video

that was selected by the teacher. Popeska et al. (2018) discovered that students who participated in the brain break videos each day had more positive attitudes and motivation towards physical activity than the students in the control group. They also found that the students in the intervention group had made improvements in their self-awareness and motivation in the classroom. While doing the study, Popeska et al. (2018) found that technology has been a great help in influencing students on their motivation and engagement. They found that when videos or internet-based activities are used, students are more likely to participate in them and be more engaged in them as well.

Academics

Students who regularly participate in physical activities help students with coordination movements and also help students perform better in academics than students who do not participate in physical activities (Cosgrove et al., 2018). They also said that they recommend that schools have multiple opportunities throughout the school day for students to participate in physical activities. Children who are at a young age have a better opportunity to be active and develop skills that are important to their health and development (Callcott et al., 2015). They also found that when children experience movements early on, they develop social and cognitive skills that help their well-being.

These findings led Callcott et al. (2015) to conduct a study that incorporated movement rich environments to see the effects it had on reading and writing skills in pre-primary aged students. Pretests were given to all the students before the intervention group started partaking in the physical activities. The intervention group had a 15-minute session each day where they could do some type of physical activity during their reading block. Once the interventions were over, the results were calculated. Callcott et al. (2015) determined that the intervention groups

had significantly higher scores on all the reading and writing tests than the control groups did. Callcott et al. (2015) also indicated that having students participate in some kind of physical activity benefits their learning and academic performance.

In another study done by Kirk et al. (2014), they determined that when teachers can incorporate physical activity into academic lessons that they are doing, it can benefit the students without having to decrease instructional time to find time to incorporate physical activity breaks in the school days. The study that was done by Kirk et al. (2014) was on Head Start programs. Kirk et al. (2014) broke the classrooms up into two different groups. There was an intervention group that received lessons taught by teachers that incorporated physical activity and the control group that did not have lessons incorporating physical activity taught to them.

Kirk et al. (2014) made sure that all the lesson interventions were easy and engaging for the students. The lessons that were taught included skills in picture naming, alliteration, and rhyming. After the results were figured out after the six-month intervention period, Kirk et al. (2014) found that scores on the alliteration and picture naming tests increased for the intervention group more so than the control group. They did not find any significant change between the intervention group and the control group on the rhyming tests. Kirk et al. (2014) indicated that when incorporating physical activity into classroom lessons and content, it can improve the students' academic performance and their physical activity level at the same time.

A study conducted by Mead et al. (2016) was done to see if certain students that used stability balls had a bigger increase in academic performance and test scores than students who did not use stability balls. One class was able to sit on stability balls throughout the school day. The second class had activity breaks that were implemented. The third class was the sedentary group where they did not have activity breaks nor did they sit on the stability balls.

The stability ball class was able to sit on them all day when receiving instruction. The sedentary class did not receive any activity. Mead et al. (2016) wanted to know the effects these different interventions had on students. After the study was done and the results were gathered, Mead et al. (2016) discovered that scores from the tests were higher for the class that had stability balls when compared to the sedentary class. They did not notice much difference when they compared scores from the stability ball class and the activity break class. This resulted in their hypothesis of how stability balls had an impact on students when taking standardized math tests to be true (Mead et al., 2016).

Research supports that exercise and physical activity can help improve academic scores and performance in students (Mead et al., 2016). Cosgrove et al. (2018) found that executive and cognitive functions are important when it comes to students learning. They suggest that schools provide opportunities for students to be physically active before, during, and after school. Bedard et al. (2019) discovered that physical activity in students is linked to improved cognitive function. They also found that this can improve students' mood and motivation towards schools and academics.

Physical Activity helps students with Intellectual Disabilities and Behaviors

Physical activity has been known to help improve the health and academic performance of students with intellectual disabilities (Everhart et al., 2012). Everhart et al. (2012) found that physical education and activity have a big part in students with disabilities being able to engage appropriately with other students. In the study that Everhart et al. (2012) did, they found that the results of providing students that have intellectual disabilities a physical activity break before they worked on math and language arts materials helped improve their scores. When the teachers from this study were interviewed, Everhart et al. (2012) indicated that the teachers

noted that students were more focused and they liked the structure of having a physical activity break each day before beginning work. They also recorded that the teachers found that students were more motivated to try their best on the assessments and assignments they had to complete after learning.

Fundamental movement skills are important in all students, especially ones with intellectual disabilities, as they are necessary to be physically active (Maiano et al., 2019). They also found that young children with intellectual disabilities can have some limitations on some of their skills resulting in them not fitting in socially. Maiano et al. (2019) found that it is important for these students to find ways to be physically active so it will not only help their academic performance but also their health and weight. The study that Maiano et al. (2019) conducted was to have students participate in some balance and strength intervention activities to see how it affected their physical and social skills as well as their performance in the classroom. They found that students with intellectual disabilities who participated in these physical activities had performed better physically and academically in the classroom than students who were not part of the intervention activities. The implementations of physical activities on students benefit them in their classroom performance and improve the health of students with intellectual disabilities (Everhart et al., 2012). Lima et al. (2011) discovered in their study that when students with intellectual disabilities have different reactions to stimuli, it helps teachers know which stimuli should be increased because it helped the student. They also found that when students had a negative reaction to certain stimuli, teachers knew to remove it or prevent it from happening so that negative behaviors wouldn't be a result.

Self-Regulation and Sensory Processing

Self-regulation is an important factor in helping students be successful with their academic achievements while they are in school (Dan, 2016). Dan (2016) defined self-regulation as mental capacities that involve impulse and emotional control, having self-guidance of thought, and behaviors that are socially acceptable for the environment that the student is in. From a very young age, students start to develop self-regulating strategies as their brain matures and they begin to understand different cognitive skills (Dan, 2016). Dan also discovered that students' ability to control their actions are based upon the environment they are in and the feedback they obtain to reinforce the positive behaviors. The study that Dan did was on self-regulating interventions and how students reacted to them. In the interventions, it was said to students that they need to believe that they are in control of their actions and need to be motivated to help themselves regulate their behaviors. After the study was conducted, Dan (2016) found that the interventions were successful in helping students regulate their behavior so that they can focus on their academics and progress in the classroom. Not only was teaching students to self-regulate their behavior in the classrooms so that it was acceptable, but it also helps students focus on their school work (Foran et al., 2017).

Self-regulation is something that different psychologists studied and it is also something that Dan (2016) talked about in the study that they conducted. Albert Bandura discovered that students learn through observations. Dan (2016) mentioned that students can figure out which behaviors are acceptable and which ones are inappropriate based on the environment they are in. Like Bandura, Dan (2016) found that Vygotsky discovered that students can have self-control based on what they learn from the environment they are in. Dan (2016) referred to students being able to scaffold behavior from their adults and peers. Dan referred to the scaffolding process as

modeling and answering questions about behaviors that students might have to help them be independent in regulating their behavior. Piaget's theory is a little different from the other two Dan discovered. Dan (2016) discovered that Piaget's theory has students self-regulate their behavior from their experiences they go through and the observations that they make from society. From these theories and psychologists, Dan (2016) found that students' ability to control their actions and behaviors are important for them to do in order to be successful in schools and society.

Like self-regulation, researchers have found that sensory processing can help manage student behaviors so they can focus in a school setting (O'Donnell et al., 2012). O'Donnell et al. (2012) define sensory processing as organizing and interpreting different stimuli through the seven different sensory stimuli. Lima et al. (2014) reported that the seven areas of sensory processing are tactile sensitivity, taste and smell, movement, underresponsive or seeking sensations, auditory, energy level, and visual. O'Donnell et al. (2012) found that if students have difficulty responding to different stimuli, might be because the environment that the student is in is either too overstimulating or there isn't enough stimulation. These types of environments can cause some students to have more behavioral or emotional problems (O'Donnell et al., 2012). Pollock et al. (2014) found that when students have sensory processing issues it can also affect their toileting habits. Multi-sensory rooms are spaces that have different items that can help provide students with the stimulation they need to help calm and relax (Stephenson & Carter, 2011). They reported that multi-sensory rooms also help motivate students to perform better in the classroom on academics. Lima et al. (2011) suggest that sensory stimulation interventions can improve the nervous system and help students process sensory information better impacting their ability to participate and communicate with peers in the classroom. Stephenson and Carter

(2011) reported that students who have severe and intellectual disabilities need to experience sensory to develop social and cognitive skills.

Stephenson and Carter (2011) discovered in their study that multi-sensory environments have positive effects on students because these rooms provide them with sensory stimulation that benefits them. They also mentioned in their study that students learn through using their senses which results in greater academic outcomes. Another thing that was discovered by Stephenson and Carter (2011) in their study was that when students used multi-sensory rooms, it helped students with behaviors because they were able to feel a sense of calmness and get themselves to a relaxed state before returning to the classroom. Every student is different and reacts to things differently. When given the right tools, students with intellectual disabilities can cope by participating in a sensory break that best suits them (Lima et al., 2011).

Attention Deficit Hyperactivity Disorder (ADHD)

Students with Attention Deficit Hyperactivity Disorder (ADHD) have problems with academic performances, but Silva et al. (2015) discovered in their study that physical activity can be used to help improve ADHD habits. They defined ADHD as someone who is inattentive, restless (hyperactive), and impulsive. In the study that they did, Silva et al. (2015) found that students who had ADHD performed better, after doing physical activity, on different tasks than students who did not do physical activity before performing the tasks. With their results, Silva et al. (2015) also discovered that after students participated in some kind of physical activity, their attention and impulse control had increased. Cerrillo-Urbina et al. (2015) also did a study where they found that exercise and physical activity could replace the medication that students with ADHD take and help with problematic behaviors that occur in the classroom. Cerrillo-Urbina et al. (2015) reported that physical activity and medications target the same catecholaminergic

systems in students, therefore both being an effective way of managing symptoms of ADHD. Similar to Silva et al., Cerrillo-Urbina et al. (2015) defined ADHD as patterns of inattentiveness and hyperactivity or impulsivity. From their study, Cerrillo-Urbina et al. (2015) discovered that students with ADHD improved their attention, hyperactivity, impulsivity, and anxiety after participating in yoga activities more so than students without ADHD. They reported that exercise is important to all students, especially students with ADHD because it changes their dopamine levels so they can focus and perform better in the classroom.

Sempere-Tortosa et al. (2020) defined ADHD as patterns of inattention and hyperactivity or impulsivity that affect students' social and academic performances negatively. In a study they did, Sempere-Tortosa et al. (2020) discovered how much students with ADHD need to move compared to students without ADHD and that they would benefit from physical activity breaks to help them focus better in the classroom. They also found in their results that when students can participate in some form of physical activity before sitting down to learn or do an academic task, they can have more focus with fewer movements in their seats. Therefore, Cerrillo-Urbina et al. (2015) suggest that students with and even without ADHD participate in some kind of physical activity regularly to maintain and improve academic achievement and intellectual functionings.

Autism

Like students who have intellectual disabilities or ADHD, students with autism spectrum disorder (ASD) may have difficulties with being social and struggles with their academics (O'Donnell et al., 2012). Students with autism have sensory processing difficulties which can cause them to respond inappropriately to stimuli by including behavior problems in the classroom making them score lower on assessments than students without disabilities

(O'Donnell et al., 2012). Students with autism and other disorders struggle with behavior which can then inhibit their academic achievement (Harvey et al., 2018). In a study that Harvey et al. (2018) conducted, they found that when teachers incorporated physical activity as part of their academic lessons, the students (most with autism) made great gains in their academics as well as their behaviors in the classroom. They also mentioned in their results that students' time on task and focus were greater when the teachers used physical activity within their academic lessons. In the research that Stephenson and Carter (2011) did, they found that multi-sensory rooms were helpful to students with autism that are anxious or over-stimulated. They said that it helps relax and calm students by utilizing the materials or objects in the multi-sensory rooms. When students are calm and relaxed, there are fewer behaviors that occur in the classroom (Stephenson & Carter, 2011).

Behavior and Teacher-Student Relationships

De Laet et al. (2016) reported that their research shows that students who show and participate in rule-breaking behavior are more at risk for failing in their academic performance. De Laet et al. (2016) defined rule-breaking behavior as not following the rules at home or school, lying, running away from home, hanging out with people who are bad influences, and skipping classes. Teacher-student relationships affect how students behave in the classroom as well as their academic performance and social-emotional development (De Laet et al., 2016). For students to show positive behavior and positive engagement, teachers-students interactions must be done in a positive way (De Laet et al., 2016). They also discovered that if a teacher-student relationship is negative, then students are more likely to be involved in situations that include rule-breaking behaviors. De Laet et al. (2016) mentioned that this goes for all students because it

helps students to improve their academics and motivation to participate in physical activity as well as tasks in the classroom.

Teacher's Perceptions

In the early years of a child's development life, it is important to develop some healthy routines for sedentary behavior and physical activity to promote positive results in the classroom (Ellis et al., 2018). Ellis et al. (2018) discovered that educators were not aware of the benefits that were provided to students when they were involved in physical activities or even spending time standing while doing tasks. They also mentioned that educators were unaware of the consequences that students encountered when they spent more time sitting while performing or being involved in academic tasks. After being interviewed by Ellis et al. (2018), teachers agreed that when implementing physical activities, they should be realistic, easy, and used consistently to help students perform in the classrooms. Teachers feel that it is important for them to be role models when doing physical activity or movement exercises (Gehris et al., 2014). In a study that Gehris et al. (2014) conducted, they interviewed teachers about their perceptions of physical activity that takes place in their classrooms. They mentioned in their results of the interviews that teachers felt that when they participated in the physical activity with their students, it created a special bond between them and the students all while helping build students' self-confidence. The teachers in this study said they started their day with different gross motor activities so that students were able to relax and be more focused when it came time for activities or academic tasks that did not need much movement (Gehris et al., 2014). The teachers also liked the fact that students were able to retain and recall different information taught through movement activities (Gehris et al., 2014). Gehris et al. (2014) reported that teachers saw students

learning more social skills when they were participating in movement during more unstructured play in the classroom.

Like teachers in the previous study, Benes et al. (2016) interviewed teachers who were knowledgeable about the benefits of physical activity, but they did not know much about how movements that are connected to learning can help benefit students in the classroom. The teachers said they had similar experiences with physical activity in their classrooms by saying that students had enjoyed doing physical activities because it increased their engagement with lessons. Benes et al. (2016) had also reported that teachers used physical activity breaks when they felt students needed to refocus or when they needed to improve their performance on a task. Another thing that teachers mentioned about physical activity was that when they connect certain movements to certain lessons, students can recall those movements to remember the content that was taught (Benes et al., 2016). Other teachers in a study done by Larsen et al. (2013) discussed that they liked implementing physical activity breaks throughout their school day because it was something that all students could do and be self-motivated in.

For teachers to implement and incorporate physical activity into their classrooms, teachers felt that they needed to be trained and know how to facilitate breaks into their school day (Larsen et al., 2013). Since teachers were lacking the knowledge and skills to implement physical activity breaks into their classrooms, most students were not meeting the 60 minutes of physical activity that is recommended (Larsen et al., 2013). Larsen et al. (2013) reported that teachers were concerned about how to include physical activity into their lessons across all content areas, knowing there is great importance for it due to the positive outcomes it has on students and their performance. Another rationale that teachers had for incorporating physical activities into their classrooms were because their students were showing a need to be active and

because it again increased their learning and performance (Larsen et al., 2013). Overall, teachers know that students need physical activity incorporated into their school day because it not only helps them develop new motor skills but it also helps students built upon the self-confidence that they need for school and throughout life (Gehris et al. 2014).

Physical Activity Interventions to Help Improve Performance

Reducing the sitting time that students have in the classroom by incorporating physical activity breaks has shown positive results among students (Ellis et al., 2018). Some activities that Ellis et al. (2018) discovered that teachers were implementing were by having small trampolines in the classroom for students to jump on and mounting different puzzles or painting options on the walls for students to complete. They also reported that teachers were moving chairs away from the tables so that students would have more standing time in the classroom. In a study done by Mead et al. (2016), they discovered that when students use stability balls in the classroom instead of chairs, students were more alert and focused when the teacher's lessons were given.

Popeska et al. (2018) reported that video games or internet-based physical activity interventions are more popular nowadays because they catch students' interest and keep them engaged. Some other songs and movement interventions that Callcott et al. (2015) found to help increase student's performance were programs called Movement ABC-2 and Moving on With Literacy. Callcott et al. (2015) reported that both of these programs allow students to be physically active through songs and movements that help them learn. The results they found were that students made greater gains than other students on their academics when they participated in these interventions. Another movement intervention that was found to be successful in helping students succeed was yoga. In studies done by Cerrillo-Urbina et al. (2015) and Perera et al (2015), they both discovered that yoga was calming and brought body awareness

to students. Students were also able to see a reduction in impulsivity and anxiety which then helped them focus better (Cerrillo-Urbina et al., 2015).

Many interventions or activities can take place inside, as listed above, but some activities can take place outside to help get students moving or physically active. Brittin et al. (2017) reported in their research that students tend to be more physically active when they are outside versus being inside. They suggested that teachers should allow students to take breaks outside when possible to promote students getting in the recommended amount of moderate-to-vigorous activity time. Larsen et al. (2013) found during their study that students were able to be more physically active when schools had facilities outdoors for students to use. In their study, the schools they included in their research had playgrounds, soccer fields, and areas for students to climb as well as places for students to participate in activities when it snowed. Brittin et al. (2017) found that when schools and teachers made classrooms, active classrooms, there were positive results that evolved from that.

Future Research

There are always researchers out there that are finding new things to research or are finding new studies to conduct. That is how people learn and find answers to things. After reading and using all the research articles for this literature review, it has been eye-opening how important physical activity is for students to participate in so that it benefits them in their academic success. Of all the articles that were read and searched through to find ones appropriate for this literature review, there were not two that had similar interventions that were done, but they all came out with similar results. Knowing this, it would be interesting to see how larger groups of students were used for these studies. Future research should be done that involves different researchers using the same methods and interventions, but having different students in different areas to see how the results would match up. Another area of future research that could be done is doing the same interventions with each grade level in a school district to see how it affects a whole district academically. This research could be done in multiple districts to see how it would affect each district differently or to see how much scores were to improve.

Conclusion

In conclusion, this literature review has looked at and discussed how physical activity does benefit students and their academic performance when they participate in it. This literature review has also given teachers and students some sensory and movement interventions that are helpful so that students can focus on the learning that takes place in the classroom. Students are expected to learn and remember a lot of information that is provided to them in schools. For students to be able to process information after receiving any kind of instruction, their brains require some kind of physical activity break (Perera et al., 2015). No Child Left Behind was put into place causing schools to cut out time for physical activity so there was more time to focus on math and reading instruction. Teachers then needed to get creative and start incorporating more physical activity into their lessons. Bedard et al. (2019) discovered in their study that when teachers implemented physical activities into their academic lessons, students were more on task and found the lessons to be more enjoyable. All of which in turn helped increase the students' academic performance.

The way students view themselves as a learner and their emotional engagement they have in the classroom also reflects upon their academic performance. There are times that physical activity has been shown to boost a student's confidence (Olivier et al., 2019). They found that when students did some sort of physical activity, they were more likely to value learning and feel competent in class. These traits would reflect in their assignments, assessments, and overall achievement. If students feel more confident in their learning, there are less likely to be times where there are behavioral problems. Students with ADHD, autism, or who have issues with behaviors can struggle with being able to stay focused and may not have ways to help self-regulate their behavior. Students like that can also struggle with sensory processing issues and be

over or under-stimulated depending on the environment they are in. Harvey et al. (2018) discovered in their research that students who struggle with behavior or sensory processing issues could benefit from participating in physical activity breaks. Harvey et al. (2018) also found that when the students take these kinds of breaks, their time on task increases as well as their attention span while aggressive or disruptive behavior decrease.

Teachers' perceptions have been a big part of how physical activities take place in classrooms. Some teachers do not know how to properly implement or incorporate physical activity breaks into their classrooms. After having talked about physical activity breaks during professional development days or talking about it with other teachers or colleagues, teachers have found many ways to include breaks into their school day. Whether it is in their lessons or squeezing in some extra time in the day for students to take a short break, it benefits students tremendously. Foran et al. (2017) concluded in their research that teachers liked having physical activity breaks as a tool they could use throughout their day. The teachers reported that it changed the moods of themselves as well as the students and helped students find enjoyment and fun in their lessons and school day (Foran et al., 2017). There are so many different interventions or objects that can be used to help students achieve and be successful. Teachers just have to find the right ones that work for their students. Once teachers get to know their students and build that relationship with them, they can read and gauge them pretty well. Physical activity breaks do not have to be taken at a certain time of day. Castelli et al. (2014) suggest that physical activity breaks be taken at any time throughout the school day. If teachers feel their class needs a boost before diving into some deep learning, they can have them get up and moving. If students have just gotten done taking a lengthy assessment, they can get their students up to do something active.

That is the great thing about physical activity breaks. There are so many things that students can do and try until they find things that help them regain focus so they are ready to learn or tackle a big assessment. By providing students with breaks that benefit them physically can in turn help them be academically and behaviorally successful in the classroom, which is what teachers and parents want to see. Students need physical activity breaks so they can learn and remember skills and knowledge that will help them throughout their schooling career and in their future.

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