

Northwestern College, Iowa

NWCommons

Master's Theses & Capstone Projects

Education

Summer 2020

Movement to Enhance Learning and On-Task Behavior in Early Childhood Classrooms

Angela James

Northwestern College - Orange City

Follow this and additional works at: https://nwcommons.nwciowa.edu/education_masters



Part of the [Early Childhood Education Commons](#), and the [Educational Methods Commons](#)

Recommended Citation

James, Angela, "Movement to Enhance Learning and On-Task Behavior in Early Childhood Classrooms" (2020). *Master's Theses & Capstone Projects*. 235.

https://nwcommons.nwciowa.edu/education_masters/235

This Article is brought to you for free and open access by the Education at NWCommons. It has been accepted for inclusion in Master's Theses & Capstone Projects by an authorized administrator of NWCommons. For more information, please contact ggrond@nwciowa.edu.

Movement to Enhance Learning and On-Task Behavior in

Early Childhood Classrooms

Angela James

Northwestern College

A Literature Review Presented

in Partial Fulfillment of the Requirements

For the Degree of Master of Education

Table of Contents

Abstract	3
Review of the Literature	5
History.....	5
Recess	7
Movement and the Brain.....	9
<i>Cerebellum</i>	9
Movement and Self-Regulation	10
<i>Self-Regulation and the Brain</i>	11
<i>Early Childhood and Self-Regulation</i>	11
Movement and Student Engagement	13
Movement and Academic Performance.....	16
Movement Strategies in the Classroom	18
<i>Movement as a Brain Break</i>	20
<i>Teacher Support</i>	22
Conclusion	23
References.....	25

Abstract

The purpose of this literature review was to examine the impact of movement on learning and behavior. The literature provides numerous studies that reveal effects of movement on student achievement and on-task behavior of young children. As educators strive to keep students engaged and on-task, research shows that movement opportunities are a strategy to be utilized. Physical activity can benefit self-regulation and academic performance. Strategies for using movement in the classroom are given to support teachers.

Introduction

Keeping children engaged and having them maintain on-task behavior is essential to students' learning achievement (Iverson, 2019). Teachers are searching for strategies to reduce off-task behaviors, and movement activities are something to be considered (Iverson, 2019). The basis of all active learning in early childhood is movement (Shoval, Sharir, & Shulruf, 2013). That raises the question of whether intentionally incorporating movement can increase on-task behaviors and improve academic performance in the early childhood classroom.

Miramontex & Schwartx (2016) define off-task behavior in school as being disengaged from the academic activity that is taking place. Some examples of off-task behaviors include not responding to directions, engaging in other conversations or activities, staring into space, getting out of their seat, and being disengaged from the academics that are being taught (Miramontez & Schwartz, 2016). These behaviors negatively affect student learning (Baker, 2007). When a child is on-task, they are looking at the adult who is giving the instruction, looking at the assignment, using materials appropriately, and following the directions (Miramontez & Schwartz, 2016). Teachers desire to create a classroom environment that encourages students to stay engaged and focused, since this is critical to helping students' make achievements academically (Iverson, 2019).

This literature review seeks to synthesize the literature surrounding the use of movement to influence academic performance and on-task behavior in early childhood. The literature suggests the primary benefits of movement pertain to recess, the brain, self-regulation, student engagement, academic performance, and classroom use. It is the desire of teachers to help students learn using strategies based on research.

Review of the Literature

History

Educational philosophers' opinions of movement in the classroom have differed since the establishment of kindergarten in the mid 1800's. Kindergarten was first instituted by Friedrich Froebel in 1837 for children to learn through play (Muelle, 2013). The Froebel concepts impact early childhood development today, as he saw a child as a seed in a garden that would eventually develop and it was the job of education to provide that environment for growth (Sniegoski, 1994). The classroom culture was to be based on the interests and activities of the child and the teacher's job was to stimulate the child's development, not interfere with free play (Sniegoski, 1994).

Maria Montessori was an Italian physician and educator who started a childcare center in 1906 focused on working with poor and disadvantaged children, whom many believed were unable to learn (History of Montessori, 2020). She kept the students engaged in hands-on learning experiences and noticed that the children absorbed knowledge from their surroundings (History of Montessori, 2020). Montessori asserted movement is what connects, and is dependent upon, mental development (Montessori & Claremont, 1969). She also saw the mind and movement as a connected and continual entity (Montessori & Claremont, 1969). Montessori shared that in order to broaden their understanding, children are to use movement (Montessori & Claremont, 1969).

Jean Piaget was an influential researcher in the 20th century that was interested in how children think (Huitt & Hummel, 2003). Piaget's theory connects with Montessori, which is based on activity being an essential part of learning (Muelle, 2013). Piaget proposed that knowledge originates from action (Piaget, 1952, as cited in Savina et al., 2016). Preschool and

primary classrooms that encourage discovery learning and support the interests of the child follow Piaget's philosophies (Huitt & Hummel, 2003).

Howard Gardner's published work from 1983 describes a theory that humans have multiple intelligences, and one or more is dominant in each person (DeVries, 2015). He believed that all of the intelligences must be developed. The kinesthetic learner is one of the multiple intelligences from Gardner's work. This person is able to use their body to play and move as they connect with learning (DeVries, 2015).

In 2001, the No Child Left Behind Act (NCLB) was instituted to increase accountability of public schools with respect to student achievement (U.S. Department of Education, 2004). This increase focused on achievement outcomes which resulted in a stronger reading focus in the younger grades (U.S. Department of Education, 2004). Because of this initiative, many children have less free time, reduced recess, and fewer physical activities at school, and are encouraged to focus more on math and reading instead (Barros et al., 2009). Following NCLB, early childhood education has transformed to focus more on structure, testing, and academic achievement (Furmanek, 2014). Due to the focus on annual testing and adequate yearly progress, the physical activity and health of students has suffered (SHAPE, 2016a). Twenty percent of schools in the United States decreased recess time from 2001-2006 (Shammas, 2019). Statistics show that in 2010, about half of schools were failing, as they did not make adequate growth for the year (Hunt Institute, 2016).

The NCLB was replaced by Congress in 2015 with the Every Student Succeeds Act (ESSA), in order to create a well-rounded education by including health and physical education (SHAPE, 2016a). Federal funding was provided to help improve physical education activity

(SHAPE, 2016b). It may be too soon for researchers to know whether the inclusion of health and physical education has made changes to academic progress.

Recess

Recess is defined as a break during the school day that is unstructured, which allows children the time for free play (Waite-Stupiansky & Findlay, 2001). It is a tool that schools use to allow students to have brain breaks and physical activity, along with developing social skills (Wiebelhaus & Hanson, 2016). This is a time for children to be able to communicate, share, and problem solve, since free play is an important and needed part of the school day for children (Brez & Sheets, 2017). Many children love, anticipate, and are fully engaged in this time of needed play in the daily school schedule. Recess should not be viewed as a separate aspect of learning, but rather as a necessary part in the learning process (Dotson-Renta, 2016). According to the American Academy of Pediatrics, recess is necessary for child development, and should not be taken away for behavior or academic reasons (Murray & Ramstetter, 2013).

Holmes, Pellegrini, and Schmidt (2006) sampled two different preschool classrooms from a private school in northeastern United States. One class met in the morning, with five boys and nine girls and the other met in the afternoon with four boys and ten girls. The curriculum was play-based with various periods of academic work included. After the academic work was finished, recess was held. After recess, a story was read to them. The length of the recess was intentionally varied in 10-minute, 20-minute, and 30-minute increments. The children were observed three days a week, during and after outside recess, for 16 observations over one and a half months. They were observed 10 minutes before and after each recess. Each child's behavior was recorded every 30 seconds, noticing inattentive and attentive behaviors toward the teacher. For all of the children, their attention was the greatest after the 20-minute recess break,

followed by the 10-minute and 30-minute times. This study was an exploration of the effects of different recess amounts on preschoolers' attention in the classroom. The conclusion was that short and frequent breaks maximize the attention for young children (Holmes et al., 2006).

Recess is an opportunity for health, learning, and social skill development (Barros et.al, 2009). Wiebelhaus & Hanson (2016) reported findings from their study with three kindergarten students in a public Title 1 school in the upper Midwest. The qualitative methods for this study included interviews, notes, videotaping, and charts. The kindergarten teacher collected data for the study before, during, and after gross motor stations for eight weeks. The students were videotaped during whole group lessons before the gross motor stations, and again after the stations to set the baseline for off-task behaviors. The results showed that classroom movement activities decreased students' off-task behaviors and they were more attentive during whole group instruction (Wiebelhaus & Hanson, 2016).

The Let's Inspire Innovation 'N Kids (LIINK) project (LIINK, 2020a) was designed to increase unstructured, outdoor recess and character education for students. The first-year intervention included a cohort of schools focused on kindergarten and first grades. The off-task student behavior data has been compared between the treatment school (who is doing the intervention), and a comparison school in the area, who is not participating (LIINK, 2020a). Teachers have been trained and students have been scheduled with four, 15-minute breaks during the school day (LIINK, 2020c). The results consistently show the off-task behaviors in the intervention groups are notably lower than the comparison school (LIINK, 2020b). The LIINK project also noticed that children look forward to recess, the transition time to and from recess has decreased, children are more focused, academic performance increased remarkably in reading and math, and misbehavior during recess has decreased significantly (LIINK, 2020b).

Movement and the Brain

Early childhood is an important stage for brain development, and movement can help with this process (Kerpan, Humbert, Rodgers, & Stoddart, 2019). Scientists have evidence of major connections between the brain's performance and physical engagement (Stevens-Smith, 2016). A study took place where an electrode connection was placed on a child's head, which was connected to a computer program to map the areas of the brain (Stevens-Smith, 2016). The child was observed while reading, doing math, and being physically engaged at the same time. With these activities, certain parts of the brain would light up, showing that the brain was being activated (Stevens-Smith, 2016; Jensen, 2000). The areas of the brain that lit up when the child would read or perform math skills were the same areas that were lit up when the child was in a physical activity (Stevens-Smith, 2016; Jensen, 2000). These results continue to support the fact that physical engagement enhances learning connections (Stevens-Smith, 2016).

Cerebellum

The cerebellum is located at the back of the head, near the brainstem (Cherry & Lakhan, 2020), and is the size of a small fist (Jensen, 2005). It comes from the Latin word which means, "little brain", and it is responsible for coordinating movements, motor skills, balance, and posture (Cherry & Lakhan, 2020). It receives information from other parts of the brain, which then controls movements (Cherry & Lakhan, 2020). Researchers believe that the cerebellum plays a role in thinking, attention, and processing language (Cherry & Lakhan, 2020).

In the past, evidence was suggested that the cerebellum was solely connected with movement, but studies now show that it is also connected with cognition or thinking (Savina et al., 2016). The part of the brain that processes learning is the same that processes movement (Jensen, 2005). Most neuroscientists agree with this connection between movement and

cognition (Jensen, 2005), and believe there is an apparent link between the two (Waite-Stupiansky & Findlay, 2001). As exercise occurs a chemical is released, which allows the neurons to communicate with each other (Waite-Stupiansky & Findlay, 2001). This physical activity also increases oxygen to the brain (Jensen, 2005). The brain needs oxygen as it is vital to the learning process (Stevens-Smith, 2016). While we are moving, we are doing our best thinking (Medina, 2008). As children are playing games, their brain is being activated in many areas, which then triggers learning (Jensen, 2005). At other times, students may need slower movements, in order to calm down and concentrate (Jensen, 2005). Movement should be a common part of the school day, as that is what will influence children's brains, strengthen learning, and help with motivation and memory (Jensen, 2005).

Movement and Self-Regulation

Self-regulation occurs when a person is able to manage their emotions and attention in order to control impulses and behavior, solve problems, and complete tasks (Murray et al., 2015). A key indicator of self-regulation is on-task behavior, as students are able to pay attention and manage behavior with the situation that is currently happening (Kerpan et al., 2019). This behavior is an important skill in life (Dan, 2016), as it affects so many aspects of learning. When children struggle with this skill, they have trouble with concentration, sitting still, and participation with learning activities (Gillespie, 2015). One of the hardest things for young children, in regard to self-control, is resisting emotional impulses (Tarullo et al., 2009). There are various environmental factors, such as where the child grows up, genes, and temperament, which affect self-control (Tarullo et al., 2009). This is a learned behavior, and as children receive positive encouragement from their environment, they in turn desire to develop self-control (Dan, 2016).

Self-Regulation and the Brain

In relation to self-control, there are several regions of the brain that support a child's ability to control impulses (Tarullo et al., 2009). The prefrontal cortex is a part of the brain that is behind the forehead (Tarullo et al., 2009). This area is involved with suppressing impulses, following rules, reasoning, and decision making (Tarullo et al., 2009). These higher order skills that coordinate thinking and behavior are also referred to as executive functions (Williams, 2018).

The ability to develop self-control is a long process, as the brain regions involved are immature at birth and are fully mature at the end of the adolescent years (Tarullo et al., 2009). Between the ages of 3-6, there is swift brain growth in the prefrontal cortex, which aids in the development of self-regulation and executive functions (Williams, 2018). Preschool and kindergarten students become more capable of exercising better self-control, as they refrain from certain behaviors and are able to perform complicated directions (Dan, 2016). In order for these brain connections to mature faster, a very structured environment is needed (Tarullo et al., 2009). Predictable routines also support children's self-control growth (Tarullo et al., 2009). The learning experiences that are provided in early childhood help shape the parts of the brain that affect self-control (Tarullo et al., 2009). It is the responsibility of early childhood teachers to provide opportunities for children to regulate their thinking, emotions, and behavior (Williams, 2018).

Early Childhood and Self-Regulation

To be able to pay attention, children need to have some control over their body (Wiebelhaus & Hanson, 2016), and be able to take responsibility for their own learning (Perels et al., 2009). Teachers can support self-regulation behaviors through daily classroom activities

(Dan, 2016). Any of these skills can happen with enjoyable and fun activities that keep children engaged (Williams, 2018). Coordinated movement activities are effective ways to encourage self-regulation, as children strive to synchronize to a given beat or rhythmic movement (Williams, 2018).

Zachariou & Whitebread (2015) explored a case study of ten 6-7-year-old students to determine if musical play provided opportunities for self-regulation behaviors. Each of the six musical sessions lasted 35 minutes as students worked in pairs or groups in the following types of activities: handclapping games, circle games, movement, instrument, and a combination of musical play. The musical play activities were recorded and the following self-regulatory behaviors were identified and coded: metacognitive knowledge behavior, metacognitive regulation behavior, and emotional/motivational regulation behaviors. Based on the data results, musical play provided an opportunity for self-regulatory behaviors to increase in each of the three areas. Instrumental play showed the most self-regulatory behaviors, whereas handclapping games and movement play provided the least amount of self-regulatory behaviors. It is interesting to note that the instrumental play activities were less teacher-led and more open-ended (Zachariou & Whitebread, 2015).

Kerpan, Humbert, Rodgers, & Stoddart (2019) did a study with a kindergarten and first grade combined class at an Indigenous school in Canada regarding off-task behavior. The class of 14 students participated in the intervention activities, but 9 students were a part of the measurable data. The school day was divided into 45-minute periods, with numerous learning activities taking place. Practice data was collected for one-week, which was the non-active class time where no physical activity was taking place. Data for on-task behavior was taken during the mid-morning lesson and mid-afternoon lesson. After the one-week non-active lesson, there

were two weeks of active lessons, where the same academic content was taught, but in the middle of the lesson the students participated in a five-minute physical activity game. This activity was related to the content that was being taught, and was adapted from the *Energizers* activities. Two observers assessed the on-task behavior by observation and the guidelines for measuring the behavior were clearly defined beforehand. When the nine participants received no physical activity, there was a significant difference from the beginning of class to the end of the class regarding on-task behavior. Students were 15.7% more off-task at the end of class without the movement intervention. Their ability to stay on-task after 45-minute of instruction dropped significantly. This finding demonstrates the link between movement and self-regulation in young children, as on-task behavior decreased with no physical activity, and increased with physical activity (Kerpan et al., 2019).

Movement and Student Engagement

Student engagement is the attention and interest students show when they are learning, which connects with their motivation in order to add to the progression of their education (Great Schools Partnership, 2016). Engagement is apparent when students are in tune with what the instructor is teaching them. When children are engaged, they are interested, listening, focused, and learning. This concept is based on the belief that a student's learning improves when they are interested or inspired and it suffers when they are bored or disengaged (Great Schools Partnership, 2016). In learning environments today, the goal is for students to be engaged, so that learning and thinking are happening together.

Lindt and Miller (2017) conducted research to compare the outcomes of movement and nonmovement lessons on engagement in second and third grade reading and math classes taught by four teachers. The teachers were trained in the approach, and taught one week of lessons that

included movement and one week of lessons that did not include movement. They rated students' interest levels, observed the students, and recorded video sessions following each lesson. They discovered the students were more engaged, focused, and excited about the lessons that integrated movement (Lindt & Miller, 2017).

Lay (2016) shared an action research study from her kindergarten classroom in the upper Midwest, which consisted of 23 students. Weather permitting, kindergarten students received one 25 minutes of recess each day. Lay tested an intervention of additional afternoon movement activities on student outcomes. This research took place during their end-of-the-day reading block. There was a two-week observation period to track off-task behaviors during a ten-minute period of independent work time during reading to serve as the baseline. The results from the observation of off-task behaviors were tallied and separated into the following categories: incomplete work, redirection given, and students seeking extra movement or sensory input. Next began the two-week movement intervention time. During the first week, Lay created a time for an additional ten-minutes of outdoor recess in the afternoon, and before the independent work time, she led students in movements from Brain Gym. During the second week of the movement intervention, in addition to the afternoon recess, a Movement Corner was developed in a corner of the classroom with photos of learned movements to help focus and engage the students. Students were able to visit the corner when they needed more movement, and then could return to their work. There were 15 instances of incomplete work during the initial observation and 3 during the movement intervention period. There were 53 redirections given during the baseline observation period and 32 redirects given during the movement intervention. There were 32 movement seeking behaviors during the observation period and 8 movement seeking behaviors during the movement intervention. Lay's findings showed that when students participated in

additional movement, there was a decrease in incomplete tasks, off-task reminders, and behaviors seeking attention (Lay, 2016).

Students have diverse needs and schools work to meet the needs of all learners, even those with difficult behaviors (Harvey et al., 2018). Off-task behavior is usually caused when children sit for long periods of time during classroom instruction without any type of movement integration (Goh et al., 2018). Disruption within the classroom setting and among students is also caused by this behavior (Mahar et al., 2006). As young children participate in tasks where effort and concentration are expected, breaks are very much needed (Holmes et al., 2006).

Mahar, Murphy, Rowe, Golden, Shields, and Raedeke (2006) conducted research in North Carolina with kindergarten through 4th grade students, which had 15 classes--three classes per grade. Training was given to the teachers on the *Energizers* classroom activities, and they led the students in one 10-minute activity each day for 12 weeks. The physical activity assessment was given at all grade levels. The on-task behavior assessment intervention was given in two 3rd grade classrooms and two 4th grade classrooms. It was given for 30 minutes during academic instruction right before and for 30 minutes after the students performed the *Energizers* activity. Results showed that on-task behavior improved after the *Energizers* activity, and the mean percentage increased by more than 8%. Teachers also indicated classroom behavior improved when students were given more movement during the day (Mahar, et al., 2006). Being mindful of this strategy can really benefit the overall classroom culture.

Students are more engaged in, focused upon, and excited with lessons that integrate movement (Lindt & Miller, 2017). Children have fun when physical activity is used in the classroom (Guarino, 2014), which also is a motivation technique (Vazou et al., 2012). The positive social interactions that take place also support the enjoyment that students have during

these movement breaks (Martin & Murtagh, 2015). Students may see this as a break from academics, but there are many other positive cognitive benefits (Savina et al., 2016).

Movement and Academic Performance

Children's academic achievement and performance are helped when a classroom environment is created to encourage them to stay engaged (Iverson, 2019). Academic performance is shown through assessment scores and involves the results from a student's education (Sullivan et al., 2017). Notable behaviors that result in academic achievement are concentration, paying attention and being on-task (Sullivan et al., 2017). As physical activity is integrated into the academic content of the day, it not only maintains on-task behavior, but it also has a positive effect on academic performance (Savina et al., 2016). When off-task behaviors are lessened, students are able to focus on instruction, which shows that movement in the classroom is able to support student learning (Wiebelhaus & Hanson, 2016).

Merritt (2017) performed an action research study in a kindergarten classroom with eight boys and seven girls to determine if growth in academics was affected by using a planned physical activity curriculum. The growth in academics was determined from the fall to winter F.A.S.T. assessment. Informal and formal surveys were used with students to reflect on their learning and feelings about their growth every two weeks. Throughout the four-month duration of the study, six surveys were given to the students. Every morning a twenty-minute block of time was set aside for the exercises from the A Chance to Grow curriculum. Student survey results show that 98% of students believed that learning in kindergarten was fun and creative. The F.A.S.T. assessment showed 100% positive growth for the fifteen kindergarten students, comparing data from the fall to winter testing periods. The findings reveal that having planned curriculum with movement and exercise will have a positive impact on academics and student

engagement (Merritt, 2017). While the absence of a control group may mean the results cannot be attributed entirely to the intervention, the findings suggest the intervention could be attributed to some of this success.

When classroom movement opportunities take place, behaviors, attitudes, and academic achievement improve (Mok et al., 2020). Some may believe physical activity breaks could be a distraction, yet reports show that devoting this time during the school day does not detract from academic performance (Erwin et al., 2011). This is due to the fact that students have demonstrated willingness to learn, and were more attentive and alert following movement activity (Bershlinger & Brusseau, 2013).

Gehris, Gooze, and Whitaker (2014) examined the impact of movement on student learning. They studied six focus groups and thirty-seven teachers over a three months' time in a Head Start program that served 1100 low-income, preschool-aged children located within three cities in Pennsylvania. The participants were given open-ended questions, along with specific questions on teachers' perceptions of movement being used to influence student learning, types of movement that are most beneficial, proper settings to support movement experiences, challenges that hinder movement experiences, and how those can be overcome. The responses were recorded and coded with key phrases that were used. Based on the teacher responses, the researchers found that teachers perceive children have a need to move, and this is how children learn best. The teachers described how children were able to remember concepts through movement, so children can be provided with physical activities to teach learning concepts. The teachers also shared they started the day with gross motor movement so their students would focus during sedentary activities. The results also stated that teachers believed children were

motivated to move when their teachers moved with them, as movement experiences build social skills (Gehris, Gooze, and Whitaker, 2014).

Movement Strategies in the Classroom

Movement is used as a tool in the classroom in order to create meaningful learning (Guarino, 2014). Movement integration provides opportunities for student physical activity during class time (Kerpan et al., 2019). This could happen when a movement activity is integrated into the curriculum, or as an opportunity to increase physical activity when there is no connection to academic learning (Kerpan et al., 2019). Both types of breaks contain active movement, yet the major difference is whether or not academic content was connected with the break (Fedewa et al., 2018). If academics are not connected to the break, the purpose is to refocus and energize the students without a planned, targeted outcome (Orlowski et al., 2013).

Miller & Lindt (2018) shared a study focused on movement lessons that integrated physical activity into academic content. The study took place in a public elementary school in North Texas. The selected math and reading classes were from two second and two third grade classes. All of these students participated in the lessons and assessments, but data was taken from 76 students. This program took place two weeks before the end of the school year. Two classes were the control group and the other two were the intervention group for the first week, and then they switched for the second week. During the lesson, the classroom teachers tallied the students' on- and off-task behaviors, made note of any comments on the major differences between student behaviors, summarized the classroom environment, and discussed the student engagement after the lesson. To determine if students were retaining the reading and math content knowledge, pretests and posttests were given with 10 questions and scored on a 100-point scale. Two math and reading classes had greater retention scores in the movement

intervention, while two reading and math classes had greater scores in the traditional control group. The findings also showed that the majority of students enjoyed and were excited during the movement lessons. The majority of the students were engaged, participating, and involved more so during the movement lessons. In regards to content retention, the movement intervention worked for half of the classes (Miller & Lindt, 2018). An inference based on the findings revealed that more research is needed, as the teacher's influence and the timing of the school year for this intervention could affect the results.

Griss (2013) describes kinesthetic teaching as bringing physical movement into the classroom to connect it to the content that is being taught. An example of kinesthetic teaching is when students are asked to physically respond to a question, such as 'show me how the character feels at the end of a story,' 'show me what a comma looks like,' and 'show me an animal that lives on a farm.' As the students respond, their learning is visible. Students are able to activate physical, social-emotional, and cognitive responses to what they are learning, which makes learning meaningful (Griss, 2013).

Active lessons add interest and motivation for students, as they are more engaged in the learning process (Orlowski et al., 2013). Students are not receiving the facts passively, which enhances the learning experience (Stevens-Smith, 2016). As the movement is connected to a new idea through a physical learning experience, new information becomes more likely to be remembered (Guarino, 2014). Teachers can use movement activities to help children understand new concepts (Gehris et al., 2014). Students can walk, run, skip, and hop to review or learn new content (Savina et al., 2016). Educators use similar activities during patterning in math to jump, wiggle, clap, jump, wiggle, clap (Furmanek, 2014). Science vocabulary can be built as students dance or act out the vocabulary word that is called out (Furmanek, 2014). Students can show

facial emotions relating to a book that was just read, discovering the meaning of new emotion words (Lindt & Miller, 2017). Young learners can hop forward and backward on a number line as they learn about addition and subtraction (Lindt & Miller, 2017). Students can move around the classroom as the teacher calls out a different skill for them to do, such as skipping, galloping, or running in place (Vazou et al., 2012). Children can practice walking on balance beams, crawling, or play a game of hopscotch (Wiebelhaus & Hanson, 2016). The class can have a dance party or play Duck, Duck, Goose (Mulrine et al., 2008). Circle games could be played with movement to a rhythm or music (Williams, 2018). Students could dance, do aerobics, play Simon Says, or run a relay outside (Furmanek, 2014).

Lindt & Miller (2017) suggested students dance to learn a new idea, such as skip counting by doing the Macarena, use their bodies to show concepts, use motions from a song or hand gestures to remember an idea, and use movements to communicate their answer to a content question. During one study, dancing using songs and actions was integrated during content learning, learning new information, and for review games of content knowledge before an assessment (Lindt & Miller, 2017). In order to grasp concepts, students moved around the room to stations, as they were representing learning with their actions, which had a positive effect on their learning and physical activity (Lindt & Miller, 2017). While no quantitative evidence was offered, Lindt & Miller (2017) determined that students were engaged and focused on the lessons with movement activities, rather than those without.

Movement as a Brain Break

Brain breaks are movement activities provided for students throughout the day to have a break from academic tasks (Wiebelhaus & Hanson, 2016). Providing this time to students will help children stay focused and engaged. Using phrases in the classroom, such as “to keep your

brain awake” or “it’s time for a brain break” introduce young students to an idea that their brain is a very important part of their body, and that movement and thinking are a connection to the brain.

Weslake and Christian (2015) focused on three different brain breaks in a third-grade classroom with twenty-three students. Each of the weekly brain breaks took place for five minutes during the math lesson. The first week focused on relaxation and breathing, and the students ranked it as low enjoyment. It took two to five minutes to get the students to refocus. The second week consisted of a highly physical brain break, and the students were highly engaged. It took an average of 5 minutes and 48 minutes to regain focus. The third week involved some physical activity and the movement was related to the math content. The average time to refocus was 1 minute 24 seconds. Based on the student perceptions and teacher observations, the mathematics brain break was easier for students to refocus, and was students’ preferred activity (Weslake and Christian 2015).

Ackerman (2018) observed her preschool students to determine if brain breaks would help off-task behaviors during their end of the day activities. There were 25 students observed, 13 in the morning class and 12 in the afternoon class. Data was recorded during the final 10 minutes of their large group meeting time for six weeks. The associate collected data by recording reminders that students needed, whether it was to raise their hand, sitting crisscross, hands in their lap, or eyes on the teacher. The baseline data took place for two weeks. A two-week brain break intervention was added before the end of the day meeting and data was recorded. For the final two weeks, recess time was moved for students to play outside before the end of the day meeting and data was recorded. Results showed that the total number of reminders needed for off-task behavior during the baseline observation was 146. After the 10-

minute brain break was included, the number decreased to 88 reminders. When the students had a 15-minute recess break, the off-task reminders decreased to 46. The study concluded that fewer reminders are needed for off-task behavior as more movement opportunities were provided (Ackerman, 2018).

Teacher Support

Movement is a natural tendency in young children, and when movement is linked to teaching practices, a mind and body connection happens that enhances children's learning (Furmanek, 2014). Young children have a need to move and teachers can respond by teaching spatial awareness and academic concepts (Gehris et al., 2014). It is crucial for the teacher to create an active classroom environment for students (Orlowski et al., 2013). If educators are committed to this, their influence on student learning and health will have great potential (Bershwiner & Brusseau, 2013). Teachers must plan and provide these physical movement opportunities for their students (Furmanek, 2014), as these activities can be easily integrated into the classroom schedule (Goh, 2017). Teachers have the unique privilege to inspire a lifelong love of movement (Furmanek, 2014), through the connection with cognitive activity.

The Centers for Disease Control (CDC) recommends that schools provide professional development to teachers on ways to increase physical activity in the classroom (CDC, 2018), as teachers are not generally trained on this idea (Wadsworth et al., 2012). Teachers need to understand the benefits of classroom activity towards learning, so they do not view activity as taking away from academics (Erwin et al., 2011). Physical education teachers can collaborate with classroom teachers to share insight as to other movement ideas to utilize during the day (Orlowski et al., 2013). By providing teachers with training, lesson ideas, and equipment (Martin & Murtagh, 2015), they will likely desire to do these activities if it doesn't seem

cumbersome (Erwin et al., 2011). Teachers are constantly making daily decisions in order to use the time that they have with their students wisely. If staff are able to view classroom physical activities as a tool to help their students with mood, energy, and learning, it will be enjoyable for all (Orlowski et al., 2013).

Conclusion

Movement is a key component to enhance learning and behavior. Self-regulation skills can be developed through movement activities. Self-regulation is a needed skill for students to be able to learn and behave. In particular, research must be conducted to determine whether specific types of movement have more impact, and whether students with particular characteristics benefit more than others.

No Child Left Behind legislation focused heavily on math and reading. In recognition of the need for a more well-rounded education, the Every Student Succeeds Act mandated physical education and health inclusion into the curriculum for all children. Unfortunately, limited research has been conducted to determine whether this inclusion has impacted students' academic achievement. Future research is also needed to determine whether increasing physical activity for children through teacher-led movement and student-led movement directly impacts academic achievement. This information can help with planning school schedules, which may need to be modified to include more movement opportunities during the school day.

This literature review has shown that movement is extremely important in the early childhood classroom. It is a necessity for students' ability to learn, grow, and stay engaged during lessons. Movement aids in the opportunity for students to be able to have on-task behavior. Teachers can know with confidence that as they increase the activity levels during the day, their students' behavior and alertness can improve (Bershwiner & Brusseau, 2013). As

children have opportunities to move, their off-task behaviors are decreased, they are focused on instruction, and the classroom environment is more successful (Wiebelhaus & Hanson, 2016).

Utilizing physical activity breaks during the day is an effective way to support learning and development (Furmanek, 2014). It has the ability to reach all students, can be implemented across the curriculum, and is an important tool for learning (Guarino, 2014). Evidence shows that movement activities are low-cost and easy to implement, while improving learning, on-task behavior, self-regulation, academic performance, and the health of today's youth (Savina et al., 2016).

References

- Ackerman, A. L. (2018). Relationship between movement and student behaviors. *Northwestern College NWCommons master project*. Orange City, IA.
- Baker, Ryan. (2007). Modeling and understanding students' off-task behavior in intelligent tutoring systems. Conference on Human Factors in Computing Systems - Proceedings. 1059-1068. 10.1145/1240624.1240785.
- Barros, R. M., Silver, E. J., & Stein, R. E. K. (2009). School recess and group classroom behavior. *Pediatrics*, 123(2), 431–436. <https://doi.org/10.1542/peds.2007-2825>
- Bershwiner, T., & Brusseau, T. A. (2013). The impact of classroom activity breaks on the school-day physical activity of rural children. *International Journal of Exercise Science*, 6(2), 134–143.
- Brez, C., & Sheets, V. (2017). Classroom benefits of recess. *Learning Environments Research: An International Journal*, 20(3), 433–445. <https://doi.org/10.1007/s10984-017-9237-x>
- Centers for Disease Control and Prevention. (2018, November). *Strategies for Classroom Physical Activity in Schools*. Retrieved from US Department of Health and Human Services:
https://www.cdc.gov/healthyschools/physicalactivity/pdf/2019_04_25_Strategies-for-CPA_508tagged.pdf
- Cherry, K., & Lakhan, S. (2020, June 16). *What is the cerebellum?* Retrieved from Very Well Mind: <https://www.verywellmind.com/what-is-the-cerebellum-2794964>
- Dan, A. (2016). Supporting and developing self-regulatory behaviours in early childhood in young children with high levels of impulsive behaviour. *Contemporary Issues in Education Research*, 9(4), 189–200. <https://files.eric.ed.gov/fulltext/EJ1116432.pdf>

DeVries, B. A. (2015). *Literacy assessment and intervention for classroom teachers (4th ed.)*.

Scottsdale, AZ: Holcomb Hathaway, Publishers, Inc.

Dotson-Renta, L. (2016). Why young kids learn through movement. *The Atlantic*. n/a.

Retrieved from <https://www.theatlantic.com/education/archive/2016/05/why-young-kids-learn-through-movement/483408/>

Erwin, H. E., Beighle, A., Morgan, C. F., & Noland, M. (2011). Effect of a low-cost, teacher-directed classroom intervention on elementary students' physical activity. *The Journal of School Health, 81*(8), 455–461. <https://doi.org/10.1111/j.1746-1561.2011.00614.x>

Fedewa, A. L., Cornelius, C., Erwin, H. E., Ahn, S., & Stai, C. (2018). Examining the influence of teacher behavior and curriculum-based movement breaks. *The Journal of Educational Research, 111*(5), 584–593. <https://doi.org/10.1080/00220671.2017.1323719>

Furmanek, D. (2014). Classroom choreography: enhancing learning through movement. *Young Children, 69*(4), 80–85.

Gehris, J., Gooze, R. A., & Whitaker, R. C. (2014). Teachers' perceptions about children's movement and learning in early childhood education programmes. *Child: Care, Health, and Development, 41*(1), 122-131.

Gillespie, L. G. (2015, July). Rocking and Rolling—It Takes Two: The Role of Co-Regulation in Building Self-Regulation Skills. Retrieved from NAEYC:
<https://www.naeyc.org/resources/pubs/yc/jul2015/rocking-rolling>

Goh, T. L., Fu, Y., Brusseau, T., & Hannon, J. (2018). On-task behavior of elementary students during movement integration. *Journal of Physical Education and Sport, 18*(1), 103–106.
<https://doi.org/10.7752/jpes.2018.01013>

Great Schools Partnership (2016, February 18). Student Engagement. Retrieved from The

- Glossary of Education Reform: <https://www.edglossary.org/student-engagement/>
- Griss, S. (2013, March 20). The Power of Movement in Teaching and Learning. Retrieved from Education Week Teacher: https://www.edweek.org/tm/articles/2013/03/19/fp_griss.html
- Guarino, J. (2014). Building a community with a kinesthetic classroom. *Educator's Voice*, VII, pages 24-31.
https://www.nysut.org/~media/files/nysut/resources/2014/april/edvoice7_03_kinesthetic_classroom.pdf?la=en
- Harvey, S. P., Lambourne, K., Greene, J. L., Gibson, C. A., Lee, J., & Donnelly, J. E. (2018). The effects of physical activity on learning behaviors in elementary school children: a randomized controlled trial. *Contemporary School Psychology*, 22(3), 303–312.
<https://doi.org/10.1007/s40688-017-0143-0>
- History of Montessori*. (2020). Retrieved from American Montessori Society:
<https://amshq.org/About-Montessori/History-of-Montessori>
- Holmes, R. M., Pellegrini, A. D., & Schmidt, S. L. (2006). The effects of different recess timing regimens on preschoolers' classroom attention. *Early Child Development and Care*, 176(7), 735–743.
- Huitt, W., & Hummel, J. (2003). Piaget's theory of cognitive development. Educational Psychology Interactive. Valdosta, GA: Valdosta State University.
https://intranet.newriver.edu/images/stories/library/stennett_psychology_articles/Piagets%20Theory%20of%20Cognitive%20Development.pdf
- Hunt Institute (2016). *ESEA Reauthorization-Every Student Succeeds Act*. Retrieved from The Hunt Institute: http://www.hunt-institute.org/wp-content/uploads/2016/01/Update_ESEAREauthorization_Final_ForWeb.pdf

- Iverson, R. (2019). The impact of physical activity breaks in the classroom. *Northwestern College NWCommons master project*. Orange City, IA.
- Jensen, E. (2000). *Brain-based learning: The new science of teaching & training* (Rev.). Corwin Press.
- Jensen, E. (2005). Teaching with the brain in mind (2nd ed., rev. and updated, Ser. Gale virtual reference library). Association for Supervision and Curriculum Development.
- Kerpan, S., Humbert, M. L., Rodgers, C. D., & Stoddart, A. L. (2019). Improving kindergarten and grade one indigenous students' on-task behavior with the use of movement integration. *Journal of American Indian Education*, 58(1-2), 84–107.
- Lay, C. (2016). The Connection Between Movement and Student Engagement in a Kindergarten Classroom. *School of Education Student Capstone Theses and Dissertations*.
https://digitalcommons.hamline.edu/hse_all/4253
- LIINK. (2020a). Logic behind liink. *Texas Christian University*. Retrieved from Let's Inspire Innovation 'N Kids: <https://liinkproject.tcu.edu/about-us/logic-behind-liink/>
- LIINK. (2020b). The liink project end of year report. *Texas Christian University*. Retrieved from <http://liinkproject.tcu.edu/wp-content/uploads/2014/11/TCU-Liink-Project-End-of-First-Year-Report.pdf>
- LIINK. (2020c). Unstructured, outdoor play breaks. *Texas Christian University*. Retrieved from: <https://liinkproject.tcu.edu/action/character-development/>
- Lindt, S. F., & Miller, S. C. (2017). Movement and learning in elementary school. *Phi Delta Kappan*, (98)7, 34-37.
- Mahar, M. T., Murphy, S. K., Rowe, D. A., Golden, J., Shields, A. T., & Raedeke, T. D. (2006).

- Effects of a classroom-based program on physical activity and on-task behavior. *Medicine and Science in Sports and Exercise*, 38(12), 2086–94.
<https://doi.org/10.1249/01.mss.0000235359.16685.a3>
- Martin, R. and Murtagh, E. M. (2015). 'Preliminary findings of active classrooms: An intervention to increase physical activity levels of primary school children during class time'. *Teaching and Teacher Education*, 52, 113-127.
<http://dx.doi.org/10.1016/j.tate.2015.09.007>
- Medina, J. (2008). *Brain rules: 12 Principles for surviving and thriving at work, home, and school*. Seattle, WA: Pear Press. Retrieved from:
<http://www.brainrules.net/pdf/mediakit.pdf>
- Merritt, E. J. (2017). The impact of physical activity on academic growth. *Northwestern College NWCommons master project*. Orange City, IA.
- Miller, S. C., & Lindt, S. F. (2018). Engaging elementary students through movement integration in mathematics and reading: an exploratory study to understand teachers' perceptions. *Curriculum and Teaching Dialogue*, 20(1-2), 31–43, 178-179. Retrieved from <http://ezproxy.nwciowa.edu/login?url=https://search-proquest-com.ezproxy.nwciowa.edu/docview/2097606296?accountid=28306>
- Miramontez, S. K.H., Schwartz I.S. (2016). The effects of physical activity on the on-task behavior of young children with autism spectrum disorders. *International Electronic Journal of Elementary Education*, 9(2), 405-418.
- Mok, M. M. C., Chin, M. K., Korcz, A., Popeska, B., Edginton, C. R., Uzunoz, F. S., ... Durstine, J. L. (2020). Brain breaks® physical activity solutions in the classroom and on attitudes toward physical activity: a randomized controlled trial among primary

students from eight countries. *International Journal of Environmental Research and Public Health*, 17(5). <https://doi.org/10.3390/ijerph17051666>

Montessori, M., & Claremont, C. A. (1969). *The absorbent mind*. New York: Dell Pub. Co.

Muelle, C.M. (2013). The history of kindergarten: From Germany to the United States.

Retrieved from:

https://pdfs.semanticscholar.org/a670/1f631bfc54ddd91ccf5100fac005eea0405.pdf?_ga=2.20958840.1187272463.1592409547-1951210818.1584157105

Mulrine, C. F., Prater, M. A., & Jenkins, A. (2008). The active classroom: supporting students with attention deficit hyperactivity disorder through exercise. *Teaching Exceptional Children*, 40(5), 16–22. <https://doi.org/10.1177/004005990804000502>

Murray, R., Ramstetter, C. (2013). The crucial role of recess in school. Council on School Health, & American Academy of Pediatrics. *Pediatrics*, 131(1), 183–188. <https://doi.org/10.1542/peds.2012-2993>

Murray, D.W., Rosanbalm, K., Chrisopoulos, C., & Hamoudi, A. (2015). *Self-Regulation and Toxic Stress: Foundations for Understanding Self-Regulation from an Applied Developmental Perspective*. OPRE Report #2015-21. Washington, DC: Office of Planning, Research and Evaluation, Administration for Children and Families, US Department of Health and Human Services. https://www.acf.hhs.gov/sites/default/files/opre/report_1_foundations_paper_final_012715_submitted_508.pdf

Orlowski, Marietta & Lorson, Kevin & Lyon, Anna & Minoughan, Susan. (2013). My classroom physical activity pyramid: A tool for integrating movement into the

- classroom. *Journal of Physical Education, Recreation and Dance*, 84(9), 47-51.
<https://doi.org/10.1080/07303084.2013.827556>
- Perels, F., Merget-Kullmann, M., Wende, M., Schmitz, B., & Buchbinder, C. (2009). Improving self-regulated learning of preschool children: Evaluation of training for kindergarten teachers. *The British Journal of Educational Psychology*, 79, 311–27.
<https://doi.org/10.1348/000709908X322875>
- Savina, E., Garrity, K., Kenny, P., & Doerr, C. (2016). The benefits of movement for youth: A whole child approach. *Contemporary School Psychology*, 20(3), 282–292.
<https://doi.org/10.1007/s40688-016-0084-z>
- Shammas, B. (2019, March 7). *Time to Play: More State Laws Require Recess*. Retrieved from Edutopia: <https://www.edutopia.org/article/time-play-more-state-laws-require-recess>
- SHAPE. (2016a). *Every Student Succeeds Act: Game Changer for Health and Physical Education*. Retrieved from Shape America-Society of Health and Physical Educators: <https://www.shapeamerica.org/advocacy/upload/ESSA-fact-sheet-SHAPE-America-temp.pdf>
- SHAPE. (2016b). *Status of Physical Education in the USA*. Retrieved from SHAPE of the Nation: https://www.shapeamerica.org/advocacy/son/2016/upload/Shape-of-the-Nation-2016_web.pdf
- Shoval, E., Sharir, T., & Shulruf, B. (2013). The challenge kindergarten model: Integrating body-movement and scaffolding to keep the child in the center and make systematic progress in learning. *Early Childhood Education Journal*, 42(4), 279–286.
<https://doi.org/10.1007/s10643-013-0609-2>
- Sniegowski, S. J. (1994). *Froebel and Early Childhood Education in America*.

<https://files.eric.ed.gov/fulltext/ED385386.pdf>

- Stevens-Smith, D. A. (2016). Active bodies/active brains: The relationship between physical engagement and children's brain development. *The Physical Educator, 73*(4), 719-732.
- Sullivan, R. A., Kuzel, A. H., Vaandering, M. E., & Chen, W. (2017). The association of physical activity and academic behavior: A systematic review. *The Journal of School Health, 87*(5), 388–398. <https://doi.org/10.1111/josh.12502>
- Tarullo, A., Obradović, J., & Gunnar, M.R. (2009). Self-control and the developing brain. *Zero to Three, 29*(3), 31-37.
- U.S. Department of Education (2004). *Executive Summary*. Retrieved from U.S. Department of Education: <https://www2.ed.gov/nclb/overview/intro/execsumm.html>
- Vazou, S., Gavrilou, P., Mamalaki, E., Papanastasiou, A. & Sioumala, N. (2012). Does integrating physical activity in the elementary school classroom influence academic motivation? *International Journal of Sport and Exercise Psychology, 10*(4), 251-263. <http://dx.doi.org/10.1080/1612197X.2012.682368>
- Wadsworth, D., Robinson, L., Beckham, K., & Webster, K. (2012). Break for physical activity: Incorporating classroom-based physical activity breaks into preschools. *Early Childhood Education Journal, 39*(6), 391–395. <https://doi-org.ezproxy.nwciowa.edu/10.1007/s10643-011-0478-5>
- Waite-Stupiansky, S., & Findlay, M. (2001). The fourth r: Recess and its link to learning. *The Educational Forum, 66*(1), 16–25. <https://doi.org/10.1080/00131720108984795>.
- Weslake, A., Christian, B. (2015) Brain breaks: Help or hindrance. *Teach Collection of Christian Education, 1*(1), 38-46.
- Wiebelhaus, S.E., & Hanson, M.F. (2016). Effects of classroom-based physical activities on off-

task behaviors and attention: Kindergarten case study. *The Qualitative Report*, 21(8), 1380-1393. Retrieved from <http://nsuworks.nova.edu/tqr/vol21/iss8/2>

Williams, K. E. (2018). Moving to the beat: using music, rhythm, and movement to enhance self-regulation in early childhood classrooms. *International Journal of Early Childhood: Journal of Omep: L'organisation Mondiale Pour L'education Prescolaire*, 50(1), 85–100. <https://doi.org/10.1007/s13158-018-0215-y>

Zachariou, A. & Whitebread, D. (2015) Musical play and self-regulation: does musical play allow for the emergence of self-regulatory behaviours? *International Journal of Play*, (4)2, 116-135. <https://doi.org/10.1080/21594937.2015.1060572>