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Teacher Perspectives of Physical Activity and Student Engagement in Middle School English Language Arts: An Action Research Investigation

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Concordia University–Portland

College of Education

Doctorate of Education Program

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Teacher Perspectives of Physical Activity and Student Engagement in Middle School English
Language Arts: An Action Research Investigation

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Concordia University–Portland
College of Education

Dissertation submitted to the Faculty of the College of Education
in partial fulfillment of the requirements for the degree of
Doctor of Education in
Higher Education

Mark Jimenez, Ed.D., Faculty Chair Dissertation Committee

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Concordia University–Portland

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Abstract

The researcher sought to determine how teachers in a middle school academic setting perceived the incorporation of movement with regards to student engagement. Three seventh grade English Language Arts instructors from the same middle school, one of whom was the researcher, incorporated three different physical activities into the academic class period and observed academic engagement indicators. The three movements used were 4-minute walking breaks, 2-minute stretching breaks, and a discussion technique that involved throwing, standing, and walking. Results showed that teachers perceived changes in academic engagement with all three activities, though the results for stretching indicated mixed positive and negative changes in academic engagement behaviors. Based on the teacher reports, all three activities can be useful in improving academic engagement, but the activities must be directly linked to an academic task for best results. Results also indicate a need for further research with regard to more varied activities and possible implications of whether academic engagement changed by movement has any impact on academic achievement.

Keywords: teacher perceptions, physical activity, academic engagement

Dedication

This dissertation is dedicated to my daughter, Seraphina Marie, that she may understand that all things are possible. Though challenges may arise, success comes to those who continue to work toward their goals.

This work is also dedicated to my parents, Shana and Arden, who have supported my every endeavor. My success is only possible because the foundation they built was not simply solid starting ground, but a springboard that has propelled me to achieve my highest potential.

And finally, this research is dedicated to my brother Joseph, a body in constant motion, whose presence is both energizing and grounding. Without him, I would not have learned the power of perseverance.

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Chapter 1: Introduction

Introduction to the Problem

With the rise of technology and the instant gratification generation, keeping students engaged in academic learning environments has become an interesting balancing act for educators. Lack of engagement to lessons in class has been correlated to decreased performance on a wide range of assessments over the years (Fuller, et al., 2018). Teachers must compete against a constant stream of distractions to try to keep students focused on tasks that most would agree are cognitively beneficial, but sometimes these helpful activities or lessons are not immediately recognizable as relevant or interesting to today's students.

Making content relevant to students in required courses can be a challenge. Every student at the middle school being studied is required to take an English Language Arts class. Some of those classes are specialized for students identified with exceptional needs such as Special Education, English Learners, and Honors (Advanced) classes. Teaching students the skills they need to read, write, listen, and speak effectively can be difficult in a world with ever changing technological advances. These improvements in technology, while useful, are also creating a new problem for teachers of English Language Arts because students start to ask why they need to learn these skills. For example, one of the researcher's students once posited that they didn't need to learn to read or write well all the time; they'd just use YouTube if they needed to figure out how to do something. While that may be the case for some activities, it does not change the immediate need for teachers to engage students in class because helping students learn skills in English Language Arts is still a requirement in education.

Most students are "plugged in" at all times to various forms of social media and digital entertainment. As of 2013, 78% of teens between the ages of 13 and 17 had cell phones and

nearly half of those were smartphones (Madden, Lenhart, Duggan, Cortesi, & Gasser, 2013, p. 2). Presumably, those statistics have increased over the last four years as technology continues to advance. Because of an increase in access to technology, students' brains are seemingly in overdrive at all times. When asked, then, to focus on a single task in school like writing an analysis which may or may not allow the use of technology, students can disengage and deactivate.

Another realm of academic engagement involves emotional engagement. When students are dealing with trauma at home or in other areas of school—for example, if a student is being bullied outside of class, but must then attend academic classes with their tormentor—it can be difficult to get them to engage in academic activities. In the book *Fostering Resilient Learners*, the researchers determined that in order to engage students in the learning environment, teachers must first acknowledge that what is happening outside the classroom has a direct effect on the cognitive functioning capability of students in the classroom (Souers & Hall, 2016). While the strategies for dealing with trauma are varied, some of the suggestions include deep breathing and taking a walk to help settle or refocus the mind if students are spiraling into a negative or panicked attitude. If such activities as monitoring breathing and taking a short walk can help students dealing with emotional trauma return to academic focus and engagement, it stands to reason that such activities could also assist students who are simply disengaged for other reasons as well.

Background, Context, History for the Problem

In order to provide the best learning environments, teachers are tasked with not only becoming experts in their content areas, but also experts in finding ways to reactivate their students. While often mentally stimulating, technology often lacks adequate physical stimulus to

fully engage younger students. Identifying classroom strategies that improve student learning is a continuously necessary endeavor in today's education system. As technology advances, students are able to access information about virtually any topic from anywhere. Rather than schools as a vehicle where students have access to information, educators must focus on methods that can help students with retaining, understanding and subsequently being able to analyze said information to synthesize new and creative ideas.

In order to get students to learn to their highest potential, teachers must find ways to increase active student engagement. Measuring student engagement can be done in a number of ways. In some studies, there is a direct approach that involves either self-reporting from the subjects or researcher observations of student posture, note-taking, or fidgeting (Darnell & Krieg, 2019). In Darnell and Krieg's study, however, the researchers used a measure of heart-rate changes between lecture and active learning sessions within the lecture. What they found was that heart rate increased during active learning like discussion and problem solving activities, but then returned to normal or lower rates during the remainder of the lecture (2019). This implies that while active learning does cognitively engage students in the activities, it has little to no measurable lasting effects. Thus, there is a need to find a different approach to improving student engagement, even after students have returned to lecture or informational input.

With increasing engagement during lecture in mind, the researcher seeks to examine the issues of physical activity and engagement in the classroom setting through action research. In the classroom setting, action research allows the teacher-researcher to implement various interventions and then reflect on the effectiveness or ineffectiveness of the strategies applied (Herr & Anderson, 2005). This type of study lends itself more easily to the middle school setting where student subjects are unlikely to be cognizant or self-aware of their own learning processes,

whereas students in higher education might be. Unlike positivist research, which is more generalizable to a population at large, action research deals specifically with a unique set of individuals and how they respond to and interact with a given situation. Positivists believe that phenomena are measurable using deductive principles (Hall, 2010, p. 13). This means that the positivist researcher would approach the problem of disengaged students as a social experiment wherein something can be measured and a solution can be found. With action research, the teacher-researcher is not merely a gatherer of data that can be statistically analyzed, as early researchers might once have assumed (Herr & Anderson, 2005, p. 18). In fact, for action research projects, numerical data are not necessarily as useful as anecdotal data. In this study on middle school engagement, numerical data does not always give one an idea of what an engaged student would look like. Also, the numerical data that is most helpful might be difficult to gather because it would require medical technology that is not readily available to middle school teachers, so recorded observations from experienced teachers can be beneficial with regards to understanding academic engagement. Humans are a complex system of individuals, and while action research may not be able to predict with certainty how any particular group will react and develop, it does allow the teacher-researcher the opportunity to reflect on teaching practices that are effective in varied situations. As a whole, such information can then be used to help shed light on similar situations that other individuals may face in the future.

Statement of the Problem

It is not known if incorporating physical activity in middle school English Language Arts courses will have an effect on academic engagement. Learning requires students to actively use their brains to solve problems. Physical activity can impact emotional and cognitive health, but most classroom environments in the middle school setting are not equipped to provide adequate

physical activity. As a teacher in a public school classroom, the researcher noticed increased attentiveness during lessons that included increased physical activity, which prompted the current investigation.

Purpose of the Study

The purpose of this study is to explore how incorporating physical activity in middle school English Language Arts courses will have an effect on academic engagement. This study is important because it will provide data that supports or refutes the idea that increasing movement in classrooms has an effect on academic engagement. Currently, there is not a strong enough consensus on the use of physical activity in middle school classrooms as an academic intervention.

Research Questions

1. How does incorporating three different physical activities—2-minute stretching breaks two times per 90-minute block, Hailstorm discussions, and 4-minute walking breaks—affect middle school student academic engagement in seventh grade English Language Arts?
2. How do teachers perceive the incorporation of physical activity in the classroom?

The first question is important to this study because analysis will provide evidence as to whether or not these specific opportunities for physical activity are viable interventions. Strong, positive perceptions of the use of stretching, Hailstorm discussion, and walking breaks, as well as teacher-perceived changes in academic engagement would be one indication that periodic movement breaks are a practical tool.

The second question is significant because teacher observations and responses in other classrooms may provide further insight and strategies that are not detailed by the teacher–researcher in her own notes.

Rationale, Relevance, and Significance of the Study

These questions are relevant to the educational community because analysis will provide evidence as to whether or not increasing moderate physical activity is a viable intervention for students with minimal academic engagement. Positive teacher perceptions or perceived changes of academic engagement would be one indication that increasing movement is a practical option in the academic setting. Understanding the answers to these questions is necessary because when studying a classroom intervention, teacher buy-in can have a major effect on results.

Disconnected students are likely not only mentally inactive in the classroom, but also physically inactive. Medical experts have found evidence that increasing classroom activity can help alleviate physical health problems like obesity in children, but there is still a gap in the literature as to the effect of physical activity on academic engagement. Despite this gap, one might expect teachers to attempt to incorporate more physical activity in their classrooms given the recorded health benefits.

One reason teachers might not incorporate more physical activity in their classrooms is that some physical activity interventions can be time consuming. With the pressure on high stakes performance tasks, especially in secondary schools, taking students for a walk around the school can eat up precious instructional time. There are other interventions that may be too expensive for some schools to consider as options. For example, standing desks may provide more movement options, but with a price tag between \$250 and \$750 per desk, not including the stool, it isn't truly a conceivable alternative to regular desks or tables in many schools.

Other interventions would require some teachers to drastically change their teaching methods. Supporters of active learning believe that ideally all teachers will transform their classrooms to incorporate active learning. It is difficult to expect capable, veteran teachers to abandon methods that have been relatively effective during their decades of experience without solid evidence to support a reason for change. Teachers and administrators are more likely to embrace change if shown data on the effectiveness of a relatively inexpensive intervention that does not require major shifts in methodology.

Nature of the Study

Psychology and educational research often involve positivist research, which generally refers to the stereotypical ideas and methods of scientific inquiry and the belief that phenomena are measurable using deductive principles (Hall, 2010, p. 13). “The positivist believed in *empiricism*—the idea that observation and measurement was the core of the scientific endeavor” (Trochim, Philosophy of research, 2006, para. 4). For many people, this approach is seen as a more reliable and valid form of research because it often utilizes numerical data that can be analyzed and explained by statistics. In the field of education, especially when specifically focused on teaching and learning in the classroom setting, data inherently covers the social implications of human interactions and behavior. Because of this, the positivist approach is less applicable because while the teacher–researcher has noticed a problem, it is not necessarily a numerically measurable problem, nor is it one with a simple or singular solution.

This study consisted of action research. This means that the researcher is an instructor of a current middle school course and intends to record field note observations, review teacher journals, and conduct a focus group interview of teachers to obtain information about activity changes in her classroom and other classrooms on a day-to-day basis. Developing awareness of

the reflective process teachers go through is necessary in determining best practices and provides greater understanding of how and why teachers make decisions in particular situations.

Definition of Terms

Active learning. This term refers to portions of lessons that encourage students to cognitively engage (Darnell & Krieg, 2019). Types of active learning activities include, but are not limited to: discussion, work pages, problem-solving—either with others or independently, and categorizing.

ELA. This term is an abbreviation for English Language Arts, the title for courses in which students learn to improve reading comprehension and writing skills.

Physical activity. This term refers to any sort of activity that requires bodily movement (Wang, Huang, Wu, & Wang, 2014). This might be more vigorous activities such as walking, running, or bouncing on a yoga ball, as well as background movement such as standing or stretching.

Academic engagement. For the purpose of this study, this term can be defined as students having positive, academically related verbal and non-verbal interactions with peers, voluntarily asking insightful questions beyond simple recall, contributing to class discussions, and providing both verbal and written analytical responses to course material (Gasiewski, Eagan, Garcia, Hurtado, & Chang, 2011).

Assumptions, Delimitations, and Limitations

In this study there are a few delimitations. First, the study will use interviews of teachers in one particular school who agree to participate in the study. Also, the teachers are all instructors of the same subject—ELA—and serve the same student population. Their students will share the same range of socioeconomic backgrounds. Having teachers with most of the same

type of students is a delimitation because it prevents the likelihood of data skewed by vastly different rules or procedures as one might find if the teachers were at different schools with different expectations. Also the students live in the same general area and deal with similar issues as a demographic.

Second, the teachers were all working with one particular grade level. In this way, the observational field notes will detail student interactions and behaviors from a specific age range, 12–13 year old students. In studying one particular grade level, there is a higher likelihood that the students will be at similar maturity levels and interactions should be relatively similar.

Finally, as the data will only be analyzed and interpreted by a single researcher, there was no issue with inner rater reliability. If more than one person were interpreting the data, there would need to be some way to calibrate or homogenize the interpretations. As it is only one person, the explanations of interpreted data are based in that one person's experience of understanding.

There were also some limitations due to factors outside of the researcher's and instructors' control. First, class sizes and make up are decided by counselors and administration. Thus, some classes may have more students than others. This may cause issues and differences in the way students respond to activities. Classes with more students have less room to move comfortably, for one. Another issue with class make up is that some students may have a social history with other students that would make them uncomfortable participating in activities or groups with certain peers. For example, if two students were best friends but had a falling out, they may not feel comfortable participating in class activities together.

Also, because these classes are assigned relatively randomly, some classes may have more students on Individualized Education Plans (IEP), 504 (behavioral) plans, English

Language Proficiency (ELP) plans, and a multitude of other accommodations. Students with IEP and ELP accommodations may have an impact on the data because these students may not understand instructions for the activity at first. Students on 504 plans may have impulse control issues that make certain physical activity lessons more difficult to complete without becoming a disruption. These limitations might change the perception of academic engagement because those students may be more engaged with trying to learn or understand the movement than they are engaged with the academic concepts.

As a final limitation, only interview and journal data from teachers who agree to participate were analyzed. This impacts the data because instructors willing to incorporate movement in their classrooms are more likely to have a mindset that assumes physical activity will improve academic engagement. For data collection, there were questions that ask teachers to explain the positives and negatives of the activities, which makes it less likely that the observation data would be skewed.

Summary

Chapter 1 provided the researcher's reasoning for selecting action research as the most applicable methodology. Because this study involves teacher-led interventions and focuses on such a small sample, action research allows for the flexibility and depth needed to develop understanding of how new movements can be incorporated into middle school ELA. In Chapter 2, the literature review will cover the most relevant published studies that helped guide the researcher in developing a conceptual framework and methodology in light of existing findings in the field.

Chapter 2: Literature Review

Introduction to the Literature Review

“Curiosity is the heart of all research,” (Machi & McEvoy, 2012). Truly, in order to sustain interest in a project such as this, a researcher must begin with an initial sense of wonder about the topic they choose. But the researcher must also assume that the audience most likely is not well versed in the field. Thus, the main purpose of the literature review stands to build a case as to the importance of new research. In the following chapter, the body of evidence is important as a basic understanding, but it also helps the researcher identify where there may be gaps in the current knowledge base. In action research, the literature review process begins to guide the researcher on the cyclical path toward developing understanding.

The literature review for this study discusses the scientific literature concerning the effects of incorporating physical activity in the classroom. The literature review is divided into five subsections. In the Conceptual Framework, there is a discussion of how the major paradigm of positivist theory influences the current research. The Review of the Research Literature and Methodological Literature discusses the most recent body of knowledge on topics such as neuroscience and the connections between physical health and physical activity in the classroom. Review of Methodological Issues, the third section, acknowledges the limitations of the previous bodies of work with regards to physical activity in the classroom and discusses how those limitations are accounted for in current study. Section four, Synthesis of Research Findings and section five, Critique of Previous Research discuss how the previous body of knowledge informed this study’s research and design.

Conceptual Framework

Research as an idea is based on the grounds of deepening understanding about a particular topic. Ultimately, the researcher's goal is to use thorough examination to discover more than was previously known about the existing body of knowledge. "All research is based on assumptions about how the world is perceived and how we can best come to understand it" (Trochim, 2006, para. 3). Thus, the researcher conducted participatory action research to develop a better understanding of how to engage students in one particular setting.

As educational research continues forward, one must consider that there is but one reason to continue asking questions about human behavior. While no study can accurately predict the actions and natural phenomena of a single individual, action research can help teacher researchers not only take action, but then reflect and form new ideas. Action research is cyclical in nature (Herr & Anderson, 2005). Every day teachers plan, act, observe, reflect, and repeat. With action research, this spiral is much more formally observed and documented. From this idea, the current research relies on the theory of Participatory Action Research (PAR) because the researcher seeks to plan lessons that incorporate more activity, implement said lesson plans, observe and document through field notes and interviews, reflect on the outcomes and then determine a new plan based on those results. Through qualitative documentation, the teacher-researcher hopes to determine whether there is a perceived correlation between minor increases in physical activity in the classroom and academic engagement. Though each cycle of PAR will likely result in a unique experience, the sum of those experiences may help educators determine best courses for action.

Another way to look at PAR is as an individualized program evaluation. As the teacher-researcher gathers information, the data provides the essential feedback needed for success. In terms of program evaluation, PAR might be considered a formative evaluation because it is designed to help form the programs themselves (Posavac, 2011).

Research in education should aim to not only identify problem areas, but to actively seek to identify workable solutions. As previously stated, action research relies on continual planning and reflection (Herr & Anderson, 2005). For this study, the researcher intends to collect data about the connections between physical activity and academic engagement in the middle school ELA classroom. Through previous observation of her public school students, the researcher has developed a hypothesis that the two are connected in some way. This study is designed to provide evidence that either supports or negates that hypothesis.

Review of the Research Literature and Methodological Literature

By conducting a thorough review of the existing literature, researchers can develop and refine both the questions driving the research and also the methods and instruments used in data collection and analysis. Studying the work of others should not be considered tedium, but rather should be recognized as “a core, driving component of the empirical research cycle” (Ravitch & Riggan, 2012, p. 14). Thus, for the study, the researcher sought previous work that discussed psychology concerning physical activity, cognitive function, language arts education, academic engagement, and factors associated with academic achievement.

Neuroscience in education. Educational neuroscience is still a relatively new field. Though there may be a few cases prior to, the major body of research began about a decade before the turn of the millennia. According to Brahm Norwich, Professor of Educational Psychology and Special Educational Needs (2015), educational neuroscience started to develop

in the 1990s. Norwich asserts that research in educational neuroscience does not leap directly into educational practice, but must also be “mediated by educational psychology” (para. 4). The major suggestion is that educational neuroscience research cannot be conducted in a vacuum but must rather be done in conjunction with learning about teaching practices and its connections to children’s brain development. In the practice of teaching, therefore, developing an understanding of neuroscience is not only beneficial, but is a necessity.

If educators regard learning as a process, there must be some thought put into the natural order of development. When it comes to thinking about students’ ability to learn, understanding brain development can help teachers understand why certain activities may be more beneficial to learning than others. According to Field, Beeson, and Jones (2015), the brain develops from the inside out. This is significant because the interior portions of the brain control the basic survival function, the middle layer involves emotional responses, and finally the outer layer is where our cognitive thought processes occur (Field, Beeson, & Jones, 2015, p. 209). Because humans cognitive thought process is third on the hierarchy of development, educators should understand that developing lessons that meet students’ basic needs and elicit emotional responses will be far more effective at producing cognitive thoughts. This allows students to not only fully understand material, but also analyze and synthesize information into innovative ideas.

With regards to the first and second developmental layers of the brain, teachers should be aware that students need to feel safe and secure, both physically and emotionally, in their learning environments. The person who has the most control over this aspect is the teacher and when teachers have a better understanding of brain development, they are better able to create an environment conducive to learning. In a qualitative case study from the University of South Australia, researchers “concluded that educators learning about developmental neuroscience lays

a foundation for improved early childhood practice” (Diamond & Whittington, 2015, p. 18). This is significant because it shows that having a basic understanding of neuroscience can help inform teachers’ classroom practices. When teachers consider their students’ basic needs, they are better able to develop a positive learning environment that improves academic achievement.

If one understands that students’ basic survival needs and emotional needs must be met before major cognitive or academic processing can occur, it transforms the view of the typical teaching practices. For centuries, teachers taught through lecture because they had to disseminate information efficiently to students who did not otherwise have access, but with technology improvements, access to information is no longer the major issue confronting students (Lom, 2012). Even with the information so readily available via technology, lectures have remained the norm because many instructors tend to teach the way they were taught. This tradition is not necessarily the best pedagogical practice.

Traditional lectures are not categorized as “bad” pedagogy, but they should not comprise the entirety of the allotted class time. Lectures can be the most efficient way to disseminate information, especially in larger class settings (Lumpkin, Achen, & Dodd, 2015). Efficient, however, does not necessarily mean most effective. The researchers note that lectures should be punctuated with active learning strategies to increase student engagement and understanding.

This idea of efficiency versus effectiveness is echoed by Markman and Duke (2016) in their discussion on whether our current school model works with the students’ developing brains, which require a physical component for full comprehension and internalization. Judy Willis (2010), a neurologist turned classroom teacher, suggests movement during activities – such as pantomiming vocabulary or tossing a ball while discussing key points of a text – as a way to naturally increase the dopamine levels in the brain. This dopamine promotes feelings of

happiness and positivity, so students are more likely to be engaged and the information they learn in this state is more likely to be retained and recalled faster than memories not associated with feelings of positivity (Holmes, 2016). Additionally, Medina (2008) refers to the connection between movement and neural development as “physical activity is cognitive candy” (p. 22). His work as the Director of the Brain Center for Applied Learning Research has led him to the conclusion that active bodies lead to healthier brain tissue because the increased activity increases blood flow to the part of the brain that is involved in memory function (p. 22). This part of the brain is called the cerebellum and it is also the part of the brain that processes movement (Jensen, 2005). It stands to reason, then, that increasing opportunities for physical movement will help the cerebellum develop neurological links that will help students with cognitive development in academics. This idea is one of the keys to the current study because many of today’s teachers may not necessarily be ready to make major changes to their current lecture methods, so finding a non-intrusive way to incorporate more physical activity into a lecture-style class could help students’ cognitive development.

One idea neuroscientists and educational researchers have connected is the way in which the brain processes new information. Vygotsky’s Zone of Proximal Development and Krashen’s notion of comprehensible input suggest that educators need to be aware of their students’ current capabilities and then design activities that challenge students, but in a safe and engaging manner. One suggestion is to compare academic learning zones and challenges to the way people engage with video game levels (Willis, 2010). The levels start out relatively simple, and as skills are mastered, the difficulty increases by introducing new challenges slowly. With curriculums and standardized testing being what they are, teachers know that they cannot make every day of learning like a game. The important take-away Willis suggests, however, is that the major

component in the video games is the idea of novelty. She has several suggestions as to how to introduce novelty in the classroom, including playing music that connects to the concepts or changing seating arrangements periodically.

Teachers must consider on a daily basis the psychology of seating arrangements. Public classrooms are increasingly more inclusive of students with disabilities and are more diverse as populations grow and change. Teachers need to design seating arrangements that are flexible enough to be suited to the task, as well as routine enough to establish consistent classroom management to support students with social difficulties (Farmer et al., 2016). Seating arrangements can influence student relationships and classroom climate (McKeown, Stringer, & Cairns, 2015) which can have a significant impact on student engagement. Whether the task is an independent, individual project or a collaborative, interactive endeavor, teachers need to understand how seating arrangements can have an effect on student behaviors, especially on-task time and academic engagement.

Seating arrangements can also promote the use of multiple senses. Dr. Tim Holmes (2016) shares that all of the senses are processed in distinct parts of the brain, but that they are all interconnected. Those connections inform how each individual perceives and interprets new information. This is important because the use of more than one sense allows the brain to form more connections between dendrites (Wilson, 2010). Dendrites are the extension of the nerve cells that transmits synapses to other cells. Seating arrangements that allow students to move or stand, then, allow them to employ kinesthetic senses while also listening or viewing images. Flexible seating arrangements include allowing students to sit/lay on floor cushions, bar-height tables that allow students to perch on stools or stand, and the addition of physical activity promoting equipment to standard desks, such as large rubber bands to bounce one's feet on or

under-desk bike pedals. More about the feasibility of these options for movement and others will be discussed later in the chapter.

Although not necessarily just seating, it is important to remember that the physical arrangements of an activity have an impact. For example, if an instructor wants to encourage discussion, English education professor Jeffrey Wilhelm suggests having students in paired circles, as this first allows students to respond to an inquiry question with a partner before being asked to contribute to the larger group discussion (Wilhelm, 2007) Students physically move themselves into an arrangement that encourages positive student-student interactions and does not allow them to opt-out of the activity. This engagement in the discussion process allows all student ideas and voices the opportunity to be heard and developed.

One aspect of how the brain works is developing an understanding of why people respond in various ways. As we learn more about the brain, we also learn more about human motivations. More recent research has begun to develop around the idea of making education accessible for all students, especially those for whom education is not a priority at home. Research suggests that parental involvement is positively correlated to students' academic success (Thompson & Mazer, 2012). So, if parents do not prioritize education at home or have negative attitudes based on personal experience, students are less likely to find academic success. One area that has not always been a focus is the trauma students carry with them from events outside of the school walls. For many students, there are negative events that make academics the least of their worries because their basic needs are not being met elsewhere. As previously discussed, humans are less likely to be prepared to learn if their physical and emotional needs are not being met.

Souers and Hall (2016) suggest several strategies that teachers can use to help students regain a sense of mental and emotional control, thereby allowing them to fully engage in the academic activities. One of these strategies is the idea of connecting body awareness to deep breathing. They state that deep breathing can help students maintain and return to a regulated state (p. 68). Along with this, they also recommend such activities as yoga, music exercises, and brain breaks. With regards to the current study, the idea of incorporating movement and physical activity into the English Language Arts classroom may provide an added benefit to students with childhood trauma as it promotes a mind-body connection and a level of personal control they might not experience elsewhere.

Recess policies and student development. In the United States, the government has always had a role in public education. Historically, the federal government's role in public education has been relatively limited. One of their major contributions has been determining who has the right to attend school. In more recent decades, national standards have been implemented as an attempt to help schools improve academic performance for all students. In the early 1980s, the Department of Education began administering the National Assessment of Educational Progress, which was then transferred to the Educational Testing Service, and determined based on the standardized tests that the United States was a nation at risk of not meeting educational standards on par with the rest of the first-world nations (The League of Women Voters of the United States, 2011). Academic achievement is often quantified as a student's achievement in a particular subject as assessed by standardized national assessment tests within a school or educational setting (Kall, Nilsson, & Lindén, 2014). Starting in the mid-1980s to early 1990s, school reform became a major political subject as politicians and educators strive to meet or exceed mandated expectations.

To this end, limits have been placed on non-structured time during the academic day. Recess time has been shortened or eliminated in some schools. Even in schools where non-structured play is still championed, the time allotted for recess in the upper grade levels is severely limited. For example, in the school district location of this study, the regular public middle schools have one advisory period of 30 minutes and seven 45-minute periods with a four minute break between each. All students have a two-period block for their English Language Arts courses. Lunch is a total of thirty minutes and occurs before, in the middle of, or after fifth period. Thus, if students are expected to remain focused on their studies for the entirety of every class period, they would have roughly six hours of “on-task time” with a broken hour of “off-time” during each day. More than 90% of elementary students from kindergarten to fifth grade participate in regularly scheduled recess during the school day (Ramstetter & Murray, 2017). That number drops dramatically, however, as just shy of 35% of sixth graders, and presumably lower for the upper grades beyond, participate in regularly scheduled recess (Ramstetter & Murray, 2017). This presents a problem, especially when some students are held late or have their lunch time limited due to disciplinary measures.

While physical activity is accepted as a way into improve cognitive function (Geertsen, et al., 2016), there is often little support given for classroom teachers to actually implement physical activities. Though administrators might support the theory, funding is often an issue and interested teachers are left to find their own means of increasing physical activity for their students. In an article, “The Crucial Role of Recess in Schools” (2013), from *American Academy of Pediatrics*, researchers gathered data and put together a list of recommendations for schools. The number one published recommendation stated, “Recess is a necessary break in the day for optimizing a child’s social, emotional, physical, and cognitive development. In essence, recess

should be considered a child's personal time, and it should not be withheld for academic or punitive reasons" (Murray & Ramstetter, 2013, p. 186). This is significant because it comes from one of the most well-respected health organizations concerning child development. While the focus of the recommendation seems to target younger children, one could infer that high school students also need active time that is not necessarily academic in nature.

Recess is a key to social and physical development. As far as social development, recess allows students to practice navigating the complex social and emotional skills learned in classrooms. Benefits include managing emotions, showing respect and empathy for others and creating positive relationships with peers (London, 2018). These skills have been associated with improved academic achievement (London, 2018). With regards to physical development, schools in Shanghai at both the elementary and secondary level include unstructured recess time as well as structured recess time. According to Chang and Coward (2015), elementary students spend nearly half the school day at recess and high school students have breaks at a higher frequency as academic demands increase. "Prolonged sitting in a closed room may be harmful for one's body and could result in health problems such as obesity, myopia, and even blood problems" (Chang & Coward, 2015). Based on the neuroscience and psychology, human brains are designed to take care of survival and emotional needs before cognitive thought, which means students' brains will not be working at full academic capacity if they do not have the opportunity to be active to counteract the negative side-effects of sedentary nature. Thus, students with higher fitness levels may score better on college readiness exams due to the fact that higher fitness levels have been linked to longer attention spans and spatial working memory (Geertsen, et al., 2016).

The impact of play and movement is important for educators to understand. While some might ignore play activities as inconsequential, experts have found that activities such as

standing and stretching, noncompetitive group games, and walking excursions can improve cognitive function (Jensen, 2005, p. 64). These kinds of activities are common in games that small children play at recess and during more structured play time. As recess time decreases, educators should be looking at ways to incorporate these kinds of activities in classrooms. They do not diminish cognitive achievement, and could in fact boost brain development. Part of this is due to the biological processes that take place during such play. Most notably, activities like these help “the brain release BDNF, brain-derived neurotrophic factor,” which increases the communication between neurons (Jensen, 2005, p. 64). BDNF is a protein that not only encourages growth, it also encourages new neurons to generate, providing more opportunities for connection (Medina, 2008, p. 22). Increasing the pathways for synapses creates connection between ideas and generates better understand and creative thought. When students are actively engaged in learning, they are more likely to form these connections and improve cognitive function, which will lead to improved academic achievement.

Despite the fact that school authorities may support increased physical activities, it can be difficult to find physical activity outside of physical education classes or organized sports in today’s schools. There are few opportunities for unstructured physical activity during school hours for secondary students in the United States. In a study from 2009 to 2012, researchers found that only 12.9% of high schools had a recess time (Hood, Colabianchi, Terry-McElrath, O’Malley, & Johnston, 2014, p. 700). This may not be surprising or unusual because students are expected to have longer attention spans, but it is troubling for other reasons, as well. Another study found that sedentary behavior was positively correlated to increased bullying victimization for high school students (Lowry, Lee, Fulton, Demissie, & Kann, 2013). Those researchers suggested schools find ways to increase physical activity as a preventative measure for bullying.

Given that schools are unlikely to reduce seat-time, however, the current researcher seeks to find ways to incorporate an more physical activity into the classroom in order to counteract the sedentary habits of many middle school classrooms.

Sedentary students. Over the past 50 years, technology has been making life less physically demanding. In some ways, this may seem positive, but when it comes to physical health, labor intensive jobs that demanded moderate physical activity were beneficial. In a recent study, researchers determined that today's workers burn 100 fewer calories per day than workers 50 years ago. They conclude that the decline in physical activity and subsequently an increase in sedentary work behavior has led to an increase in obesity (Church et al., 2011). The sedentary habits found in the workplace are also found in today's schools.

Sedentary behaviors in classrooms are not unusual in high schools. If most classrooms were active, there would not be a need for students Individual Education Plans (IEPs) to have a specific accommodation that allows them to stand up and walk or pace around the classroom as needed. For example, item six on the Illinois State Board of Education's state-approved accommodations states that students on an IEP or 504 plan may have a seating accommodation that allows the "opportunity for student to stand, move, and/or pace during the regular test session" (Illinois State Board of Education, 2010). If student activity and movement in classrooms was the norm, such accommodations would be unnecessary.

Inactivity in the classroom is an issue because of the prevalence of obesity in students. One of the detrimental side-effects of physical inactivity is a higher propensity of obesity. According to a recent article, "Prevalence of Childhood and Adult Obesity in the United States, 2011–2012" (2014), roughly 17% of children ages 2–19 years old are considered obese (Ogden, Carrol, Kit, & Flegal, 2014). While being overweight has adverse health effects, there is also a

link between obesity and academic underachievement. One long-term study looked at a cohort of over 8,000 students in Finland and found that students self-reported being physically active had higher grade-point averages than those students identified as obese (Kantomaa et al., 2013). This is significant as the study also asserts that obesity is a global epidemic. With such a high rate of obesity, most schools should be looking for interventions that help combat obesity and its negative effects on academic achievement. As it concerns this study, obese students make up a significant portion of the student population and could benefit both physically and academically from a physical activity intervention.

Considering the link between sedentary behavior and obesity, and then the connection between obesity and lower academic performance, it is necessary that educators and administrators contemplate interventions. As educators strive to help their students succeed academically, they must consider all the factors that might be an impediment to student success. If the medical community asserts the position that increased physical activity can improve cognition, educators must also understand that students do not necessarily choose to be physically active on their own time. Instead, most students are engaged with media today. “Eight- to eighteen-year-olds spend more time with media than in any other activity besides (maybe) sleeping—an average of more than 7½ hours a day, seven days a week” (Rideout, Foehr, & Roberts, 2010, p. 3). This amount of time spent with technology media leaves educators with a difficult task as to help students actively improve their academic endeavors.

Physical activity and academic achievement. Links between physical movement and academics in classrooms is not a new concept, but in today’s standardized score-driven environment, this connection can be set aside as it is not seen as a priority. Efficiency and quantitative score results are what seem to be most in demand. In a book called *Brain Briefs*, two

psychologists provided their perspectives on many of today's questions on a variety of topics, including those related to education. They discuss the idea of academics and movement in a section titled "Do Schools Teach the Way Children Learn?" Schools today are essentially described as "learning factories" because Western society has decided that there are basic skills that all humans should know and understand, and have attempted to develop the most efficient way to impart this knowledge (Markman & Duke, 2016). This has led to the stereotypical classroom setting: desk-filled classrooms with one instructor and a larger number of pupils, all of whom are expected to be seated and on task at all times. Efficient. Unfortunately, as Markman and Duke pointed out, "Sitting quietly and still for long stretches of time is not a natural childhood activity," (p. 48). And while they admit that this may seem appealing from an efficiency standpoint, the idea that conceptual learning and movement that allows students to interact with the subjects had been deemed necessary by the likes of educational experts John Dewey and Alfred North Whitehead roughly 100 years ago.

John Medina, one of the leading researchers in the fields of education and brain sciences, compiled a list of the twelve most important factors for using an understanding of the brain to determine a course of action for a healthy, productive lifestyle. The number one principle for "surviving and thriving" was "Exercise Boosts Brainpower" (Medina, 2008).

According to the Institute of Medicine, "during the last 10 years, a growing literature has demonstrated a relationship between physical activity and academic performance" (as cited in Jaakkola, Hillman, Kalaja, & Liukkonen, 2015, p. 1719). Recent studies have aimed to determine the best interventions for student improvement based on a variety of factors like age, physical health as regards obesity, learning disabilities, and gender to name a few.

In a quantitative study in the Southeastern United States, elementary students received daily physical activity breaks (Erwin, Fedewa, & Ahn, 2012). Effects were examined using mixed design ANOVAs, and the results were rather interesting. Students who had received the intervention had significantly higher reading fluency and mathematics scores. While this researcher's study involved middle school students, the fact that there were statistically significant results found for elementary students provides promising support to the idea that increased physical activity in the classroom can yield improved academic achievement. Perhaps that achievement gain is due in part because students were actively engaged in the curricular lesson. While the current study did not measure changes in academic achievement, this study is significant because it supports the idea that incorporating physical activity in the academic setting should not have a negative impact on students' academic achievement, so there is not a concern that this study would have caused harm.

Another elementary school study aimed to "investigate the potential effects of daily energy expenditure on the academic performance of elementary" students (Wang, Huang, Wu, & Wang, 2014, p. 1). Researchers used 3 Day Physical Activity Recall to determine level of physical activity. There were many variables, but students in the middle physical activity level outperformed the highest physical activity academically. Mahar et al. (2006) conducted a similar study in an elementary school using an in class physical activity protocol known as "Energizers." "Energizers" was developed based on the *Brain Breaks* video protocol. It was designed by researchers in North Carolina, with permission and collaboration from the *Brain Breaks* developers in the Michigan Department of Education, as a way to comply with a policy designed to promote healthier habits in elementary-aged children (North Carolina Department of Public Instruction, 2006). Students in the treatment group showed significant increases in on-task

behavior compared to their peers in the control group. These studies are important because they lend weight to the idea that physical activity in the classroom does not need to be excessive in order to improve cognitive function.

In another study, the researcher focused mainly on the increase in physical activity for students over the course of the year, (Kulinna, 2012). While the gains were small, the researcher noted that any change of increased physical activity in a given community may have a significant impact on creating healthy habits for a lifetime. One of the most significant aspects of Kulinna's work is a discussion on the idea that teacher change is a major factor in pupil influence. By this, Kulinna noted that as teachers grew more comfortable with implementing increased activity in their classrooms, students reported increased buy-in to the program. With this idea, there may be need for a discussion on ways that teachers add to or negate anxiety in the classroom. If more teachers are aware of anxiety interventions and begin to implement anxiety-reduction protocols, students may be more likely to respond positively. This also helps the development of the implication of the necessity of physical activity in the classroom.

Perhaps one of the reasons physical activities in the classroom can be helpful is that they can promote academic engagement. When students are moving, they are actively participating, rather than passively sitting. Also, when students are engaged, the number of behavioral disruptions decreases (Lane, Smither, Huseman, Guffey, & Fox, 2007). This is significant because a decrease in disruptions to the learning process allows students to stay on task and in active learning mode. If physical activity in a lesson can keep students academically engaged and reduce disruptions, it stands to reason that they would be likely to attain higher academic achievement.

Movement-centered classroom strategies. Incorporating movement activities in classes, as previously stated, is not an entirely new concept. There are many “brain-based” strategies that have been employed by districts around the country. Unfortunately, some curricula adopted and implemented claim to be brain based, but are “neither effective nor adequately supported by valid scientific research,” and can lead to teachers being hesitant about new strategies (Orange County Department of Education, 2015). Despite this, there is an abundance of valid research to support a wide range of curricular strategies and approaches. Many of these involve a regular incorporation of physical activity with learning activities.

One of these approaches is called Project GLAD, which stands for Guided Language Acquisition Design. GLAD is not a curriculum or program, but describes itself in this way:

“OCDE Project GLAD is a rigorous professional development model based on a collection of research-based, effective classroom strategies. It focuses on an integrated approach aimed at supporting language acquisition and proficiency in grade level content standards” (Orange County Department of Education, 2015).

This model is typically used across subjects in order to help support students who have a primary or “home” language other than the one in which they are being instructed. In the middle school classroom, GLAD strategies support learning for all students because their brains are still developing and learning the nuances of language. GLAD strategies include “Display picture with text for comprehensibility, exhibit patterns visually and audibly, and incorporate physical movement or gestures for longevity” (Orange County Department of Education, 2015). This idea of movement or gestures for longevity ties back to the neurological component of multisensory learning leading to greater engagement and recall.

Sometimes, school districts create their own collection of strategies that can be shared with not only their own teachers, but also with teaching programs. For example, a small school district in Idaho partnered with the College of Idaho to develop a strategies binder to help new teachers and those interested in teaching by providing strategies paired with example lessons. In the Literacy Strategies binder, items are categorized by reading processes, reading areas, and reader strategies. Examples all include purpose, rationale, and research guiding the inclusion of the strategy in the binder. Of the 61 strategies listed, 14 specifically involve movement and most of the others include opportunities for physical activity depending on space and time available during any one particular lesson (Wilder School District, 2005). In addition to the strategies included, the resource also lists the advantages of each activity. For the activities involving movement, the advantages listed often refer back to the neurological components. For example, the advantages of the Reader's Theatre activity list a "variation in the classroom routine," (p. 125) which harkens back to Willis' (2010) concept of using movement to introduce novelty to engage learners in the classroom materials.

Other schools have incorporated classroom strategies that incorporate not just dance, but linking movement to concepts through role play. This can be used in science classes to show how organisms or chemicals interact with one another, as well as language arts where students might be asked to move the way a particular character would in a scene from the story. Both of these examples could have a positive impact on engagement and learning because of the emotional connection some students' experience (Skoning, 2010). Kentel and Dobson (2007) conducted a cross-cultural comparison of movement literacy and reported that children participating in dance, games, and other forms of movement throughout their school day experienced joy while learning.

Increasing joy and positivity is important to helping students learn because often the pressures of success can be overwhelming. To that end, perhaps another key curricular buzzword that has arisen in recent years is the idea of a “brain break.” According to an Oregon State University pilot study, brain breaks originally referred to physical activity breaks implemented in the classroom setting through a video titled *Brain Breaks: Classroom Fitness for Children* (Perera, Frei, Frei, & Bobe, 2015). These brain breaks required no equipment other than a device with which to show the video and a chair, and they could be accomplished in a classroom. They involved a warm-up, a stretching/relaxation, endurance, or strength activity and then, finally, a cool down. The pilot study involved a majority of Oregon Public elementary schools and what they discovered was that the teachers felt that the physical activity breaks during the academic day were mostly beneficial for students, especially the stretching/relaxation activities. In fact, “23% of the teachers indicated that they used the Brain Breaks protocol every day, often at the request of the students” (p. 59). Some, however, felt concern over the idea of implementing yet another activity into the already busy academic requirements. Their concerns are quite valid, but the pilot study suggests that the incorporation of the movement activities, with buy-in from the instructors, did more to help student engagement and achievement than any negative impact from “lost” time for academic work. This study seems to support the idea that age-appropriate activities, when implemented consistently, can improve student engagement and enjoyment in the classroom. With regards to the current study, this pilot indicates that middle school students might also benefit from short physical activity breaks during academic classes like English Language arts, especially stretching/relaxation activities.

Another popular addition to curriculum in elementary schools is a program called Go Noodle. Go Noodle’s advertisement states “Move with Purpose! Boost Productivity. Improve

Behavior. Build Community.” In essence, students are asked to get up and follow the movements, dances, and activities of leaders in a video. All of the songs and movements are connected to concepts students are learning in class. The concept behind Go Noodle seems very similar to the *Brain Breaks* video. Students follow a video of age-appropriate activities that are no more strenuous than PE classes, but can be accomplished in the classroom with no equipment. The difference between the two is that Go Noodle seems to directly tie course concepts to the movement activity. While most of the evidence provided is anecdotal, Holly Stephenson shared the work of Dr. Laura Chaddock-Heyman, which showed that the types of exercises used in Go Noodle had a positive impact on brain structure and function in elementary school students (Stephenson, 2014). Go Noodle activities were also based on research (Hillman & Kramer, 2013) which found that students who had taken a short exercise break before a test had increased cognitive control, improved academic achievement, and changes in brain waves.

One possible barrier in studying the engagement of school-aged children is that the subjects often do not have the self-awareness nor the vocabulary to effectively communicate their level of engagement. Thus, it is left to the perception of the instructor to observe and detect whether students are engaged in the lessons. In one study, researchers from the University of Nebraska, Omaha noted that the teachers from various grade levels perceived different levels of enjoyment based on the type of physical activity. For example, younger students in the second grade were more likely to love the physical activity breaks, often requesting them each day (Dinkel, Schaffer, Snyder, & Lee, 2017). But as students got older, they were more self-conscious, and did not wish to participate because they feared negative social repercussions, assuming they might be perceived as silly. This study shows that the selected activities for middle school students must be physical activities that are low-risk. Movements that involve

dancing or stretches such as bending to touch one's toes might be considered high-risk for pre-teen adolescents amongst their peers.

With the incorporation of movement into class activities where there normally is a minimal amount, there is concern about a loss of instructional time. Physical activity, if implemented, must therefore be an activity that does not cause more interruption than the length of time the activity takes. One study in a primary classroom determined that for younger students, activities with moderate movement that are also tied to concepts to be taught directly after the physical activity are the most beneficial (Weslake & Christian, 2015). "The results indicated that of the three types of brain breaks used in this classroom-based research, brain breaks that related to the subject content and used moderate amounts of movement achieved the best results in terms of combined enjoyment and refocus time," (p. 7). While this study focused primarily on the students' enjoyment of the activity and how long it took them to return to focus on academic work, the results show that periods of high activity are likely to make returning to academic work difficult. Thus the current study in the middle school English Language Arts classroom would be best conducted with moderate to low energy physical activities tied to curricular activities to reduce the amount of lost instructional time.

Interventions to increase physical activity. Today's students are not alone in their learned sedentary behavior. Some innovators in the business world noticed a need for more active work environments for their stationary employees. With the research that has been done in the workplace, there are some ideas that can be transferred to the classroom to help educators develop lessons that incorporate more movement. Google is one such company which has been at the forefront of innovation when it comes to thinking about company workspaces. In Google's innovative corporate offices, the workspaces are as varied as the individuals who inhabit them.

For example, Google's corporate offices in Zurich have "meeting eggs," which are a variety of small rooms that are oval in shape and have seating spaces within that are designed more like a living room or restaurant booth than a typical office conference room (Google, 2016). Offices also include bowling alleys and pub-style meeting spaces complete with billiards tables (Google, 2016). Other companies have created similarly stimulating environments.

As the saying goes, a body in motion stays in motion. Many adults work in industries where they sit at desks for the majority of the day, similar to the way that most students sit in desks for the majority of the day. One Australian study aimed to determine if standing more throughout the day would provide benefits for the cardiovascular system and reduce the participants' waistlines, or if it was necessary to increase steps through walking to find improvements (Healy, Winkler, Owen, Anuradha, & Dunstan, 2015). They found that standing increasing standing time did provide benefits, as did increased time walking, in reducing the risk of cardiovascular diseases. Although that study included adults in the workplace, it stands to reason that students could also experience health benefits from both increased standing and walking. This is significant to the current study, as incorporating walking into the class day does not require any additional equipment or major planning, other than for time. So not only is this a possible intervention activity, but it is also cost-effective.

One intervention that businesses are implementing is the use of standing desks. A 2014 study examined the use of standing desks as a replacement for sedentary office workers. While the data did show that the workers enjoyed the standing desks and the improved health benefits, "no difference was found in productivity. This finding is in line with findings from other studies reporting that sit-stand or other active workstations do not increase, and do not hinder, productivity" (Dutta, Koepp, Stovitz, Levine, & Pereira, 2014, p. 6662). Studies in the classroom

have provided similar evidence of health benefits such as a decrease in BMI (Wendel, Benden, Zhao, & Jeffrey, 2016), and an overall decrease in sedentary behavior (Minges et al, 2016). While these studies were important in determining the physical benefits of standing desks in the classroom, they lacked substantial information on the effects the standing desks had on student behavior and classroom environment.

Another possible intervention is the use of Bouncy Bands. These devices were developed by an elementary school counselor named Scott Ertl. Each device consists of two PVC support pipes and a length of exercise tubing. The PVC pipes attach to the front legs of a desk or chair and the tubing stretches between them. This device allows students “to stretch their legs, bounce their feet and prop up their feet” (Ertl, 2015). According to survey data posted on the Bouncy Bands website, the majority of teachers, students, and parents reported a positive experience with the device. Much like the Dutta et al. (2014) study, the reported outcomes were mostly emotional in nature rather than focused on academic performance or engagement.

Using Bouncy Bands to increase physical activity is based on a basic definition of physical activity and teaching practices that incorporate increased movement. Caspersen et al. defined physical activity “any bodily movement produced by skeletal muscles that results in energy expenditure” (as cited in Institute of Medicine, 2013, p. 38). Thus, any strategy used in the classroom that involves increasing bodily movement for the purpose of energy expenditure might be considered an active intervention. Though the Bouncy Band intervention did not result in an overly taxing form of energy expenditure, there were perceived benefits by students, parents, and teachers. This is helpful in the current study because it suggests that even limited activity can have an effect on emotional changes, which leads the researcher to believe that minor physical activities could have an effect on academic engagement.

Some of the minor changes have not been in activities, but rather in the classroom design. Recently, there has been an increase in classrooms that are developing non-traditional seating options. This is what is known as “flexible seating” and has become a new option in many classrooms around the country. Flexible seating seemed to be the buzzword of 2016, with teachers implementing such options as stability balls, stationary bikes, bosu balls, and cushions or mats on the floor in middle and high school classrooms. Much of the spread of this type of seating has occurred through individual advocates in educational news sources or teacher blogs (Delzer, 2016; Markusen, 2016; WeAreTeachers, 2016). As part of the current research study involves increased movement, classroom furniture that allows for increased physical activity may be beneficial in creating opportunities for movement not directly instigated by the teacher.

Review of Methodological Issues

Many of the studies reviewed did not necessarily aim to observe changes. They were observational, data collection studies whose major goal was to provide evidence that an intervention may be needed in the future. For example, in the Lowry et al. (2013) the researchers were looking for factors correlated to physical activity and sedentary behavior. Lowry et al. did not attempt to study any sort of intervention, but rather sought to gather information to determine whether or not an intervention was necessary. Because of this, there was not a need for parental consent. Similarly, for this action research project, the teacher-researcher gathered information about classroom movement from other teachers but also conducted interventions in the classroom. While the students all participated in the teacher–researcher’s selected interventions, there was no need to obtain parental consent because there was no input from students directly.

In the Mahar et al. (2006) study of using the “Energizers” protocol with middle school students, the researchers used a control and an experimental group, which allowed for

quantitative data of test scores and on-task behavior. While the majority of the data for this research was qualitative, student on-task time can be quantified, as can discipline reports, which can be obtained from teacher records in aggregate form as it was in the Mahar study.

Struggles with sampling. One of the struggles in conducting an intervention study is gathering data from enough participants. In the Hood et al. (2014) study, the researchers were able to gather voluntary data from thousands of participants from a wide range of school settings. This is the ideal for any research but can be difficult given the nature of particular studies. For the current action research, the teacher-researcher is requesting interviews and journals from teachers from one particular middle school. By providing rich and thick description of this particular case, other researchers or interested parties may be able to use this research for ideas on possible movement interventions in other settings.

With such a small sample size, another struggle lies in trying to assume typical behavior or responses to movement activities for the set of students each teacher works with. Classroom dynamics are an interesting microcosm of human behavior. With less than one hundred students to each teacher, even a handful of student interactions may make a major difference in the teachers' reporting of their interpretation of the movement activity. Herr and Anderson's (2005) text suggests that in cases where the sample population is small, there is a much greater risk for having skewed data when trying to generate norms. This is yet another reason for the deliberate selection of qualitative action research, as each interaction provides a wealth of information to be interpreted. Whether the students respond to the physical activities positively, negatively, or neutrally is of less concern than the teachers' understanding and perception of how each class responds. In the classroom, understanding what is ineffective is just as important as understanding what an effective activity is with regards to academic engagement.

Synthesis of Research Findings

One important factor of educational research is that it must be used to develop and determine the appropriate strategies for any given class. Marzano, Pickering, and Pollock (2001) determined that there were nine instructional strategies that were the most effective in improving student achievement. But in the same book that details these strategies, *Classroom Instruction that Works: Research-based Strategies for Increasing Student Achievement*, the researchers also admit that the strategies they recommend are certainly not the only strategies that are effective. They propose that effective pedagogy involves instructional strategies, management techniques, and curriculum design (p. 10). This study proposes a focus on the idea that if teachers are able to combine academic strategies, they already use with an increase in appropriate classroom physical activities, it is possible that students might have a greater chance of improving academic engagement and achievement.

In English Language Arts, one of the major criteria for success is reading comprehension. While there are many reading programs available, those that employ strategies engage students in the reading process are most effective. Educational researcher John Hattie explained such programs as:

based on the premise that the engaged reader is internally motivated to read, hence the aim is to engage students and attend to motivational as well as reading instruction strategies. The engaged reader is cognitively active in using strategies and seeking to link old to new information; behaviorally active in task participation, effort, and persistence in the face of difficulty; and reading frequently for pleasure and learning. (Hattie, 2009, p. 136)

This idea lends weight to the current research into the necessity of actively engaging students in academic learning. By providing opportunities for physical activity in the classroom, students would be also be cognitively and behaviorally engaged.

Studies reviewed earlier in this chapter provide evidence that public schools in the United States could benefit from an increase in physical activity. There is a positive correlation between increased physical activity and decreased propensity for obesity (Kantomaa et al., 2013). As obesity is linked to decreased academic achievement, improving student health is correlated to students improving academically (Geertsen, et al., 2016). This could be due to the neuroscience research that asserts that cognitive function is the lowest priority when compared to survival and emotional security.

Also, increased fitness levels have been linked to increased cognitive functioning and memory (Geertsen et al., 2016). Thus, increasing physical movement in classrooms could have an impact on academic success. While the study is not specifically focused on improved academic achievement, it stands to reason that increasing physical activity should not be detrimental to academic success. In this action research, the teacher-researcher will collect information on three specific physical activity interventions and whether there is a difference in the level of impact on student's engagement in academic activities. There should be no concern that the implemented activities would harm students' achievement.

Critique of Previous Research

Much of the research involved with incorporating movement in the classroom includes purchasing specialized classroom furniture or equipment. In the case of Bouncy Bands, the data provided by the website was collected and disseminated, but not fully analyzed (Ertl, 2015). There has been no formal research study on the effects of Bouncy Bands on academic

engagement. With studies on standing desks, the research does show anecdotal data in terms of academic engagement as this current action research proposes, but this data are more of a side note than the true focus of the study. Other sources detailing use of such equipment is generally anecdotal or found in online blogs, which while relevant in the sense that they provide a general knowledge of a product, are not valid research to be used or cited here. Much of the “research” located in the beginning of the process served more as inspiration for movement opportunities.

Another issue with the current body of research is that it is difficult to find information about middle and high school physical activity opportunities during the school day because so few of these establishments have a regularly scheduled recess period (Hood et al., 2014; Ramstetter & Murray, 2017). Thus, much of the research involved younger students. While still relevant, younger students typically spend most, if not all, of their day with the same teacher and the same group of students. Middle school students, however, have transitioned to multiple teachers and multiple class periods. This is important to note for the current research because class dynamics and academic engagement for any one student may be dictated by previous interactions during the day. Finding out whether increasing physical activity has any correlation to changes in academic engagement could greatly benefit teachers’ everyday decision-making.

Several of the studies included in the previous sections of the literature review involved elementary-aged children” (Chang & Coward, 2015; Erwin, Fedewa, & Ahn, 2012; Perera, Frei, & Bobe, 2015; Stephenson, 2014) and the physical activities were geared more toward students who find it socially acceptable to move around and be silly around their peers. With the current study involving students at the middle school level, then, it is necessary to attempt to incorporate activities that are more appropriate for their age group. Dancing is, therefore, out of the equation because while some students would be perfectly comfortable with the activity, there are others

who would feel alienated. If the purpose is to give the brain time to rest and process throughout the academic period, feeling alienated would be detrimental. Also, activities which were not enjoyed by elementary students, such as stretching, might be more amenable to the older students who are typically more stationary throughout their classes than elementary students.

As the studies with standing or stand-biased desks show that they can be beneficial (Dutta, Koepp, Stovitz, Levine, & Pereira, 2014), the obvious idea may be to attempt to incorporate them into every classroom as an option for student seating. One of the major problems for teachers who want to incorporate new equipment or furniture in the classroom is that such things typically require funding. Most standing desks cost nearly \$200 each, and adding table-top options are still typically \$90 each (Gopher Sport, 2019). This is certainly not a viable option without full support and funding from the district. There are table leg extenders that only cost about \$12 a set (Gopher Sport, 2019), but to outfit a full class of 25 students, the cost of \$300 would still be more than most teachers receive for supplies, if they receive any supply funding at all, and there is no guarantee that such devices would work with the desks already available. While a determined teacher may be able to obtain grants and outside funding for such an undertaking, many teachers will not, as they have many other pressing issues to deal with. The researcher proposes to study student reactions to specific movement activities that could be incorporated into any setting, with traditional seating and without. This research may help to further inform educators and administrators as to the possible changes in student engagement when more movement is introduced into the English Language Arts classroom. If the results of the study show a positive correlation between academic engagement and the introduction of class activities that moderately increase physical activity, other such solutions may be used. These

strategies could be beneficial in schools where funding does not allow for expensive new classroom equipment like standing desks or other activity-promotional seating options.

Chapter 2 Summary

Chapter 2 discussed the relevant and recent research in the fields of educational neuroscience, physical activity in schools and business, and the correlation between physical activity and academic achievement. Educational neuroscience research has been helping doctors and educators understand more about how the brain works with regard to the learning process, memory, analytical thinking and other important aspects of learning. Increased physical activity has been correlated to an improvement in cognitive functioning, which could be due to a variety of factors – including the decreased likelihood of negative symptoms related to sedentary behavior. While many schools have reduced the amount of physical activity over the years in favor of more academic “seat time,” some are following a new trend in the business model. Many businesses are now finding ways to help normally sedentary employees increase opportunities for physical activity during the workday. Schools, or in some cases individual teachers, have also begun working on increasing the amount of physical activity in classrooms.

Chapter 3 provides the background and demographics of the study participants. It gives a detailed protocol of the research study. This protocol includes the guiding questions and basic assumptions of the teacher-researcher. Details about how data were collected and interpreted is explained.

Chapter 3: Methodology

Introduction

It is not known if incorporating physical activity interventions in middle school English Language Arts courses will have an effect on academic engagement. Most students are not getting adequate physical activity, in part due to the fact that there are few opportunities for unstructured physical activity during school hours for secondary students in the United States. One recent four-year study found that roughly 13% of high schools had a recess time (Hood et al., 2014). This lack of physical activity can affect physical, emotional, and cognitive health. While many of those schools may offer a Physical Education class, those classes are not necessarily required of every student whereas a scheduled recess each day would be available for every student. According to the Institute of Medicine, “during the last 10 years, a growing literature has demonstrated a relationship between physical activity and academic performance” (as cited in Jaakkola, Hillman, Kalaja, & Liukkonen, 2015, p. 1719). Based on the Jaakkola et al.’s research, there appears to be a positive correlation between increased physical activity and improved academic performance, but more research is needed as to what specifically about physical activity has an impact academically. As such, educators must seek to find the best ways to secure the benefits of the link, which may have implications for improvements in academic performance.

In the current study, students at the Middle School have seven, 45-minute periods per day. In the last two school years, however, the school implemented a two-period block for all students’ English Language Arts classes. Previously, they had separate classes for reading comprehension and writing skills. With the implementation of the block, the students now have one 90-minute block which covers all English Language Arts skills. They spend the majority of the day seated in desks, which may contribute to a build-up of excess energy or, conversely, lethargy. Neither of these consequences is helpful in classroom productivity. Puig-Rivera et al. (2015) conducted a

descriptive, cross-sectional study of Spanish university workers and found a significant relation between high levels of physical activity and higher mental well-being, work productivity, and spending less time sitting in general. During the last seven years as a public school teacher, the researcher has noticed increased attentiveness and improved academic scores after lessons that included increased physical activity.

An Australian team of researchers discussed the idea that while most health organizations have promoted consistent moderate to vigorous activity throughout the week, there are major health benefits that can come from what they call “background” physical activity such as standing or taking breaks from sedentary behavior throughout the day (Dunstan, Howard, Healy, & Owen, 2012). In the school general classroom setting, this might include lessons that are delivered in an environment that encourages movement rather than sedentary behavior. For the purposes here, a general classroom setting is one in which the school provided equipment assumes that students are seated either in desks or at tables for the majority of the class period. Physical education classes or electives in an atypical classroom such as welding or woodshop, for example, would already involve physical activity as is prescribed by the course curriculum, and would not be considered a “general classroom setting” for this particular research study. With regards to this study, increasing physical activity will refer to three specific intervention activities: teacher-guided stretching, Hailstorm Discussions, and a 4-minute walking break during the 90-minute block.

Hailstorm Discussion is a discussion technique developed by the researcher and her intern teacher in the autumn of 2016. Students write responses on small scraps of paper and form two circles, with the inner circle consisting of one third of the students and the outer circle containing the remaining two thirds of the population (see Figure 1). Students in the outer circle throw their crumpled responses into the center of the inner circle. Inner circle students then retrieve one response, read it aloud and then describe what they think about the response they read. Once

students on the inner circle have all read and responded, they trade places with someone in the outer circle and the process is repeated until all students have participated and/or the instructor chooses to end the activity. This activity may also be conducted as one large circle with all students throwing in and retrieving responses in one session rather than multiple circles.

Students in Group 1 ▲ Students in Group 2 ■ Students in Group 3 ◆

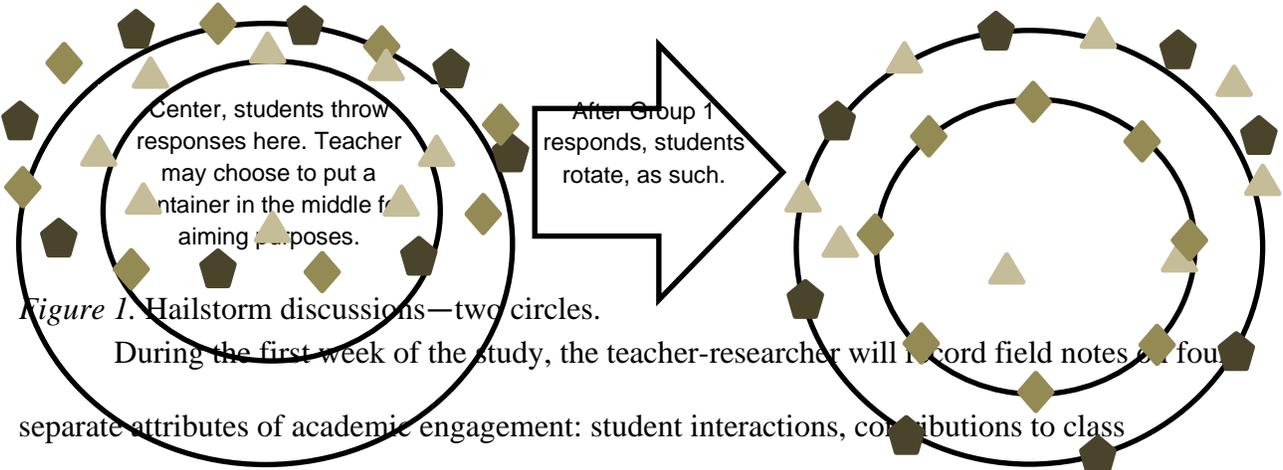


Figure 1. Hailstorm discussions—two circles.

During the first week of the study, the teacher-researcher will record field notes on four separate attributes of academic engagement: student interactions, contributions to class discussions, asking insightful questions, and analytical responses to course materials. Then, each week for eight weeks, the teacher-researcher will implement the three physical activity interventions. Each week during the intervention portion of the study, the teacher-researcher’s field notes will focus on observations of one of the attributes of academic engagement.

Participating teachers were trained by the teacher-researcher as to how to implement the three physical activity interventions and will observe the teacher-researcher’s implementation with her students. Then, the participating teachers will implement the physical activity interventions with their students and journal once a week during the eight intervention weeks. Journal prompts will guide teachers to focus on one academic attribute each week. Both the teacher-researcher and the participating teachers will focus on the same attributes each week of the intervention period. Weeks one and two will focus on student interactions. Weeks three and four will focus on contributions to class discussions. Weeks five and six will focus on asking insightful questions. Weeks seven and eight will focus on analytical responses to course material.

Research Questions

1. How will incorporating three different physical activities—2-minute stretching breaks two times per 90-minute block, Hailstorm discussions, and 4-minute walking breaks—affect middle school student academic engagement in seventh grade English Language Arts?
2. How do teachers perceive the incorporation of physical activity in the classroom?

The first question is important to this study because analysis will provide evidence as to whether or not these specific opportunities for physical activity are viable interventions. Strong, positive perceptions of the use of stretching, Hailstorm discussion, and walking breaks, as well as teacher-perceived changes in academic engagement would be one indication that periodic movement breaks are a practical tool.

The second question is significant because teacher observations and responses in other classrooms may provide further insight and strategies that are not detailed by the teacher-researcher in her own notes.

Purpose and Design of the Study

The purpose of this study is to determine whether increasing physical activity through the use of three specific movement activities in the English classroom has a perceived effect on academic engagement. This study is important because it will provide data that supports or refutes the idea that increasing movement in classrooms has an effect on cognitive function and student behavior. Currently, there is not a strong enough body of evidence on the use of physical activity in middle school classrooms as an academic engagement intervention.

In an effort to meet the multitude of academic standards, schools have unwittingly become one of the largest perpetrators for encouraging sedentary nature like lengthy sessions of sitting, which is linked to obesity. Chang and Coward (2015) posited that it is harmful for the body to experience such prolonged sitting, with the possibility of obesity, myopia, and blood issues as

negative effects. Church, et al. (2011) also concluded that an increase in sedentary work behavior has led to an increase in obesity. There are other problems linked to the sedentary nature of schools, such as an increase in bullying behaviors (Lowry et al., 2013) and a decrease in cognitive abilities (Kantomaa et al., 2013). With so many issues linked to sedentary behavior, the researcher chose to study the effects of increasing opportunities for physical activity in English classrooms. Based on the findings that sedentary behaviors can be detrimental, the researcher chose to incorporate movements that would be familiar to students such as walking and stretching breaks, as well as Hailstorm discussions, which require students to remain standing.

In a pilot study, Mehta, Shortz and Benden (2015) also noticed that there was a growing body of literature about physical activity in the classroom as a health intervention, but with regard to academics the “studies focused primarily on teacher/rater’s observations of student engagement/performance” (pp. 1–2). In their study, however, they were able to focus their measurements on cognitive activity. Through the use of infrared spectroscopy, the researchers measured prefrontal cortex activity and “in general, continued utilization of the stand-biased desks was largely associated with improved executive function and working memory capabilities” (p. 7). The researchers did admit that there was no control group comparison, however, so there were likely other factors involved in increasing mental capabilities. This study is significant because it presents an introduction to the idea that increasing opportunities for physical activity need not be excessive. Even if the increase in physical activity was only a transition to standing rather than sitting periodically, this intervention shows that small movements can be an important factor in increasing academic engagement.

With the idea that small movements can have improvement, the researcher chose three physical activities that did not require great exertion on the students’ part. As previous research showed an impact from simple movements like standing, the researcher included simple stretches

and walking breaks, in addition to the Hailstorm discussion that involved mostly an increase in standing time. As most classes tended to be seated for a majority of the class period, an impact is possible from including activities that increased opportunities to stand, stretch, and walk.

Qualitative research: Action research. Research design is the process of identifying research goals, and then structuring research activities in such a way as to increase the likelihood those goals are met (Creswell, *Research design: Qualitative, quantitative, and mixed method approaches*, 2009). One qualitative research method available to teachers is known as action research, which focuses on a reflective process of inquiry that is conducted by a member of a particular organization with that organization (Herr & Anderson, 2005). Because the researcher is part of the community being studied, there are some problems that must be accounted for such as bias. In most cases, however, action research is conducted as an attempt to develop professionally or to determine the most effective solutions to issues within a working environment where participants are still expected to continue their main obligations. In the school setting, teachers are often conducting action research on a daily basis—observing a problem, determining a possible solution, implementing the solution, reflecting on effectiveness and then moving forward to determine whether the problem is solved or whether there is still more to be accomplished. The difference between what teachers do every day and dissertation action research truly lies in the amount of documentation that is collected and disseminated. For this study, the researcher employed the action research model to collect and disseminate observational data, weekly reports from participating teachers, and an interview to determine what worked, what did not work, and what the next likely steps should be.

In qualitative studies, researchers often collect notes and anecdotes, conduct interviews, and keep work samples or products related to the study. These examples of data collection and analysis will help guide the researcher through this current study. Unlike quantitative data

collection and analysis that can be reported numerically, seemingly disconnected from the humanistic elements of the participants, qualitative data collection and analysis relies heavily on the researcher's perspective and interpretations of any given situation.

Research Population and Sampling Method

The Middle School (pseudonym) is located in a suburban setting. The school district has five elementary schools, two middle schools, and one major high school. There is an alternative middle school and an alternative high school for students identified as at risk students. Though the district is smaller than some of the most immediate surrounding districts, it is by no means the smallest in the state, as it ranks 10th largest in the state. According to the IES's National Center for Education Statistics (2017–2018), three quarters (75%) of the school's nearly 700 students are eligible for free lunch. By ethnicity, over half are Latino, just under half are White, and the rest are listed as other ethnicities.

According the school counselor, English language learners and Special Education students with Individualized Education Plans (IEPs) made up another 30% of the student body, meaning that nearly a third of the school population had accommodations and needs beyond the general education student. These numbers also did not account for students on behavioral plans or those with migrant status. Such a diverse student population is significant because with such a high percentage of students needing accommodations, one can assume that nearly every class that was not designated as advanced or honors would include students from these at-risk populations. These numbers also did not account for students on behavioral plans or those with migrant status. Such a diverse student population is significant because with such a high percentage of students needing accommodations, one can assume that nearly every class that was not designated as advanced or honors would include students from these at-risk populations. In addition, some students with

accommodations might also be academically advanced, so all classes, theoretically, could include a diverse population of students.

In this case, the sample classes were chosen based on the time of day because all three participating instructors had general education courses during the last block of the day. One of the teachers had advanced classes for the other two blocks, and the class sizes were much more varied. While each class was its own microcosm of human interaction, choosing classes of general education students during the same time of day would help align responses.

Instrumentation

There are two sets of data beyond the researcher's observations used for triangulation. First, the teachers were asked to fill out an Observation Report each week. For each week, there was a different attribute focus (see Appendix A). In weeks one and five, the teachers were asked to focus on observations of student interactions. In weeks two and six, the teachers were asked to focus on observations of contributions to classroom discussions. In weeks three and seven, teachers were asked to focus on observations of the quality of students' questions. In the fourth and eighth week, teachers were asked to focus on observations of students' analytical responses to classroom materials. The weekly observation reports also asked teachers to indicate which of the physical activities they used and whether or not they used any physical activity outside of those requested by the researcher.

Once the weekly observations had concluded, teachers were asked to respond to a series of follow-up questions in an interview (see Appendix B). The teachers were given the questions ahead of time to give them a chance to respond in writing. The researcher was also able to ask clarifying questions or to probe for more depth of responses after they had shared their initial written responses.

Data Collection

In action research, the participant pool is smaller in size and as such, the teacher-researcher knew and interacted with the students assigned to her course. This means that the participants were known to the researcher, but the researcher also understands the need for confidentiality.

Individual students in the observed courses were not be identified with any information that could be used to determine a particular subject as the teacher recorded field notes.

Each week, the teacher-researcher wrote detailed observations of how students responded to the three movement activities with regards to student interactions, contributions to classroom discussions, asking insightful questions, and analytical responses to course materials. In addition to the teacher-researcher's own observational data, two other English Language Arts teachers were asked to journal once a week about their own classroom observations during the study. This allowed for the researcher to avoid bias as much as possible. For example, the researcher was one of the individuals who developed Hailstorm Discussions. Because of that level of involvement, there may be some bias from the researcher as to its impact on academic engagement. With the inclusion of the observations from the other teachers and her own detailed notes, the researcher determined if there is an actual effect rather than simply seeing what she believes to be true.

After the conclusion of the study, teachers were invited to participate in a focus group style interview about movement in the classroom (see Appendix A). As the other English Language Arts teachers are colleagues of the teacher-researcher, anonymity is not a feasible option, but names of individual teachers will neither be collected nor reported in the data.

Identification of Attributes

In order to discuss student engagement, there must be a cohesive list of attributes that define what it means for students to be engaged in an activity. With regards to education, academic engagement is central to the learning environment because it is the key component in active

learning. “Active learning requires students to think and learn beyond remembering and understanding,” (Cardullo, Wilson, & Zygoris-Coe, 2015, p. 5). This idea is based on Bloom’s taxonomy, which classifies classroom behaviors as lower level or high-level thinking. Students who are not involved with the lessons are far less likely to retain information, let alone be able to use said information for higher cognitive functions such as analysis or synthesis (Bloom et al., 1956). Some researchers have also noticed higher retention rates in post-secondary schools for students who exhibit higher academic engagement (Barnes, Macalpine, & Munro, 2015; Soria & Stebleton, 2012).

Gasiewski et al. (2011) reviewed the findings of their predecessors in which the three major dimensions of academic engagement were determined to be behavioral, emotional, and cognitive (p. 231). In addition to the accepted forms of engagement, there are several components which can be considered attributes in all of these dimensions. Students may find they experience varying degrees of each of these components at different times during lessons. For this study, the attributes teachers were asked to focus on were student interactions, contributions to class discussions, asking insightful questions, and both verbal and written analytical responses to course materials.

In order to determine whether there are changes in these attributes during the course of the study, the teacher-researcher recorded observations for 2 weeks prior to implementing active learning lessons. Then once a week for 4 weeks, the teacher–researcher wrote observations in the form of field notes about the four attributes and whether there were any perceived changes in frequency of engagement or higher-level analysis.

Participating teachers were asked to record a journal each week for 4 weeks. Each week, the journal question focused on a different attribute. Then, all four attributes were discussed in a focus group. Data from the journals and focus group responses were analyzed for themes along with the teacher–researcher’s own field notes.

Data Analysis Procedures

Focus group responses, teacher journal entries and researcher field notes were transposed and uploaded to Atlas.ti software for coding. All data were kept in a secure location with a passcode known only to the researcher. All names and any other identifiers that could be linked to specific student observations were not collected or else were removed prior to analysis to maintain confidentiality.

Coding categories developed as patterns emerged during data collection. Some specific behaviors expected to be observed include body language, verbal responses, and time spent writing. Other observations and key words appeared during the course of the study. The coded data was analyzed using qualitative content analysis to identify themes through careful examination.

Limitations and Delimitations of the Research Design

Delimitations of the study include the use interviews of teachers in one particular school who agree to participate in the study. Teachers invited to participate are all from one subject area—English Language Arts—and serve the same student population. Their students share the same range of socioeconomic backgrounds. Second, the teachers work in one middle school, Example Middle School (pseudonym), in the Example School District (pseudonym) with one particular grade level. In this way, the observational field notes detail student interactions and behaviors from a specific age range, sixth- through eighth-grade students, so approximately 11–14 years of age. Third, as the data were only analyzed and interpreted by a single researcher, so there was no issue with interrater reliability.

There were also some limitations due to factors outside of the researcher's or instructors' control. First, class sizes and make up are decided by counselors and administration. Thus, some classes had more students than others. Also, because these classes are assigned relatively randomly, some classes had more students on Individualized Education Plans, 504 (behavioral) plans, English Language Proficiency plans, and a multitude of other accommodations. Second,

only interview and journal data from teachers who agree to participate were analyzed. Finally, while the age range is limited, each teacher only works with one particular grade level. Because of this, teachers may have different observations of behavior based on maturity.

Validation: Credibility and Dependability

In order to maintain credibility, data was triangulated. “Triangulation may involve the use of different methods, especially observation, focus groups and individual interviews,” (Shenton, 2004, p. 65). In this study, triangulation will consist of using data from researcher field notes, participating teacher journals, and a focus group. One way to maintain credibility for collecting information in a focus group is a process called member checking. Member checking means sending a transcript of what was recorded during the conversation to the participants so they have a chance to confirm or add to what was originally recorded (Creswell, 2013, p. 252). It is important to include member checking in this research endeavor because the teachers’ perspectives on academic engagement are key. Member checking allows the participants to review for researcher-bias in the collected information and interpretation. The process also reduces the possibility that the teacher-participants’ ideas could have been misrepresented.

Another key characteristic in credibility for this particular study is prolonged engagement between the researcher and the participants (p. 65). The researcher has access to the participants because they are students in her classes. As such, the researcher has an adequate understanding of the organization and trust of the participants (p. 65).

In addition to triangulation and prolonged engagement, the researcher will also use reflective commentary and “detailed description of the case and its setting” (Creswell, 2013, p. 199). Because it is an action research study, these detailed descriptions will allow others to read the analysis of the data and the researcher’s findings as evidence supporting their own interventions with students or to gain further understanding of methods others have attempted in the classroom.

Rich and thick description were used to describe the connections between the intended activities and the actual outcomes for each day, the minutia of daily classroom life, and the effectiveness of the process (Shenton, 2004).

Expected Findings

The researcher expects to find that there is a perceived change in classroom engagement as a result of incorporating more movement activities. In one UK study (Booth et al., 2013), researchers found that moderate to vigorous physical activity led to an improvement in English course assessments. Though the study will have a smaller sample size and timeframe than the Booth et al. study, the researcher expects that incorporating furniture and lessons that promote increased physical activity rather than sedentary behavior will have a notable correlation to academic engagement. Given that engaged students are likely to have higher level cognitive processes, there may be some transfer to improved academic performance.

Ethical Issues

All components of the research process pose some type of concern about ethical issues. Cresswell (2013) discussed these ethical issues at length and suggested ways to make sure researchers do not ignore problems that may arise in the name of scientific observation. With Cresswell's recommendations in mind, the researcher took basic precautions throughout the research process.

In order to make sure the research did not pose harm to the participants, the researcher first submitted a detailed proposal to the Internal Review Board (IRB). This proposal outlined the major processes, participants, and included documentation of permission granted from the site, in this case, the school where academic engagement was to be observed. As no one stood to benefit financially, nor were there any outside funders to appease, there was no conflict of interest. With regard to storing data, all data collection on paper was stored in a file cabinet that only the researcher had access to. Digitally collected data was stored in a password protected location,

where again, the researcher was the only person with access to the information. Participating teachers' names and those of the students in their observations were not recorded or stored in any portion of the data. As the researcher did not employ a recording device, there is no audio data to be destroyed to protect confidentiality. Other data will be destroyed within 3 years of study's publication.

Due to the fact that the research involves implementing an intervention for minor children in an academic setting, one of the main ethical issues is that conducting research has the possibility of a negative impact. Also, students may reject the increase in physical activity. In studies where teachers increased physical activity in the classroom, results showed no significant increase or decrease in academic performance (Ahamed et al., 2007; Lees & Hopkins, 2013). Findings in an extensive literature review of 850 articles showed that there was a positive correlation between physical activity and academic performance in young students as long as the activity was developmentally appropriate and included consistent moderate to vigorous levels of exertion (Strong et al., 2005). With such studies in mind, the researcher has determined that while students may not experience increased academic performance, it is unlikely that students in the participating teacher's class activities would experience any negative academic impact, and therefore intervention does not pose a significant risk to the students.

Another ethical issue that may arise is in the consideration of researcher bias. As the researcher is an instructor, she will have access to English Language Arts students. As this project deals with action research, however, the instructor-researcher's perspective and personal observations are the very crux of the data analysis. It is precisely that individualized reflection that is crucial to understanding how one teacher may react and adapt to student behaviors and engagement in a real classroom setting.

Also, as one of the people who developed the Hailstorm discussion technique, there is an inherent bias in the idea that the researcher would have wanted their activity to have a positive impact on engagement. Again, this bias is where the use of responses from other instructors determined whether what the researcher had previously found to be true was really evident in the classroom. As the other teachers involved in the study had no ties to the activity, they were able to provide unbiased feedback that the researcher may have noticed, but neglected to make note of as an important observation. Summary

Chapter 3 discussed the methodology of the current study. This study's purpose is to determine whether or not incorporating physical activity interventions has any correlation to academic engagement in high school language arts classes. In order to maintain validity, the researcher has attempted to limit the variables as much as possible by using students of relatively the same age, in the same geographic location, and in the same course of study. To maintain dependability, the researcher will use rich and thick description throughout the research process to provide as much detail as possible. By providing descriptions of particular classroom events with details about student and teacher dialogue, body language, and behavior, the teacher will have a more accurate record of how students and teachers reacted to the implementation of new activities. Over time, this record provides insight into trends within this particular school at this particular grade level. With attention to detail, these notes will allow for qualitative data coding and analysis.

Chapter 4: Data Analysis and Results

Introduction

There is not a large enough body of research to determine whether incorporating physical activity interventions in middle school English Language Arts courses will have an effect on academic engagement. As the students make continued progress through the educational system in the United States, the number of opportunities for unstructured physical activities during the school day becomes much more limited. Hood et al. (2014) determined that less than 15% of students in secondary schools had recess time. This lack of physical activity can affect physical, emotional, and cognitive health. Even if schools offer a wide variety of physical education classes throughout the day, those classes are not necessarily required of every student every day. A mandated recess would provide daily opportunities for students to get moving. This is important because there is a positive correlation between increased physical activity and increased academic performance (Jaakkola, Hillman, Kalaja, & Liukkonen, 2015, p. 1719). Though individual teachers may not be able to mandate a recess period for their building, they can take steps to ensure their students receive some form of physical activity during academic courses. As such, educators must seek to find the best ways to secure the benefits of the link between physical activity and academic engagement, which may have implications for improvements in academic performance.

This action research study is a qualitative study designed with the purpose of gathering evidence about three specific movement activities in a middle school language arts setting and their effects on students' academic engagement in the course. Students in middle school language arts are typically sedentary as the nature of the ELA curriculum does not require that students be up and moving about. With the assistance of two other middle school ELA teachers, the researcher sought to answer the following questions:

In addition to being the researcher, I am currently a seventh grade ELA teacher in a small, suburban setting. While this is my eighth year of teaching, it is my first official year in the middle school setting. After working with the students for the first semester, I felt comfortable assessing their typical levels of academic engagement. As a teacher, I am aware that students who are engaged in the lessons will retain more and will be more likely to participate in activities that promote higher levels of cognitive functioning than simple recall. It was necessary, then, to determine if what I assumed to be true was actually working in the classroom. Through careful consideration of previous studies, I determined that I could help my students become more academically engaged through an increase in movement in the classroom. My motivation for the study was to find out whether the simple activities I planned to incorporate were beneficial, as such data would be useful as I continue to work towards helping my students succeed academically. To do this, however, I was aware I would need more than my own observations to combat my personal bias and enthusiasm. Thus, I recruited two other ELA teachers who would be willing to incorporate the same movements into their classroom activities.

Over the course of nine weeks, my two assisting teachers and I implemented the three strategies in one of our seventh grade ELA blocks, and I collected qualitative data throughout. The descriptions provided show evidence that students are often tired due to a lack of adequate sleep and participating in the activities can help them refocus for a short period of time. Their individual levels of tiredness, however, also impacted the perceived attitudes toward those movement activities. Though the teachers saw a range in engagement and willingness to participate, they concluded that incorporating movement led to a perceived moderate increase in academic engagement.

Chapter 4 describes the sample population, the activities, and the observations of the three participating teachers. After an analysis of the data, results are described and summarized.

Description of the Sample

The Middle School (pseudonym) is located in a suburban setting. The school district has five elementary schools, two middle schools, and one major high school. There is an alternative middle school and an alternative high school for students identified as at risk students. Though the district is smaller than some of the most immediate surrounding districts, it is by no means the smallest in the state, as it ranks 10th largest district in the state. According to the IES's National Center for Education Statistics (2017–2018), three quarters (75%) of the school's nearly 700 students are eligible for free lunch. By ethnicity, over half are Latino, just under half are White, and the rest are listed as other ethnicities. According the school counselor, English language learners and Special Education students with Individualized Education Plans (IEPs) made up another 30% of the student body, meaning that nearly a third of the school population had accommodations and needs beyond the general education student. These numbers also did not account for students on behavioral plans or those with migrant status. Such a diverse student population is significant because with such a high percentage of students needing accommodations, one can assume that nearly every class that was not designated as advanced or honors would include students from these at-risk populations. In addition, some students with accommodations might also be academically advanced, so all classes, theoretically, could include a diverse population of students.

For this action research, only seventh grade students English Language Arts (ELA) teachers were recruited to limit differences in curriculum and student age/maturity level. In this school, there is a team of three instructors for each grade level in English Language Arts. In the seventh-grade team, the researcher and both of the other instructors are women. One teacher is in her twelfth year of teaching. She has taught the same grade level and subject for those twelve years. Over those years, the format has changed. Originally, there were six class periods split with

three sections of a course called “Reading” which focused on literature comprehension and analysis, and three sections of “English” which focused on the writing process and grammar. Now, there are three block sections of “English Language Arts” in which the instructors are expected to cover the range of skills. The third teacher is in her third year as a certified teacher but had previously spent eight years as a substitute in a neighboring school district. She completed her degree as a non-traditional student after she had raised her own children. While she was a substitute, she saw a wide range of ages and content, as well as formats. The block format has been the only format she has worked with as a certified teacher, and as such all three participating instructors, the researcher included, have described themselves as “comfortable” with block scheduling.

Both instructors recruited had also been trained in Guided Language Acquisition Design (GLAD) protocol within the three years prior (OCDE, 2015). This protocol introduced classroom strategies that help spark interest and aid in retention of new language by helping students form connections. When the researcher introduced the premise of the current study to the participants, both agreed that the selected activities would work cooperatively with their established classroom strategies.

Each ELA teacher has three 90-minute blocks. Class sizes ranged from 21 to 30 students, depending on the class period. In order to maintain consistency, the teachers selected the final block of the day as the study class because one teacher’s first two sections were advanced classes, whereas the final section of the day was a general education class. Also, the final block of the day provided more similarity in class size as no teacher had more than 25 students in those class periods.

Research Methodology and Analysis

Overview. In the studies reviewed in Chapter 2, evidence supported the need for an increase in physical activity in public schools in the United States. Increasing physical movement in classrooms could have a slight impact on improved physical health and possibly academic success. Another indicator for improved academic success is academic engagement. In this action research, the teacher-researcher gathered information on which physical activity interventions have an impact, either positive or negative, on student's engagement in academic activities.

Methodological strategies. The researcher's experience, middle school students complain about routine as being "boring" or simply "not fun," but they truly struggle with changes to their normal educational experience. Once the novelty of an experience wears off, it becomes perhaps a little boring, but also structured. The safety net of being able to know and anticipate how the day is going to work allows students to truly work with course materials and be engaged not with just learning what is expected behaviorally, but also with the new skills needed in the course standards. With that in mind, there needed to be an established routine to when and how the movement activities were implemented. The variations would be purely on the part of the researcher and assisting teachers' observations. Thus, the study began by introducing one movement activity on a specific day of the week.

In this school, Wednesdays are shortened days, so it is most helpful to maintain as regular a schedule. Therefore, the researcher decided to make Mondays, Wednesdays, and Fridays the day to implement the 4-minute walking break in the middle of the block. Because of the nature of the school week, discussions are easier to implement later in the week because most students will have had a chance to work with materials and be relatively caught up, versus earlier in the week where new material may have been introduced. Tuesdays, then, were designated stretch days, and Thursdays were best suited to Hailstorm discussions. There were some days where the lesson plans had to be adjusted due to unforeseen events, so students either did not have a movement activity or

one was replaced with another. For the most part, however, the researcher and assisting teachers followed the determined schedule as best they were able.

Coding and thematic procedures. There were four prompts for journal reflections distributed to the teachers throughout the study with questions focused on the attributes on academic engagement. The reflection responses, answers to final interview questions, and the researcher's observations provided the primary sources of research data. Though the researcher initially considered coding and tagging by attributes of academic engagement, it became more and more apparent that the responses should also be grouped by notations based on the movement activities that were implemented, namely stretching, walking breaks, and Hailstorm discussions.

Action research. The methodological approach for this study was action research. In qualitative studies, researchers collect notes and anecdotes, conduct interviews, and keep work samples or products related to the study. These examples of data collection and analysis guided the researcher with the decision to collect field notes, ask the participating teachers to provide weekly reflections, and then complete an interview at the end of the implementation phase. Unlike quantitative data collection and analysis that can be reported numerically, seemingly disconnected from the humanistic elements of the participants, qualitative data collection and analysis relies heavily on the researcher's perspective and interpretations of any given situation. Thus, even though the assisting teachers may have their own thoughts and commentary on their notes, the researcher's understanding and interpretation of the reflections provided are at the forefront of the qualitative data analysis.

Protocol deviations and problems with analysis. During the final week of the study, there is a lapse in the field notes from the researcher and the reflections from the two assisting teachers. Unfortunately, tragedy struck the school as a whole and the researcher specifically as during the final week of the study Example Middle School lost a well-known, and well-liked

student. This student had been in the researcher's class, and she was unprepared for the emotional upheaval this created. Her classes spent the rest of that week attempting to cope and begin the healing process, so data collection on movement activities were relatively abandoned, as was all teaching of core content.

Summary of the Findings

Prior to conducting the movement interventions and upon completion of the interventions, the data were read and re-read so that there would be a solid foundation for analyses. Data were then reduced to a manageable amount and were coded for patterns and themes. The analysis of these themes were guided by the research questions:

1. How will incorporating three different physical activities—2-minute stretching breaks two times per 90-minute block, Hailstorm discussions, and four-minute walking breaks—affect middle school student academic engagement in seventh grade English Language Arts?
2. How do teachers perceive the incorporation of physical activity in the classroom?

The first question is important to this study because analysis will provide evidence as to whether or not these specific opportunities for physical activity are viable interventions. Strong, positive perceptions of the use of stretching, Hailstorm discussion, and walking breaks, as well as teacher-perceived changes in academic engagement would be one indication that periodic movement breaks are a practical tool.

The second question is significant because teacher observations and responses in other classrooms may provide further insight and strategies that are not detailed by the teacher-researcher in her own notes.

The qualitative data from the note and interviews with the assisting teachers was read in conjunction with the researcher's own field notes to provide a comparative analysis from week-to-week to develop emergent themes. One of the major themes to emerge was the idea that physical activity will be more readily accepted by students when it is directly linked to an academic task.

Taking structured physical activity breaks like stretching breaks within the classroom did not necessarily go over well with the students. If the movement is used truly as a break from academics, it must also be unstructured to a point. With the idea of less structure, walking breaks did not need to be tied to academic endeavors because students were not asked to remain in a controlled environment. Stretching, however, was seen as a foreign task and many students responded negatively.

Another theme to emerge was the idea that movement does not need to be excessive to be effective in engaging students to the task. It also does not require special equipment not normally found in a classroom. Having students stand during an activity that might normally involve sitting can add enough movement and novelty to the activity to engage students more so than they might if they remained seated.

Data and Results

Early notes on academic engagement attributes. Prior to implementation of the movement activities, student interactions were widely varied. In the researcher's classroom, there were three main interactions: isolation, comradery, and rivalry. Students who isolated themselves tended to be more academically engaged. They sat alone or in pairs by choice near the front of the room. While they would engage in conversation when necessary, they also exhibited shy and reserved behaviors. They had developed a "personal bubble" and it was respected by their peers in the classroom. Students displaying overt comradery and rivalry had a tendency to invade one another's personal space at will, often with the same behaviors: slapping one another on the back, hugging, hanging arms over shoulders. The variation between comradery and rivalry, however, tended to be exhibited in facial expressions and tones as they spoke to each other. Laughter and smiles for the former, and sharp, curt words or tattling with angry glares for the latter. During independent class activities, student attention spans wandered and conversations tended to be more

off-topic than on. This particular class had a fascination with sports, particularly basketball as the NCAA March Madness tournament was in full swing.

As for contributions to classroom discussions, during the initial phase students had to be called on to elicit a response aloud in this class. In other classes, the researcher felt she could not seem to call on students fast enough and the room would erupt into loud a hubbub of incoherent responses. This class, however, struggled with the confidence in responding, which led to excruciatingly painful wait times in uncomfortable silence until the teacher finally selected a student most likely to be able to respond. Responses that followed were typically mumbled and/or underdeveloped, as though the students were trying to get out of any type of public display of knowledge.

With regard to asking insightful questions, most questions were content related, but not necessarily insightful. For example, students asked, “What is symbolism?” or “What does red mean?” during a lesson on developing topics for a Socratic seminar. Some questions developed were insightful like, “Is the CWA (school writing assessment) important?” or “Can natural disasters ever be a good thing?” or “What did you think about the film compared to the text?” The students who were asking the more basic questions sometimes had difficulty because they were special needs students or were English Learners.

Finally, with analytical responses to course materials, there was much more variance amongst the students. Responses were collected in student journals and during a major unit discussion. Many students had copied answers from their friends or else wrote down ideas presented by the teacher. Students who had completed the journal entries fared much better in the fishbowl discussion than those who did not complete their entries. There were a few exceptions to this rule. One male student who tended to be non-compliant during written activities positively came to life during the discussion. The following excerpt is from field notes:

[He] carried his small group with many insightful comments beyond the regular responses. Incorporated four examples of personal experience and three ideas from movies he had watched.

This particular student is a self-proclaimed non-reader. Based on his responses and analysis of a text read aloud, it would appear he is very much an auditory learner and visual learner, with struggles in reading and writing, rather than comprehension.

Student observation codes.

Mandatory stretching needs purpose. After implementation of the movement interventions, notes indicate stretching did little to promote more academic student interactions. In fact, the required movement activity produced negative responses in the classroom.

The students found the stretches to be “lame” because they were tired. Other phrases used include, “This is so stupid,” “Do I have to do this?” and one student simply said, “I don’t want to.” At least three students expressed discontent through exasperated sighs, and one rolled her eyes in frustration.

Similarly, one of the cooperating teachers decided not to use stretching after the first week because of the negative backlash from the students.

We will not be using stretching after this week’s outbursts. It is more hassle than it’s worth. I’m sorry if this creates a problem.

For whatever reason, that class was opposed to being asked to stretch. After a follow-up interview with the teacher on this matter, she had this to say:

My students audibly groaned and some flung themselves bodily across their desks in the seated position. Many of them simply refused defiantly, crossing their arms across their chest while remaining seated. Some made pointed eye-contact as if daring me to force them

into stretches. I don't get it. They sit so long all day; you would think they would **want** to take a few minutes to stretch.

This brings up an important idea for incorporating movement, which will be discussed later in Chapter 5.

However, the third teacher incorporated the stretches between novel reading and the post-reading activities. During the stretching, students were encouraged to ask questions and discuss the relatively ambiguous endings of the chapters. According to the instructor:

The students were able to ask more insightful questions at the higher levels of Bloom's taxonomy than on days where there was no stretching between reading and reading response activities. For example, instead of asking one another about plot points, they were questioning why the author would choose to use certain imagery or discussing which elements in the text led them to certain conclusions about characters.

Thus, this instructor was able to continue incorporating stretching without an interruption to the daily class routines and activities.

Walking breaks are positive. Walking during the 4-minute break produced more noticeable results for all instructors. From field notes:

Students present show more signs of alertness. [Student] had her head resting on her arm on the desk and doodled flowers prior to the break. Upon return, she has raised her head, though she still rested her cheek on her fist. Rather than doodling, she turned her head slightly in the direction of another student who was asking a question, and then wrote down notes as other students responded.

Common changes in the student behavior included students who had previously been slouched in seats or had heads down on desks were more alert, that is, seated upright, actively participating in question-answer sessions, and writing notes during reading/post-reading activities. This theme

carried over in the non-researcher led classes as the other teachers responded that their students were also more “sociable” and “talkative” after being sent out to walk for the 4-minute break. These positive student interactions led to a more involved classroom atmosphere. According to one instructor:

Students were more focused on their task when they returned from their walking break. The task required them to provide opinion based responses to questions...after their movement break, students were more willing to go beyond surface level answers and provide more substance and detail to their opinions.

For example, the question asked of students was “What can we infer about the main character?” One student response before the walking break consisted of a simple sentence, “The character is brave.” After the walking break, the students were asked to take another look at their responses and revise. This student’s response developed into, “The main character is brave because they could have taken the safe way out, but they chose to try to help others, even though it was dangerous.”

This teacher’s perception was that the students were more likely to have improved analytical responses to course materials after literally walking away from the materials for a few minutes. On a final note, all teachers noted that the four-minute walking break led to better peer interactions. The implications of these ideas will be discussed further in Chapter 5.

Hailstorm discussions depend on class culture. During the discussions observed prior to movement activity implementation, the class in question was notoriously quiet. From field notes:

[Student] decided to try to avoid participation in discussion today. Method of avoidance: hide under a coffee table in the front of the room. He had been seated on the floor cushions beside the table, but when I asked the question and looked toward that corner of the room, he laid flat and wriggled under the table. This elicited giggles from the other students

seated in their desks. When I politely, but firmly, required him to respond from beneath the table, his feet kicked half-heartedly—as though he hoped I hadn’t noticed he was under there – and his muffled response was short and did not fully answer the question.

Before the use of Hailstorm Discussions, some students would shrug or give other non-verbal cues. Often, there are “yes” or “no” responses despite the fact that the question was an either/or question or one that started with “why.” This could be due to the fact that they want simply to respond and be out of the spotlight, but it could also highlight a severe lack of understanding about the materials.

With few exceptions, students in the researcher’s class enjoyed the Hailstorm discussions. This seemed to be due to the fact that the students connected the act of throwing written responses into the center of the room with the sport of basketball. As previously mentioned, this group of students was particularly inclined to enjoy basketball, so this activity was almost automatically engaging. At first, they were a bit hesitant to read the response they had picked up:

[Student] slowly unrumpled the paper and looked at it. Her eyes flicked up to meet mine and her brow furrowed. “Do I have to?” she questioned in a plaintive tone. “Just start by reading what they wrote. Then tell us if you agree or disagree.” She sighed heavily, then quietly read the response on the paper, and stated she disagreed. Others then mirrored her response by stating they disagreed as well.

Many of the students seemed to find that it was easier to read someone else’s response to a question than their own. Data taken from the field notes suggested the following:

More students were reading confidently. Some of them struggled due to penmanship, squinting at the paper, and turning it this way and that. For a few, there were requests for help to read because the writing was nearly illegible. But they became more engaged as the activity continued. There were shorter pauses in transitioning from student to student.

Audibly, they had increased their volume and had a confident tone. Then, students began to “own” their responses.

“That’s mine!” rang out as several students claimed a response all at once before erupting into a fit of giggles.

“You wrote that too? That was what I said,” [student] exclaimed before running across the circle for a high five. He then skipped merrily back to his position in the circle, a half-smile etched on his face.

Eventually, they were able to evaluate the quality of the various responses and then further develop their answers or clarify responses.

In the other classrooms, teachers noted that students were more alert and focused on the responses.

My students kept trying to guess who wrote what. Though I explained that it didn’t matter who wrote what, they did start responding to what was written on the paper.

Teachers did note, however, that it was cumbersome at times to incorporate when the discussion was supposed to be brief.

This activity was entertaining for the students, but I had only planned on this discussion taking 10 minutes. It took five minutes for them to write their responses, crumple the paper and get in a circle. Then the tossing and the retrieving took another two minutes. With 24 kids in the class, there was no way to get through all the responses in three minutes. So I needed to have included more time for it when originally planning the lesson, and I’m not sure how practical it is for weekly use.

There may be ways to abbreviate the activity, or it might not necessarily need to be a weekly classroom activity as it is relatively time-consuming.

Movement perceptions codes. For the most part, teachers had positive perceptions of the classroom movement activities. The instructors seemed to understand the inherent benefits of movement in the classroom, despite some neutral and negative student reactions.

Table 1

Teacher Perceptions of Movement Activities

Teacher	Hailstorm Discussions	Stretching	Walking Break
One	Positive; useful for formative assessment of concepts and validation of strong ideas	Neutral; students were unimpressed	Positive; helped both students and self
Two	Positive; not practical multiple times a week	Negative; students rebelled	Positive; students more alert
Three	Positive; helpful before written analytical responses	Positive; transitional aid	Positive; student willingness to participate increased

Note. These perceptions are based on the teachers' journals and interview responses. Each movement activity is described as positive, neutral or negative, as well as the reasoning for the description.

Movement is necessary. In general, the teachers involved found movement to be a positive addition to their ELA classes. Though they implemented the new activities for sake of the study, they both also incorporated other movement activities.

T1 uses activities such as gallery walks or stations that required students to move to new groups or find new partners after a certain amount of time. If I put a timer on the board for the movement duration, students are able to transition quickly and efficiently. I had previously tried these kinds of physical activities without a timer, but we lost too much instructional time trying to get the students to refocus once they had finished the task that involved movement. They either milled about aimlessly or stayed too long in one location chatting off-topic with their peers. After displaying a timer, students felt a sense of urgency to complete the task at each station.

For the other teacher, movement could give students time to reset if they started to display negative classroom behaviors.

Sometimes, I [T2] have the students do an “Alice in Wonderland Tea Party” kind of movement. I tell them they have to trade seats and move to a new area of the classroom with new partners so they can get a new perspective. In an almost sing-song voice, I call out, “Move down, move down, move down!” This helps when I have a group that isn’t collaborating well or when I have a really chatty group because it isn’t necessarily a directed disciplinary action. They are seventh-graders; it is in their nature to be talkative. Moving them around helps us regain focus on a task or topic because even a small change in “scenery” allows students to pause and refresh.

The act of getting up and going to new area in the classroom usually gives the off-task or misbehaving students an opportunity to refocus and get back to the activity at hand. Another of the most prevalent ideas in teacher and researcher notes included flexible seating options.

Flexible seating needs rules. Flexible seating means that students have the opportunity to choose seating arrangements that best suit their personal learning modes. For example, some students work best when seated in a desk, but others prefer to sit on the floor, or stand at a taller table, or perch on a stool. One teacher noted:

One of my students decided that they wanted to recline in the recycling bin as a lark. He was genuinely surprised when I told him that was fine, that I didn’t care where they chose to sit for independent reading. The student scooped a few papers from the bottom of the bin to the side he intended to use as a backrest. Then he settled in, almost like a cat snuggling in to a freshly emptied cardboard box. Upon finding it to be actually comfortable, the student requested that they be allowed to sit there every day as a permanent seat, and not just during independent reading. At first I was hesitant and told

him that he could try it, but if he got off task, he'd have to move back to one of the other seats.

The teacher was pleasantly surprised when the student in the recycling bin maintained focus and was able to contribute quality course work. She noted that his ritual of “settling” into the discarded paper seemed to give him some amount of joy in the silliness of the action.

Both the researcher and one other teacher had implemented flexible seating with floor cushions, exercise balls instead of chairs, benches and tables, low profile lawn chairs and coffee tables, and stools with taller bistro-height tables.

My most popular seating option seems to be the exercise ball. Students will attempt to steal them from one another if they get up to sharpen a pencil or get a tissue. We had to establish ground rules that just because a student stood up, they were not relinquishing the right to their seat. One could not be expected to carry their desk with them to get a tissue, so no one should be expected to carry a ball when leaving their chosen location.

These nontraditional seats were mostly helpful options available in addition to standard issue desks.

As with many things, however, students can abuse the flexible seating options, so rules must be established. Sometimes too much choice sends students into over-stimulation and they can no longer focus on the tasks. One of the teachers said:

Originally, I had a sofa and some lap-tables, but had to remove the sofa because students would sleep or were inattentive while seated in that area of the room. I tried moving the sofa to a different location, but it just wasn't working. I finally gave up when a student actually snored during a lesson. It took away from the entire class's focus as everyone not only laughed that day, but then the next day they also teasingly asked the student if he

planned to nap again. The value that particular seating option might have added for one student was eliminated by the distraction it caused to the class as a whole.

In such cases, flexible seating becomes less beneficial and must be limited. In the sofa case, the comfortable seat was sent to another teacher's room, much to the dismay of the students in the original owner's classroom.

When they came in and saw it was gone, they whined, "But why? Where did it go?" I told them that it was a privilege, not a right. The purpose of adding a sofa had been to improve class morale, not disrupt the learning process. They grumbled, but admitted they had not been responsible. So while they were still visibly and audibly disappointed by the disappearance of their favorite distraction, they were not overly surprised once I had explained my reasoning.

Student attitudes. As with flexible seating, some ideas that were not part of the original study showed up more often than anticipated. Students are indeed people with valid thoughts, feelings, and opinions. While they were not consulted prior to the implementation of movement, their attitudes toward movement must be considered. There is always the chance that students will be resistant to activities, and sometimes new ideas are uncomfortable at first. One teacher noted:

Sometimes the students wouldn't participate because they thought it was dumb or didn't want to embarrass themselves. Social aspects of school are important, and if they have friends in class that they think will mock them, they will resist. They'd rather be in trouble with me than suffer a social wound.

This seemed to be the case with stretching. Even though the stretches were in no way revealing or inappropriate, students felt opposed to stretching. From field notes:

One response was, "This isn't P.E., Miss!"

Other student grumbles, “Ugh,” “This is so useless,” and “What does this even have to do with anything?”

This is a reminder that students come into classrooms with preconceived notions of what they expect the classroom activities to be. When those expectations are not met, their initial reaction is less that of surprise, and more disappointment and annoyance.

Summary

Chapter 4 findings revealed that students and teachers had mostly positive responses to movement activities. Stretching seemed to be the least favorite, whereas the walking breaks were the most implementable strategy. Hailstorm discussions had mixed reviews, but when planned for, were not detrimental to student academic engagement. Chapter 5 will present possible explanations as to why the activities were perceived as they were, as well as conclusions on how to utilize the data as the researcher continues in the educational field.

Chapter 5: Discussion and Conclusion

Introduction

The purpose of this action research was to determine whether increasing physical activity through the use of specific movement activities in the English classroom has a perceived effect on academic engagement. This chapter includes a discussion of major findings as related to the literature on movement in academic classrooms, specifically language arts. Also included is a discussion on implications of this study for classroom strategies as they relate to the four indicators of academic engagement. Finally, this chapter will contain discussion and future research possibilities to help answer the questions:

1. How will incorporating three different physical activities—2-minute stretching breaks two times per 90-minute block, Hailstorm discussions, and four-minute walking breaks—affect middle school student academic engagement in seventh grade English Language Arts?
2. How do teachers perceive the incorporation of physical activity in the classroom?

The first question is important to this study because analysis will provide evidence as to whether or not these specific opportunities for physical activity are viable interventions. Strong, positive perceptions of the use of stretching, Hailstorm discussion, and walking breaks, as well as teacher-perceived changes in academic engagement would be one indication that periodic movement breaks are a practical tool.

The second question is significant because teacher observations and responses in other classrooms may provide further insight and strategies that are not detailed by the teacher-researcher in her own notes.

The four attributes of academic engagement observed were student interactions, contributions to classroom discussions, asking insightful questions, and analytical responses to course materials.

Summary of the Results

Overall, the teachers agreed that the students' academic engagement improved with the incorporation of movement activities in the lesson. The most user-friendly activity from the study was including walking breaks, whereas the 2-minute stretching sessions had mixed results for engagement. The Hailstorm Discussions produced higher academic engagement but were cumbersome and had to be specifically planned for in order to account for time management.

Discussion of the Results

Of the three movement activities implemented, mandatory stretching was an unexpectedly controversial inclusion to the classroom. One reaction that was entirely unanticipated on the part of the researcher was the student backlash to having two minutes of stretching mandated once a week. Students at this age may not necessarily be able to articulate why they oppose an activity, but they do have a sense of awareness as to what they dislike. In such cases, it seems more detrimental to continue implementing the movement as it would promote a negative classroom atmosphere, which would hinder the learning process and disengage students who might otherwise have been more willing participants in the education process.

Perhaps the students in the two classrooms that opposed stretching felt as though it was yet another unnecessary addition to the classroom. Despite an explanation as to the benefits of stretching, the students remained either openly hostile toward the activity or apathetic at best. In the class where students were instructed to discuss the reading and ask questions while they stretched, there was zero pushback. In that scenario, they were given a specific academic task tied to the curriculum content, and the stretch was presented as a background activity.

The students in that class had improved engagement during the movement activity because the focus was still on the course content, but they were allowed to use a physical activity to transition from information input (reading the novel) to information analysis and output

(discussion and writing). This lends to the idea that movement can improve academic engagement in an academic classroom, but the movement itself should not be at the forefront if it is not an expected part of the class.

Activities like walking breaks, Hailstorm discussions, or stations/centers were expected in the academic setting as the walking took place during an established break time, and the discussion was the main focus of the Hailstorm, which therefore made those activities acceptable in the academic classroom. Stretching, however, depending on the presentation and mix of students, was not welcomed as a positive addition to the environment. Perhaps this is because it caught the students off guard. As previously mentioned, students often claim they want variety and change, but are most comfortable in situations that have clear expectations and established regulations. Stretching was not something that had been part of their accepted canon for what an ELA class should be. Thus, when presented as a mandated activity, they resisted, leading to a decrease in academic engagement for the majority of students observed in this study.

On the other hand, the most easily accepted and usable activity was the inclusion of the walking break. This activity allowed students to remove their focus from the task at hand, and move around. It also gave them time to talk with their peers. While none of the anecdotes provide evidence that the walking break led to more insightful questions or analytical responses, it did improve their interactions with peers. The walking break gave them an opportunity to talk with peers about nonacademic topics, so they were more ready to focus in class, and the interactions were much more positive.

Hailstorm Discussions proved useful in the classroom as all students were able to participate and were willing to do so. The students were able to incorporate both forms of receptive skills and expressive skills, as well. They were required to write a response, then read someone else's response, then speak by both reading aloud and responding to what was written, and finally

they also had to listen to their peers reading and responding. This activity led to more positive interactions with peers in the classroom as there were clear expectations as to what was appropriate to do and say when standing in the circle. Add to that the added benefit of minor background movements and this was a highly successful classroom strategy. There were some minor issues with timing, and there is never a guarantee that students will follow the established protocol, but the majority of students participated fully.

This discussion method may not be the best to use for every discussion opportunity, but that is to be expected. It is definitely an activity that requires twenty minutes or more, depending on the level of and number of questions asked. For example, one would need to plan for more time if the questions asked would require a two to three sentence response versus a question that might only need one word in response. This activity could also be used as a game with multiple rounds, thus requiring even more time. As such, it is not practical for everyday use, but that does not mean that it is not a helpful tool in incorporating more movement during a class activity like discussion that would normally be a stationary, sedentary activity.

Student interactions.

Two-minute stretching breaks. In one of the three classes studied, 2-minute stretching breaks improved perceived academic engagement through student interactions based on that teacher's perceptions. With the connection to a specific classroom task, students felt that there was a purpose behind the movement and were positively motivated to participate. When thinking about the reasons for a lack of engagement in academic activities, this idea makes sense because instead of the stretching being just another "random" addition to the classroom procedures, it was presented as purposeful movement. They were able to focus on the conversation with one another, which allowed them to stay on task and share personally relevant information with their peers.

In the classrooms where students rejected the idea of stretching breaks, the activity did not improve student interactions. Students were actively engaged, but not *academically* engaged. They were engaged in opposing the activity, but it did little to help them communicate with one another and focus on the tasks. When the students shut down, they also shut out their peers.

Hailstorm discussions. Students' interactions with one another in the Hailstorm Discussion circle were more social at first. They high-fived one another during the portion where they were supposed to shoot their answers into the container in the middle. They also verbally expressed joy when someone made a basket or jeered good-naturedly when someone would miss. Overall, the interactions were positive.

These happy interactions improved the classroom atmosphere and everyone maintained academic focus during the reading and sharing portion of the activity. When individuals responded to one another directly, instructors did not have to re-focus or re-direct. This is significant because most students interacted with at least one other student in a positive manner while engaged in the activity.

Four-minute walking break. During the walking breaks, student interactions were not academically focused. This was expected, as by definition, they were on a break from academic tasks. When in the hall, their interactions tended to be friendly physical contact like draping an arm across a shoulder or fist bumps. Some of them chose to burn excess energy by running or skipping, which led to verbal reprimands from teachers posted in the hallway.

Upon return to the classroom, student interactions with one another were sometimes increased during class activities. They sat up more attentively and looked at their peers as they spoke. They mostly maintained focus on course topics, but had a few side conversations, as most people are likely to do during unscripted conversation and discussion. They were able to self-monitor and return to the course topic with relative ease. This is significant because students were

learning the skills necessary to engage in peer-to-peer activities appropriately. If they retain such lessons from interactions, this would be a useful skill in a workplace environment.

Contributions to classroom discussions.

Two-minute stretching breaks. If anything, the classroom discussions after the stretching breaks were livelier than before. They were not, however, on topic in the researcher-instructors classroom. After the initial round of stretching led to seemingly collective outrage, the class was unified in expressing their dislike of the activity. Their discussion tactics were not eloquent, but they were clear. Also, it led to action that worked in their favor – their dislike of the activity and verbal projection of that dislike led to the discontinuation of the activity.

For the instructor who structured the stretching-breaks as a post-reading activity, it did not lead to more active full-class discussions, but the activity did improve one-on-one engagement. This may be something to try in a think-pair-share style activity where students are asked to respond on paper first, then stretch and discuss one-on-one, and then engage in a full-class discussions. If their contributions to the full class are anything like their contributions to student interactions, they may all share more meaningfully and at a higher percentage of student participation than usual.

Hailstorm discussions. With regards to contributing to discussions, Hailstorm Discussions by far improved engagement. Where students previously might have been nervous or shy, they were confident in their ability to read a response written by someone else. This activity was especially helpful for Special Education students and English Learners because they had the opportunity to hear and see how the activity worked before it was their turn.

Originally, this activity was designed to help English Learners participate in a discussion in a general education English classroom. Teachers of English Learners must provide opportunities for them to read, write, listen and speak. Hailstorm Discussions allow them to practice all four

skills with academic language, which many English Learners struggle to master though they have found success with basic interpersonal communication skills. With this activity, they were provided with a model for verbal response before it was their turn. The teacher can control the activity so that the English Learners can observe first. This takes away some of the anxiety of not knowing how to put into words what they might understand.

In this discussion, they did not have to try to share their own idea first, so they were more able to participate fully. For those struggling students, they may not have had an idea to share initially and could have thrown a blank paper. Whoever got their paper would then respond with something along the lines of, “This paper is blank, but I think...” This allowed everyone to engage in the activity and glean ideas from students who had a better grasp on the topic.

On most occasions, this activity led to 100% student academic engagement. They were sharing what others had written and then responding to that, rather than simply waiting for their turn to say their own ideas. Many times in a discussion, students disengage after they have said their piece or while waiting for their turn to speak, they focus so much on what they want to say that they often miss it when someone has already voiced a similar thought or opinion. With this activity, they waited for their turn, but they were also actively listening for someone else to read *their* response. When they did hear their written response read aloud, they often received the validation of their ideas from their peers. If they had written something that other students disagreed with or something that was incorrect, they did not have to worry about suffering the social consequences of being “wrong” because of the anonymity of the activity. But more than that, they got immediate feedback and corrected information that they could hopefully retain for use in a future writing activity. If their thinking was off or based on false assumptions, they had the opportunity to fix it before submitting any written assignment.

By keeping students standing in the circle after the basket-shooting portion of the activity, they were still participating in the background movement. Standing up and facing all their peers at once could be intimidating for some at first, but the nature of the activity allowed for more of a cohesive community.

The one major downside to this activity is that it does take up more of the class period than the prescribed times of the stretching and walking breaks. Both of those movements happen outside of the curricular tasks, and even if tied to a curricular task, they have defined time-limits. Depending on class size, how many questions were asked, and the length of responses, Hailstorm Discussions could take an entire class period or block. In some ways, that could be a good thing because students would be up and moving and engaged for the entire class.

Four-minute walking breaks. On the whole, the addition of a walking break in and of itself did not seem to lead to improved contribution to class discussions. While students were more engaged in other ways, their class discussions remained relatively unchanged after a short walking break. This could be due to the fact that class discussions were not immediately implemented after the walking breaks as often as the other activities. It might also be that while students did not necessarily contribute more or less, their contributions to the class discussion had more depth, which was noted in other academic engagement attributes like asking insightful questions and providing analytical responses to course materials.

Asking insightful questions.

Two-minute stretching breaks. In the class that implemented stretching breaks successfully, the instructor noticed an improvement in the questioning between pairs. With increased physical activity, it would reduce the sluggishness many students might feel after silently reading for an extended time.

If they are not feeling as tired, their brains are more likely to be functioning at full capacity, which allows them to develop more insightful questions. It may also have something to do with genuine interest in what their partner had been reading or working on previously.

Hailstorm discussions. While the movement helped students stay actively engaged, their questions did not become overly insightful after or during Hailstorm Discussions. Likely, this is due to the nature of the discussion method. While students are speaking, listening and responding, they are rarely developing and asking new questions. It may be helpful to try a secondary activity which is more like a Jeopardy discussion whereas the instructor, I provide students with statements, photos, or quotes from texts and then have the students write questions about said topics for the Hailstorm.

Another option to help increase insightful questions might be to have students perform a Hailstorm Discussion, but instead of recycling the response after, require them to write a question to the person's written response. Then we would repeat the toss, select, read, respond portion of the activity. This would take more time in an already time-consuming activity, but it might lead to more depth of questioning over time.

Four-minute walking breaks. According to the teacher responses, the walking breaks did allow students to offer more insightful questions to the class. Perhaps this might be due to the stepping away from the topic where the brain can develop new connections. They might also have taken time during the walking to talk to peers, and in so doing, come up with new questions about the topic.

Analytical responses to course materials.

Two-minute stretching breaks. For two of the three classes, the stretching breaks did not lead to a deeper analysis of course materials. As the students' negative or apathetic attitudes were

disruptive to the academic process, the instructors of those classes determined not to continue with the activity after a couple attempts to implement the stretches.

The third teacher, however, found that student writing after the stretch and partner talk activity did show improved analysis. Their responses were longer and went beyond simple statements of what happened to possible theories on why characters acted a certain way, or how the events in their stories were connected to their personal experiences. Perhaps the stretching break allowed them time to bounce ideas off another student before writing. It is also possible that the stretching activity allowed students to refocus on the topics and mentally work through new possibilities.

Hailstorm discussions. For some students, the analytical responses they provided would have always been proficient. For many students, however, being able to listen to other ideas and have their own ideas validated gave them the confidence to take their writing a step further. Students who elected to keep the written response from the activity usually used a portion of it in a subsequent writing activity. One trend the researcher has noticed over the past few years is an increased sense of students wanting to know “the” answer, as though there is only one. The movement and increased engagement in this activity allows students to stay mentally checked-in long enough to realize that there are generally many “correct” answers in an ELA classroom.

When students are asked to think critically, they are often not confident in their own answers. This makes sense in middle school when so many things are changing, from the format of the school day, to new social groupings, even new bodily changes. It can be overwhelming to navigate all of those things and maintain confidence in one’s academic capabilities. Perhaps one of the more valuable outcomes of the Hailstorm Discussion is that it allows students to analyze first as an individual, and then receive feedback from peers to further their understanding of the topic at hand.

Four-minute walking breaks. By far, the walking breaks have given the students the opportunity to develop deeper analytical responses better than the other two activities. While the Hailstorm Discussions allowed students to practice as a group and each individual showed academic engagement, the walking breaks are the easiest to implement. As noted in one of the interviews, just walking around the halls for a few minutes led to greater engagement in the course activities. They also showed that after the walking break, they could review a previously written statement and significantly expand on their explanation.

The reason this is significant is that it creates the greatest impact with minimal effort. It is an efficient activity because it does not require any added planning time or materials. In fact, if the instructor chose, they could implement the walking break at any time during the class period, and not necessarily just during the normally scheduled break times.

Discussion of the Results in Relation to the Literature

Neuroscience in education. An idea touched on in *High Impact Learning* was the idea of community building as an essential tool for increasing engagement. Perhaps the reason the Hailstorm Discussions were so universally accepted by both students and teachers had to do with this concept. Community building involves both listening and communicating respect (Knight, 2013). Students listened to one another, sometimes only to hear if it was their response, but they still listened. The anonymity of the activity allowed everyone's voices to be heard. It also provided a respectful way to respond because good ideas could be applauded or validated, while less than stellar ideas could be debated or elaborated upon without pointing out the speaker. This harkens back to the ideas posed by Field, Beeson, and Jones (2015) in that it meets their emotional needs to feel safe in the classroom. When the students know that they will not be singled out for odd, unpopular, or "incorrect" ideas, they are more willing to participate fully in the activity. This engagement allows them to delve into the concepts and deepen their understanding.

Perhaps another reason the Hailstorm Discussions were successful was due to the physical arrangement of the circle. As previously discussed, Wilhelm (2007) noted that pairing students in a circular format allowed students to connect to one another in a way that sitting in small groups or rows does not. By facing one another in the circle, students could see everyone, but were also aware of being seen by others. Rather than this being a moment of panic for students who tend to shy away from spotlight, it allowed them to be seen by the whole group without having to move into a singular position at the front of the room. Nor did heads and bodies have to turn to face the speaker, as the circle already promotes that sense of attention.

Hailstorm Discussions also allowed students to claim responses and bask in the approval of their community when they did well. Hearing their ideas repeated by others and agreed with helped feed the positive emotions, thereby creating a sense of belonging and community. This feeds into the students' emotional need to feel secure and safe in the classroom setting (Field, Beeson, & Jones, 2015). It provides an opportunity for them to feel like a valued member in the class, which will help them maintain a sense of belonging and ownership of the learning activities and environment. These key social-emotional attributes of the activity may have lent more to the engagement than the background movement involved in the standing, throwing, and retrieving. The movement in the Hailstorm Discussion was expressly tied to the activity, much like the stretching discussions employed in one classroom. Purposeful movement led to more engagement from the students.

Recess policies and student development. Walking breaks might be seen as inefficient, especially when regimented by bell systems or specific times, rather than as natural breaks during transitions between lessons. As noted in *Brain Briefs*, students are not empty vessels to be filled. They are people with their own notions and needs, including physical bodies that move, which plays a distinct role in how and when they learn (Markman & Duke, 2016). Sitting still all day is

not natural for humans, and even less so for young children. While it may not be efficient to take a four-minute walking break in the middle of the lesson, it can be necessary for their development and continued engagement. As the teachers observed, students were able to express themselves both verbally and in writing after walking. This could be linked to the idea that students were able to move and process without the expectation to immediately respond. The background movement may have provided the outlet needed to then help the students re-engage and focus on the writing or speaking task requested after the break.

One of the keys to getting students engaged in the learning process is authenticity. People in general get excited when something is the “real deal.” As discussed in Knight’s *High Impact Instruction*, it isn’t enough to get students engaged with the assessment; they must also buy into the day-to-day processes (p. 225). When the students did not see a connection between the movement activities and the purpose of the lesson, they were actively disengaged and complained about the activity. For example, the stretching activities, while possibly beneficial to blood flow and brain development, were seen as inconsequential by students in two out of the three classes. As this school is not among the 35% of middle schools that incorporates recess for its students (Ramstetter & Murray, 2017), it would be helpful if students could engage in a physical activity within the classroom, especially one that is a 90-minute block. However, the students in the class where stretching was tied to a two-minute post-read, informal discussion, not only were fully engaged in the activity, but seemed to enjoy it as well. Instead of it being stretch then discuss, it was stretch *and* discuss, which made all the difference in the value of the activity to the students.

Physical activity and academic achievement. In the elementary school study by Erwin, Fedewa, and Ahn (2012), the students involved in physical activities in the lessons showed improved reading fluency and math scores. While the results of this study do not point to any record of improved academic achievement, they do show that the physical activity involved in

Hailstorm Discussions and walking breaks may have contributed to improved academic engagement. The teachers perceived an improved ability to develop topics both verbally and in writing after the movement lessons.

Perhaps more importantly, the results were similar to those found in the Energizers study (Mahar, et al., 2006). In that study, the researchers found that the physical activities allowed students to have increased on-task time when they returned to normal academic activities. In much the same way, the students in the middle school classes showed increased academic engagement, which means they were on-task and likely not have to be redirected as often. Also, when the students returned from walking breaks, they were more likely to write things down, rather than simply doodle or stare into space. The kinesthetic action of writing the notes is bound to have helped them retain the information for later use. Increasing the amount of on-task time and decreasing the number of negative behavioral issues is beneficial for everyone involved because it allows the students to learn in an environment with limited distractions, and it allows the teacher to focus on helping students understand rather than correcting behavior.

Movement-centered classroom instruction. According to Willis (2010) many of the adopted strategies in schools around the country are not actually brain-based, as many of the materials claim. Due to this lack of research, teachers tend to be hesitant to make major adjustments to what is working in their classrooms. The teachers involved in this study were willing to test the use of movement activities they felt comfortable implementing in their classrooms both for the sake of the research, but also because when presented with the literature on the benefits of movement in the classroom setting, it made sense. When two of the instructors found that one of the movement activities was not only not helpful, but was actually detrimental, they terminated its use. That does not mean, however, that stretching in the classroom setting is inherently bad. What is promising is that one teacher did find success in increasing academic

engagement with stretching. This is an important note because there are many possible strategies and activities to choose from in the “teacher tool box.” What this situation shows is that sometimes it is not the strategy itself that is the key, but how it is used that makes it a useful classroom tool.

The same can be said for all aspects of curriculum, from the stories used to the types of furniture present in the classroom. It hearkens back to the study that found that students who were in classes that incorporated dance and other types of movement experienced joy while learning (Kentel & Dobson, 2007). Students who report feeling joy while learning are obviously engaged in the activity. Students who did not experience joy, or in fact experienced anger or disgust for a movement activity, as two out of three classes did during the stretching, would not have been engaged no matter how interesting the subsequent materials were. Students were genuinely joyful during portions of the Hailstorm Discussions and the walking breaks, as evidenced by the reported smiles, high-fives, and in one case, skipping merrily across the classroom. For this study, the major take-away is that any sort of movement-centered classroom instruction strategy can be used to the benefit of the students if it is adapted to meet the needs of each individual class.

Interventions to increase physical activity. Increasing physical activity can increase the heart rate. According to previous research “changes in [heart rate] also correlate with changes in engagement,” (Darnell & Krieg, 2019, p. 10). Perhaps the reason standing during the Hailstorm Discussions and the vigorous walking were more well-received by students and teachers reported higher levels of academic engagement during or after the activity is that the heart-rate remained elevated for a longer period of time.

Standing is one way to decrease sedentary behavior and has been shown to have health benefits (Wendel, Benden, Zhao, & Jeffrey, 2016). This was found in settings that incorporated stand-biased desks. Unfortunately, stand-biased desks are rather expensive, so many classrooms do not have enough – if any – to accommodate all students. To that effect, teachers who wish to have

their students benefit from standing rather than sitting, need to find activities that incorporate standing. With the Hailstorm Discussions, students spent the entire activity on their feet, even if they were not actively moving. In classes that have lots of students with little physical space, this kind of activity, if used regularly, could improve academic engagement. While standing may not have benefits for productivity (Dutta, Koeppe, Stovitz, Levine, & Pereira, 2014, p. 6662), it did seem to have an impact on student engagement. Students in the classes that use standing during activities such as the Hailstorm Discussion regularly may find an increase in academic engagement.

In the previous discussion about the health benefits tied to increased standing and walking throughout the day (Healy, Winkler, Owen, Anuradha, & Dunstan, 2015), researchers found that both standing and walking were beneficial. For that reason, the researcher chose to not only incorporate a standing activity, but also to look at the possible academic engagement benefits of a walking activity. The walking activity was beneficial as the teachers noticed increased engagement in class activities when they returned, even if the activity is a stereotypically boring activity such as note-taking. Another possible benefit to incorporating regular walking breaks into the class day is that it sets students up for a future in which they know how to avoid sedentary behavior. If they are used to taking a 4-minute walking break every 90–minutes or so during adolescence, this may become a habit they carry into adulthood. If they are more able to focus on necessary tasks after a walking break in school and it has health, then they might also find this to be true in the workplace and avoid debilitating sedentary behavior.

Limitations

One of the limitations of this study was the timing. Implementing new activities into a class towards the end of the school year can be difficult. Classroom management is one of the most important aspects of creating a positive learning environment. While there is no one right way to set up a classroom or specific protocols that must be used by every teacher, establishing those

expectations at the beginning of the school year is important. If the timing could have been changed to the beginning of the school year, there may have been slightly different results.

Also, the limitation of time was relevant to the number of weeks of school left. This did not leave much room for deviation. A longer study may have been beneficial. Although nine weeks yielded a wealth of information, it may have been helpful to be able to look at a full semester's-worth of data. With 16–18 weeks, it would have been possible to go through the rotations of journal prompts four times instead of only twice. In a qualitative study such as this one, more responses from the teachers would have lent to definite data saturation.

Another limitation was the age and maturity of the student population observed. While the use of only seventh grade students allowed for trustworthiness in the data, it is also a widely varied age-group in terms of development. Many students have already begun to go through physical and emotional changes that their peers have not. This leads to a rather interesting class dynamic, and can make activities like stretching seem awkward for some students because they have developed a unique sense of self-awareness. Some of their hesitance to stretch, despite the fact that stretches did not require any major body bending or twisting, may have been due to a negative perception of their own bodies.

Implication of the Results for Practice, Policy, and Theory

As discussed in Chapter 2, action research is cyclical in nature (Herr & Anderson, 2005). This study fit into that model because as the teachers observed and implemented the activities in their lessons each day, they were also reflecting on what went well and what could be changed. This led to the elimination of one of the movement activities fairly early on in the process for two out of the three instructors. Change and adaptation are a necessary component of the teaching environment. While not ideal, this elimination provides an example of how sometimes teachers might respond to a process or activity that is not working. There may have been a way to discuss

the problem with the third teacher and then modify the activity the next week, but in this case that did not happen.

It stands to reason, then, that this might happen with other activities or processes mandated by others. In this case, participation was voluntary, so the teachers had the opportunity to stop at any time they felt uncomfortable or that it was a detriment to their classroom. Had this been a procedure mandated by administrators, would the teachers have attempted to resolve the solution through modification? It is possible, but it is also possible they might have gone to their superiors to say that it was not working.

One of the unexpected benefits of the research to the researcher was simply in the act of journaling. Often, teachers will compare mental notes at the end of the day. They do this to see if their students are behaving or responding to topics in a way that is outside of the norm. If other teachers are experiencing success, they often want to know how they are achieving those results and what they might be able to take back to their own teaching. In this case, physically writing down the interactions and attributes of engagement showed the researcher that some of the ideas that she had assumed were not entirely correct. Some of the days that felt like they were entirely negative were actually going well until one incident derailed the learning process. Keeping track of the observations allowed her to go back and focus on some of the positives, whereas the negatives are more often addressed in reflecting with other teachers. It is so important to focus on things that are going well, not because one should ignore the negatives, but because to constantly focus on what needs fixed can be mentally exhausting.

With regards to the theory that movement in an academic classroom can provide academic benefits, this study seems to imply that it is possible. All factors, however, must be considered when choosing which activities to implement. As noted by Kulinna (2012), the more comfortable the teacher is with protocol and activities, the more likely there is to be higher student buy-in to the

activity as well. When the teachers are enthusiastic about incorporating movement, and they have a solid grasp of how the students will respond to that movement, it becomes a more positive environment for everyone. That positivity can benefit academic engagement, and subsequently may lead to more academic success.

Recommendations for Further Research

The results of this study provide evidence that including more physical activity into academic classes can be beneficial for academic engagement. Logically, the next step would be to determine if that increased engagement led to an increase in either productivity or academic success. That study would most likely require both quantitative and qualitative data collection to collect observations on academic engagement and how it correlated to writing output and scores on tests and quizzes. Such a study is more complex, and would likely require a full semester or a full school year of data collection. That said, the benefit of such a study would be to provide more evidence to the body of research teachers can call upon to inform teaching practices and the need to incorporate varied classroom equipment.

It might also be interesting to repeat this study in the same manner, but with the addition of heart-rate monitors. The quantitative data from the heart-rate monitors could be used as an added measure of engagement. Fuller et al. (2018) noted that some indicators of engagement such as posture and head nodding could be feigned, meaning that the teacher might be perceiving engagement, though the student was only pretending to avoid being reprimanded or redirected. Further research that uses both the observations and the heart-rate indicator of engagement could help teachers determine trends in their lessons. While not all portions of lessons can necessarily be the most engaging, it would be beneficial for the teacher to recognize patterns. If the patterns of the time students report feigned engagement are present before summative assessments, the instructor could take steps to incorporate more active learning and physical activity during those times.

Another option would be to repeat the study using different movement activities suggested by the instructors such as gallery walks, scavenger hunts, or possibly incorporating dance as they do in younger grade levels. It is possible that the incorporation of dance might receive push-back in the same way stretching did, due to the social embarrassment factor. Much like the results of this study showed that stretching had to be tied to a specific transitional activity, dance moves might be tied to transitioning. For example, teachers might use a popular song that involves the most current viral dance craze (so long as it is appropriate for school) as an activity transition song. Rather than require students to dance, the instructor would be able to encourage students to move by praising students who chose to voluntarily dance along with the song. This would increase the heart-rate more than walking alone might, and the increased activity could improve energy, attention and focus, but conducting a further study is necessary to determine this.

Additionally, it might be interesting to study academic engagement with regards to background movement provided by flexible seating opportunities. Although the study might require funding to purchase classroom equipment such as standing desks, bosu balls, balance boards, Bouncy Bands, etc., it would be beneficial to determine their impact on academic engagement. There are many teachers in the area of the current study who have already received funding for such items based on other studies that show improved academic achievement in subjects like mathematics and science. It is possible that a researcher might be able to study students in classes that have already incorporated flexible seating options, or else request some flexible seating options as a loan to an ELA classroom to see if the effects are similar.

For future researchers desiring a quantitative study, rather than qualitative, one route may be to follow the guidelines of the study by Weslake and Christian (2015) and track the length of time it takes for students to return to academic focus after a physical activity. In this way, the teachers might be able to determine whether the activity was more of a distraction to students

rather than a beneficial break that allowed for more developed processing. With that quantitative data added to the qualitative observations, researchers could begin to group different kinds of activities for various subjects or for various learning intentions and outcomes.

This study was conducted in a middle school language arts class, so it may be beneficial to expand to other content areas. There could be increases in engagement in math courses or history and social studies environments. Any class, truly, where the teacher notices students are not engaging with the material could attempt to incorporate more movement. Of course, the type of movement may need to change depending on the course content. For example, a math class may not need to incorporate discussions, so Hailstorm discussions may not be as appropriate as they would for a class like social studies or history. The walking breaks, stretching, and flexible seating might be much more applicable, however.

For this study, the data came from teacher perspectives of movement in the classroom. It is assumed that the students increased normal physical activity because the teachers added activities that were physical activities. But perhaps, it does not actually add more movement than normal transitions. An option to discover how much students actually move throughout the day would be to have them use pedometers or other activity trackers throughout the day. This could give researchers an idea of how much students normally move before implementing physical activities versus after and whether some students are participating in physical activity more often than others. As to the impact on academic engagement, a continued journal from the researcher and teachers on perceived engagement in addition to the quantitative movement data could be of interest.

Another tangent might be to study the impact of movement on older students. There seems to be a larger body of research detailing the need for movement in elementary schools, but there are fewer studies to suggest that older students in high schools or colleges might also benefit from

more movement. One argument researchers might run into is that older students have the opportunity for movement through after school sports, and may not want to incorporate more movement. They also have the opportunity to take physical education classes if they want to do so. This does not always solve the problem, however, because the idea is that cognitive tasks could benefit from having some sort of physical activity in conjunction.

For the student athletes, the increased movement during the day would not be strenuous, so it should not interfere with training. For example, as a former high school teacher, the researcher had implemented non-desk seating and attempted to incorporate more movement throughout the block periods. None of the seats available had backs, and students had the option to stand, sit on stools or benches, or sit/lay on cushions on the floor. This was met with some resistance from a handful of students who complained that the lack of traditional seating was causing back pain or exhaustion. When asked for evidence, however, the students could show no supporting data for their opinions. Those that were in sports were not unable to continue competing. They were, however, distinctly less engaged due to their anger at the seating arrangements and activities. They might be swayed if there were an incentive involved, but that might then skew the data as far as actual academic engagement versus engagement for the sake of a reward. That said, however, there tend to be many more students in high schools and colleges or universities who are not involved in regular physical activity who might benefit from increased movement in classrooms.

Also, this idea of increased movement could be extended to various workplaces as an opportunity to see how movement breaks in normally sedentary jobs might improve engagement and attitude. Though there have been studies on how movement and standing desks impact productivity, it may be worth looking at how attentive workers are when they are asked to incorporate more movement into their daily routines. While it may not have changes in productivity, it may make differences in employee health.

It could be interesting to see if increasing physical activity had any changes on the number of sick days employees needed to take. In addition, employees might be able to share whether the sick days were taken for physical health or mental health. Though often labeled the same in employee reporting, if the employees were able to self-report the underlying cause for sick leave, there could be some information that employers could use as to whether or not incorporating more moderate movement during the workday was beneficial for employee health. If such a study showed increased mental or physical health benefits, companies would be able to make decisions that could best help their employees. While some companies are large enough to be able to offer opportunities for gym memberships, some smaller companies may not be able to do so. Incorporating equipment that allows employees to move more than they normally would during the day might be a way for the companies to enjoy the benefits of better health, both physical and mental, without having the financial strain of paying for monthly or yearly gym memberships.

While the teachers' observations also detailed some student responses and reactions, this study lacked any data with the thoughts, feelings, and concerns from the subjects being observed. A future study could involve student perceptions of academic engagement rather than teacher perceptions. Although interviewing students would require obtaining parental consent and the willingness of the students to provide responses, it could add depth to the quality of the discussion. Students, especially at this age, are more than capable of coming up with creative ideas. They might have suggestions for other movement activities that the teacher could consider, or they might be able to explain why they did not enjoy a particular activity, which would allow the teacher to modify to better suit the needs of the students in the class.

Something else that might be gained, and extremely valuable, from student input, would be the community atmosphere from holding a focus group. Students who feel as though they have no control would be able to voice their concerns and see real changes made in the classroom.

Teachers would be able to gauge not only the attitude of the class, but also see how students' ideas change through discussion and collaboration. Involving the students might also lead to a greater sense of buy-in and improve classroom culture. This type of focus group interview could be conducted quarterly or even at the end of each semester to help reflect and drive change that is meaningful for not only the teacher, but the students as well.

Conclusion

Teaching middle school ELA is equal parts frustrating and exhilarating. Though the students are still children, they are quickly moving toward being young adults. They need a positive and engaging classroom atmosphere to help them wade through sometimes confusing and difficult content. As instructors, there is so much more to teaching than expecting students to sit and take notes and then regurgitate responses.

Instructors of English Language Arts are tasked with helping students become better at analyzing a variety of situations, comparing and contrasting ideas and characteristics, and developing creative solutions to complex concepts. Getting students to dig deeper than simple comprehension tasks is impossible if they are not engaging with the materials and concepts presented. To that end, finding ways to get and keep students academically engaged is an imperative. It is not just about trying to make students like a class or a teacher. It is not just about building a classroom community. Engaging students allows teachers to help their pupils gain the skills they need to be productive and informed members of society.

Life is not a series of sitting and taking notes, and as such, neither should be the classes a student takes. Incorporating movement to help students engage with the content will help them learn more effectively. When students are more engaged, they are also more likely to remember what they have learned, which will allow to start making connections and developing a better understanding of their world.

If society is expecting educators to send forth students capable of critical thinking, positive social interactions, and creating solutions to complex problems, they must first have been exposed to opportunities to do so. Increasing the variety of activities in the classroom is one way to provide those opportunities. Finding ways to engage students with academic concepts can only benefit their cognitive development. Joining the mental activities to some sort of physical movement provides the mind-body connection that stimulates students in ways that note-taking never can. While the saying goes, “A body in motion stays in motion,” one might also posit that a mind in motion also stays in motion. The world needs people who have the wherewithal to struggle through complex issues until they find a viable solution. People who are taught to simply take notes may assume that someone has the answers or that there is no solution.

While the evidence provided in this study does not prove unequivocally that students *need* movement to be more engaged, it does suggest that it can help. In a world where people consume more and more content via video and digital gaming, getting students actively engaged in a non-digital environment is tantamount. Although there are advances being made in the realms of virtual reality, this is not the only solution. It is possible that one day we will be living in a mostly virtual world with haptic gloves and bodysuits that will allow us to “feel” objects that don’t actually exist. While this might be an amazing learning tool in the future, it should still be just that: a tool. Also, the only way we might get to those futuristic options that are only available as science fiction right now is to help students develop that curiosity about learning and problem solving. And one way to get them involved with their learning is to give them the chance to physically move through the world, one room at a time if need be, and make connections to the real people sitting beside them day in and day out.

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Appendix A: Weekly Observation Reports

Please answer the following questions. Feel free to be as detailed as you wish, but do not include names or identifying information about yourself or your students.

Question 1 (All weeks)

Which movement activities did you use this week? Please mark all that apply.

- a. Walking Break
- b. Stretching
- c. Hailstorm Discussion

Question 2 (Varied by week)

Weeks 1 and 5: What did you notice about your students' interactions with one another after the movement strategies were implemented?

Weeks 2 and 6: What did you notice about your students' contributions to classroom discussions after the movement strategies were implemented?

Weeks 3 and 7: What did you notice about the quality of your students' questions after the movement strategies were implemented?

Weeks 4 and 8: What did you notice about the quality of your students' analytical responses after the movement strategies were implemented?

Question 3 (All weeks)

Did you incorporate other movement into your lessons this week? If yes, please explain what you did and how it affected your students' engagement in classroom activities.

Appendix B: Interview Questions

1. What do you think of when you hear the phrase “movement in the classroom” or “classroom-based physical activity”?
2. How did you include movement activities and how did you feel about those activities?
Please explain.
3. What is your understanding of the connections between movement and learning?
4. What are the benefits of using movement in the classroom?
5. What are the negatives of using movement in the classroom?
6. Do you think that you should integrate more movement into the classroom? Why or why not?
7. Are there other kinds of activities you would have liked to try with your classes? Please explain what they are and why you have not been able to incorporate such activities into your classroom.
8. Are there any other comments or observations you wish to share or discuss?

Appendix C: Statement of Original Work

The Concordia University Doctorate of Education Program is a collaborative community of scholar-practitioners, who seek to transform society by pursuing ethically-informed, rigorously-researched, inquiry-based projects that benefit professional, institutional, and local educational contexts. Each member of the community affirms throughout their program of study, adherence to the principles and standards outlined in the Concordia University Academic Integrity Policy. This policy states the following:

Statement of academic integrity.

As a member of the Concordia University community, I will neither engage in fraudulent or unauthorized behaviors in the presentation and completion of my work, nor will I provide unauthorized assistance to others.

Explanations:

What does “fraudulent” mean?

“Fraudulent” work is any material submitted for evaluation that is falsely or improperly presented as one’s own. This includes, but is not limited to texts, graphics and other multi-media files appropriated from any source, including another individual, that are intentionally presented as all or part of a candidate’s final work without full and complete documentation.

What is “unauthorized” assistance?

“Unauthorized assistance” refers to any support candidates solicit in the completion of their work, that has not been either explicitly specified as appropriate by the instructor, or any assistance that is understood in the class context as inappropriate. This can include, but is not limited to:

- Use of unauthorized notes or another’s work during an online test
- Use of unauthorized notes or personal assistance in an online exam setting
- Inappropriate collaboration in preparation and/or completion of a project
- Unauthorized solicitation of professional resources for the completion of the work.

Statement of Original Work (Continued)

I attest that:

1. I have read, understood, and complied with all aspects of the Concordia University–Portland Academic Integrity Policy during the development and writing of this dissertation.
2. Where information and/or materials from outside sources has been used in the production of this dissertation, all information and/or materials from outside sources has been properly referenced and all permissions required for use of the information and/or materials have been obtained, in accordance with research standards outlined in the *Publication Manual of The American Psychological Association*.

Alphonsina M. Savell

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Name

March 30, 2020

Date