

Moving Through the Curriculum: The Effect of Movement on Student Learning, Behavior, and Attitude

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Abstract: This study explored the effects of incorporating movement in the classroom on a daily basis on student achievement, behavior, and attitude towards the class. Both quantitative and qualitative data of three 8th grade classes were collected through the use of a pre and post affective student questionnaire, behavior checklists, monitoring grades, and a teacher observation journal. The study found little to no significant change in student achievement or attitude, but the data did show a significant decrease in the out of seat behavior and off-task talking in two of the three classes. Qualitative data suggest potential benefits for student behavior and attitude. Additional research for an extended period of time is recommended to better study the effects of movement in the classroom.

Every day in the classroom, I see signs of it – the bored restlessness that comes from sitting still for too many hours each day. There are hands fidgeting, eyes wandering around the classroom, and students looking for any opportunity to leave their seats, such as getting up to sharpen a pencil, throw away trash, get a tissue, use the restroom, or even take a trip to the nurse. It is a constant fight for teachers to keep these students in their seats. In the meantime, other students have gone to the opposite extreme and, having given in to the demand for seated silence, sit slumped over with their heads on their desks, doing nothing. Whether they have too much energy or are lethargic, there is a simple way to help these students focus and enter a mental state more conducive to learning: the addition of purposeful movement to everyday classroom lessons.

Physically and mentally, we as human beings are not well-suited for sitting still and focusing on a task for an extended period of time. As discussed in the following literature review, research has shown a positive connection between movement and learning. Unfortunately, traditional schooling methods do not reflect this research, and many students face the prospect of numerous consecutive desk-bound hours each school day. The purpose of this study was to add to the body of literature concerning movement and learning by examining the effects of incorporating purposeful movement into the daily lessons of an eighth grade language arts class over a five week period. Specifically, this study explored the relationship between movement incorporated into lessons and the academic achievement, classroom behavior, and attitude of students.

Literature Review

Traditional schooling methods, involving long periods of time in which students are passive and seated, are not conducive to student physical needs. According to Wiles and Bondi (2007), adolescents are especially susceptible to restlessness and need to move because of “fluctuations in basal metabolism” (as cited in Helgeson, 2011, p. 82). Moreover, Jensen (2000) points out the physical problems with such a sedentary schedule, arguing that students who sit for most of the day face risks of “poor breathing, strained spinal column and lower back nerves, poor eyesight, and overall body fatigue” (p. 35). Simply put, sitting at a desk extensively is not physically conducive for learning. Additionally, after twenty minutes of physical inactivity, neural communication decreases (Lengel and Kuczala, 2010). As the goal of school is to promote learning and stimulate neural activity, this extensive physical inactivity seems counterproductive. Alternatively, by providing students with opportunities for purposeful movement within class periods, educators can overcome these negative effects.

Beyond just counterbalancing the negative effects of too much passive, seated work, movement has also been shown to benefit learning in a variety of ways. For example, movement is good for the body, can help reduce student stress, and increases positive feelings. Movement can enhance performance as it leads to increases in circulation and heart rate (Jensen, 2000). Even just stretching helps cerebrospinal fluid flow and oxygen reach key areas of the brain, and movement provides relief from musculoskeletal tensions (Jensen, 2000). Movement also serves to relieve stress (Lengel & Kuczala, 2010), which is especially good for adolescents, who often experience additional stress from hormonal imbalances (Helgeson, 2011). When students are stressed, they often have more difficulty learning and remembering because their brains go into a defensive mode, which activates more primitive parts of the brain and hinders learning (Templeton & Jensen, 1996). By decreasing tension and stress, movement activities can promote learning and positive attitudes. Further, movement triggers the release of a number of neurotransmitters and hormones, including dopamine, serotonin, adrenaline, and endorphins, which cause students to feel happy and excited (Jensen, 2000; Lengel & Kuczala, 2010). These positive feelings resulting from movement-related learning activities are likely, in turn, to promote a positive association with learning and school.

Using movement in class can increase student motivation, engagement, and attention. Requiring students to move can help engage even those typically reluctant, disinterested learners (Honigsfeld & Dunn, 2009). Research has shown that exercise and purposeful movement focus attention and increase alertness (Lengel & Kuczala, 2010; Jensen, 2000; Stalvey & Brasell, 2006). Students who are active in the classroom are more involved in learning and better able to concentrate. Numerous teachers who have incorporated movement into their lessons have reported the positive effects of movement on student attitude and motivation (see Pirie, 1995; Streat, 2011; Wolfe, 2009; Zimmerman, 2002). Many students enjoy activities that allow them to move and are excited for movement-oriented learning. Peebles (2007) describes how movement can be added to activities that involve the repeated readings of the same text – an often tedious, but necessary, task for practicing fluency – to make them exciting and interesting for

students. Movement helps promote a positive learning atmosphere in which students are alert, engaged, focused, and excited to learn.

Related to this movement-inspired positive learning atmosphere, the addition of movement to daily lessons can also facilitate classroom management. Students who are interested and excited about what they are doing in class are less likely to act out to disrupt the class. Movement engages students both physically and mentally, and by so doing helps reduce the amount of off-task behavior (Helgeson, 2011). The increase of arousal and the decline in physical fatigue that come from movement help students to focus their attention to the task at hand (Jensen, 2000; Nash, 2009). Movement can be especially beneficial to students with Attention Deficit Hyperactivity Disorder (ADHD) because of the improvement it provides in centering attention (Mulrine, Prater, & Jenkins, 2008). In a study on the effects of using stress balls in the classroom, Stalvey and Brasell (2006) found a significant decrease in the number of student distractions during instruction time when students were permitted to manipulate a stress ball. Stalvey and Brasell speculate that the stress balls provided students with an appropriate outlet for their urges to move and thus helped to take the place of disruptive behavior.

Movement does not just influence mood and behavior; physical movement has also been linked to academic achievement. In a study on the effects of acute exercise on academic achievement, Hillman, Pontifex, Raine, Castelli, Hall, & Kramer (2009) found evidence of enhanced cognitive function in preadolescents after bouts of exercise. In particular, exercise improved the performance of these adolescents in tasks that involved inhibition, suggesting that exercise aids in the control of attention. Hillman et al. also found that preadolescents performed significantly better in reading comprehension following exercise as opposed to following a rest period. In their study concerning the classroom use of stress balls, Stalvey and Brasell (2006) found an increase in writing performance when students were given the stress balls. The mean score of paragraphs written by the 21 sixth grade students in the study went from 73% before the stress ball intervention to 83% while using the stress balls. More generally, movement in the classroom promotes exercise, and research has shown connections between student fitness and academic achievement (Hillman et al., 2009; Lengel & Kuczala, 2010). Further, movement improves the vestibular system and development of spatial awareness, both of which have also been positively connected with success academically (Lengel & Kuczala, 2010).

Considering the associations between movement and academic achievement, it should come as no surprise that movement promotes learning. Physical activity can support and improve connections between neurons, enabling more effective neural communication, which is essential for learning (Helgeson, 2011; Lengel & Kuczala, 2010). In essence, movement helps to get students' brains active, thinking, and building connections. Movements can be used to promote communication between the hemispheres of the brain. In particular, because the right hemisphere of the brain controls the left side of the body and vice versa, exercises that cross the midline of the body force the two hemispheres to cooperate (Lengel & Kuczala, 2010). Considering how both hemispheres must work together for essential school activities, such as reading and writing, building connections between the hemispheres is important for learning. Cognitive activity is further aided by physical activity as movement promotes blood flow within the brain, increasing the level of oxygen, which is necessary for functioning (Mulrine et al., 2008). From a biological standpoint, physical activity helps the brain in learning.

Aside from promoting learning conditions, physical activity promotes retention of what is learned as well. As Lengel and Kuczala (2010) explain, it is easier to retain and recall information when it is associated with movement. Similarly, it is often easier to remember a physical experience as opposed to information received through a book or straight lecture. In an article on movement and the brain, Jensen (2000) explains how physical activity assists in episodic encoding: “The brain forms maps, not only on the basis of the scenery, but also from the body’s relationship to the scenery. More locations provide more unique learning addresses” (p. 34). When students have opportunities to move around during class instead of always sitting in the same place, the unique positions in which they learned information can help them to recall what was learned. Noradrenaline and dopamine, which can be released due to movement, also improve the storage and retrieval of information (Jensen, 2000).

To this end of promoting retention and easier recall of information, teachers are encouraged to use “brain breaks” within their classrooms. Lengel and Kuczala (2010) provide 22 simple brain break activities involving movement, all of which can be completed in two minutes or less. The idea behind brain breaks is exactly as implied by the name – to provide the brain with a break from learning. Movement brain breaks can lessen feelings of being overwhelmed by information as well as provide opportunities to re-energize, even have fun, and to refocus upon return to learning (Lengel & Kuczala, 2010). Most importantly, brain breaks give the hippocampus – part of the brain involved in memory – a chance to process information and form memories (Jensen, 2000; Lengel & Kuczala, 2010). This break time is important because, as Jensen describes, “You can pour all the water you want from a jug into a glass, but the glass can only hold so much” (p. 34). Continuing to shower students with information after a certain point is pointless and detrimental to student attitude; the brain can only take in so much information at a time. The use of short strategic brain breaks may sacrifice a little time, but it helps students to be able to absorb more information, making it worthwhile.

While movement activities in class clearly have benefits for all students, they may be especially beneficial to kinesthetic learners, whose learning needs are often neglected as the traditional classroom frequently caters instead to their auditory and visual peers. Kinesthetic learners face a serious disadvantage in the traditional classroom, for as Gage (1995) states, “if we teach the same way all the time, then we are consistently denying the same set of students the education which they deserve” (p. 53). Considering the nature of the traditional classroom, it seems of little coincidence that many at-risk students in middle and high school are often tactile and kinesthetic learners (Honigsfeld & Dunn, 2009). In a study on learning style and reading, Carbo (1984) notes that “poor readers demonstrate a decided preference for learning in an environment that differs markedly from that of many classrooms” (p. 75). This leads to speculation that the cause of reading difficulties for these struggling students may in fact be the discrepancy between how they are being taught and how they learn best.

The addition of movement activities to the classroom can help to provide for the needs of these kinesthetic learners, many of whom are typically low achieving students, and give them greater opportunities for academic success. Numerous studies have shown the positive effects of teaching students in accordance with their preferred learning styles (Carbo, 1984; Farkas, 2003; Honigsfeld & Dunn, 2009). Tactile and kinesthetic learners are more likely to absorb and retain information when they are moving rather than passively

listening to a teacher (Honigsfeld & Dunn, 2009). With this knowledge in mind, educators can help many lower achieving students achieve academic success. Hands-on, active learning is able to engage many students whose learning style is not provided for by traditional teaching (Honigsfeld & Dunn, 2009). In a study on cooperative learning involving movement activities, Shoal and Shulruf (2011) found active, movement-oriented learning activities to be most beneficial to the lower achieving students, who made the greatest improvement during the study. Adding movement to lessons is a way for educators to provide for some of their students with the greatest needs – those who are underachieving and whose learning needs have been neglected for far too long.

Beyond just the research supporting the use of movement in academic classrooms, there are numerous narratives describing teachers' individual methods for incorporating movement, making recommendations, and documenting the success that they and their students have found by using kinesthetic learning and movement activities (see Gage, 1995; Peebles, 2007; Pirie, 1995; Wolfe, 2009; Zimmerman, 2002). Examination of such articles shows that teachers have found a wide variety of ways to use movement in teaching and these have widely met with success in their classrooms. For example, Wolfe (2009) engages her students, even at the college level, by having them stand and order themselves to create a human timeline of biblical history. In Zimmerman's (2002) classroom, students create movements, using skipping, jumping, and walking, to learn about each type of meter in poetry – iambic, trochaic, anapestic, etc. – and then move to the rhythm of poems. Pirie (1995) describes a variety of movement activities he uses with his students, including an activity in which they create and enact the dreams of a character, using pieces of events and snippets of text from the literature. Regardless of content, there are always activities that teachers can include to incorporate movement in the classroom. Even simple methods such as posting vocabulary/notes around the room for students to find and copy, stand-sit warm-ups, and four corners activities – in which each corner represents a possible answer to the question and students have to go to the corner of the correct answer – can get students moving and learning (Helgeson, 2011). Despite the avoidance of kinesthetic learning in the traditional classroom, once educators bring movement into the classroom, the possibilities for engaging, movement-related learning activities seem endless.

The Study

Research Questions

This study sought to add to the growing body of research regarding movement and learning. Specifically, this study focused on the effects of incorporating movement into the classroom on a daily basis, seeking to answer the following three questions:

1. How does use of movement in the classroom affect student achievement?
2. How does use of movement in the classroom affect student behavior?
3. How does use of movement in the classroom affect student attitude?

Population

The population in this study consisted of three eighth grade Reading and Language Arts classes in a rural southern Maryland middle school. Class A consisted of 19 students, Class B of 15 students, and Class C of 26 students, making a total of 60 students in the study. All three classes were taught by the same teacher and student teacher (me, the researcher). Classes A and B were standard level classes while Class C was an honors level class. The difference in size and level of Class C resulted in an altered intervention for this class, as explained below. Of the 60 students, 28 were female and 32 were male. The population was ethnically diverse, consisting of 23 African American students, 26 Caucasian students, 8 Hispanic students, and 3 Asian/Hawaiian/Pacific Islander students.

The Intervention

This study took place over the course of five weeks, the first of which was used to collect pre-intervention data and the remaining four weeks to implement the intervention, which concerned incorporating movement within the classroom on a daily basis. This intervention consisted of using three main strategies to incorporate movement into the classroom: 1) brain breaks; 2) movement within lesson activities and; 3) use of stress balls. These particular strategies were chosen for a number of reasons. Used in combination, these three strategies helped to spread movement throughout the course of each ninety-minute class by providing movement during the lesson, as a halfway break, and during silent reading. Additionally, these strategies could all be incorporated into the previously established routines of the classroom without making huge changes that might disconcert students and cause upheaval. Most importantly, these strategies were adapted and chosen based on the research in the above literature review; they have each been used and found to be effective in other classrooms. Conscious of time constraints and my lack of experience using movement in the classroom, I sought to start small in this study by introducing movement in more subtle and gradual ways. With more experience and time, I would have included more gross-motor movements, such as those described in the above literature review.

The first part of the intervention consisted of adding brain breaks to the daily classroom routine. In this study, brain breaks were used on a daily basis in two out of the three classes (Class A already has a brain break built into the schedule as students go to a period of specials halfway through). The brain breaks were short (approximately two minutes or less) periods of time in which students were asked to stand and do a specific movement challenge. The activity during these breaks varied each day. Brain breaks usually occurred approximately half-way through the ninety-minute period, and the goal of each was to give students a break from academic thinking and to get them out of their seats.

The second strategy included in this intervention was the use of movement within lesson activities. Each day during the intervention, I intended to include at least one activity related to the lesson that required student movement, though, as I will discuss later, there were times when unanticipated complications and limitations prevented me

from achieving this goal. Movement was incorporated in a variety of ways – station work, sit-stand activities, moving to form groups, role play, and more.

The third and final strategy included in the intervention was the use of stress balls. In my study, students were allowed to take one of the provided stress balls during periods of silent, independent reading. Students could squeeze and manipulate the balls while they read as a way to fulfill their need for movement during this seated and silent activity. Students had independent reading opportunities with the stress balls approximately two times per week for at least ten minutes each session. Stress ball use was incorporated only into Class A and Class B, which both contained more struggling readers than Class C, whose students were stronger independent readers. Additionally, the larger size of Class C raised concerns about maintaining classroom management while using the stress balls.

Mixed Methods Research

To examine the effects of incorporating movement into the classroom, this study took a mixed methods approach to research, meaning that both quantitative and qualitative data were collected and analyzed together within a single study. Mixed methods research is becoming increasingly popular as it combines both quantitative and qualitative techniques. As Johnson and Onwuegbuzie (2004) explain, “The goal of mixed methods research is not to replace either of these approaches but rather to draw from the strengths and minimize the weaknesses of both in single research studies and across studies” (pp. 14-15). As both quantitative research and qualitative research are valuable and informative, mixed methods research provides a way to combine the advantages of each. Moreover, mixed methods research provides an excellent opportunity for triangulation, as multiple methods of gathering data are used to examine the same phenomenon. This study used the concurrent triangulation strategy of mixed methods research, meaning that qualitative and quantitative data were collected simultaneously and each method was used to confirm the findings of the other (Creswell, 2003). According to Creswell, this is the most familiar of the mixed methods strategies and “can result in well-validated and substantiated findings” (p. 217). See Figure 1 below for a visual depiction of how the mixed methods approach was used in this study.

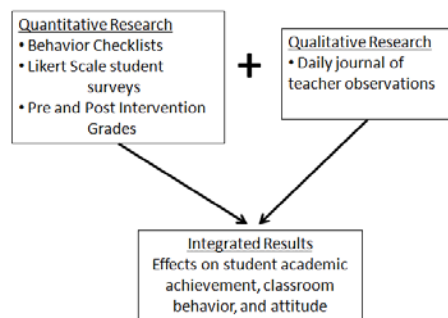


Figure 1. This study used a mixed methods approach, meaning that both quantitative and qualitative research was performed and the results were integrated.

Data Collection

This study incorporated a variety of data collection methods, both qualitative and quantitative, to measure the effects of incorporating movement in the classroom on academic achievement, classroom behavior, and student attitude. Data were collected through the use of student surveys, behavior checklists, a teacher-completed observation journal, and monitoring of grades. Data were collected regarding student achievement, behavior, and attitude through two different sources each, as shown in Figure 2.

To determine the effect of movement on student..	Data Sources
Academic Achievement	Monitoring Grades Observation Journal
Behavior	Behavior Checklists Observation Journal
Attitude	Student Surveys Observation Journal

Figure 2. Two different sources were used to gather data concerning each of the three research questions in this study.

Student Surveys. A brief student survey was administered to students both before and after the intervention. The questionnaire consisted of five items related to student attitude towards the class (see Figure 3). Students were asked to rate these items on a Likert scale with options of Strongly Disagree, Disagree, Somewhat, Agree, and Strongly Agree. The answer “Somewhat” was used as a neutral answer to indicate either indifference or mixed feelings about the statement.

Behavior Checklists. Behavior checklists were used in the first and fifth week of the study to record the frequency of specific student behaviors before the intervention and during the final week of the intervention. These checklists were used to record the following student behaviors: leaving assigned seat without permission, not doing work, off-task talking, laying head down on the desk, tapping/drumming, and requesting to leave the room (to go to the bathroom, nurse, water fountain, locker, etc.). Behaviors were recorded in three forty-five minute sessions for each class prior to the intervention and in three forty-five minute sessions for each class in the last week of the intervention. Behaviors were observed and recorded by my mentor teacher, who took note of student behavior every couple of minutes and recorded tallies on a seating chart for each targeted behavior observed to keep track of which students performed these behaviors and how often.

Observation journal. A daily journal of teacher observations was maintained throughout the course of the study. In this journal, I recorded any observations related to student achievement, behavior, and attitude, as well as any side observations or circumstances that may have affected the results of the study. Journal entries were usually recorded at the end of the school day, though a couple of Friday entries were delayed by a day or two.

Monitoring of grades. Student grades were recorded in the first week of the study (prior to the intervention) and again in the final week of the study. Because there are a

variety of factors that influence student grades, this data source was treated cautiously and used only in conjunction with other data sources.

Statement	Strongly Disagree	Disagree	Somewhat	Agree	Strongly Agree
1. This class is helping me to become a better reader and writer.					
2. I wish I didn't have to take this class.					
3. I look forward to coming to this class.					
4. I think this class is boring.					
5. I enjoy this class.					

Figure 3. The five item student survey administered before and after intervention to measure student attitude towards the class.

Data Analysis

After the completion of the intervention, all collected data were analyzed either through the use of t-tests or theme analysis. Data from the pre and post-intervention student questionnaire were compared using t-tests to determine any significant change in student attitude. T-tests were also used to analyze any potential differences in the frequency of each of the specified behaviors recorded by the behavior checklists between the week before the intervention and the final week of the study. A third set of t-tests was used to determine any significant differences in student grades from the beginning to end of the study. As previously mentioned, any difference in grades has been interpreted warily as they are affected by so many factors. The qualitative data gathered from the observation journal were coded and analyzed for common themes regarding student learning, behavior, and attitude. Analysis of the observation journal also included examining the entries for any unanticipated themes that emerged. The results of the t-tests and theme analysis were then integrated for interpretation.

Findings

Overall, the study found mixed results concerning the effect of movement on student achievement, behavior, and attitude. At times, the results differed between type of data – quantitative or qualitative – and between the different classes. This report will discuss the quantitative data first, breaking it down by class, before proceeding to the qualitative data.

Quantitative Data

The quantitative data collected in this study reveal a distinct difference between Classes A and B and Class C. As such, these two groups will be addressed separately at first.

Classes A and B. A series of t-tests was conducted to compare student grades, behavior, and attitude before and after the movement intervention. During analysis of student grades, one student's scores from Class A were removed from the data because of extenuating circumstances. Overall, the average of student grades in each class decreased slightly, dropping in Class A from 78.99% to 78.71% and in Class B from 78.22% to 76.29%. As shown in Table 1, the two-tailed, paired-sample t-tests revealed that the changes in both classes were not significant ($p = .69$ and $p = .10$); rather, this decrease in grades could simply be due to chance.

Table 1. *Student Grades Before and After Intervention*

Class	Pre Intervention Grade Average	Post Intervention Grade Average	Class Size	P-Value
A	78.99	78.71	18	0.686029
B	78.22	76.29	15	0.104693

With regard to student behavior, a series of two-tailed, two-sample t-tests revealed significant changes in two of the six targeted behaviors for both Class A and B. Prior to conducting t-tests, I removed data for one student in Class A and three students in Class B because of multiple absences either in the pre-intervention observation sessions or the post-intervention sessions. As shown in Table 2, the average frequency of out of seat behavior per student per forty-five minute period dropped from 0.55 to 0.15 in Class A ($p = .009$) and from 0.69 to 0.09 in Class B ($p = .001$). The average frequency of off-task talking per student per period also dropped, sinking from 0.49 to 0.00 in Class A ($p = .02$) and from 2.66 to 1.32 in Class B ($p = .01$).

Table 2. *Average Frequency of Behavior Per Student Per Period*

Class	Behavior	Pre-Intervention	Post-Intervention	P-Value
A	Out of Seat	0.549	0.154	0.0091*
	Not Working	0.176	0.269	0.4425
	Off-task Talking	0.490	0.000	0.0194*
	Head Down	0.412	0.212	0.2349
	Tapping/Drumming	0.059	0.115	0.5218
	Request to Leave Room	0.000	0.000	N/A
B	Out of Seat	0.688	0.088	0.0013*
	Not Working	0.531	0.412	0.6494
	Off-task Talking	2.656	1.324	0.0145*
	Head Down	0.406	0.529	0.5582
	Tapping/Drumming	0.063	0.088	0.6983
	Request to Leave Room	0.000	0.000	N/A

*indicates significant result ($p < 0.05$)

As shown in Table 3, results from the affective student survey revealed no significant change in attitude towards the class. As the questionnaires were anonymous and sample sizes varied some between pre and post, two-tailed, two-sample t-tests were

conducted to compare. Survey data were removed if students gave obviously conflicting answers. This eliminated two Class A pre-intervention questionnaires.

Table 3. *Student Scores on Pre and Post Affective Surveys*

Class	Pre-Intervention	Pre Sample Size	Post-Intervention	Post Sample Size	P-Value
A	0.785	13	0.291	14	0.133
B	0.693	15	0.545	11	0.671

Class C. As with Classes A and B, a two-tailed paired t-test was conducted to test for a significant difference in pre and post intervention grades. Two students were removed from the data because they left the class during the study. Unlike for Classes A and B, results from this t-test revealed that the decrease in grades, a drop from 84.02% to 81.34%, was a significant change ($p = .0001$) and thus cannot be attributed to chance. Analysis of behavior checklists for Class C, however, revealed no significant changes in student behavior, unlike Classes A and B. These results were based on data from all but two students, who were removed due to multiple absences on observation days. Finally, a two-tailed, two sample t-test revealed no significant change in attitude in Class C over the course of the study.

Table 4. *Class C Quantitative Data*

Class	Pre Intervention Grade Average	Post Intervention Grade Average	Class Size	P-Value
C	84.02	81.34	24	0.000149*
Class	Behavior	Pre-Intervention	Post-Intervention	P-Value
C	Out of Seat	0.261	0.145	0.187
	Not Working	0.304	0.130	0.1581
	Off-task Talking	1.696	1.638	0.8826
	Head Down	0.261	0.174	0.3665
	Tapping/Drumming	0.014	0.000	0.3191
	Request to Leave Room	0.072	0.029	0.2477
Class	Sample Size	Pre-Intervention	Post-Intervention	P-Value
C	Pre: 22 Post: 17	0.336	0.624	0.437

*indicates significant result ($p < .05$)

Qualitative Data

The teacher observation journal was highlighted and color coded according to themes of achievement, behavior, attitude, and an unanticipated theme of the difficulties of incorporating movement into the classroom. The major findings regarding each theme are discussed below.

Achievement. To code for achievement, I analyzed the observation journal for any information concerning student understanding of the content, such as “This class [Class A] really struggled with the linking verbs.” What is most noticeable, however, is the relative lack of observations concerning student achievement. This suggests that there was no perceptible difference in achievement as I, the researcher, apparently did not notice much about achievement that was worth recording. The few comments that do pertain to student achievement reveal mixed reactions. One entry in particular speaks of a grammar movement activity in which the one class that was reluctant to participate (Class A) was also the only class that struggled to understand the content. As this pertains to just one entry it should not be taken as conclusive evidence, but it is interesting to note the possible connection between the movement activity and comprehension. With regards to the stress ball use, the observation journal expresses my uncertainty regarding its effect on student reading comprehension: “it is hard for me to tell if the balls are actually helping or if the students are just playing with them.” Overall, the journal provides little to no evidence of the intervention’s effect on student achievement.

Behavior. The teacher observation journal includes conflicted observations regarding the effects of the movement intervention on student behavior. Comments coded for the theme of student behavior focused on the actions of students in class and how these actions compared to the expected behavior. A recurrent observation found in the journal was the idea that in some cases adding movement to the class added behavioral problems. For example, there were days when “I ended up taking a number of balls away from students who were getting distracted or silly with them.” Some students created distractions with the stress balls by bouncing them, dropping them, or switching with each other. Students also did not always cooperate with my movement activities, such as when I had students stand during a group read aloud and “Students moved around everywhere and would not stay by their chairs like I said to.” Throughout the journal, it is also important to note that certain days were recorded as good behavior days or bad behavior days regardless of how much or how little movement I incorporated into the lesson.

The observation journal does note some positive effects of the movement intervention on student behavior. In particular, multiple entries refer to the idea movement activities engaged more students than usual. My Paul Bunyan Around the World activity “got all students participating – even [three students who were usually disruptive or off-task]” and my use of a discussion ball led to my observation that “Students who do not usually participate did want to participate so that they could get the ball.” Another recurring observation concerned student behavior when given stress balls. Despite some disruptive behavior with the balls, the balls were clearly a valued possession, and some students seemed to purposefully avoid any obvious misbehavior that would make me take away their stress balls. Some students with the stress balls seemed to at least pretend to be reading. As I recorded in my journal, “Even if the balls don’t help students read, they at least help keep them quiet and not distracting others.”

Attitude. The observation journal contains mostly positive observations concerning student attitude related to movement. In particular, numerous references are made throughout the journal regarding how much students seem to like the brain breaks. I observed that “students were fascinated by the challenge” provided by the brain break activity, students “show me if they’ve been practicing past [brain break activities],” students specifically requested brain breaks or complained when I forgot to do a brain

break, and students “get very excited – ‘Ms. Wells – look at me!’” Brain breaks became an anticipated part of daily routine that consistently intrigued and excited students. The stress balls were also well-received by many students. Students would ask if we would be using stress balls, complain when we were not using them, and some would even thank me for providing the balls. For some students, this enthusiasm seemed to wane, as noted in the observation journal: “Fewer students seem to be taking them each time, but some students definitely seem to like them.” On the other hand, the movement activities I incorporated into lessons were not always received well. At times students would complain about having to get up, and any movement activity that might make them self-conscious about how they looked tended to be met with hesitation and/or reluctance.

Difficulties of incorporating movement. During analysis of the teacher observation journal, an additional theme emerged regarding the difficulties of incorporating movement into the classroom. First and foremost, my own anxieties and fears as the teacher implementing these strategies are apparent throughout the journal. My journal entries reveal an underlying belief that there is a fine line between adding movement to class and creating chaos. My fear of losing control is repeatedly mentioned. For example, I expressed my frustration that “it is so difficult to add movement without creating chaos.” My anxieties at times caused me to alter my lesson plans, such as when “I chickened out on the gallery walk I had planned. Students wandering around is time consuming and likely to lead to chaos!” As a student teacher who was struggling with classroom management, incorporating movement was at times a terrifying prospect, and I was unwilling to take too many risks. I was particularly intimidated by adding movement to Class C, my largest class. My second journal entry notes “I have only been doing brain breaks with this class because frankly I am afraid to do anything else ... classroom management is scary enough without adding potential issues.” Due to my difficulties in incorporating movement, I was not as successful implementing my intervention as desired. Table 5 below shows the frequency with which each class received the intervention over the 18-day time period.

Table 5. *Frequency of Movement Intervention Strategies*

Class	Brain break	Stress balls	Movement activity	Days with at least partial intervention	Total days possible
A	N/A	7	12	14	18
B	15	5	11	16	18
C	10	N/A	7	12	18

Along with my fear, other difficulties with incorporating movement are evident in my journal entries as well. At times, I was hesitant to use brain breaks because students were working well and I did not want to interrupt. Similarly, I struggled to incorporate movement “without it just seeming forced.” My plan to use brain breaks and movement in lessons on a daily basis did not take into account the idea that perhaps movement should be used when appropriate and when needed, not just inserted for the sake of adding movement. Movement activities also take up time, a valuable commodity in the classroom, and I was apt to skip movement on days when our normal routine was altered, such as early dismissal days or days when we spent time in the computer lab. Finally, it was

difficult to remember to incorporate movement. My journal documents numerous instances when I simply forgot to do the brain break I had planned or was distracted and forgot to pass out stress balls.

Discussion and Limitations

The results of this study indicate that the movement intervention had little to no effect on student achievement. Although Class C did experience a significant decrease in grades, there are so many factors that influence student grades that this data should be interpreted cautiously. Given that this drop in grades is evident only in Class C, which experienced less of the intervention than Class A or B (see Table 5), this decrease does not seem attributable to the movement intervention. It should also be noted that the pre-intervention grades were based on considerably fewer assignments than the post-intervention grades, which were recorded a month later. The overall lack of information on achievement in the observation journal also suggests little to no change in achievement, though this lack may partially be due to a failure to establish what achievement looks like, making it harder to observe. Although the movement intervention did not overall seem to help achievement, it did not seem to hurt achievement either.

Analysis of the effects of movement on behavior revealed several promising results. The consistency of results among Class A and B suggest that the movement intervention may have decreased out of seat behavior and off-task talking. This coincides with data from the journal about more students, including those who are often off-task and/or disruptive, being engaged in movement activities. Students who are actively participating are less likely to be off-task talking or wandering out of their seats. These results are supported by research reported in the literature review that movement engages more learners, including those who are usually reluctant (Honigsfeld & Dunn, 2009). These results also reflect the idea from earlier research that movement gives students an appropriate outlet for their need to move and thereby reducing disruptions (Stalvey & Brasell, 2006). Although the behavior in Class C did not significantly change, this is could be because Class C received the least of the intervention (see Table 5).

Admittedly, there are a number of other factors that could have influenced student behavior other than the movement intervention. For example, after a month more of full-time teaching experience, my classroom management may have improved, affecting student behavior. Yet, if this were the cause, one would expect to see the change in behavior echoed in Class C as well. It should also be noted that one of my post-intervention observation sessions took place the day after the daylight savings time change, and behavior – especially in the earlier classes – did seem altered. Another limitation to the study lies in the use of behavior checklists. Behavior was observed for a total of six periods per class, three at each end of the study. This gives a limited view that may or may not accurately reflect normal classroom behavior. Behavior checklists were also not used during the middle of the study, though in retrospect they should have been used to provide a better idea of the changes, or lack thereof, in behavior.

Although the quantitative data indicate no significant change in attitude in this study, the qualitative data reveal a distinctly positive student attitude towards at least certain aspects of the movement intervention. Given that attitude is difficult to change and

the fact that this intervention lasted for only four weeks, the lack of statistically significant findings is not surprising. This is not to say that movement does not affect attitude, but rather that in the short duration of this study, adding movement did not significantly affect student attitude. The very positive student reactions to brain breaks and stress balls, as recorded in the observation journal, suggest that, were movement strategies refined and consistently used for a longer period of time, it is possible that movement could positively affect attitude.

Conclusion

Adding movement to the classroom is not one simple action, but rather a gradual process that takes time. Both students and teachers need to adjust to the changes that come with movement, which can make the classroom seem out-of-control, especially at first. Once movement is established into the classroom routine, it still takes time for student achievement, behavior, and attitude to change. The short duration of this study did not allow enough time for the teacher (me) to comfortably adjust to using movement, nor for student behaviors, attitudes, and achievement patterns – many of which had become ingrained by the third quarter – to change much. Despite the many limitations, this study did find significantly reduced out of seat behavior and off-task talking in Classes A and B, which supports the idea that movement can benefit classroom behavior. Additionally, the teacher journal included some promising observations regarding student attitude towards movement as students responded very positively towards both the use of brain breaks and stress balls.

Given the findings of this study, as well as the findings of previous studies, more research should be conducted over an extended period of time to better study the effects of movement on student achievement, behavior, and attitude. A longer study would enable time for adjusting to using movement and also time to observe changes that may be slow to take effect. Future research should additionally investigate incorporating movement strategies beyond what was used in this study and incorporating more gross-motor movement, such as stretching. Finally, teachers conducting new studies regarding the use of movement should consider carefully how and when they use movement; a great tool is still only applicable and useful at certain times. Movement should not be forced into but rather purposefully merged with lessons. With more research and experience, teachers will be able to use movement as a powerful tool for the benefit of all learners.

References

- Carbo, M. (1984). Research in learning style and reading: Implications for instruction. *Theory Into Practice, 23*(1), 72-76. doi: 10.1080/00405848409543092
- Creswells, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Farkas, R. D. (2003). Effects of traditional versus learning-styles instructional methods on middle school students. *The Journal of Educational Research, 97*(1), 42-51.
- Gage, R. (1995). Excuse me, you're cramping my style: Kinesthetics for the classroom. *The English Journal, 84*(8), 52-55.
- Helgeson, J. (2011). Four simple ways to add movement in daily lessons. *Kappa Delta Pi Record, 47*(2), 80-84.
- Hillman, C. H., Pontifex, M. B., Raine, L. B., Castelli, D. M., Hall, E. E., & Kramer, A. F. (2009). The effect of acute treadmill walking on cognitive control and academic achievement in preadolescent children. [Article]. *Neuroscience, 159*(3), 1044-1054. doi: 10.1016/j.neuroscience.2009.01.057
- Honigsfeld, A., & Dunn, R. (2009). Learning-style responsive approaches for teaching typically performing and at-risk adolescents. [Article]. *Clearing House, 82*(5), 220-224.
- Jensen, E. (2000). Moving with the brain in mind. [Article]. *Educational Leadership, 58*(3), 34.
- Johnson, R. B. & Onwuegbuzie, A. J. (2004). Mixed methods research: A research paradigm whose time has come. *Educational Researcher, 33*(7), 14-26.
- Lengel, T., & Kuczala, M. (2010). *The kinesthetic classroom: Teaching and learning through movement*. Thousand Oaks, CA US: Corwin Press.
- Mulrine, C. F., Prater, M. A., & Jenkins, A. (2008). The Active Classroom: Supporting Students with Attention Deficit Hyperactivity Disorder through Exercise. *TEACHING Exceptional Children, 40*(5), 16-22.
- Nash, R. (2009). *The active classroom: Practical strategies for involving students in the learning process*. Thousand Oaks, CA US: Corwin Press.
- Peebles, J. L. (2007). Incorporating movement with fluency instruction: A motivation for struggling readers. *Reading Teacher, 60*(6), 578-581.
- Pirie, B. (1995). Meaning through motion: Kinesthetic English. [Article]. *English Journal, 84*(8), 46-51.
- Shoval, E., & Shulruf, B. (2011). Who benefits from cooperative learning with movement activity? [Article]. *School Psychology International, 32*(1), 58-72. doi: 10.1177/0143034310396806
- Stalvey, S., & Brasell, H. (2006). Using stress balls to focus the attention of sixth-grade learners. *Journal of At-Risk Issues, 12*(2), 7-16.
- Strean, W. B. (2011). Creating student engagement? HMM: Teaching and learning with humor, music, and movement. *Creative Education, 2*(3), 189-192. doi: 10.4236/ce.2011.23026
- Templeton, R. A., & Jensen, R. A. (1996). Can adding movement to learning improve the classroom environment?
- Wolfe, L. M. (2009). Human Timeline: A Spatial-Kinesthetic Exercise in Biblical History. [Article]. *Teaching Theology & Religion, 12*(4), 366-370. doi: 10.1111/j.1467-9647.2009.00555.x

Zimmerman, V. (2002). Moving poems: Kinesthetic learning in the literature classroom. [Article]. *Pedagogy*, 2(3), 409-412.