

Does exercise improve student motivation?

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## **Abstract**

Physical activity has been associated with beneficial effects on cognitive brain function, attention, and alertness. Scharf and Payer (2018) found that teachers who incorporate movement and activity breaks into their daily classes, observed students who were more alert, focused and perform better academically. This study investigated the effect of classroom exercise on student motivation and focus during Health classes offered online due to pandemic regulations. The study was conducted over a 3-week period with 65 8<sup>th</sup> grade students during their Health classes. The students took part in 10 minutes of exercise at the start of class every other day. A checklist was completed by students on both exercise and non-exercise days to measure their motivation and focus levels. Mean ratings of focus and motivation, understanding of lessons and enjoyment of lessons were compared across exercise and non-exercise days using a t-tests for dependent samples. The results indicated showed that in this three-week study, 10 minutes of exercise before virtual health classes had no significant impact on students' ratings of their focus and motivation, understanding or enjoyment of lessons, so all three null hypotheses were retained. Future research conducted in face-to-face settings or with modifications to the virtual lessons to encourage fuller participation might show more clearly how exercise in school can impact motivation, understanding and enjoyment of lessons.

# CHAPTER I

## INTRODUCTION

### Overview

Educators face numerous challenges while trying to gain student attention and motivation to meet classroom objectives. Students differ in how they retain knowledge and remain focused during a class. It is vital to the educational process to learn and understand how and what motivates students to focus.

Behaviors driven by internal rewards are referred to as intrinsically motivated. An example of this would be when students perform activities because they enjoy the activity they are learning. Behaviors that are driven by external factors are referred to as extrinsically motivated. Many schools rely on extrinsic forms of motivation, for example, using positive behavior systems, giving student rewards, and using visual behavior charts to encourage students to behave or attend to lessons. There has been much debate regarding the use of such types of extrinsic motivation strategies and about whether they truly reflect best practice for educators, as research suggests they may lead to lower intrinsic motivation in students (Tollefson, 2000). It is up to teachers and building administrators to find ways to motivate their students using intrinsic or extrinsic motivators or both. There are many strategies that teachers can implement during class to increase student focus and motivation to take part in class and learn. One strategy which has been shown to provide both physical and mental benefits is the use of exercise breaks.

Exercise breaks during class are an intervention planned and implemented by the teacher that can help students gain intrinsic motivation for and benefit from instruction. This is a unique way to motivate students during class and allows them to take a break from sitting and learning to move their bodies. Exercise increases blood flow to the brain and allows the brain to properly

focus, which may provide long-lasting health benefits to students. Using exercise to enhance focus and motivation can also help students learn how to intrinsically motivate themselves by implementing their own exercise breaks during homework tasks.

This researcher became interested in this topic after teaching middle school health and physical education for ten years. With a passion for exercise, the researcher began to study the impacts that it has on student motivation and focus. After reviewing literature about whether athletes perform or focus better in school than non-athletes, the researcher wanted to learn whether including exercise in her lessons would increase student motivation and focus during health class and benefit her students.

### **Statement of Problem**

The purpose of this study was to see whether participation in a 10-minute exercise intervention before? Health classes improved students' perceptions of their motivation and focus as well as their understanding and enjoyment of class.

### **Hypothesis**

Based on a review of relevant studies, it was hypothesized that students' focus and motivation in Health class would be greater on days with an exercise intervention compared than on days without exercise incorporated into class. The following null hypotheses were evaluated at the conclusion of the intervention using t-tests for dependent samples:

*ho1: mean focus and motivation score on exercise days = mean focus and motivation score on non-exercise days (sum of items 1-3 on SMFS)*

*ho2: mean understanding of lesson on exercise days = mean understanding of lesson on non-exercise days (item 4 on SMFS)*

*ho3: mean enjoyment of lesson on exercise days = mean enjoyment of lesson on non-exercise*

*days (item 5 on SMFS)*

### **Operational Definitions**

For this study, the following definitions apply to terms used in this paper:

- **Health Education Classroom:** Classes took place virtually, through Zoom with a health teacher. Most participating students did not receive special education interventions.
- **Exercise intervention strategies:** This took place for the first ten minutes of class on exercise intervention days. Students completed two 5-minute circuits of the same exercises. The circuit included one minute each of the following: squats, jumping jacks, modified pushups, ski jumps and lunges. These same exercises were then repeated for one more circuit. The teacher/researcher encouraged students by playing music, doing the exercises with students, and talking students through each exercise.
- **Student Focus and Motivation Survey (SFMS):** This survey was developed by the researcher which students were asked to complete at the end of each Health class on both exercise and non-exercise days. It posed three questions which asked students to rate their motivation and focus from one to five and one question each about their understanding and enjoyment of the lesson. A copy of the SFMS is located in Appendix A.

## **CHAPTER II**

### **REVIEW OF THE LITERATURE**

This literature review was completed to explore the effects that exercise has on student motivation. The six sections in this review are, student motivation, the relationship between exercise and motivation, benefits of classroom exercise interventions, barriers of using exercises for student motivations, effective strategies for implementation of exercise breaks and a conclusion.

#### **Student Motivation**

Motivation is an internal process that drives a person to support goals and strive for success. There are many factors related to what motivates students. Motivation is categorized into two distinct types: intrinsic motivation, or motivation from within oneself and extrinsic motivation or motivation from tangible rewards. As Mudedola (2018) noted, “There are a significant portion of student still not earning a high school diploma, examining ways to best motivate students and exploring strategies to improve learning and academic success are warranted” (p.229). Gobblar (2018) suggests that decades of research show that students learn better from intrinsic motivation rather than extrinsic factors such as grades. Gobblar (2018) believes that the best way to motivate students to do well academically is to ask them what they want to get from the class and notes that it is virtually impossible to make someone learn if they are not willing to do so. Gobblar noted in her study “Will Students Actually Want to Do This Assignment,” that there are three practical ways to encourage student buy in, which are to create 1) value, 2) expectancies and 3) environment. All three of these variables work together to influence student motivation and increase focus. Fulmer and Frijters (2009) state that “Motivation consist of the biological, physiological, social and cognitive forces that direct

behavior” (p.219). It is important to note, that research has shown that academic motivation is highly differentiated across subjects. Fulmer and Frijters research also note that individuals’ motivation is affected by variables such as ability and attention. Lastly, Tollefson (2000) analyzed students’ willingness to expand effort on school tasks as it related to theories of motivation. The variables that Tollefson considered included task difficulty, self-efficiency, and expectancy of success. The overall findings suggested that students in the study were more willing to participate in class activities when they had been motivated. Finding ways to increase intrinsic and extrinsic motivation in students is a challenging task for educators.

### **Relationship between exercise and motivation**

Motivation is often an internal process that is driven by an external force, such as exercise. The following research examines the impacts of classroom exercise on student motivation and focus on class.

Research suggests there could be. For example, Mulrine, Prater and Jenkins (2008) noted “Regular movement can assist with students’ concentration as well as helping them control impulsivity” (p.16). Exercise can help students cope with stress and promotes positive self-image and improves memory. It also increases activity in parts of the brain that involve memory, attention, spatial sense, language, and emotion. There are also indications that exercise can strengthen learning and boost motivation and morale (Jenson 2005). “Children engaged in daily physical education showed superior motor fitness, academic performance and attitude towards school as compared to their counterparts who did not participate in daily physical education” (Mulrine, Prater, Jenkins, 2008, p.17). MacMath, Wallace, & Chi (2010) recommend that to motivate students, teachers should ensure that concepts are taught in a meaningful way and to have a balance between direct instruction and challenging activities. One way this can be done is

to incorporate classroom exercise breaks that are challenging and engaging and, when possible, relate directly to the lesson.

### **Benefits of classroom exercise to increase motivation and focus**

Physical activity has many benefits. Scharf and Payer (2018) found that physical activity has been associated with increased physical and mental health, but also has beneficial effects on various cognitive and brain functions. In their study, Scharf and Payer (2018) focused on coordinative define fitness and muscular strength as they assessed attention and concentration levels of students ages 11-14 over an 11-week time frame. The intervention consisted of several stations including, hand eye coordination, strength exercises, balancing activities, jumping activities and ball games. To determine changes in cognitive functions, attention, and concentration abilities, they administered the Frankfurter Aufmerksamkeits-Inventar psychometric assessment. In this test, participants are to discriminate between similar symbols as accurately and quickly as possible. They compared the test results from before and after exercise and found that both test groups showed an increase in concentration abilities after the exercise intervention.

Benes and Finn (2016) conducted a mixed method research design with emphasis on qualitative methods to examine the integration of movement in the classroom. They started their experiment by providing 44 teachers with a movement survey of basic demographics, how comfortable they were incorporating movement into their classrooms, and their feelings and attitudes about classroom movement. Teachers were then taught how to incorporate movement in their classes and how to collect data based on the survey they had provided. The teachers then reported their individual findings of regarding the effect of movement breaks during lessons.

This study found that physical activity during class time had many positive academic

outcomes reported by the teachers through peer reviews, multiple analysts, member checks and surveys for data collection. The data reported increase on task classroom behavior, creation of a positive learning space and improved levels of concentration after implementing the movement break. Teachers also reported that students enjoyed moving in class and that the movement increased students' engagement with academic content. The teachers reported that they used movement to give students a break before moving into academic content and that it helped to refocus students.

Mulrine, Prater, Jenkins, (2008) conducted an observational study in which the classroom teacher incorporated movement throughout the class that included: classroom transition exercises, lesson energizers and structured movement games. They used an observational check list pre- and post-exercise intervention. The data showed students were more focused and more attentive in class. Their research finds that exercise throughout the class (transition exercises, lesson energizers and structured movement games) improved academic performance and reduced disruptive classroom behaviors.

In another example, Jarrett, Maxwell, Dickerson (1998) conducted a study with 55, 4<sup>th</sup> grade students to compare their behavior on days in which they had a 20-minute recess period to the days that the students did not have recess. Jarrett, Maxwell, Dickerson (1998) used a chart to analyze student behavior and found that 60% of the students exhibited less fidgeting and improved work behavior on days with recess breaks compared to the days without recess.

In summary, many studies have indicated there appears to be a connection between exercising in class and student performance and motivation to learn. There are also barriers to implementing exercise strategies to increase student motivation.

### **Barriers to using exercise for student motivation**

Many studies show that incorporating exercise breaks into learning creates benefits for students and teachers. The implementation of exercise strategies can have barriers and limitations, however. For example, Benes and Finn (2016) reported that teachers possessed limited knowledge related to how to use movement to benefit learning in the classroom. Teachers also lacked knowledge of student attitudes towards movement. This study also showed that older teachers, had more negative attitudes towards implementing movement than younger teachers. Some teachers also reported that integrating movement required them to change how they think. For some this came as a positive change and for others, it was perceived as a burden. They also reported that this required shift in the way teaching and learning are viewed. “Three major challenges were discussed: getting students on board with movement in the classroom, planning for movement and the lack of exposure on how to use movement in the classroom” (Benes and Finn, 2016, p.124). Another barrier noted in this study was that teachers reported that students who felt uncomfortable about their bodies tended to be resistant to participating in movement activities due to self-esteem issues.

Howie and Pate (2015) reported that students may react differently to exercise breaks during class and the amount of exercise time needed for necessary benefits may exceed what is practical. Their study also noted that teachers may need to spend more time differentiating exercises for students to see optimal results. This would pose a barrier into teachers by adding to their already busy planning schedules.

### **Effective strategies for implementation of exercise breaks**

To be able to determine if exercise helps student motivation, there needs to be effective strategies in place for teachers to implement quickly and efficiently. Scharf and Payer, (2018)

implemented motor-coordinative exercises intervention that consisted of several rotating stations to incorporate strength and balance. This was done every morning for 30 minutes before the school day began, for a four-week time frame.

In Howie and Pate' study (2015), they assessed the amount of time of exercise as the independent variable. They compared separate groups of 9–12-year-old students, doing aerobic activity at a moderate to vigorous intensity for different amounts of time (5, 10 or 20 minutes) to the results of having 10 minutes of sedentary activity. This was done during a math class where the teacher gave verbal cues throughout the exercise routine to encourage participation and increases in intensity. The conclusion of this study found that a 10–20-minute exercise breaks moderately improved math performance and participation compared to the seated lessons.

Another approach conducted by Camahalan and Ipok (2010), students rotated between 15 minutes of academics and five minutes of physical activity during math class. They incorporated stretching and basic body weight exercises such as jumping jacks. They also combined movement and learning by creating math songs with standing hand and body movements. This study used anecdotal notes to track results and found that students showed improvement on attentiveness during classroom activities, behavior, and math learning.

These three studies provide different approaches to adding physical activity to a student's daily routine. The approach to adding exercise breaks is especially important and must be practical and manageable for the teacher.

### **Conclusion**

Physical activity has many benefits to the health and studies have found it may also improve academic success of students. Trudeau & Shephard (2008) state that there is no denying the role of neuroscience in the process of academic achievement. Teachers who incorporate

exercises breaks into their classroom routines for as little as five minutes notice great benefits to students focus and behaviors. Higher intensity aerobic exercise that increases the heart rate seems to have the greatest short-term impact on student focus, attention, and motivation (Howie and Pate (2015). According to the research examined in this review, incorporating exercise breaks into daily planning and class time may pose challenges but also have short and long-term benefits for health and academics which far outweigh the effort required to implement them. Further research is warranted to determine specifically how exercise can benefit focus and motivation and address aspects of school performance.

## **CHAPTER III**

### **METHODS**

#### **Design**

The main purpose of this one group, quasi-experimental study was to determine whether classroom exercise increased student motivation and focus. Exercise was the independent variable and student motivation and focus and understanding and enjoyment of lessons, assessed by items on the SMFS survey, were the dependent variables. Sixty-five 8<sup>th</sup> grade students participated in the study during their online health class. Students completed a ten-minute exercise routine every other day at the beginning of class and were asked to fill out the SMFS at the end of every class. Means responses on exercise and non-exercise days were then compared using three t-tests for dependent samples.

#### **Participants**

Sixty-five 8<sup>th</sup> grade students ranging in age from 12 to 14 participated in the study. This group included 32 students who identify as male and 33 students who identify as female. In this group of students, four received special education accommodations through 504 and IEP plans. There was no randomization used to select these students; all were participants in the researcher's class. This grade level was selected for study as the researcher observed a seeming lack of student motivation and focus during their Zoom classes compared to her 6<sup>th</sup> grade students. This grade level was also selected because they had a full semester of health class versus just a quarter as in the other grade levels, which gave the teacher more time to implement the research.

#### **Instrument**

The instrument utilized in this research study was an online student motivation and

focus survey, which was developed by this researcher primarily to assess of the participating students' focus and motivation in Health class on days with and without the exercise intervention. The survey contained five questions to which students responded on a Likert type scale with answers ranging from one (low) to five (high). Three items asked for ratings about how focused and motivated students felt during that day's class. Responses to those three items were summed to yield a total score reflecting focus and motivation. One additional item inquired about understanding of the lesson and one inquired about enjoyment of the lesson. These were also rated on a five-point scale. A copy of the SMFS survey is shared in Appendix A at the end of this paper.

### **Procedure**

After the sample group of 65 8th grade students was selected, students began a three-week exercise intervention program for the first ten minutes of every other Health class. Every other day of Health class, the students began with ten minutes of moderate to high intensity exercise. This consisted of two, five-minute body weight circuits in which each of five exercises was done for one minute and then the circuit was repeated. The circuit included one minute each of the following: squats, jumping jacks, modified pushups, ski jumps and lunges. For consistency in the study and for the students, the exercise routine stayed the same throughout the three weeks. After the ten-minute exercise routine was complete, students participated in Health class as usual. On non-exercise days, students spent the first 10 minutes of Health class seated and participated in academic warm-ups and drills. Every day, during the last five minutes of class, all students in attendance were asked to complete the Focus and Motivation survey online to determine their level of focus and motivation during class. This was quantified by the researcher by summing their responses to items one to three. Responses to items 4 and 5 and

comments were also recorded to test hypotheses two and three and to gather more information for discussion.

After three weeks, the survey results from the exercise days were compared to those from the non-exercise days using three t-tests for dependent samples. A summary of those results follows in Chapter IV.

## CHAPTER IV

### RESULTS

#### Hypotheses Tested

Every day, during the last five minutes of class, all students in attendance were asked to complete the SMFS survey online. Their levels of focus and motivation during class was calculated by summing their responses to items one to three, which yielded scores which could range from one to 15 and were compared for exercise and non-exercise days. Responses to items 4 and 5 were also recorded to test hypotheses two and three and for discussion. The following null hypotheses were tested using t-tests for paired samples after 14 days of the intervention (seven with and seven without exercise sessions at the start of virtual classes):

*ho1: mean focus and motivation score on exercise days =  
mean focus and motivation score on non-exercise days (sum of items 1-3)*

*ho2: mean understanding of lesson on exercise days =  
mean understanding of lesson on non-exercise days (item 4)*

*ho3: mean enjoyment of lesson on exercise days =  
mean enjoyment of lesson on non-exercise days (item 5)*

#### Attendance and Participation

Before reviewing the test results, attendance warrants mention, as many students opted not to complete surveys and were absent for quite a few days in both the exercise and non-exercise conditions of the intervention. Classes were all virtual, so the researcher monitored and incentivized attendance and participation as best she could by awarding participation points for exercising and offering extra credit for completion of surveys. Despite this, participation rates were only 61% and 58.5% during the exercise and non-exercise phases of the study, respectively. A breakdown of absences and participation is shown in Table 1.

Table 1

*Frequency of Absences and Non-Completion of Daily Surveys*

	<b>Absences</b>	<b>Did not complete Survey</b>	<b>Percent absent or not participating in intervention</b>
<b>Class days with Exercise</b>	50	128	39
<b>Class days with No Exercise</b>	63	131	42.5

**Focus and Motivation (SFMS) Results**

A paired samples t-test was run to compare the mean of the sums of items one, two and three on the SFMS on exercise versus non-exercise days to test the first null hypothesis. These items were intended to assess focus and motivation directly. Given the variable attendance of the participants, means for exercise days and non-exercise days were computed by summing the ratings on the three items for each day on which the SFMS was completed by each student during each condition, then dividing those totals by the number of days (out of seven) each student attended school and completed an SFMS form during each of those conditions.

Mean daily scores on items one to three for each phase could range, theoretically, from three to 15 as they were based on five-point ratings for each of the three items. Results of the paired t-test indicated the means were close (mean difference was -.358) and significantly correlated ( $r=.481$ ,  $p<.000$ ,  $n=57$ ) and variation was similar across exercise conditions. However, although the mean on exercise days (11.267) was slightly higher, it did not differ

statistically significantly from the mean on non-exercise days (10.909) ( $t = -1.763$ ,  $p < .083$ ).

Therefore, null hypothesis 1 was retained. Specific results follow in Tables 2 and 3.

*Descriptive Statistics for SFMS Items 1-3 scores across conditions*

<b>Sum items 1-3</b>	<b>Mean</b>	<b>N</b>	<b>Std. Deviation</b>	<b>Std. Error Mean</b>
No Exercise	10.909	57	1.552	.206
Exercise	11.267	57	1.453	.192

Table 3

*Results of Paired Samples t-test comparing mean SFMS scores across conditions.*

Score	t	df	Sig (2-tailed)	Mean Difference	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference	
							Lower	Upper
<b>SMFS Sum items 1-3</b>	-1.763	56	.083	-.358	1.534	.203	-.765	.049

### **Understanding and Enjoyment of Lessons in the Exercise and Non-Exercise Conditions**

Null hypotheses two and three posited that there would be no statistically significant difference in the mean responses across exercise and non-exercise days for item four on the survey, which asked students to rate how much they understood the lesson each day, or item five, which asked students to rate their enjoyment of the day’s lesson. Paired samples t-tests were completed to compare the mean responses to items four and five across the treatment conditions. Results follow in Tables 5 and 6. The analyses also indicated that the item 4 responses were statistically significantly correlated ( $r=.365$ ,  $p<.005$ ) across the two exercise conditions, but the item 5 responses were not ( $r=.251$ ,  $p<.060$ ) ( $n=57$  for both).

Table 4

*Descriptive Statistics for Understanding and Enjoyment of lessons across conditions.*

<b>Item</b>	<b>Condition</b>	<b>Mean</b>	<b>N</b>	<b>Std. Deviation</b>	<b>Std. Error Mean</b>
<b>Item 4 Understanding</b>	<i>No Exercise</i>	4.480	57	.472	.0625
	<i>Exercise</i>	4.598	57	.446	.059
<b>Item 5 Enjoyment</b>	<i>No Exercise</i>	3.206	57	.611	.081
	<i>Exercise</i>	3.340	57	.587	.078

Table 5

*Results of Paired Samples T-tests comparing mean understanding and enjoyment across conditions.*

	t	df	sig	Mean Difference	s.d.	Std. Error Mean	95% Confidence Interval of the Difference	
							Lower	Upper
<b>Item 4 Understanding</b>	-1.730	56	.089	-.119	.518	.069	-.256	.0188
<b>Item 5 Enjoyment</b>	-1.376	56	.174	-.134	.733	.097	-.328	.061

The results of the two t-tests indicated that neither the differences in the means across conditions for item 4 (mean difference=-.119,  $t = -1.730$ ,  $p < .089$ ) nor item 5 (mean difference= -.134,  $t = -1.376$ ,  $p < .174$ ) were large enough to be considered statistically significant, so both null hypotheses two and three were retained. Overall, the mean ratings and variation in responses were similar across conditions for both items and the means were slightly higher (mid 4's for item 4 vs. low 3's for item 5) for understanding than for enjoyment on both exercise and non-exercise days. While, as stated, the mean differences (see table 5) were not significant, the mean ratings for both understanding and enjoyment were very slightly higher on exercise days

than on non-exercise days.

### Student Reactions to Intervention and Class

Students were also asked to comment about each day’s lesson to see if there were themes in their reactions to the intervention. Table 6 contains a summary of their remarks regarding the exercise and non-exercise days. Overall, students’ comments about how the exercise impacted their motivation, focus, stress, and enjoyment were positive. A few students reportedly did not enjoy the unit content of substance abuse and noted that the lessons were not fun for them.

Table 6

*Summary of Student Comments*

	Typical comments	Frequency of each
<i>Class days with Exercise</i>	<i>I like the activities in this lesson.</i>	3
	<i>I felt more focused after exercising.</i>	3
	<i>Tired</i>	3
	<i>I felt less stressed</i>	2
	<i>Important lesson</i>	2
<i>Class days with No Exercise</i>	<i>Fun lesson!</i>	2
	<i>Enjoyed the games</i>	2
	<i>Interesting lesson</i>	2
	<i>Boring lesson</i>	2

The student comments show that exercise did have an impact on a few students and their motivation and focus on certain days. Overall, there were more comments on the exercise days (13) than the non-exercise days (8) with most comments being positive (10/13 on exercise days and 6/8 on non-exercise days).

## **CHAPTER V**

### **DISCUSSION**

This study tested three null hypotheses to see if exercise was associated with improved student motivation and focus, understanding and enjoyment of Health lessons. Analysis of the SFMS data indicated the mean ratings of these three variables did not differ statistically significantly across exercise and non-exercise days. This chapter will discuss the implications of the results of this study.

#### **Implications of Results**

The results of this study showed that in this three-week study, 10 minutes of exercise before virtual health classes had no significant impact on students' ratings of their focus and motivation, understanding or enjoyment of class, so all three null hypotheses were retained. However, some students noted in the comment section of the Student Focus and Motivation Survey (SFMS) that they felt more focused, less stress, and more motivated after exercising. Those who took part also reported a slightly higher understanding of the lessons' objectives and enjoyment of class on exercise days vs. non exercise days. Implementing this research plan during in-person learning might increase participation in the exercises and survey completion rates and yield more accurate results.

#### **Theoretical consequences**

The theoretical consequences of the results suggest that 10 minutes of exercise before class does not have an impact on students focus and motivation which does not support the findings discussed in Chapter II. The research reviewed suggested that exercise would have a positive impact on student focus and motivation.

### **Threats to the Validity**

There were several threats to validity in this study. This study was conducted during a global pandemic in which all participating students were being taught online. The guidelines of the school district did not require students to have their cameras turned on during class. This meant there was no definitive way to verify if students whose cameras were off were participating in the 10 minutes of exercise. Many students reported feeling uncomfortable exercising with their cameras on. To encourage them to participate, the teacher provided extra credit for students' completion of the survey and participation in the exercises with their cameras on. If students did not participate in the fitness portion and still filled out the student motivation and focus survey, which may have occurred, the results would be inaccurate. The sample included in the analyses may have been biased in that it may have contained students who were more willing than the others to exercise in class and who may be more physically fit than their peers. Lastly, student attendance was a threat to the validity of this study. As noted, there were a high number of absences during this study.

### **Connections to Existing Literature**

Various studies mentioned in Chapter II such as Mulrine, Prater and Jenkins (2008) and Scharf and Payer (2018) supported the contention that exercise can improve student focus and motivation. These studies were all done during in-person learning situations in which teachers were able to observe and encourage student movement and participation. The studies mentioned in chapter II employed similar measurement strategies to this one. For example, in Benes and Finn (2016) mixed method study, teachers used post-class surveys to collect data on student focus from students themselves. Data was also gathered from researcher observations of student behaviors after exercise to determine if the students were

more on task and focused. In addition to self-reports, this research would have employed teacher observation data if this study had been conducted during in-person learning.

Some researchers took a different approach regarding the timing of the exercise. This researcher chose to have students exercise for the first ten minutes of class. In the literature discussed in chapter II, some studies like Scharf and Payer (2018) had students exercising before school started or in the beginning or middle of class like MacMath, Wallace, & Chi (2010). The literature also indicated past studies have employed various time frames as well as intensity levels for the exercise phase. This researcher chose to have student do a ten minute, moderately intense exercise routine which did not vary. This time frame was selected because the high level of intensity in the exercise routine it also left 40 minutes to teach the lesson. This felt suitable for meeting the class objectives as well as having students benefit from the exercise. There was also a notable difference in the time frames of the experiments, with a range of two to six weeks. This research was conducted for three weeks for practical reasons.

Consistency in and replication of studies would help determine which methods are most beneficial for improving focus, motivation and learning and other variables, such as enjoyment of classes.

### **Implications for Future Research**

This research exposed a lack of student motivation to move while learning online which likely obscured the accuracy of measuring the dependent variables and how they were related to exercise in class. This could mean that 8<sup>th</sup> grade students might be more motivated when they are encouraged to participate in person, as suggested in the literature reviewed which described studies conducted in person. To better understand the impact of online learning and

exercise on focus and motivation, future research could be conducted in a controlled manner to compare outcomes in online versus in-person settings. There are students who express that they like on-line learning more than in-person learning, so if this trend persists, it might be of interest to know how to incorporate exercise in a way that is desirable to students in on-line settings.

Future research might also study whether the effectiveness of exercise interventions on focus and motivation varies with the time of day or type of class in which they are conducted or for students in different age groups, genders, or types of schools.

### **Conclusions**

In conclusion, exercise during the first ten minutes of online health class did not significantly improve students focus and motivation during the remainder of class, nor did it play a significant role in enjoyment and understanding of the objectives. It was observed that even with teacher-provided incentives, many students did not want to turn on their cameras for the exercise time. The students who did have their cameras on completed the exercises and appeared to be working hard. Despite that, not all those students who had their cameras on and completed the exercises chose to complete the survey at the end of class.

However, several students reported that exercise was helpful to their focus, enjoyment, and reduced stress levels during class. To further study the impact of exercise in schools, more consistency in using exercise breaks during class could be helpful. Fedewa and Ahn (2010) stated that only about five percent of schools provide students with daily physical activity. As schools are providing minimal opportunity for student movement throughout the day, research about how exercise can best be used to enhance health and learning should be done.

## References

- Benes, S., Finn, K. (2016) Teachers' Perceptions of Using Movement in the Classroom. *The Physical Educator*, 73 (1) 110-135
- Camahalan, Faye Marsha G, & Ipok, Amanda R. (2015). Physical Activity Breaks and Student Learning: A Teacher-Research Project. *Education*, 135(3), 291–298 <https://eric.ed.gov/?id=EJ1095394>
- Fedewa & Ahn. (2011). The effects of physical activity and physical fitness on children's achievement and cognitive outcomes: A Meta-Analysis. *Research Quarterly for Exercise and Sport*, 82(3), 521-535. doi:10.5641/027013611x13275191444107
- Fulmer, S., Frijter, J. (2009) A Review of Self-Reports and Alternative Approaches in the Measurement of Student Motivation. *Educational Psychology Revolution*, 21, 219-246.
- Gooblar, D. (2018) Will Students Actually Want to Do This Assignment? *Chronicle of Higher Education*, 64 (40)
- Howie, E. K., Schatz, J., & Pate, R. R. (2015). Acute Effects of Classroom Exercise Breaks On Executive Function and Math Performance: A Dose-Response Study. *Research Quarterly for Exercise and Sport*, 86(3), 217–224.
- Jarrett, O., Maxwell, D., Dickerson, C. (1998) Impact of Recess on Classroom Behavior: Group Effects and Individual Differences. *The Journal of Educational Research*, 92 (2) 123-126
- Jensen, E. (2005). *Teaching with the brain in mind* (2<sup>nd</sup> ed). Baltimore: Association for Supervision and Curriculum Development.
- MacMath, S., Roberts, J. Wallace, J., & Chi, X. (2010) Curriculum integrations and at risk students: A Canadian case study examining student learning and motivation. *British Journal of Special Education*, 32 (2) 87-94
- Mucedola, M. (2018).

Intrinsic Motivation Paired with Community Outreach Strategies to Improve Student Success. *The Clearing House*, 91 (6), 229-235.

Mulrine, C., Prater, M., Jenkins, A. (2008) The Active Classroom. *Teaching Exceptional Children*, 40 (5) 16-22

Tilp, M., Scharf, C., Payer, G., Presker, M., & Fink, A. (2020). Physical Exercise during the Morning School-Break Improves Basic Cognitive Functions. *Mind, Brain, and Education*, 14(1), 24–31.

Tollefson, N. (2000). Classroom Application of Cognitive Theories of Motivation. *Educational Psychology Review*, 12 (1), 63-83.

Trudeau, F. & Shephard, R. (2008). Physical education, school physical activity, school sports and academic performance. *International Journal of Behavioral Nutrition and Physical Activity*, 5, 1-12. doi:10.1186/1479-5868-5-10.

**SMFS**

**Post Class Survey**

**Please read each question below and answer honestly with a 1 being the lowest and 5 being the highest rating.**

**Key:**

- 1= not at all
- 2=a little
- 3= some
- 4= quite a bit
- 5= a lot

- 1. Did you put forth effort in participating in today's lesson? 1 2 3 4 5
- 2. Did you pay attention during today's lesson? 1 2 3 4 5
- 3. How driven or motivated were you to learn today? 1 2 3 4 5

**Supplemental Questions**

- 4. How well did you understand today's objective? 1 2 3 4 5
- 5. How much did you enjoy today's lesson? 1 2 3 4 5

Please add any comments you have about today's class:

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