An Exploratory Study of Senior High School Students' Experiences of

Physical Motion During Examinations

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Abstract

Standardized summative assessments required for students to obtain their high school diplomas usually require them to remain still and write continuously for lengthy periods of time. As a high school teacher, my experience has suggested that students, and in particular boys, struggle with the sedentary nature of these exams and that they benefit from kinesthetic activities performed throughout instructional or formative assessment periods. These concepts have been substantiated by the literature, which shows a connection between physical activity and increased academic achievement, with some males experiencing greater benefit than some females. This mixed methods study has explored the practice of sedentary exams by seeking to understand students' perspectives on their experiences during tests and exams. Forty-eight grade eleven students participated in two simulated exams – one in which they were required to sit continuously and one in which they were required to perform physical activities every fifteen minutes. Test scores, questionnaires, and a focus group were used to gather data to shed light on how integrating physical motion into an assessment affected students' scores, feelings of well-being, and overall perceptions of this modification. T-tests analyzing test scores showed insignificant change for either gender once the modification was introduced. Quantitative data from questionnaires indicated that most students benefitted from physical motion breaks, with boys responding more positively than girls overall. Qualitative data helped to further explain students' perspectives and experiences of how this modification positively impacted them. This study has implications for teachers, administrators, and policy makers.

Résumé

Des évaluations sommatives standard sont exigées aux étudiants pour obtenir leur diplôme d'études secondaires. Elles exigent d'habitude de rester en place et d'écrire constamment et pour de longues périodes. Comme une enseignante au niveau secondaire, mon expérience suggère que les étudiants, et particulièrement les garçons, luttent contre la nature sédentaire de ces examens et profitent des activités kinesthésiques exécutées tout au long des périodes d'évaluation éducatives ou formatrices. Ces concepts ont été justifiés par la littérature, qui montre une connexion entre l'activité physique et l'amélioration au niveau académique. Cette méthode d'étude mixte a examiné la pratique d'examens sédentaires en cherchant à comprendre les perspectives des étudiants sur leurs expériences pendant ces épreuves. Quarante-huit étudiants au secondaire cinq ont participé à deux examens simulés – Un dans lequel ils ont été tenus de s'asseoir constamment et un autre dans lequel ils devaient effectuer des activités physiques toutes les quinze minutes. Les résultats des tests, les questionnaires et un groupe de discussion ont été utilisés pour recueillir des données pour mettre la lumière sur comment une évaluation avec des mouvements physiques affecte les notes des élèves, leurs sentiments de bien-être et les perceptions globales de cette modification. Les analyses des résultats des examens n'ont pas montré des changements significatifs chez les mâles ainsi que chez les femmes une fois que la modification a été introduite. Les questionnaires ont indiqué que la plupart des étudiants ont bénéficié des mouvements physiques, ceci en ayant des réponses plus positives chez les garçons que chez les filles en générale. Les données qualitatives ont aidé à expliquer davantage les perspectives et les expériences de comment cette modification a un impact positif sur les élèves. Cette étude a aussi des implications pour les enseignants, les administrateurs et les décideurs politiques.

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Chapter 1: Introduction

In this chapter, the study is introduced. Herein, I explain the rationale and purpose of the study as well as the research questions that guided this work. I express the significance of the study as well as definitions of key terms used throughout this text. Finally, I describe the structure of the thesis.

1.1 The Rationale and Purpose of this Study

Tests and exams are an important aspect of most contemporary educational systems. In order to complement pedagogy, many courses utilize such evaluations to determine the level of competency that students have achieved in the subject matter. This is such that grades can be assigned and further instruction can be planned (Nitko & Brookhart, 2007). Policy makers use government mandated summative assessments to ensure that educational professionals remain focused on a common curriculum and that students within a geographic area are held to the same standards (Burger & Krueger, 2002). Thus, these assessments perform important functions in our educational systems and are seen to be a valuable tool for educationalists and policy makers.

The importance of tests and exams is well understood by students, as they are generally used to determine whether a student must repeat instruction or if they are ready to proceed to the next stage of education or career opportunity (Nitko & Brookhart, 2007, p. 8). Summative assessments, which are used at the end of courses to determine whether a student will proceed, are often called "high-stakes exams." This is because the consequences of success or failure may be life changing. Therefore, many students view success on these exams as important milestones in their lives.

The conditions under which students are required to write assessments affect their abilities to perform. Currently, most tests and exams require students to remain seated while writing for up to three hours at a time. My experience as a teacher with 6 years of experience in high school level English Language Arts (ELA) has given me an insider perspective on how students react when required to adhere to the sedentary nature of the exam room. I have witnessed the fact that many students struggle to complete exams and display high levels of frustration and anxiety. Additionally, time spent invigilating classroom tests and the English high school exit exam has revealed that more boys seem to struggle than girls on lengthy tasks. More specifically, some male students have complained that they find it difficult to remain seated for the length of time required to complete the exam, whereas female students generally complete the task without voicing complaint about this requirement. This has prompted me to question whether male and female students should perform exams under the same conditions. A review of the literature regarding gender differences as they impact learning confirms that several researchers do believe that males and females experience education in different ways, with some arguing that these distinctions should be taken into consideration when it comes to pedagogy (James, 2007; Gurian; 2009; Sax, 2010). However, there is little information about whether males and females experience exams differently. This study seeks to address this gap in the literature.

Whether or not gender differences are significant in relation to experiences during tests and exams, the literature confirms that many students find these assessments to be extremely stressful (Repetti, McGrath, Ishikawa, 1999; de Anda et. al, 2000). This is a fact that researchers and educators are becoming increasingly aware of as they seek to

understand the consequences that such a particular kind of stress, termed "test-anxiety,"

has on students (Heubert & Hauser, 1999; Cornell, Krosnick, & Chang, 2006).

Interestingly, the literature reveals that stress such as that evoked by an exam can impede

one's ability to perform cognitive tasks optimally (Eysenck & Derakshin, 2011; Miguel,

2012). As test-anxiety produces physiological responses that can hinder achievement, it

is important that students be offered strategies and techniques to cope.

   A complementary issue to test-anxiety is the relationship between physical activity

and human cognition. This is because being physically fit and active has been shown to

be an antidote to stress and anxiety, as periods of exercise enable the body to release

endorphins that yield feelings of calm and well-being (Bailey, 2006; Stead & Nevill,

2010). Many researchers have focused on the role of physical fitness and activity as

these relate to academic achievement. Several studies have pointed to the fact that when

students are physically active, their academic scores are positively affected (Trudeau &

Shepard, 2009; American Heart Association, 2010; Dudfield, 2012). Furthermore, some

researchers argue that males benefit more than females from physical activity when

approaching learning or assessment tasks (James, 2007; Gurian, 2009).

   While studies have been done at the elementary school levels regarding the impact

that physical fitness can have on academic achievement (Dwyer, Sallis, Blizzard, Lazarus,

& Dean, 2001; Trudeau & Shepard, 2009), to my knowledge there are no studies

available regarding the impact that physical activity can have on senior high school

students. Additionally, studies are sparse regarding how physical activity can impact

students when writing tests or exams.

Thus, the purpose of this mixed methods exploratory study is to examine the impact that adding physical motion during an exam situation could have on senior high school students in terms of how it could affect their scores, levels of test-anxiety, and feelings of well-being. An additional purpose is to gain a deeper understanding of student perceptions related to high-stakes exams and the modifications to exam environments that they believe would enhance their abilities to perform their best. Furthermore, the information is analyzed along the lines of gender in order to see if information emerges regarding whether males and females differ in their perspectives.

1.2 Research Questions

As described above, there is a scarcity of literature regarding how increasing physical motion could impact senior high school students as they write exams and whether differences would be experienced between males and females. Thus, the research questions that guide this study are as follows:

1) How does physical motion integrated into an examination impact test achievement measured in scores?

2) How do senior high school students experience lengthy sedentary examinations?

3) How do senior high school students experience physical motion integrated as a modification to methodology during an examination:

   a. Related to their feelings of anxiety and stress?

   b. Related to their perceptions of their achievements?

4) Are there differences between male and female students in how they perceive sedentary examinations?

5) Are there differences between male and female students in how they perceive

physical motion during an examination?

1.3 The Significance of this Study

While tests and exams are important for all students, senior high school students'

results can have immediate, life-altering consequences. As Shohamy (2001) explains,

"Tests play a major role as their results have far-reaching implications for individuals and

educational systems; tests can create winners and losers, successes and failures, the

rejected and the accepted … it is often performance on a single test … that leads to the

irreversible and far-reaching high-stakes decisions" (p. 374). Success on high-stakes

assessments can open doors to highly desired outcomes such as positions in higher

education or advancement to career opportunities. In contrast, failure can be devastating,

leading to decreases in self esteem, interpersonal problems and conflicts, and

requirements for professional psychological assistance (Cornell, Krosnick, & Chang,

2006).

Because of the weight that these exams have in the lives of students, it is important

that students be offered every possible form of assistance to enable them to be successful.

This study seeks to address a gap in the literature regarding the needs of the senior high

school demographic. As Alkharusi (2007) points out, the area of summative assessment

conditions is an important one for further research in order that all students may be

offered the best opportunities to succeed. The present study addresses this

recommendation for further research with quantitative and qualitative data that may be

found interesting to various stakeholders in the educational system.

1.4 List of Definitions of Terms

This section provides definitions of key terms that are used frequently throughout this thesis. They are specifically defined for the context of this study in order to guide the reader's understanding of the main concepts related to this research.

High-Stakes Exams: This term is used to define assessments that may have highly important consequences for students which are sometimes life altering. Generally, these consequences include decisions regarding whether students proceed to the next level of instruction or opportunity.

Test-Anxiety: This condition describes when students experience, "a combination of physiological over-arousal, tension and somatic symptoms, along with worry, dread, fear of failure … that occur before or during test situations" ("Test Anxiety," 2014).

Gender Differences: This term refers to both biological differences (usually termed "sex differences") and differences fostered through enculturation and socialization that manifest themselves by those who identify as being either male or female (Nobelius, 2004).

MELS: This acronym signifies the Quebec Ministry of Education (Ministère d'éducation, loisir, et sport). This level of government is responsible for designing the content, methodology, and rubrics that are used for the grade eleven (end of high school) English Language Arts exam.

1.5 Structure of the Thesis

This thesis consists of six chapters. In this chapter, the study has been introduced.

Chapter 2 presents a review of the literature in order to situate this study within research

concerning high-stakes exams, test-anxiety, gender differences, physical motion as it

relates to academia, and the paradigms that have guided the research. In Chapter 3, the

mixed methods methodology that was used to conduct this research is described. In so

doing, I detail each of the seven phases of the study, the contexts and participants, and the

instruments used for data collection and analyses. Chapter 4 presents results of data

collection in the form of frequency counts and t-tests for test scores and questionnaire

data. Qualitative data gathered from open-ended questions on the questionnaire and data

from a follow-up focus group are also presented by themes. In Chapter 5, the results are

discussed as they relate to each of the research questions outlined above and stated in

Chapter 3, as well as the literature described in Chapter 2. Finally, Chapter 6 describes

implications for educational practice and further research, along with concluding

comments.

1.6 Chapter Summary

This chapter has provided an introduction to this study. It opened with the rationale

and purpose. Next, the research questions were outlined along with the significance of

the study as it relates to previous research. Finally, the structure of the thesis was

described. In the next chapter, this study will be situated within the literature related to

the history of high-stakes exams, issues related to high-stakes exams today, how test-

anxiety affects students, gender differences as they relate to education, the role of

physical motion in academia, and the paradigms that guide this study.

Chapter 2: Literature Review

The purpose of this chapter is to situate this study within relevant fields of research

and paradigms related to the direction of this work. The chapter begins with a

historiographical explanation of the development of high-stakes exams. Next,

contemporary issues with high-stakes testing are surveyed. Following this, I describe

studies that elucidate how test-anxiety impacts students. After, research regarding gender

differences as they relate to education is explained. Subsequently, studies are discussed

regarding physical fitness and activity as they are connected to academia. Finally, I

outline the paradigms that influenced the research design.

2.1 The History of High-Stakes Exams

Describing the historiographical development of high-stakes exams helps us to

understand why policy makers deemed such evaluations useful in the past and why they

remain prevalent today.

2.1.1 Historiography

Looking historiographically, the literature on summative assessment in the form of

lengthy, sedentary exams reveals that this practice is a relatively new one. Wilbrink

(1997) explained that in the 18th and 19th centuries, general examinations came to be used

in Europe. Also, Womack (1993) focused on increased demand for education during this

period, now known as the Industrial Revolution, as a key impetus for policy makers to

begin to use exams, saying, "…as Britain turned itself into an industrial and imperial state

… 'middle-class education' was sharply identified as a critical unsolved problem … The

solution, adopted in a rush during the 1850s, was a competitive public examination" (p.

44). Essentially, according to these authors, the fact that the Industrial Revolution led to

increasing numbers of students attending schools necessitated an efficient and fair means

of performing mass-evaluations in order to place students into higher education or career

paths (p. 44). A key idea upon which these exams hinged, according to Wilbrink (1997),

was that they would be an objective form of evaluation (p. 40). He explained that,

"Where earlier one's family, wealth and relations were decisive to get attractive

government positions, now merit was … the prime criterion" (p. 43). Thus, the 19th

century is known for a shift toward ensuring that students were evaluated based on their

academic abilities, not on their social classes or economic standings (Pellegrino,

Chudowsky, & Glaser, eds., 2001, p. 26). Wilbrink (1997) argued that this had certain

positive effects in that "…the same meritocratic procedures, once in place, made it

possible in the 20th century to really offer educational and career possibilities to the

talented from all classes in modern society" (p. 42). The original focus of using

competitive examinations, according to these authors, was to enable students to have

access to opportunities that were aligned with their abilities.

In the North American context, wide-scale examinations followed a similar timeline

of growth during and after the Industrial Revolution, yet with a greater focus on how

testing could serve the goals of the state. Clarke, Madaus, Horn, and Ramos (2000)

pointed out that high-stakes exams have been increasingly used in the United States since

the start of the 1900s (p. 160). They expressed that the primary ideological factor driving

this change was an intensifying focus on efficiency (p. 161). By the mid-1900s, United

States politicians and bureaucrats had grown to prefer multiple choice tests because they

appeared to increase objectivity and made it easier to generalize about people and

institutions (p. 164). Essentially, this format of evaluation was propounded because it

was thought it would aid educational policy makers in making the system, "… more

efficient, manageable, standardized, objective, easier to administer, and less costly …"

(p. 177).

The continued rise of standardized testing throughout the early 20th century was

indicative of a societal focus on making all fields as scientific - or precisely measurable -

as possible. Ravitch (2002) stated that, "The leading educational psychologist in the first

half of the twentieth century … Edward L. Thorndike … was determined to demonstrate

that education could become an exact science." Influenced by the rise of behaviorism in

psychology, which focused on the relationship between stimuli in the environment and

individuals' responses to such, testing grew to be seen as the best method for moving

education away from criticisms related to it being inaccurate and subjective.

Certain political choices later in the 20th century also helped standardized testing grow

in usage. The primary reasoning that politicians gave for pushing their use was that they

would improve accountability between educators and policy makers (Ravitch, 2002). For

example, Ravitch (2002) pointed to the significance of the No Child Left Behind Law, a

law in the United States that was signed by President Bill Clinton and continues to

require all students to take part in annual tests with the explicit goal of holding teachers

and students accountable to common, nation-wide standards. A consequence of such an

ideological thrust has been that exams have been seen to be beneficial for monitoring

educational systems moreso than for assisting students. Examining a Canadian context,

Graham and Neu (2004) explained that, "In Ontario, Canada, testing has been conducted

under the auspices of the 'Education Quality and Accountability Office … The Ontario

tests … are quite openly designed as tests of curriculum, teachers, schools, and districts"

(p. 296). Drawing a parallel, they argued that in Australia, standardized tests have

primarily been used to guide policy makers regarding curriculum change (p. 296). They

concluded that currently, because testing is mainly used to support political decisions,

"Examinations at the end of Grade 12 … do nothing to help the student. They…serve as

a mechanism for monitoring the performance of the education system" (p. 300). Wiliam

(2011) also affirmed that, for the most part, the 20th century saw policy makers focusing

on using assessment to "[record] student achievement" (p. 13) rather than to provide

feedback in order to enhance learning. In essence, throughout the 20th century, exams

were viewed as a tool to provide statistics regarding educational systems, with little

attention to their affects on student development.

    Summing up the development of high-stakes testing, Pellegrino, Chudowsky, and

Glaser (eds., 2001) pointed out that the increase in the use of such evaluations over the

past few decades is indicative of an ideological movement to improve the quality of

education (p. 23). However, they expressed that in the contemporary context, such

examinations do not provide a fair basis for making important decisions because they do

not take into consideration key differences among students that affect success rates on

such tasks (p. 28). This fact has been progressively recognized by educational

stakeholders and policy makers and is prompting further research into assessment

methodologies and practices (Pellegrino et al., 2001, eds., p. 28). In particular, many

researchers are currently focusing on how classroom and large-scale assessments can be

coordinated and aligned so that the focus of all evaluations is on student learning and

growth (Turner, 2012, p. 69). As Wiliam (2011) explained, this movement has really

only been developing since the late 1980s, though it is increasingly gaining attention by educational researchers and politicians (p. 13).

Thus, the above authors described the historical development of the use of large-scale standardized assessments, emphasizing the idea that, in the past, the focus was primarily on their apparent political benefits. Currently, the trend among policy makers and researchers is moving towards studying how assessment practices can assist students in achieving success.

2.2 Problems Related to High-Stakes Exams

High-stakes exams have direct and indirect negative consequences for teachers and for students. It is important to be aware of these in order that decisions regarding how to use these tools can be made in an informed fashion.

2.2.1 Impact on Student Performance

High-stakes exams create various questions and concerns for educators and researchers. Some researchers are worried about the impact that testing has on student motivation and achievement. A 2003 study by Amrein and Berliner offered evidence for the idea that when rewards and punishments were linked to performance on tests, students felt less intrinsically motivated to think critically or to learn deeply (p. 32). In addition, Wheelock, Bebell, and Haney (2000) studied the extent to which external tests motivated students to learn by looking at self-portraits students drew regarding testing situations. Students drew images that showed they "felt anxious, angry, bored, pessimistic, and withdrawn from high-stakes tests." These authors cautioned against using tests, arguing that they diminish student motivation and performance.

2.2.2 Lack of Teacher-Student Collaboration and Communication

Some authors have emphasized that standardized testing is not an ideal method for collecting information about student learning because assessment should be a collaborative venture between educators and students. For example, the Assessment Research Group (2002) provided guidelines for developing evaluations, stating, "Assessment for Learning is the process of seeking and interpreting evidence for use by learners and their teachers to decide where the learners are in their learning, where they need to go and how best to get there." This document is interesting in that it implies that assessment strategies ought to be developed cooperatively between instructors and learners such that the content and the conditions under which evaluations are performed are in harmony with the needs of students. As well, Khan (2012) lamented the fact that exams often limit the abilities of teachers and students to convey their complex abilities and thought processes to one another. He believed that such tests were not always the best ways to evaluate teachers or students, as they do not take into account the creativity of either. In addition, Pellegrino et al. (eds., 2001) expressed that a key issue with exams is that they have little use for classroom teachers as they provide only a small insight into student knowledge and learning from a certain context (p. 8). Therefore, they do not truly enable teachers to learn about their students' learning histories, strengths, and weaknesses in order to meet them at their points of need (p. 8). Likewise, Turner (2012) analyzed one key drawback of exams, explaining that while evaluations ought to promote learning and development, as may be the case in classroom-based assessment, standardized testing does not provide students with feedback in order to enable them to evaluate and develop their knowledge (p. 68).

2.2.3 Lack of Benefit to Teachers and Students

Other critics of testing were Moses and Nanna (2007), who pointed out that exams limit educational goals and curricula while causing unnecessary stress to teachers and students (p. 56). They argued that using exams simply because they are efficient or easy to administer has no place in a system focused on quality or the best interests of students (p. 60).

Likewise, Shephard (2000) voiced that there are discrepancies between the ideas valued by contemporary pedagogues and those communicated by the use of exams, stating that, "…instruction is drawn from the emergent paradigm, while testing is held over from the past" (p. 4). In addition to testing being outdated, he explained that it is based on the idea that, for things to be fair, students should all be instructed and assessed in the same ways (p. 5). However, educators have become aware of the multiplicity of learning styles and needs. Hence, Shephard concluded that a socio-constructivist approach to assessment would be ideal, believing this to be a healthier approach to assessing diverse students.

Similarly, Smith, Polloway, Patton, Dowdy, and Heath (2001) expressed concern about testing being used as a primary means for assigning grades, particularly for students with learning challenges. They stated that, both for students succeeding with the curriculum, and for those experiencing difficulty, "…tests can obtain only a measure of a student's best performance in a contrived situation … Rigid administration and interpretation of test results can obscure, rather than reveal, a student's strengths …" (p. 13).

Furthermore, Pellegrino et al. (eds., 2001) explained their critical approach to high-stakes testing. First, they analyzed the ways in which these tests are unfair, stating that differences such as culture enhance or deter students from performing optimally and that such differences make it imperative for policy makers to consider student variation when designing the methodology and content of evaluations (p. 32). Additionally, they expressed that there is a disparity between what knowledge and skills are important to, and valued by, society and what students are being evaluated upon (p. 21). They stated, "It is … important that the assessments actually measure the kinds of competencies students need to develop to keep pace with the societal, technological, and economic changes, and that they promote the kinds of … learning that effectively build those competencies" (p. 25).

2.2.4 Student Perspectives on the use of High-Stakes Exams

Some students' opinions with regard to high-stakes exams were captured in a documentary by Bury and Warford (2003). Their film showed interviews with senior high school students regarding their perceptions of the implementation of standardized testing in Florida. The interviews revealed high levels of frustration, with students voicing that they found important content was not being taught and their true capabilities were not being assessed.

The fact that students may be affected by the reporting of scores of high-stakes exams was also recognized by Cornell, Krosnick, and Chang (2006), who explored how students responded when they were wrongfully informed of receiving a failing grade on a high-stakes exam. They presented evidence that this experience led students to feel intense levels of anxiety and depression; it was also linked to increased levels of intrapersonal

and interpersonal conflicts (p. 744). Some of those surveyed described feeling the need

to lie about their results. Another response by some was to seek professional help for

psychological issues incurred through this experience. Still others experienced extreme

turmoil when they realized they would be denied from attending important life events

such as prom and graduation.

In essence, the above authors have voiced concern that standardized tests as they are

delivered now may not be the most effective way to gather information about what

students actually know and are capable of for the purposes of empowering all students to

learn to the best of their best abilities.

2.3 Positive Aspects of High-Stakes Exams

While some authors are critical of using tests and exams, others have explained the

useful function that they can serve. This information can help us to understand the

helpful and positive role that they play in contemporary educational systems in order to

explain why their practice is sustained.

2.3.1 Focusing the Educational System on High Standards

The use of high-stakes exams can communicate that an educational system is focused

on positive values. This is emphasized by Burger and Krueger (2002), who expressed that

high-stakes exams in-and-of-themselves indicate that policy makers are concerned with

making their educational systems as excellent as possible. They argued that using such

assessments shows a concern with continuous improvement. In other words, the use of

tests and exams helps to clarify the values and the focus of the system. Burger and

Krueger qualified this stance, though, by saying that high-stakes exams should be just one aspect of how students are evaluated.

In addition, Madaus and Russell (2010/2011) argued that high-stakes tests are beneficial to society in that they can be used to ensure accountability in public education systems (p. 21); they are an effective way of regulating teaching and focusing learning (p. 22). They posited that those who advocate using high-stakes standardized tests are doing so with the good intentions of improving the educational system and that tests give important information about student and teacher performance.

2.3.2 Statistical Support for the use of High-Stakes Exams

Some quantitative data indicate that high-stakes exams have concrete benefits. Peterson and West (2003) studied the case of the No Child Left Behind policy and looked at quantitative data to argue that the use of general high-stakes exams has led to increased student achievement. They concluded that central exams help focus teachers' instructions such that they are more consistent and more organized (p. 317). Their book is strongly in favor of high-stakes exams, arguing that they hold stakeholders to high standards and focus the educational system on student achievement (p. 318).

Similarly, in The Impact of High-Stakes Exams on Students and Teachers: A Policy Brief (2004), researchers studied scores from across the United States and concluded "high-stakes exams do generally lead to higher student academic performance" (p. 4). These texts reveal that high-stakes exams are positively linked to improvements in student and teacher performances.

Though some studies show that high-stakes tests have some direct and indirect negative consequences (Cornell, Krosnick, & Chang, 2006; Bury & Warford, 2003), they

appear to be a valued element in contemporary educational systems insofar as they

challenge stakeholders to continuously strive to improve. The literature indicates that

research regarding the environment in which students write exams could provide insight

into ways to ameliorate students' abilities to achieve their best.

2.4 Anxiety related to Academia

   Some research affirms that test-anxiety can limit students' abilities to achieve their

best on exams.

2.4.1   Effects of Test-Anxiety

The literature indicates that stress can impede a person's ability to perform optimally.

Spielberger and Vagg (1995) explained that, for many students, exams induced the same

feelings of fear and anxiety that would be caused by a direct threat to their person (p. 6).

They stated that, "For some students, test anxiety is so disturbing that they must seek

professional assistance" (p. 3). Their book quantified how detrimental the effects of test-

anxiety can be, explaining that it can inhibit concentration and processing of cognitive

tasks.

2.4.2 Consequences for High-Anxiety Individuals

In terms of which students may suffer the worst from test-anxiety, Eysenck and

Derakshin (2011) studied anxiety as a personality issue. They focused on its effects on

people who are highly anxious. Their research showed that stress impairs many cognitive

functions for these individuals. In particular, anxiety was shown to impede cognitive

control when processing and responding to directions to complete a task. Interestingly,

highly anxious people were more easily distracted than others: they stated, "… anxiety is

often associated with increased susceptibility to distraction and thus impaired efficiency

…" (p. 956). They explained that anxiety can affect one's ability to control attention in

two ways: first, it can lead to not effectively controlling and using one's attention.

Second, it can lead to requiring a great deal of energy to maintain one's attention (p. 960).

This study is relevant in relation to high-stakes exams as it suggests that highly anxious

students may suffer more than others to perform their best on tasks, such as exams, that

require mental attention.

In a later study, Miguel (2012) showed that high-anxiety individuals processed

information more slowly and with less efficiency than low-anxiety individuals. However,

in contrast to Eysenck and Derakshin (2011), this study demonstrated that there was no

measurable difference between high-anxiety and low-anxiety individuals in terms of

performance (p. 23). Regarding the methodology used, the motivation level of

participants was manipulated by giving some a "no goal" option, some an easy goal, and

others a difficult goal. The results showed that when highly anxious people faced a

difficult goal, they increased their effort more than others did because they felt more

motivated (p. 219). In this way, they compensated for the decrease in efficiency caused

by test-anxiety. However, when the task required switching attention between various

components, highly anxious individuals struggled more than those with lower anxiety

levels to maintain focus and attention (p. 240). This study reinforces the concept that

highly anxious students, who are often the ones most motivated to succeed, may suffer on

tests and exams as a result of having difficulty managing their stress and maintaining

their concentration.

The fact that test-anxiety can limit a student's ability to achieve their best indicates

that research is needed into conditions and accommodations that could be provided in

order to mitigate and reduce the harmful consequences of this condition.

2.5 Gender Differences in Relation to Education

There is much literature that addresses whether there are differences between males

and females in how they experience instruction and evaluation.   This research is relevant

as it pertains to whether all students should be required to write assessments under the

same conditions, as noted by Pellegrino et al. (eds., 2001, p. 32).

2.5.1 Gender Differences should not be a Priority

Some authors have argued that gender differences are less important than other factors

when it comes to orienting educational policy. Cook and Cook (2009) stated that, "in

most areas the similarities between girls and boys far outweigh the differences" (p. 1).

Also, Thomson and Ungerleider (2004) studied whether students prefer same-sex or co-

educational classrooms. They explained that, although some students enjoy and benefit

from studying in a same-sex environment, the benefits to students of studying in co-

educational classes make this the better option in that students are offered a richness of

perspectives and learning styles that they may not otherwise encounter.

Several authors have expressed concern over differences in achievement levels

between boys and girls, as will be described below. Critiquing this approach, Martino

and Rezai-Rashti argued that the differences between boys and girls have been over-

stated and under-supported. They affirmed that there are some measurable differences

between males and females in terms of scholastic achievement, but stated that ethnic

background and income level are much more important factors in explaining performance

differences than gender.

Thus, while gender differences are an objectively observable reality, the authors

described above do not believe that they should be a primary focus for educators or

policy makers.

2.5.2 Scholarly Studies Indicating Gender Differences are Important

Other studies have shown that there are significant statistical differences between male

and female students in terms of their achievement that indicate a need for policy makers

to attend to this problem.

Bosacki (2007) studied 91 children aged five to eight regarding their self-perceptions

as students. He concluded that there were important differences between male and

female students. In particular, he stated: "The gender-related differences in the relations

among children's socioemotional competencies and self-perceptions suggest that girls

may be more influenced and/or sensitive to others' perceptions and expectations than

boys are." This is significant because it indicates that female students may be more

influenced by the ideas and visions of educators, which could relate to how they perform

in assessment situations.

Mead (2006) gave a balanced overview of the situation in the United States at the time

of writing. She explained that, in the United States, girls were scoring higher than ever

before, and were doing slightly better than boys. At the same time, she affirmed that

boys from certain ethnic backgrounds (Hispanic) and from lower socioeconomic status

families experienced greater academic challenges than others. She studied scores from

the National Assessment of Educational Progress (NAEP) to show that some boys were

struggling in comparison to girls, and argued that this indicated a need for further

research in the areas of gender, ethnicity, and scholastic achievement (p. 19).

Differences in achievement levels between the genders have prompted governments to

examine what can be done to ameliorate their systems to ensure greater equity. The

Australian Government funded a study wherein Alloway, Freebody, Gilbert, and

Muspratt (2003) used a mixed methods design by reviewing scores and surveying

students in grades two, three, six, and seven in three states. They determined that there

were significant differences between boys and girls in terms of scores and motivation

levels, particularly in literacy classes. When they introduced electronic and graphic texts,

along with more active assessments such as speaking, acting, and debating, success rates

rose for boys.

In Ontario, differences in achievement between boys and girls prompted a study *Me

Read? And How* (2009), which used interviews and group surveys to show that boys

became more engaged in learning when they were involved in choosing materials that

they related to, when they were allowed to be more active, and when they felt they had a

voice in influencing teaching orientations.

Also studying the case of Ontario, Finlay (2012) used quantitative data from the

Toronto District School Board as the basis of her argument that literacy education must

be approached differently for boys and girls. She stated that, "In the Toronto District

School Board, standardized tests show a six to 12 percent performance gap [between

boys and girls] in Grade 3 reading and writing assessments." Finlay acknowledged that

biological differences between the sexes do not determine that boys will score lower than

girls and that students are all individuals, with various learning styles, abilities, and needs.

However, she pointed out that some research supports the fact that many boys do learn in more kinesthetic ways than girls, and that teachers need to integrate more motion and interaction with the world in order for more boys to be able to learn in ways that are meaningful for them.

In Sweden, Rosander and Backstrom (2012) questioned whether gender differences were linked to differences in academic achievement in the upper levels of high school. They studied 476 students in Sweden between the ages of fifteen and twenty-one years old. Fifty-three percent were girls and forty-seven percent were boys. They found that there were statistically significant differences between boys and girls on personality measures as well as academic marks. In particular, they found girls scored higher in natural science and Swedish language.

These studies demonstrate that differences in achievement between male and female students have been documented in various parts of the world, prompting some policy makers to seek strategies to reduce the gender gap.

2.5.3 Gender as a Social and Cultural Construct affecting Students

Other authors studying the issue of gender differences have focused on how they are formed through socialization and enculturation. Connell (1995) critically analyzed how ideas of masculinity had been formed and used to normalize certain ways of being that then discriminated against, and silenced, others. Connell questioned the popular scientific (biological and psychological) perspectives that argued that gender-related behaviors are ingrained, arguing that these perspectives, themselves, are politically formed to uphold a segment of the population's power. Connell used ethnographic research from interviews with men to examine the impacts of the dominant discourse on

masculinity in the West. This study cautioned all members of society to remain sensitive

to individual differences and to not propound gender stereotypes.

Furthermore, Kehler and Martino (2007) used interviews with boys in the United

States and Australia to gain understanding of the extent to which boys felt that a

homogenized gender identity had been assigned to them through their education system.

They cited instances of boys feeling that there was a normal, expected way for them to

behave and explained that the boys included felt that there was a hegemonic gender

identity assigned to them in school. The boys included were open to questioning gender

norms, which Kehler and Martino attributed to their desire to find a more fulfilling and

affirming way of developing their identities. They encouraged educators to engage male

students in active discussions about identity and to learn from their experiences.

As well, Kehler (2010) emphasized that educators should question how gender

stereotypes and expectations are formed and sustained through choices of literature and

learning activities. Kehler pointed out that gender is largely shaped through how

individuals are socialized; thus, encouraging certain literacy techniques or genres may be

limiting or harmful for some individuals who identify as being male, but do not fit the

stereotypes. He advocated for literacy policies and practices that encourage diversity and

exploration of various identities and lifestyles.

Regarding how gender socialization affects females, several researchers have noted

that pressures arising from socially propagated ideals of femininity are manifested

through many girls struggling with body image issues, depression, and low self-esteem

(The Development of Sex and Gender, 2014). In particular, one study conducted in

Norway found that, as children move into the adolescent years of thirteen and fourteen,

girls experience significantly higher levels of depressive feelings than do boys (American

Psychological Association, 1999). This fact could be an explanatory factor regarding

differences between how males and females behave in school.

In addition, one study extrapolated the influence of gender socialization to

relationships between teachers and students (Jones & Myhill, 2010). This study revealed

that gender stereotypes of males as being more active and females as being more calm

and receptive are linked to teachers assuming their female students will out-perform their

male counterparts on academic tasks.

While the literature reveals that socializing factors are linked to both males and

females struggling in certain ways, gender assumptions have been seen to favor many

girls in their performances in school. In particular, a study by Klinger, Shulha, and

Wade-Woolley (2009) found that the assumption that "boys must be boys" (p. 38), in

terms of being more active than girls, was expressed through lower expectations for boys

than for girls among parents and teachers with regards to literacy achievement.

Thus, the role of socialization is an important one with regards to how males and

females are influenced in their goals and beliefs about their academic potentials.

**2.5.4 Biological Differences between Genders that Impact Learning and
Achievement**

Several researchers have found that the biological differences between the genders

are significant. Martin, Fabes, and Hanish (2009) observed that gender differences are so

ingrained in humans that they are even observable in heart rates.   These researchers

studied the heart rate variability of boys and girls over three minutes followed by eight

weeks of observation of these children's' interactions and observed that boys have a

higher heart rate variability than girls do.

Additionally, Perrson, Herlitz, Engman, Morell, Sjolie, Wikstrom and Soderland

(2013) studied twenty-four men and women using MRI technology. They concluded that

men are more accurate in spatial negotiation than women. They explained that

hippocampal activation during tasks related to spatial orientation differs between men

and women, with men experiencing greater facility in orienting themselves. Intriguingly,

they found that women often use more verbal techniques than men do when facing

orientation tasks.

Another biological difference between the sexes pertains to auditory performance.

Sax (2010) focused on differences in the shape and function of the auditory cortex. He

explained that some boys are slightly less sensitive to sound than girls, meaning that

sound may need to be amplified and placed specifically in a room such that all boys are

able to benefit from auditory stimuli.

This research is important for corroborating the idea that, from a biological standpoint,

boys and girls experience and respond to information differently, which may affect how

they learn and how they perform on assessments.

2.5.5 Gender Differences as Significant into Adulthood

Gomez, von Gunten, and Danuser (2013) provide evidence of the fact that gender

differences remain relevant beyond childhood in relation to how humans perceive and

respond to information. They studied adults in Lausanne by showing them different

images to see how they would react emotionally. These researchers concluded that, "The

current study adds a unique piece to our knowledge about gender differences in emotion

across adulthood by showing that men and women have different affective experiences to

specific contents and that these differences are rather stable across the adult lifespan" (p.

7). This study is interesting because it indicates that gender differences remain important

throughout our life spans, continuously affecting how we respond to new information and

situations.

2.5.6 Gender Differences as they relate to Assessment

Only one available study to my knowledge looks at the match between gender-based

instruction and assessments. In his 2007 dissertation, Alkharusi studied 1,636 ninth

grade students and concluded that boys experienced traditional assessment methods more

negatively than their female peers. By traditional methods, he described standard exams

in which students were required to remain silent and perform a task for an extended

period of time. Alkharusi concluded that in single-gender classrooms, females and males

performed differently on assessments, noting in particular a benefit for females when

males were not present. In addition, in his conclusions, he presented the idea that

students should be assessed in ways in which they can perform optimally.

2.6 Gender Differences and Physical Activity

Some research indicates that certain boys may benefit more than some girls from

kinesthetic activities used in classroom instruction. James (2007) looked at the

physiological differences between boys' and girls' brains. She explicitly extended her

research to classroom practices by explaining that there are major differences in how the

majority of boys learn from that of most girls. She stated that, "...boys in ninth grade

learn best by being active, by putting their hands on the materials, and by talking about

the material once they have some context to work with; they like doing something in

class ..." (p. 2).

Also, Gurian (2009) argued that brain differences and chemical differences require

educators to teach in gender appropriate ways. He argued that, "Sitting still for fifty

minutes is often the wrong way for a boy's brain to work – the male brain often needs to

be kept stimulated through physical movement in order to perform cognitive tasks as well

as girls do" (p. 161).

The studies by James and Gurian suggest that physical motion should be a key aspect

of pedagogy and, by extension, assessment, particularly for boys.

2.7 Physical Motion and Academia

Physical motion is known to have positive affects on people insofar as it can help to

mitigate the negative consequences of stress and can help to sharpen peoples' cognitive

performances. This is relevant as it indicates that increasing physical motion could be a

helpful accommodation for students facing high-stakes exams.

2.7.1 Philosophical arguments for the interconnectedness of motion and the mind

The current practice in education is for students to remain sedentary for long periods

of time, which essentially communicates that only cerebral functions are important.

Damasio (1999) gave evidence for the interconnectedness of consciousness and physical

movement, while Madigan (2006) and Johnson (2007) argued that the brain and body are

interdependent and that moving intentionally can prepare the brain for learning.

Effectively, these authors expressed that the mind and body are inextricably connected,

and this connection is significant for how we learn and perform on cognitive tasks.

2.7.2 How Physical Motion Benefits Students

Physical activity has been shown to have numerous benefits for students. Bailey

(2006) explained some reasons that physical activity can improve academic performance,

saying **"**Researchers have suggested that [Physical Education] can enhance academic

performance by increasing the flow of blood to the brain, enhancing mood, increasing

mental alertness, and improving self-esteem." Also, Medina (2008) argued that our

brains are not designed for long periods of remaining sedentary (p. 20) and that physical

fitness is directly linked to improvements in test scores and academic achievements (p.

25). Furthermore, Mitchell (2012) contended that our problem-solving and analytical

abilities are best activated during periods of motion. Likewise, Dudfield (2012) claimed

that well-designed sports and physical education programs could assist in enhancing

mental performance.

Along with improving cognitive functioning, increased levels of physical activity

yield other benefits for students. Ratey (2008) described particular situations where

schools increased physical activity and how it led to benefits such as improved moods

and increases in motivation among students (p. 35). Also, Trudeau and Shepard (2009)

performed a detailed review of studies on elementary aged children that positively linked

higher levels of physical fitness with increased concentration and productivity in school.

They explained that serotonin, released as a result of physical activity, has a calming

effect that can improve some children's ability to focus on academic tasks. As well,

Stead and Nevill (2010) looked at longitudinal studies that show academic achievement is

improved through regular physical activity, as are students' perceptions regarding their

schools, their aspirations, and their social behaviors.

2.7.3 Studies Regarding Physical Activity and Academia during the Elementary

School Years

Numerous studies have been done at the elementary school levels that have linked

increased levels of physical activity and fitness with higher levels of academic

achievement.

Dwyer, Sallis, Blizzard, Lazarus, and Dean (2001) studied 7,961 students between the

ages of seven and fifteen in Australia in order to document the relationship between

physical activity and academic performance. In order to do so, they required participants

to perform physical fitness tests to assess their overall fitness levels. They then analyzed

the role of fitness with regards to academic achievement by comparing it to known

"school ratings of scholastic ability" (p. 233). The authors concluded that across all the

ages of students involved, there was a positive correlation between higher levels of

physical fitness and academic achievement. In addition, they noted that this relationship

was consistent between boys and girls.

In 2006, Coe, Pivarnik, Womack, Reeves, and Malina studied 214 sixth grade

students' levels of physical activity and fitness in relation to their grades in school. Their

study considered the effect of order by breaking participants into two groups wherein one

group performed physical education during the first semester and the other performed it

during the second semester. They did not see that this modification impacted the results.

Students' levels of physical fitness were measured through the SOFIT (p. 1516) system

whereby experts assigned each student a score based on their levels of physical fitness

and activity. Academic achievement was measured using marks from four core courses

and standardized assessments. Interestingly, these researchers determined that students

who exercise vigorously had "significantly higher grades" than those who exercised only moderately.

Also, Hillman, Pontiflex, Raine, Castelli, Hall, and Kramer (2009) studied twenty students around the age of nine to determine the impact of exercising on a treadmill prior to performing assignments requiring cognitive attention. They presented evidence showing that a single period of intense physical exercise can lead to an increased ability to hold one's attention and perform academic tasks (p. 1044).

The study by the American Heart Association (2010, March 4) examined the relationship between students' physical fitness and their academic performance. Researchers studied 725 fifth grade students in Wood County, West Virginia by looking at their body mass indexes, fitness levels, and scores on standardized tests. They found that children with good overall fitness levels at the outset of the study had higher test scores in math, science, and social sciences. The second highest group in terms of academic achievement was composed of those who were not fit in fifth grade but were by the end of the study (when they were in seventh grade).

These studies indicate that physical activity and fitness have important implications for academic achievement. However, there is a lack of research related to exercise and academic achievement for senior high school students. As these studies are an important basis for this current work, they are summarized in Table 2.1 for easy reference.

**Table 2.1 Summary of some Studies about the Relationship between Physical
Motion and Academia on Elementary School Children**

Study	Dwyer, Sallis, Blizzard, Lazarus, and Dean (2001)	Coe, Pivarnik, Womack, Reeves, and Malina (2006)	Hillman, Pontiflex, Raine, Castelli, Hall, and Kramer (2009)	American Hearth Associaton (2010)
Purposes	To document the relationship between physical activity and academic achievement	To determine the relationship between levels of physical fitness and academic achievement	To determine the impact of exercising prior to performing tasks requiring cognitive attention	To examine the relationship between physical fitness and academic performance
Participants	7,961 Australian children aged 7 to 15	214 sixth grade students	20 students aged 9	725 fifth grade students
Methodology	1) school ratings of scholastic ability were used to measure academic achievement 2) Students performed physical fitness tests and were assigned a rating 3) scholastic ability scores and scores on physical fitness tests were compared	1) Students were assigned a fitness score by an expert using the SOFIT program 2) Academic scores were assigned from 4 core courses using standardized assessments 3) Students' scores were analyzed following this modification	1) students were required to exercise on a treadmill prior to performing cognitive tasks	1) Documented participants' body mass indexes, fitness levels, and scores on standardized tests
Conclusions	There is a "significant correlation" between scores on physical fitness tests and scores on academic assessments	Students who routinely performed vigorous physical exercise had higher scores on tests and evaluations than other students. Moderate fitness levels were not correlated to higher achievement.	A single period of intense physical exercise can lead to an increased ability to hold one's attention and perform academic tasks	Children with good overall fitness levels at the outset of the study had higher test scores in math, science, and social sciences. The second highest group was those who were not fit in fifth grade but were by the end of seventh grade.

2.8 Paradigms influencing this research

The ideological and pragmatic decisions made regarding this study have been influenced by several paradigms. This section expresses the most relevant paradigms, or philosophical orientations and worldviews (Teddlie & Tashakorri, 2010, p. 14), as they relate to the research design.

2.8.1 Social Constructivism

First, the study was shaped by a social constructivist (also termed 'constructionist') paradigm. Vygotsky (1978) argued that knowledge is most effectively constructed through the interactions that humans have with one another (p. 35). By extension, for knowledge to be constructed through research, it is most effective to do so in a manner that includes discussion and deep interaction between the researcher and participants (Crotty, 1998, p. 42). This challenges the traditional view of teacher or researcher as expert and students as more passive recipients of information, but, as Luke (1995) pointed out, the relationships between students and those in authority, such as teachers or administrators, are not fixed, but are based upon the ideas and discourses that both parties bring to their interactions (p. 11). As a researcher and as a teacher, my view was that the best guides for our policies and procedures are the voices of students themselves, and that we have much to learn from their opinions. Therefore, this study was designed such that the interactions between the students and myself would be prioritized in order to enable students to construct their opinions and support them in giving rich and authentic responses.

2.8.2 Ontological Pluralism

Second, the study was influenced by ontological pluralism (Teddlie & Tashakorri, 2010, p. 4) insofar as the perspective taken towards the gathering of data was that important information could be amassed from all stakeholders as well as from multiple instruments (Phillips & Burbules, 2000, p. 26). Thus, quantitative and qualitative information were both given import in the design and reporting of this study. In addition, the experiences of students, expressed through their own words, were considered valuable and this information was coordinated with quantitative information in a balanced fashion.

2.8.3 Critical Realism

Third, this work was shaped by critical realism, thus entailing a thorough grounding in real-world issues and concerns, which is integrated into research approaches directed at gaining context-specific information from multiple stakeholders (Teddlie & Tashakorri, 2010, p 161). This was done in the interests of change or improvement, as encouraged by Teddlie & Tashakorri (2010, p. 161). Crotty (1998) explained that the goal of critical inquiry is to move human practices closer to social justice and equity (p. 157). Also, Fairclough, Graham, Lemke, and Wodak (2004) stated that "…critical social scientists can claim no special expertise in curing social ills, but … can certainly reflect on what the problems are and how they might be resolved" (p. 1). In accord with these reflections, this research was conducted with a critical perspective regarding accepted practices used on high-stakes exams while seeking to explore modifications that could enhance students' opportunities for success. Additionally, critical realism was relevant to the research design insofar as it broadens the range of resources accepted for inquiring into the

complexity of an issue by validating the idea that knowledge may be gathered from

multiple subjective perspectives (Teddlie & Tashakorri, 2010, p. 661). Therefore, the

research was grounded in the context of classroom instruction and evaluation and gave

precedence to the voices of students themselves while seeking knowledge about how to

improve their conditions.

2.8.4 Pragmatism

Fourth, the methodology designed herein flows out of the philosophy of pragmatism

as defined by Tashakkori and Teddlie (2010, p. 88), which encapsulates the above

paradigms insofar as it emphasizes that knowledge is gathered through interactions with

the objective world. Furthermore, in order to address real-world questions and issues, a

pragmatic ideology empowers the researcher to draw on the ideological and practical

possibilities within both quantitative and qualitative fields (Tashakkori & Teddlie, 2010,

p. 88). According to Tashakkori and Teddlie (2010), there are two specific positive

aspects of embracing a pragmatic ideology: "It can free researchers to *creatively*

construct new research approaches … [and] It focuses on continuous improvement of the

human condition" (p. 89). An essential component of pragmatism is the view that

researchers should be engaged in "a problem-solving, action-focused inquiry process

[and] … a commitment to … progress" (p. 131). This was the case with this study, which

combined quantitative and qualitative tools to address research questions derived from

experience in current high school contexts. In addition, the methodology was designed to

discern solutions to observed issues in the hope that the research will have practical value

for various stakeholders in educational settings.

There is much overlap between these orientations, with each offering specific tenets that have been integrated into the research design. Combining these paradigms indicated that a mixed methods research design would be most appropriate, as will be detailed in the next chapter.

2.9 Chapter Summary

This chapter has reviewed the relevant studies and paradigms that are associated with this thesis, showing that the literature related to this research is truly interdisciplinary insofar as it links several fields of study including research on high-stakes evaluations, the impact of test-anxiety, the role of physical fitness and exercise in learning, and gender differences as they affect achievement.

A historiography of high-stakes exams shows that policy makers have focused on efficiency, uniformity, and standardization in summative evaluation methods when requiring students to sit and write for lengthy periods of time. However, increasingly, researchers are focusing on how exams can and should empower students. Several texts express that the use of high-stakes exams is linked to increased student and teacher productivity. Regarding test-anxiety, the literature reveals that for many students, exams are extremely stressful and that this stress can impede optimal achievement. Numerous authors have explored ways that gender differences are important as they relate to academic achievement. In addition, much educational literature has focused on how physical activity can help students to achieve better results in school as well as decrease their feelings of stress when under pressure. Some researchers have even argued that the need for motion is greater among male students.

Teachers and policy makers are being encouraged to include more physical motion in the classroom (James, 2007; Gurian, 2009), yet, as Barnes, Clarke, and Stephens (2000) explained, "…attempts at curriculum reform are likely to be futile unless accompanied by matching assessment reform … (p. 623). Thus, research is needed regarding the link between physical activity and performance on high-stakes exams at the high school level as well as whether this would differ significantly between male and female students.

In the next chapter, I describe the methodology that was used to gather and analyze data throughout the seven phases of this study.

Chapter 3: Methodology

This chapter gives an overview of the methodology used throughout the study. It begins by presenting the research questions and the broad research paradigm. It then describes each of the seven phases of the study. In so doing, it outlines the participants, contexts, instruments, and procedures utilized in the collection of data. It also details the procedures employed to analyze and integrate this information.

3.1 Research Questions

The five questions (as stated in section 1.2 above) that directed the choices of participants, instruments, as well as the research design are as follows:

1) How does physical motion integrated into an examination impact test achievement measure in scores?

2) How do senior high school students experience lengthy sedentary examinations?

3) How do senior high school students experience physical motion integrated as a modification to methodology during an examination:

   a. Related to their feelings of anxiety and stress?

   b. Related to their perceptions of their achievements?

4) Are there differences between male and female students in how they perceive sedentary examinations?

5) Are there differences between male and female students in how they perceive physical motion during an examination?

3.2 The Appropriateness of a Mixed Methods Research Design

As recommended by Tashakkori and Teddlie (2010, p. 275) and Turner (2014, p. 13),

this study began with research questions. The paradigmatic orientations embraced as a

researcher, which were detailed in Chapter 2, as well as the specific questions guiding the

inquiry suggested that multiple instruments would be necessary to compose the research

design. The first question required the analysis of quantitative data, whereas the others

could be answered using tools that gather both quantitative and qualitative information.

Thus, it was evident that a mixed methods research (MMR) design would be most

appropriate as this approach gives the researcher freedom to choose the suitable

quantitative and qualitative tools to address the particular research questions and aims

(Tashakkori & Teddlie, 2010; Creswell & Clark, 2007; Creswell & Garrett, 2008, p. 327;

Creswell, 2014).

3.3 The Phases of the Study

The study developed in seven phases. Each phase is described in detail below.

3.4 Phase One: Initial Project Design

The first phase of the study began in September 2011 and lasted until May 2013.

During this period, the initial project design for the pilot study was created.

3.4.1 Reflecting upon the Suitability and the Goals of the study

The research design began with a thorough intrapersonal examination of why the

issue of physical motion in relation to exams was pertinent to me, whether it was

significant enough to merit the level of investigation required by a research study, and

what the possible consequences could be. Bickman and Rog (2009) emphasized that the

researcher needs to be aware of personal motivations when conducting a study, and that

these should be made explicit (p. 73), while Hesse-Biber (2010) pointed out the reality

that, when formulating research questions, there are political, social, economic, and

personal motivating factors and it is important to understand how these are impacting

one's work (p. 35). Hence, the researcher's goals and perspectives are inextricably

embedded in the research design and should be well understood and stated as clearly as

possible.

In addition, Sarantakos (2005) stated that one of the main criteria for deciding

whether a research study is appropriate is to determine whether the study will have

relevance for the broader community (p. 83).

Therefore, it was necessary to begin by reading broadly regarding the relationships

between the different elements of my experiences – tests and exams, test-anxiety, gender

differences, physical activity, and academic achievement - in order to discern the position

of my experiences in the classroom in relation to the literature as well as whether this

topic would be relevant to students, teachers, and other stakeholders. The process of

reading literature related to the research questions expanded into an interdisciplinary

collection of information, as evidenced in Chapter 2.

The conclusion to this process was that my personal goal was clarified. This goal was

to explore whether adding physical motion to a high-stakes assessment could improve my

work as a classroom teacher as well as that of other teachers, administrators, and

potentially policy makers. Furthermore, the literature confirmed that research could be

relevant and beneficial in order to increase our understanding of methods available to increase student success on exams.

Having identified my position regarding the suitability of investigating this issue, I conducted a literature review of the relevant fields, as was detailed in Chapter 2, which, combined with my research questions, was the basis for determining the methodology for this study. Due to the various components contributing to my data collection, my research design was shaped by the following areas: the history of high-stakes testing, current issues with high-stakes assessments, test anxiety, gender differences, and physical motion as it relates to academia. It was also influenced by the paradigms of social constructivism, ontological pluralism, critical realism, and pragmatism.

3.4.2 Choosing the Target Population for the Pilot Study

Initially, I decided that a pilot study would be conducted in which the target population would include students in grades ten and eleven - the two upper levels of senior high school. This is because both grade levels face high-stakes examinations: the grade ten students write the History and Citizenship MELS exam while the grade eleven students write the English Language Arts MELS exam. I reasoned that both grade levels would be interested in and feel implicated by the research questions.

3.4.3 Designing the Instruments for the Pilot Study

To ensure that the experience would be authentic and familiar for students in current English courses, I designed a Reading Response task similar to that required on the 2013 MELS ELA Exam. On this task, a guiding question was given and students were required to analyse and evaluate texts as they related to the question.

The instrument that I used was one that was met with interest and enthusiasm by my own students during the process of preparing them for the MELS exam. Therefore, I decided to use it during the study. The guiding question that I presented to students was "What is the relationship between money and happiness?" For each group, during the first mock test they addressed the guiding question by analysing a ten-minute video clip showing the final scene from the movie *The Pursuit of Happyness*. During the second mock test, all groups referred to the first ten photographs from the photo essay *State Street Family* by Glenn H. Austin (A State Street Family Album), wherein students were allowed one minute to view and analyse each photograph. The procedure of using the movie clip in the first session and the photo essay in the second remained consistent for all groups such that the sessions were procedurally equivalent. The only variable that was changed during the sessions was whether students remained sedentary or whether they periodically performed physical activities.

I wished to gather a large amount of quantitative data regarding students' perceptions throughout the study. This was so that statistical analyses could be performed with the hope that the information would be generalizable to other similar populations (Kelley, Clark, Brown, & Sitzia, 2003). Hence, a 5-point Likert Scale questionnaire was chosen as an appropriate instrument to follow-up on students' opinions (see Appendix A). At the same time, I wanted to gather students' explanations of the numeric data, so I included open-ended questions following each item in order to give them an opportunity to voice their opinions more uniquely.

3.4.4 Deciding upon the Procedures for the Pilot Study

I decided that the first phase of the study would be a pilot study in order to test my

assumptions about the target population and explore whether my instruments were

sufficient to gather the information that I sought.

I determined that I would first visit two classes of students to invite them to

participate in the study by explaining the research design and distributing Consent and

Assent Forms (see Appendices D and E).

Having recruited participants, I planned to visit each class on two separate occasions

in order to gather quantitative information in the form of test scores. This would be done

by requiring students to write two mock exam situations: in one, they would sit and write

continuously for seventy-five minutes (one class period) and in the other they would take

breaks every fifteen minutes to perform physical activities. I decided to include two

groups of students and to alternate the order in which they performed the mock exam

situations so that I could analyse whether order was relevant to their perceptions. To be

able to measure the impact of the modification, I determined to analyse the scores to see

if there was statistically significant information about the effect of the modification. I also

decided that I would visit each group one week after their second mock test to ask them

to complete the Likert Scale questionnaire.

Regarding the design for the pilot study, it was evident that a primary reason for

mixing methods would be that gathering qualitative data would add richness to my

understanding of the quantitative data (Aaron, 2011). Thus, at the outset of the study, a

mixed methods sequential explanatory design was determined to be an appropriate

approach insofar as quantitative data would be gathered first, with qualitative data

gathered after to develop and explain the quantitative results (Creswell & Plano Clark, 2011).

3.4.5 Consent and Assent Forms

Consent and Assent forms were drafted for the two phases of the study: the mock exams, and the questionnaire (see Appendices D and E). I decided to only include students for whom permission had been granted and who had given their own assent. This was in order to be assured that students felt comfortable with the research questions and procedures.

3.4.6 Ethical Review

Prior to beginning data collection, ethical approval was obtained from the Research and Ethics Board (REB) of McGill University. The REB provided consent for the research design as well as the Consent and Assent forms given to the parents and students (see Appendices D and E).

3.5 Phase Two: Pilot Study

The first phase of data collection was conducted during April and May 2013. This phase was conceived as a pilot study in order to test the assumption that the study should include students from grades ten and eleven as well as to evaluate the effectiveness of my instruments.

3.5.1 The Context and the Participants

The context for this phase was a public high school including grades seven through eleven located in southern Quebec in which the students were primarily Anglophone (with English as their first language) or Francophone (having French as their first language).

In April, 2013, I approached two teachers of English language arts: one was the teacher of a group of general stream grade ten students and the other was the teacher of a small group of at-risk grade eleven students. The general stream students were those for whom it was expected that they would be able to pass the course by receiving the basic curricular materials and instruction. The at-risk students were those who were experiencing difficulty academically and who were at risk of failing or dropping out.

In order to recruit participants, I visited each group once in late April to explain the project, to distribute the Consent and Assent forms, and to invite students to participate. The result was that twenty-three secondary four students and nine secondary five students volunteered for the project.

3.5.2   Gathering Data

In early May, I conducted the first data collection session with the grade ten students. Students were required to sit and write continuously for seventy-five minutes. One week later, I returned to conduct the second session during which students were required to get up and perform physical activities every fifteen minutes. Concurrently, I visited the grade eleven class and performed the data collection procedures in the alternate order such that they performed physical motion first and sat continuously second.

One week after my second data collection session, I returned to distribute the

questionnaires. Students were given forty-five minutes to complete the questionnaire,

which included a 5-point Likert Scale and open-ended comment sections.

3.5.3   Data Analysis

The tests were scored using the 2013 MELS rubric (see Appendix I). This rubric

evaluated students' responses for demonstrating their abilities to derive the meaning of a

text in relation to a guiding question, to precise and support the use of codes and

conventions, to make connections, and to formulate a judgment about the text's qualities.

The responses were evaluated first by myself and then by the students' classroom

teachers. The scores were discussed and dyadic scores were agreed upon. Next, the

scores were entered into SPSS software and frequency counts were performed to see how

many students had scored higher on the test with physical motion than on the one without.

There was not a significant difference between the scores.

The quantitative data from the Likert Scale questionnaire was analyzed using

descriptive statistics in the form of frequency counts. Over half of the participants did

not complete the questionnaire. In addition, the results on the questionnaires that were

completed yielded information that was inconsistent. Furthermore, most students opted

not to offer qualitative data in the form of responses to the open-ended questions.

3.5.4 Reflecting upon the Pilot Study

Because of the fact that the information gathered from the pilot study was inconsistent

and insufficient to draw any conclusions, it was evident that the target population and the

instruments were not well matched to the research questions. Based on the grade ten

students' demonstrated apathy towards completing the mock tests and the questionnaires,

I comprehended that they did not feel sufficiently interested in or implicated by the

research questions. In addition, the low level of completion by both grade levels on the

Likert Scale questionnaire indicated a need to review this instrument. This indicated that

the project needed to be reviewed and the instruments revised to prepare for another

phase of data collection.

3.6   Phase Three: Revising the Project

Having learned from the pilot study, the research design was reconceptualized for the

actual study, which took place during the 2013-2014 school year.

3.6.1 Narrowing the target population and altering the instruments

From June 2013 to November 2013, the project was reworked such that later data

collection periods would yield more relevant and more precise information.

First, the target population was altered.   I concluded that it would be better to include

only grade eleven students as the pilot study indicated that grade ten students felt less

implicated in the high-stakes ELA exam required for graduation.

Second, the questionnaire was seen to be in need of revision. In order to do this, I

determined to add a focus group to the research design such that this procedure would

probe students for suggestions regarding how to make the questionnaire user-friendlier

for their peers. This group of students would help create a revised questionnaire that

would be used in the actual study.

Finally, I decided that another instrument would be useful to gather qualitative data

describing students' perceptions of the inclusion of physical motion during an exam.

Therefore, an additional focus group of students was added to the research design in

order to follow up on the data from the questionnaire.

Thus, the following demonstrates the final research design employed: a qualitative

session would be the first step in the process. Next, quantitative data would be gathered

from test scores. Third, quantitative and qualitative data would be gathered from

questionnaires. Finally, qualitative data would be gathered from a focus group.

3.6.2 Rationale for a Sequential Exploratory Study with Emphasis on Qualitative

Data

Given the complexity of the context and participants, it was presumed that qualitative

data could help me to understand the context within which the quantitative data was

recorded and the intricacy of the interactions between myself, the classroom teachers, the

participants, the instruments, and the data (Tashakkori & Teddlie, eds., 2010, p. 70;

Turner, 2014, p. 11). Furthermore, as I was including students regarding a topic that was

of direct importance to them, it was imperative that I be able to convey respect for and

interest in their personal perceptions and opinions. Therefore, it was essential to choose

qualitative instruments that would enable me to convey concern for each student's voice,

and not only for their exam scores (Tashakkori & Teddlie, eds., 2010, p. 276). For these

reasons, I decided to include a focus group after the questionnaires were completed.

As qualitative data was to be gathered first and as the emphasis was to shift towards

the importance of the qualitative data overall, the revised project became a mixed

methods sequential exploratory (MMSE) study (Creswell & Plano Clark, 2011). Figure

3.1 provides a visual summary of the MMSE nature of this study and the particulars of

each phase.

Phase 1: Project Design	Phase 2: Pilot Project	Phase 3: Project Re-design	Phase 4: Quan Data Collection	Phase 5: a. Quan + Qual Collection b. Qual Data Analysis	Phase 6: Qual Data Collection	Phase 7: Quan + Qual Data Analysis & Integration
Sept 2011-May 2013	May 2013	July 2013-Nov 2013	Nov 2013-March 2014	March 2014	April 2014	April-June 2014
Procedures:	Procedures:	Procedures:	Procedures:	Procedures:	Procedures:	Procedures:
-document analysis for literature review -design of quan data collection instrument, Likert Scale questionnaire, and qual questions -application and acceptance with REB	-Quan data collected: 32 students write 2 mock exams (one including "physical motion breaks"; the other sedentary -Quan + Qual data collected: students complete Likert scale questionnaire + open-ended questions	-target population narrowed to solely grade 11 students -48 participants recruited from 3 classes: at-risk, regular, enriched -focus group (7 students from regular stream) meets to re-design questionnaire	-48 students write 2 mock exams using the same procedures as the pilot project -researcher scores exams using MELS rubric -classroom teachers score exams	-Quan data collected: 48 students complete questionnaire -Qual data collected: participants answer open-ended questions on questionnaire -field notes taken	-Qual data collected from focus group with 6 enriched students -students respond to semi-structured questions regarding test-anxiety, high-stakes exams, mock exams and physical motion	-frequency counts and t-tests used to analyze quan data -coded text and themes used to analyze qual data
Products:	Products:	Product:	Products:	Products:	Product:	Products:
-literature review -quan instrument and questionnaire -REB Certification	-data analysis reveals inconsistent information	-new questionnaire that is simpler and shorter than original	-dyadic scores are agreed upon and recorded on exams	-SPSS data file for quan data -open-ended answers coded and used to create questions for focus group -field notes coded	-audio recording and transcription	--quan data organized as themes -qual data reported as coded text -results, implications, future research reported

Figure 3.1 Visual Design of this Mixed Methods Sequential Exploratory Study

3.6.3 Ethical Review for Revised Project

Prior to beginning the actual study, ethical approval was obtained from the Research and Ethics Board (REB) of McGill University, which provided consent for the revised research design including two focus groups as well as the Consent and Assent forms given to the parents and students (see Appendices B, C, D, E, F, and G).

3.7   Phase Three: Preparations for Data Collection during the Actual Study

Having reconceptualized the study by deciding on a target population of only grade eleven students who would participate in a mixed methods sequential exploratory research design, new groups of participants were recruited and a focus group was held to revise the questionnaire.

3.7.1 The Context and the Participants for the Actual Study

The context for the actual study was a different school than that of the pilot study. This was an ethnically diverse public English senior high school including grades nine through eleven located in southern Quebec.

In September 2013, I approached two grade eleven ELA teachers, who agreed to allow me to conduct research in their classes. Three particular classes were included in order to survey a range of learning styles and abilities. One class was a small group of students who had all been held back at least one academic year and who were considered to be at risk of failing or dropping out. The second class was a general stream group of students, as defined in section 3.5.1 above. More specific information was given by their teacher, who explained that many students in this class exhibited, "low levels of ambition regarding school and weak study skills" (Teacher 3, personal communication, November 16, 2014). The third class was a group of enriched students, meaning those who were thriving academically, for whom the curriculum was enhanced with more challenging materials, and for whom there was little fear of failure or dropping out.

In October, 2013, I held one thirty minute session with each of the three classes during which time the research aims and design were explained. I distributed the Consent and Assent forms, read these to the students, and explained all clauses, as in the

pilot study. The result was that twenty-eight general stream students, ten at-risk students,

and ten enriched students agreed to participate, giving a participant population of forty-

eight students.

3.7.2 Rationale for this Sample Size and Population

The number of students who agreed to participate in the actual study was forty-eight.

This was established to be sufficient for the purposes of the research because, as Hesse-

Biber (2010) stated, twenty-one students or more is adequate to give meaningful data for

a mixed methods study (p. 53). The primary goal for the actual study shifted from

seeking sufficient numerical information to be generalizable to being such that data

obtained would "shed empirical light about some theoretical concepts or principles" (Yin,

2009, p. 40). In this sense, the study was to be exploratory in that it would open the

discussion regarding student perceptions of physical motion during a high-stakes exam

while hopefully yielding statistically significant information that could be meaningful to

other stakeholders. Thus, it was established that forty-eight students could meet this

standard. As well, in that the groups were chosen to represent diverse learning styles and

abilities, the study used purposive sampling in order to "achieve representativeness or

comparability" (Teddlie & Yu, 2007, p. 80) between the group and other similar groups

for whom the theories or principles may be of interest.

3.7.3 The First Focus Group

In order to re-design the questionnaire that was used during the pilot study to make a

new questionnaire that would be more understandable and approachable, a focus group

was held with seven students from the regular stream class. This was because I was

given access to this class prior to the other two. Students who had returned their Consent

and Assent forms were recruited on a volunteer basis.

A focus group was chosen for this stage of the study because, as Anderson and

Arsenault (1998) explained, "Focus groups work because they provide a natural, relaxed

and secure setting where individuals are encouraged to share both positive and negative

comments" (p. 201). In seeking to increase the meaningfulness of the study for students

and teachers, a focus group appeared to be appropriate in order to enable students to

develop and explain their opinions to develop the most effective questionnaire tool.

The focus group met for one hour in a small room in the school's library. The

students sat around a table with me. First, I gave each student a copy of the original

questionnaire from the pilot study. Then, I read the questionnaire to the students.

Following this, they were asked to read alone and prepare suggested revisions. Next, I

asked each student for his or her suggestions by proceeding from one student to the next.

Although the discussion became more fluid at times, with students affirming or

questioning others' suggestions, I ensured that each student got to speak for

approximately the same amount of time.

The first step that students suggested was to eliminate questions perceived to be

repetitive. Following this, they brainstormed ways to re-phrase questions such that they

would be more efficiently presented and the questionnaire would be shorter. In order to

do this, many questions were re-worded as multiple-choice options. Five students

expressed that the 5-point Likert scale was not ideal, hypothesizing that students in the

pilot study had likely felt confused and overwhelmed by the nuanced options. Instead,

they preferred a simple "agree or disagree" option along with the opportunity to clarify

one's answer. They suggested a more effective means for eliciting short answer responses

by requiring students to simply "explain" their answers. The result was a new

questionnaire that was far shorter and more focused than that used in the pilot study (see

Appendix H).

Finally, students were presented with the option of having a paper questionnaire or an

online questionnaire. The majority of students present (five out of seven) preferred to

have a paper questionnaire, explaining that students would perceive it as a more serious

assignment if it were given in this format and they would be more likely to complete it.

Having revised the questionnaire, the next step in the actual study was to gather

quantitative data.

3.8   Phase Four: Quantitative Data Collection for the Actual Study

During this phase, quantitative data was gathered in the form of test scores from three

classes of grade eleven students, including those students who had participated in the

focus group discussed above. This phase used similar procedures to the pilot study;

because they relate directly to the data that is presented and discussed in later chapters,

they are summarized and expanded upon in this section.

3.8.1 Procedures Used during Quantitative Data Collection Sessions

During the quantitative data collection phase of the actual study, from November

2013 to March 2014, the students participated in two mock examination situations using

the same instruments and procedures as in the pilot study (see 3.4.3 and 3.5.2 above).

During both they responded to the same guiding question. During the first, they watched

a ten-minute movie clip and during the second they viewed a photo essay. The only

difference in the procedure was whether the session was sedentary or included physical motion breaks.

In each session, I began by explaining the assigned task and insisting on complete silence throughout the period, as would be the case in a formal exam.

The two exam situations presented students with two experiences. During one, students were required to sit and write continuously for the entire seventy-five minute period, thus simulating the current requirements in an examination. During the other, students were required to participate in physical motion breaks every fifteen minutes. I gave warning one minute before this point that students would soon be asked to pause. At the fifteen-minute mark, I instructed students to stand up beside their desk and perform, in silence, a physical activity of their choice. A list of suggested activities was written on the blackboard at the front of the class. This list included walking on the spot, jogging on the spot, pushups, and sit-ups. Students were required to move for thirty seconds. I then asked students to sit back down and return to their writing. Thus, in a seventy-five minute period, the students took four physical motion breaks. These procedures are summarized in Figure 3.2.
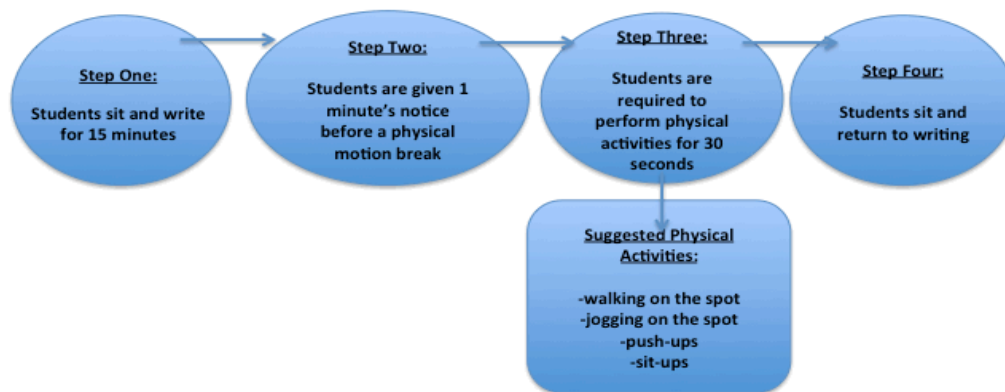
Figure 3.2: Summary of Procedures for Mock Test including Physical Motion

For the first session, two of the groups were required to sit and write continuously for the entire seventy-five minutes. During the first session for the third group, physical motion breaks were included throughout. On another date, the two groups that had participated in the sedentary mock exam then took part in a second session during which time they were required to take physical motion breaks. The group that had done the mock exam with the physical motion breaks first then took part in a second session in which they were required to sit and write continuously the entire period. This procedure was used in order to analyze whether the order of the experiences impacted students' perceptions.

3.8.2 Procedures used to Score the Tests

I scored the mock exams using the MELS 2013 rubric (see Appendix I and 3.5.3 above for a description of the rubric). The students' classroom teachers also scored the work independently. The scores were discussed and agreed upon between the classroom teacher and myself and the dyadic score was recorded on the top of each mock test.

3.9   Phase Five: Collection of Questionnaire Data for the Actual Study

During the next phase, quantitative and qualitative data were collected through the use of the revised questionnaire (see Appendix H).

3.9.1 Procedures Used

Within two weeks following the second mock exam, I returned to each of the three classes of grade eleven students. First, I returned the scored mock tests and gave students time to ask about their scores and the marking process. This was done so that students could accurately answer whether their score had changed between the sedentary mock test and the one including physical motion breaks, and allowed them to analyze the reasons for continuity or change in their marks.

Next, I asked students to complete the questionnaires. Students were given forty-five minutes to complete their work. They were required to work in silence. This procedure was followed to ensure that students would not feel influenced by one another to respond in a particular way. I encouraged them to give as much detail and explanation as possible regarding their responses in the "explain" sections following each question.

3.9.2 Analysis of Questionnaire Data to prepare for the focus group

In preparation for the next phase of the study, the follow-up focus group, the

qualitative data given by students' responses to the open-ended questions was analyzed. I

used textual coding to identify themes related to the literature described in Chapter 2 and

the research questions outlined at the start of this chapter (Ryan & Russell Bernard, 2003,

p. 88). I then used these themes to formulate questions along with prompts and probes

for the next phase of the study, as is detailed in 3.10.2 below.

3.10 Phase Six: The Follow-Up Focus Group

Following the collection of questionnaire data, a focus group was used to probe the

qualitative responses that students had given on this instrument.

3.10.1 Rationale for a Focus Group

One week following the questionnaire sessions, I returned to hold a focus group in

order to gain more insight and understanding related to students' responses to the

questionnaire and their perceptions of the study. Bickman and Rog (2009) explained that,

in exploratory research, the researcher should look at the meaning of the events (p. 75).

Also, Gillham (2000) explained when a small number of interviews or a focus group is

most appropriate, which is when each perspective is key, the questions to be answered are

open-ended, and a discussion will give richness to the data that can not be obtained only

through a questionnaire (p. 62). For these reasons, a focus group was used to inquire

more deeply into questionnaire data in order to understand any apparent inconsistencies

as well as to confirm trends.

3.10.2 Procedures Used in the focus group

I prepared for this stage of the study by following the guidance of Gillham (2000) to prepare semi-structured, open-ended questions, with follow up prompts and probes (p. 67) in order to be able to encourage students to develop their ideas.

Students were recruited on a volunteer basis determined by whether they had returned their Consent and Assent forms. Only students from the enriched group volunteered to participate in this phase of the study.

The follow-up focus group consisted of six students including five females and one male. The group met for forty-five minutes in a small room in the school's library. Students sat around a table with me. I advised them that I would be recording the focus group on my personal recording device and that this recording would be used only for the purposes of transcription and analysis.

During this session, I posed semi-structured questions related to the themes identified on the questionnaires. First, students were asked to discuss the impact of stress on test and exam writing. Second, they were probed for their perceptions of the impact of physical motion on learning. Third, they were asked to develop their ideas regarding the impact of physical motion on exam situations. Fourth, they were queried about other modifications to their exam environment that students would like to have available to them. The specific questions asked are displayed in Table 3.1.

Table 3.1: Questions, Prompts, and Probes used during the Follow-Up Focus Group

Major Question	Prompts	Probes
1. Do you feel stressed before tests or exams? Please explain.	Describe how stressed you felt on your [English] test last week?	Describe how you feel and the ways your body responds to stress…
2. To what extent did you feel stressed in the two mock test situations?	How was your stress level in comparison to a normal test in class?	What made you feel more/less stressed than usual?
3. How did you feel throughout the sedentary exam?	How do you feel when required to sit for long periods of time?	How does sitting for long periods make you feel physically? Emotionally?
4. How did you feel when you were asked to get up and move during the exam including physical motion breaks?	a. How did you feel when I (the researcher) informed you that it was almost time to get up? b. When you got up, how did you feel about having to move?	a. Did getting up to move feel strange? Did it remain strange throughout or did it come to feel more normal? b. How did getting up affect your concentration? c. How did it affect your writing after you sat back down? d. How did it affect your stress level?
5. What types of movements did you do and why?	a. Did you do high-impact movements, like running or pushups, or low-impact movements, like stretching or walking? Why?	a. How did you feel as you were doing these movements? b. How did you feel after doing the movements?
6. How do you think including physical motion in a real exam would affect you?	If you were allowed physical motion breaks, do you think they would help you? Why or why not?	a. How might these breaks affect your stress? b. How might they affect your overall performance on exams?
7. Are there things other than adding physical motion that you would like to be allowed during exams?	Describe an ideal situation for writing a test or exam: what would it look like?	a. What could be done at the start of an exam to help you? b. What should teachers/invigilators do to help you? c. What things would you like to be allowed to have or do?

In order to ensure that the procedure was used fairly, I posed one question and then asked each student to speak in turn. The prompts and probes were used when students struggled to offer an answer or asked me to elaborate upon what I meant. Once each student had spoken, I proceeded to the next question. In some cases, students asked for

me to move to the next student while they gathered their thoughts. Thus, they did not

always speak in the same order throughout. At times the discussion became more fluid,

with students validating or questioning others' ideas. However, I ensured that it

remained structured such that each student was given opportunity to comment on each

question.

3.11 Phase Seven: Data Analysis and Integration

Following the follow-up focus group, the quantitative data from the test scores,

quantitative and qualitative data from the questionnaires, and qualitative data from the

follow-up focus group were analyzed in order to describe the implications of the data in

an integrated fashion.

3.11.1 Procedures used to analyze the test scores

The quantitative data of the two test scores from each student was entered into the

program SPSS software, along with the student's gender. Inferential statistics in the form

of t-tests were used to analyze whether there was a statistically significant difference

between the scores on the sedentary test and the test with physical motion for females or

males.

3.11.2 Procedures used to analyze the questionnaires

The quantitative data gathered from the questionnaires was recorded question-by-

question in the program SPSS software. Descriptive statistics in the form of frequency

counts were performed for each question to examine the total number and percentage of

students responding in a particular direction, either positively or negatively.

Next, frequency counts were performed to compare the genders regarding the key

categories of the questionnaire. Males and females were compared concerning their

study styles, levels of test-anxiety, their perceptions of the inclusion of physical motion,

and their opinions regarding how to improve their conditions during high-stakes exams.

Third, the qualitative data from the responses to the open-ended questions on the

questionnaires was coded; it was then grouped into themes, meaning repetitive ideas

made identifiable by the literature as well as the data (Ryan & Russell Bernard, p. 88).

These themes were identified in order to increase understanding of why students

responded quantitatively as they did and to ensure that conclusions drawn would be as

accurate as possible (Gorard & Taylor, 2004, p. 59). The themes that emerged, as stated

in 3.10.2 above, were 1) the impact of stress on test and exam writing, 2) the impact of

physical motion on learning, 3) the impact of physical motion on the mock exam

situations, and 4) other modifications to their exam environment that students would like

to have available to them.

3.11.3 Procedures used to analyze the follow-up focus group

In preparation for analysis, the focus group recording was transcribed. Next, I coded

the information and grouped it into themes. The first theme related to students' responses

to the question of how much anxiety they feel as they face tests and exams. Second, they

spoke in detail about the English exam in contrast to exams in other subject areas. Third,

they described the ways that physical motion had impacted them during the mock tests.

Fourth, they discussed how physical motion could alter their experiences on high-stakes

exams. Finally, they offered ideas for other modifications to the conditions under which

they write tests and exams.

3.12   Summary of Data Collected

Throughout phases four, five, and six, which comprised the actual study, quantitative

and qualitative data were collected using several instruments. The participants,

instruments, and data collected are summarized in Table 3.2.

Table 3.2: Summary of Data Collection during the Actual Study

Type of Data	Participants	Instruments	Data Gathered
Qualitative	7 grade 11 students (drawn from general stream class)	Focus group #1	Revised questionnaire
Quantitative:	48 grade 11 students (including students from focus group #1)	1 sedentary mock test and 1 mock test including physical motion breaks	Test scores
Quantitative and Qualitative	48 grade 11 students (including students from focus group #1)	Questionnaire	Numeric data and responses to open-ended questions
Qualitative	6 grade 11 students (drawn from enriched class)	Follow-Up Focus group	Students' opinions recorded, transcribed, and grouped into themes for reporting

3.13   Chapter Summary

This chapter has explained in detail the methodology used throughout the seven

phases of this study. During the first phase, the pilot study was designed by deciding

upon a target population of grade ten and eleven students. Also, the Likert Scale

questionnaire was designed. During the second phase, a pilot study was conducted in

order to test these instruments and assess the target population. In the third phase, the

study was revised such that the target population was narrowed to grade eleven students

and the questionnaire instrument was redesigned through the use of a focus group. In

phase four, quantitative data was gathered in the form of test scores from two mock exam

situations written by forty-eight grade eleven students. Phase five consisted of students

completing the revised questionnaire, thus giving quantitative and qualitative data.

During phase six, students participated in a focus group to follow up on questionnaire

data. Finally, in phase seven, the data was analyzed and integrated for the purpose of

presenting results. In the next chapter, the results of the data collection will be presented.

Chapter 4: Presentation of the Results

This chapter presents the results from phases four, five, and six of the project, which comprise the actual study, as they were detailed in Chapter 3. First, an overview of the sample population is given. Next, quantitative data from phase four, in which test scores were gathered, are presented. The quantitative data from phase five when students completed the questionnaire are then summarized. Charts are used to elucidate key information from phases four and five that relate to the research questions.

Next, the qualitative data from this phase are reported by themes. During phase six, qualitative data were collected from a focus group in order to follow up on questionnaire data. These data are summarized by themes.

4.1 Description of the Sample Population of Phase Four

The sample population described below includes only the grade eleven students included in phases four, five, and six of the study; it does not include the students included in the pilot study.

Forty-eight students participated in phase four of this study. From this population, forty-six questionnaires were returned. These questionnaires reveal important aspects of the participant population. Descriptive statistics in the form of frequency counts were used to identify key aspects of the population.

4.1.1 Linguistic Backgrounds

The participants reported linguistic diversity, with 17.4% (8) reporting that they were unilingual, 32.6% (15) reporting that they were that they are bilingual, and 50% (23) reporting that they spoke three or more languages.

4.1.2 Gender Differences

Out of forty-six respondents, 52.2 % (24) reported being male, 43.5% (20) reported

being female, and 2.2% (2) reported being other or queer.

4.1.3 Grades in the Course

Students were asked to identify their approximate grade in their ELA course at the

time of the study. The responses were as follows: 19.9% (9) reported scoring 60% or

below, 56.5% (26) reported scoring between 60% and 79.9%, and 23.9% (11) reported

scoring 80% and above. Henceforth, the first group will be termed "at-risk," the second

"succeeding," and the third "excelling."

4.1.4 Students who identify as usually taking physical motion breaks on tests and

exams

Students were asked to indicate whether they already used physical motion or breaks

to facilitate their performance by agreeing or disagreeing with the following statement:

'When I write tests, I take breaks to stretch or regain my focus': 71.7% (33) students

agreed with this statement (Q6).

4.1.5 Studying techniques

Students were asked to report on their preferred studying techniques. The results are

summarized in Table 4.1.

Table 4.1 Summary of Descriptive Statistics Regarding Study Techniques

	Frequency	Valid Percent	Cumulative Percent
I sit and focus on the material	10	21.7	21.7
I often get up and move around	17	37	37
I do not usually study	17	37	37

* Notes: These results refer to Q7

Hence, physical motion was an important aspect of many students' study routines, with 37% stating that they used it to increase their learning and memorization.

4.1.6 Test-anxiety

Students were asked to report on their levels of test-anxiety by either agreeing or disagreeing with the statement 'Feeling stressed often prevents me from doing well on tests' (Q9): 63% (29) agreed with this statement.

4.2 Results of Test Scores

During phase four, forty-eight students participated in two mock exam situations. During one, they were required to remain sedentary for seventy-five minutes; during the other, they were required to get up and perform physical activities every fifteen minutes. Scores were assigned using the 2013 MELS rubric (Appendix I) by myself and by the

students' classroom teachers. Dyadic scores were then agreed upon. Inferential statistics

were used to analyze the results.

4.2.1 Scores on mock tests

Out of forty-eight participants, twenty-four identified as being male and twenty

identified as being female.

As with the MELS ELA exam, the mock tests were scored out of 100 points. Table

4.2 displays the frequency counts of the scores that students received, which are

presented by gender.

Table 4.2: Summary of Frequency Counts regarding Test Scores

	Sedentary Test		With Motion	
	Females	Males	Females	Males
90-100	3	0	3	0
80-89.9	8	3	8	2
70-79.9	7	7	6	5
60-69.9	2	4	6	6
Below 60	4	6	1	7

*Note: the left column indicates the number of points scored.

4.2.2 T-Tests Comparing Scores

Students' scores were analyzed to see whether there was a statistically significant

difference between the scores achieved on the sedentary test and the test with physical

motion. In order to address the research questions, the scores were analyzed along the

lines of gender.

First, I examined whether there was a statistically significant difference between the

scores that female students received on the sedentary test in comparison to the test with

physical motion. A paired-samples t-test was conducted to compare females on the

sedentary test and the test with physical motion. There was not a significant difference in

the scores for the sedentary test (M=2.3, SD=.65695) and the test with physical motion

(M=1.7222, SD=.66911).

I then examined whether there was a statistically significant difference between the

scores that male students received on the sedentary test in comparison to the test with

physical motion. A paired-samples t-test was conducted to compare males on the

sedentary test and the test with physical motion. There was not a significant difference

between the scores on the sedentary test (M=1.7917, SD=.58823) and the test with

physical motion (M=2.0588, SD=.65865).

The results of these comparisons are shown in Table 4.3.

Table 4.3: Summary of the T-test Analyses of Female and Male Groups

	Females		Males			
	M	SD	M	SD	*t*	*p*
Sedentary	2.3	.65695	1.7917	.58823	-2.707	.010
With Motion	1.7222	.66911	2.0588	.65865	1.499	.143

p < .05

4.3 Quantitative Data from the Questionnaires

The quantitative responses given on the questionnaires were analyzed using descriptive statistics in the form of frequency counts. The results are summarized below.

4.3.1 The Sedentary Mock Exam

This section reports the findings related to the exam in which students were required to remain sitting for seventy-five minutes.

4.3.1.1 Focus during the sedentary test

Students were asked to agree or disagree with the statement: 'I found it easy to focus for 75 minutes in a row' (Q13). Of the forty-two respondents, 59.5% (25) disagreed with this statement.

4.3.1.2 Physical Motion breaks

Students were asked to identify whether they naturally took physical motion breaks by agreeing or disagreeing with the statement 'When I took breaks to think or rest, I moved (by stretching, tapping pen, etc.)' (Q15). Of forty-three respondents, 80.4% (37) agreed with this statement.

4.3.2 The mock exam including physical motion

This section reports the findings related to the mock exam in which students were required to perform physical motion every fifteen minutes.

4.3.2.1 Procedures for integrating physical motion

Students were asked to report on the way in which physical motion was integrated into the mock exam. They were asked to agree or disagree with the statement 'The researcher

advised me when it was time to get up and move in a way that did not break my focus or

progress' (Q22). Of thirty-five respondents, 71.4% (25) agreed with this statement.

As well, students were asked to reflect on whether their feelings of unease and

unfamiliarity toward physical motion breaks dissipated with repetition. The results are

reflected in Table 4.4.

Table 4.4: Summary of Descriptive Statistics regarding whether adding physical motion became comfortable

	Frequency	Valid Percent	Cumulative Percent
I got used to physical motion breaks	20	61.8	61.8
It felt normal to get up and move by the end	26	76.5	76.5

The majority of participants (76.5%) indicated that, with repetition, physical motion

breaks came to feel comfortable and normal.

4.3.2.2 Types of Physical Activities Performed

Students were asked to identify the types of physical activities that they had chosen to

do during the physical motion breaks by identifying whether they had done high-intensity

movements, low-intensity movements, or both (Q23). Of thirty-five respondents, 5.7%

(2) reported doing high-intensity movements, 77.1% reported doing low-intensity

movements, and 11.4% (4) reported doing both.

4.3.2.3 Impact of Physical Motion on the Students' Feelings

Students were asked to identify how physical motion impacted their feelings about the

exam by responding to a couple of questions. The results are displayed in Table 4.5.

Table 4.5: Summary of Descriptive Statistics regarding how adding physical motion affected students' feelings during the mock exam

	Frequency	Valid Percent	Cumulative Percent
I felt mentally refreshed	23	67.6	67.6
I felt more relaxed than before	22	64.7	64.7

Of thirty-four respondents, the majority agreed that adding physical motion breaks

affected their feelings in a positive way. This is reflected by the fact that 67.6% (23)

agreed that they felt mentally refreshed and 64.7% (22) felt more relaxed after these

breaks.

4.3.2.4 Overall perception of the integration of physical motion into an exam

Students were asked to reflect on the inclusion of physical motion by agreeing or

disagreeing with the statement 'I think we should take movement breaks during every test'

(Q33). Of thirty-four respondents, 58.8% (20) agreed with this statement.

4.4 Quantitative Data regarding Students' Perceptions in Relation to Gender

In order to determine whether males and females perceived the inclusion of physical motion breaks differently, I performed frequency counts to give descriptive statistics related to the relevant questions. The results are described below.

4.4.1 Test-anxiety

Students were asked to comment on the impact of test-anxiety by agreeing or disagreeing with the statement 'Feeling stressed often prevents me from doing well on tests' (Q9). The results are displayed in Table 4.6.

Table 4.6: Summary of descriptive statistics regarding test-anxiety by gender

	Respondents	Frequency	Valid Percent	Cumulative Percent
Females	20	10	50	50
Males	23	18	78	78

This table shows that test-anxiety was felt to be a greater issue for the male participants than for the females. Half (50%) of the females found test-anxiety to negatively affect their performance in contrast with the majority - 78% - of males.

4.4.2 Ability to focus for a lengthy period

Students were requested to report on their ability to remain focused for lengthy sedentary assessments by agreeing or disagreeing with the statement 'I found it easy to focus for 75 minutes in a row' (Q17). The results are displayed in Table 4.7.

Table 4.7: Summary of descriptive statistics regarding focus on lengthy tasks in relation to gender

	Respondents	Frequency	Valid Percent	Cumulative Percent
Females	20	8	40	40
Males	23	15	65.2	65.2

Whereas most females (60%) reported that remaining focused for lengthy tasks is not a challenge for them, the majority of males did not concur. In fact, the results between the males and females were nearly precisely inverse, with 65.2% of males reporting that they struggle on lengthy sedentary tasks.

4.4.3 Experience of physical motion breaks in relation to feelings of well-being

The impact of physical motion breaks on students' senses of well-being was explored with two questions.

First, students were asked to respond to the statement 'When I sat back down after our movement breaks, I felt mentally refreshed' (Q29) by agreeing or disagreeing. The results are summarized in Table 4.8.

Table 4.8: Summary of Descriptive Statistics related to feelings of being mentally refreshed

	Respondents	Frequency	Valid Percent	Cumulative Percent
Females	18	11	61	61
Males	14	11	78.6	78.6

Thus, the majority of both females and males cited finding physical motion breaks to

be mentally refreshing, though males responded more definitively in favor (78.6%) than

did females (61%).

Students were next asked to agree or disagree with the statement 'When I sat back

down after our movement breaks, I felt more relaxed …' (Q30). The results are shown in

Table 4.9.

Table 4.9: Summary of Descriptive Statistics related to relaxation

	Respondents	Frequency	Valid Percent	Cumulative Percent
Females	18	10	55	55
Males	14	11	78.6	78.6

With regard to feelings of relaxation, female participants indicated a lower feeling of

benefit than did males. The majority of males, 78.6%, agreed that physical motion breaks

helped them to feel more relaxed in comparison to only 55% of females.

4.4.4 Opinions regarding physical motion breaks as a modification

Students were probed about whether they believe that movement breaks should be a

part of every test (Q33). The results are summarized in Table 4.10.

Table 4.10: Summary of Descriptive Statistics regarding physical motion breaks in relation to gender.

	Respondents	Frequency	Valid Percent	Cumulative Percent
Females	18	9	50	50
Males	14	10	71.4	71.4

Only half (50%) of the female respondents agreed that physical motion breaks should

be included in all tests or exams whereas the majority (71.4%) of males believed that

these breaks should be offered to students.

4.5 Treatment of missing quantitative data

Thirty-six complete questionnaires were returned out of an original participant

population of forty-eight. Of those missing, two questionnaires were incomplete from

students identifying as being female and ten questionnaires were incomplete from those

identifying as being male. Both questionnaires from those identifying as being queer or

other were complete.

The issue of missing data was addressed in the following ways: I evaluated whether

the data was missing at random (MAR), which it appeared to be, as the incomplete

questionnaires presented complete data up until the final two to three pages. As a result, I

determined that these omissions were not due to participants' purposeful decisions to

omit data related to specific questions, but were the result of other factors such as lack of

time or fatigue with the task. Therefore, where responses were absent for a question,

frequency counts were performed without supplying data for the missing cases.

Thus, percentages reported are based on the actual sample size per question, not on the total sample size of forty-eight participants. It is understood that the statistical significance of the responses decreases as a result of the decrease in sample size (Howell, 2012). However, the benefit of this approach is that it allows for "unbiased parameter estimates" (Howell, 2012), meaning that the reporting is not inflated or deflated by missing data.

4.6 Qualitative data from the questionnaires

Following each questionnaire item, students were asked to "explain" their answers. While not all students contributed qualitative information in this section, the comments given offer insight into frequently felt opinions among this population. These comments complement the questionnaire's quantitative data by explaining in more detail why students responded as they did. The information was first coded and then grouped into themes, as explained in Chapter 3. I paid attention to the gender of those commenting, and genders are indicated with M representing 'male,' F representing 'female,' and O representing 'other or queer.' The results are presented below.

4.6.1 How students experience lengthy tests and exams

Seven students commented on the fact that they find tests and exams difficult in the sense that they have trouble focusing for the length of time required. Their comments are quoted below.

M13: "I cannot just focus on one thing for 75 minutes."

M17: "75 minutes is not a lot of time, but if it would be 3 hours, it would be a different story."

M30: "I get too bored doing one thing for 75 minutes."

F15: "I like to move a bit because I am bored sitting all along."

F31: "I find 75 minutes is too long to stay focused."

F42: "Tests usually last 40 minutes and its way too long to sit still."

As well, one male student inserted the option "strongly disagree" when asked if it is easy to focus for seventy-five minutes in a row. These comments emphasize that requiring students to remain sedentary for a lengthy task may not enable all students to perform their best.

4.6.2 How students experience test-anxiety

Sixteen students described the extent of their test-anxiety, revealing that tests and exams cause them high levels of stress. For some, test-anxiety leads to not being able to focus adequately on the test itself, which can impede optimal performance. The following statements shed light on the extent and impact of test-anxiety on these students.

F4: "I need to learn to push things to the side. Things on my mind that can't be fixed. I need to stop overanalyzing everything and stay on track."

F9: "I try my best, but I lose concentration because I get very overwhelmed."

F28: "Sometimes during a test I blank out because I am stressed."

M11: "When I'm panicking during a test, I need to learn how to calm down and relax."

M12: "No matter how much I study I'm always stressed."

M30: "I'm too concerned … about failing [to do well]."

O1: "When I'm stressed during an exam, it's hard for me to focus on anything."

One male student even described his focus as being "destroyed" by the stress he feels in test situations.

Interestingly, four males and one female pointed out that their stress is much higher on summative exams (used at the end of courses to determine whether a student will advance to the next level) than on tests that are conducted throughout the school year. This points to the significance of developing techniques to empower students to cope with their anxiety on high-stakes evaluations.

Finally, two students complained explicitly of having a known anxiety disorder that worsens during test situations; one was from the excelling demographic and the other was from the at-risk group.

4.6.3 How physical motion is used by students to learn and to perform in school

Several students indicated that they already use physical motion to help themselves perform on learning and assessment tasks. Eleven students described ways in which they use physical motion when studying. For example, one female student explained that, "I tend to rewrite my notes over again, and once I do so, I walk around and read them over again." Another female explained "While studying, moving around often helps me get focused because I see it as a small break from my studying." A third expressed that he finds it necessary to take "mini eating and exercising breaks to rejuvenate." These comments emphasize that being able to move is felt to enhance memorization and focus for some of the participants.

4.6.4 How including physical motion in a test was perceived

Several students commented on how they experienced the addition of physical motion to a test situation. For nine students, even during the sedentary test physical movements were a key part of succeeding. As one student explained, "I tap my pen and shake my legs. I need to move constantly." Others voiced similar feelings of needing to move to release tensions and stress.

Regarding the test in which physical motion breaks were added, seven students commented on how these breaks affected them; their experiences are encapsulated below.

> F9: "Stretching allowed me to feel … more mellow."
>
> F10: "I stretched a lot because sitting down for long was uncomfortable and stretching releases stress on my back."
>
> F28: "It motivated me more when getting up … it helped me ease the tension."
>
> F29: "I got the same score [as on the sedentary test] but I felt more relaxed."
>
> M43: "I'm kinesthetic so I need to move around while working."

These comments detail specific ways that some students benefitted from the physical motion breaks, as well as their positive effect in relation to feelings of stress.

In addition, five students gave more precise feedback regarding how physical motion breaks should be integrated on future tests and exams. One expressed that the number of physical motion breaks was too many. Though she agreed that these breaks were helpful to her, she believed that they should be taken less frequently. Another stated, "Movement is good, but only when you decide you need it. Don't time it, just let kids stretch when they need to stretch." A third explained that physical motion breaks should be included because "I think it depends on the person 'cause only some people need it." These comments indicate that physical motion breaks could be helpful to some students during exams.

4.6.5 Other modifications that students wish to have offered to them

When discussing other tools that they wished to have offered to them during exams, the participants mentioned music, food, and time. The tool that was most heavily discussed was music. Twelve students discussed the role of music in various places on the questionnaire.

In relation to the questions regarding how students study and whether they find it easy to focus on a learning task or a test, twelve voiced that these tasks are made easier for them when they are allowed to listen to music. Their comments are summarized below.

> M2: "I need something to help me keep focused: music."
>
> F1: "Listening to our own music allows me to stay focused."
>
> F5: "With music handy I find it easy to concentrate better."
>
> F28: "Music will really help to motivate me."

Another thing that five students thought would be helpful would be to be allowed to eat throughout their tests and exams. Two students also commented that they wished to be allowed us much time as they, personally, required to complete exams.

4.7 Qualitative Data from the Follow-Up Focus Group

A focus group of six students met with me to follow-up on information gleaned from the questionnaires. A group consisting of five females and one male, all from the excelling demographic, met with me for forty-five minutes in the school's library. The results are as follows.

4.7.1 Issues related to test-anxiety

I asked students the question "To what extent do you usually feel stressed before a test or exam?" A new idea that was introduced by students in this group was that test-anxiety is often specific to the type of task or subject-area being examined. For example, one female stated, "I always feel stressed … more in the science courses. For English not really because I like writing and its calming." In contrast, another girl specified, "For English, that's the one that I stress the most for. I'm very anxiety-ridden when it comes to English."

Another idea that was developed was that high-stakes exams induce higher levels of test-anxiety than other evaluations. The male participant described feeling that "…usually if its worth more, like if they say 'this test is worth 50%' then I [think] 'Oh, ok, I can't fail this: I need to be good at it.'" In addition, one female clarified that the extent of stress felt is related to the importance placed on the exam. She explained, "It's a matter of pressure … you're being pressured to meet the teacher's [or parents'] expectations."

Five of the six participants stated that they felt higher levels of test-anxiety as they approached the secondary five ELA MELS exam than they have felt on other evaluations throughout the year. For example, one girl explained that "I've never been stressed about English exams, but this year I think I am going to be really anxious because it is over a three day period." Another female worried because "… it's that big of an exam that you have to pass to pass high school so … I'll overthink it."

4.7.2 The impact of physical motion breaks

During the next part of the focus group, I discussed the impact that taking physical

motion breaks had had on these students as it related to their scores and their feelings

towards the task.

One student was very positive towards the inclusion of these breaks as she found them

to have fulfilled a physical need that she has. She explained "I liked it because I have a

lot of back pain so whenever I was asked to get up and move I was able to stretch. It

didn't unfocus me. It was easy to get back [to writing] and it actually helped me to focus

a bit more … It was like there was no stress on my back anymore."

For another girl, though, physical motion breaks could easily be taken throughout a

test without being required to actually stand up. She explained, "I found getting up is the

same as sitting down because I usually do the same stretches … sitting down."

In terms of how the breaks were included, the male participant voiced frustration,

saying, "The only thing that bothered me is that when we had to get up and stretch we

were pressed for time after." He suggested that, if physical motion breaks were to

become routinely included, students would have to be compensated with more time to

complete their exams. As well, one girl suggested that each student should be allowed to

get up and move when or if he or she needs. She explained that she already routinely

does this and finds it to be helpful.

One student cautioned against the idea of requiring all students to perform physical

motions during an exam. This student suffers from asthma and a heart condition. She

explained "I know exercising gives oxygen to my brain, but it reduces my energy because

it puts too much pressure on my heart. If I'm trying to think after exercising, I'm more

tired because of my condition." Thus, physical motion breaks could be harmful,

depending on students' particular health situations.

Two students suggested that, instead of including physical motion throughout an exam,

students should be encouraged to exercise lightly before beginning. They explained that

going for a walk beforehand helps them to feel more relaxed and more "clear headed."

Thus, the focus group clarified and reinforced key ideas developed in the

questionnaires.

4.8 Chapter Summary

This chapter has presented the findings from the three phases of the study in which

data was gathered. First, the participant population was described. This population was

shown to be diverse in terms of their linguistic backgrounds and academic standings.

Next, the quantitative data from the test scores were presented, showing that there was

not a significant difference between the scores on the sedentary test and the test with

physical motion breaks. This remained true when the scores of females and males were

compared. Third, the quantitative findings from phase five, the questionnaire, were

summarized. These results indicate that, among this population, test-anxiety was an

important issue that students sought strategies to cope with. Also, many students found

physical motion to be helpful as they prepare for and write tests and exams. Furthermore,

a significant number of students indicated that the physical motion breaks introduced in

the mock test situation were helpful to them. Next, the qualitative details from the

questionnaire were explained, giving more information about the quantitative data.

Finally, the qualitative data from the follow-up focus group were described. In the next

chapter, I will discuss the results reported in this chapter as they relate to the research

questions and literature related to this study.

Chapter 5: Discussion of Results

This chapter discusses the results as they relate to the research questions outlined in Chapters 1 and 3. In so doing, the results are interpreted in the context of the literature discussed in Chapter 2. As well, the quantitative and qualitative data are integrated such that coherent information is presented regarding the key issues explored in this study.

5.1 How does physical motion integrated into an examination impact test achievement measure in scores?

Previous studies have explored the impact of physical activity on academic achievement, showing there to be a connection between increased physical activity and enhanced academic performance. However, all available studies have used elementary aged participants. For example, Trudeau and Shepard (2009) showed that students aged seven to nine experienced improvements in concentration after exercising. Likewise, Hillman et al. (2009) found that nine-year-old students received higher scores and had better attention following physical activity. The results of this study contribute information about students aged sixteen and seventeen, thus expanding the information to a less studied demographic. The finding that the test scores did not change significantly between the sedentary mock test and the one with physical motion contrasts with the two above studies which did link exercise to improvements in grades.

Like Dwyer et al. (2001), this study analyzed the scores along the lines of gender. The findings were consistent with this previous study insofar as there were not statistically significant differences between males and females.

5.2 How do senior high school students experience lengthy sedentary examinations?

This study began from the point of questioning whether students are being given the

ideal conditions for success on tests and high-stakes exams. Drawing on my experience

as a classroom teacher, as well as a range of literature, I sought to understand how

students experience being required to sit and write for up to three hours. From a

theoretical standpoint, Medina (2008) explained that it is counterproductive to require

students to remain sedentary, as the brain is designed to function best when stimulated by

physical activity. Researchers have presented quantitative data indicating that students

need to be more physically active to perform optimally (Trudeau & Shepard, 2009;

Dwyer et al., 2001). Therefore, I hypothesized that some students may be struggling on

assessments due to their sedentary nature.

The quantitative information given on the questionnaire affirmed that the sedentary

nature of test and exams may be a factor that is linked to some students struggling, with

59.5% (twenty-five out of forty-two students) asserting that they find it difficult to sit still

and focus for the duration of a class period (seventy-five minutes), which is significantly

less than the length of some high-stakes exams. Hence, this data indicates that my

hypothesis was well founded.

Students' comments also revealed that they are frustrated and bored when required to

remain seated and concentrated on one task for long periods of time. As one student

stated "I cannot just focus on one thing for 75 minutes" (M13). Another expressed the

need to have such tasks broken up in some way, saying, "I like to move a bit because I

am bored sitting all along" (F15). This qualitative information helps shed light on the

emotional struggle that some students experience when faced with lengthy exams, which

require them to do something that they may find to be contrary to their physical or mental

proclivities.

5.3 How do senior high school students experience physical motion integrated as a modification to methodology during an examination in relation to their feelings of anxiety and stress?

The literature regarding test-anxiety indicates that stress is a factor impeding some

students' abilities to achieve their best on tests and exams. According to Eysenck and

Derakshin (2011), test-anxiety may be most harmful to students who are highly

motivated and, hence, more likely to be significantly stressed about their grades. Their

study, as well as that of Miguel (2012), showed that anxiety interferes with cognitive

processes such that attending to intellectual tasks becomes more challenging and more

tiring. This information stirred an interest in me to inquire about whether there are

requirements in the exam methodology that could be altered to enable students to better

cope with their stress.

The first thing that I wished to ascertain was the extent to which the participants in

this study suffer from test-anxiety. To gather this information, I used quantitative data

from a question asking students whether stress prevents them from doing well on tests

and exams (Q9): 63% (29) agreed that stress is a factor they feel impacts their senses of

well-being during assessments. More boys than girls expressed that test-anxiety

negatively affects them: 78% of male respondents (eighteen out of twenty-three) versus

50% of female respondents (ten out of twenty) females identified with the statement that

anxiety decreases their performances.

The comments that students offered on the questionnaire complemented this

information by confirming that many seek strategies to enable them to cope with test-

anxiety. As one male explained, "When I'm panicking during a test, I need to learn how

to calm down and relax." Others expressed similar sentiments of feeling that their stress

is an obstacle that blocks them and which they wish to work around.

As physical activity has been shown to be one tool available to help us decrease

feelings of stress (Bailey, 2006), it seemed logical to experiment with adding physical

motion to an exam situation to see how it would effect students' feelings of test-anxiety.

Having established that, from a statistical standpoint, test-anxiety is significant within

this population, I sought to understand how adding physical motion affected their feelings

of stress. Of thirty-four respondents, the majority agreed that adding physical motion

breaks positively affected their feelings: 67.6% (23) agreed that the breaks were mentally

refreshing and 64.7% (22) found them to be relaxing. These statistics indicate that the

addition of physical motion breaks to exams could enable some students to better cope

with test-anxiety.

5.4 How do senior high school students experience physical motion integrated as a

modification to methodology during an examination in relation to their perceptions

of their achievements?

The comments that students offered reinforced the concept that adding physical

motion breaks to an exam had specific pleasant consequences. As one female expressed

"Stretching allowed me to feel … more mellow." Another female cited a difference in

her motivation level as a result of the physical motion breaks, saying, "It motivated me more when getting up … it helped ease the tension."

Only one student commented specifically on the relationship between physical motion breaks and her achievement, saying, "I got the same score [as on the sedentary tests] but I felt more relaxed."

These comments give more precise information about the ways that students benefitted from the addition of physical motion breaks and indicate that such breaks helped some students to cope with their test-anxiety and to feel more positive about the task of completing the test.

As the test situations in this study did not induce the same levels of stress as would be felt during an actual exam, yet students still indicated feeling anxious, it can be surmised that the benefits would be equal or greater should this modification be offered in a real high-stakes exam setting.

5.5 Are there differences between male and female students in how they perceive sedentary examinations?

Alkharusi's (2007) dissertation suggested that assessment strategies require further research, particularly in light of how gender differences affect performance. This study responded to his recommendation to investigate whether "traditional" sedentary exams are optimal for both boys and girls in equivalent ways. James (2007) and Gurian (2009) explicitly argued that boys, in general, have a greater need to be able to be physically active in the classroom than do most girls. Therefore, I theorized that boys might be struggling more than girls on tests and exams because they are required to remain still.

Significantly, when the quantitative data regarding how students experience sedentary

tasks were calculated along the lines of gender, the preponderance of those finding such

tasks difficult – 65.2% - were male in contrast with only 40% of female respondents.

Thus, the results from this study gave some statistical support for my idea that males

struggle more than females on sedentary exams.

5.6 Are there differences between male and female students in how they perceive

    physical motion during an examination?

The quantitative data indicated that male respondents experienced greater benefit from

the inclusion of physical motion breaks than did females, with 78.6% of males reporting

that they felt more mentally refreshed in comparison with 55% of females, and 78.6% of

males versus 61% of females agreeing that the breaks enabled them to relax. However,

due to the disparity among respondent numbers, it is not possible to draw any firm

conclusions. Although the averages were higher among males for positive feelings, the

actual number of positive responses was the same. This was because eighteen females

and fourteen males responded to this section of the questionnaire. Hence, further

exploration of this aspect of the study is required to draw a conclusion related to gender.

5.7 Chapter Summary

    This chapter has discussed the key findings of this study as they relate to the research

questions outlined in Chapter 3 and the literature in Chapter 2. The quantitative data in

the form of test scores differs from previous studies that linked physical activity to

enhanced achievement in that the scores did not change significantly with the addition of

physical motion breaks, which was consistent between the genders. Regarding my

hypothesis that students struggle on tests and exams because of their sedentary nature,

this was confirmed by both quantitative and qualitative information. Furthermore, both

types of information were used to show that this population does struggle with test-

anxiety and with feelings that it impedes their performance. Physical motion breaks were

introduced as a modification to see if they could help students feel more positive. Both

quantitative and qualitative data established that participants did experience specific

positive consequences to these breaks in the form of reduced test-anxiety and greater

feelings of relaxation, with males indicating greater levels of benefit than females. Thus,

the integration of quantitative and qualitative information supported and substantiated the

hypotheses offered at the outset of this study. In the next chapter, I present my

conclusions in the form of implications and paths for possible future research related to

this study.

Chapter 6: Conclusion

This chapter discusses plausible conclusions as well as directions for further

investigation. The first section summarizes this research study and its findings. Next, the

limitations of the study are described. Finally, I outline the implications and propose

directions for further research and contributions.

6.1 Research Summary

Previous research has confirmed that students struggle with test-anxiety in the context

of the sedentary nature of high-stakes exams. In addition, a large body of literature has

linked physical activity and fitness with improvements in scholastic achievement and

increased feelings of positivity towards academic tasks and school in general. However,

relevant studies have all been performed on elementary school children. As well, they

have focused largely on implications for pedagogical situations and not on the connection

between physical activity and performance on important assessments.

In addition, physical activity has been theorized to benefit males more than females.

These fields of study influenced and led to the development of this mixed methods

sequential exploratory study which combined quantitative and qualitative data to give an

integrated view of how adding physical motion breaks to a mock exam situation impacted

students.

This study contrasted with previous studies insofar as participants were recruited

from the senior high school demographic. The study took part in seven phases and the

results were drawn from a population of forty-eight grade eleven ELA students from a

public senior high school in southern Quebec.

The study sought to address several research questions. First, I investigated whether integrating physical motion into an examination study impacted students' scores on a mock exam. Quantitative data gathered from one assessment in which students remained sedentary and another in which students were requested to take physical motion breaks every fifteen minutes revealed that there was not a significant difference in their scores between the two, and that this finding was consistent between the genders. Second, I explored how the participants experience lengthy sedentary examinations, finding that the majority dislike and struggle with such tasks. Third, I questioned how participants experienced physical motion integrated as a modification related to their feelings of test-anxiety and achievement. The students involved affirmed that they do struggle with high levels of test-anxiety and the majority found the inclusion of physical motion breaks helped to diminish their stress and enabled them to feel more at ease, with more males identifying a benefit than females. Fourth, I sought to understand whether there were differences between male and female students in how they perceive sedentary examinations. Quantitative data indicated that more males than females struggle with the sedentary nature of exams. The quantitative and qualitative information gathered indicated that the males in this population responded more positively than the females to the inclusion of physical motion breaks.

6.2 Limitations of this study

This study has provided detailed quantitative and qualitative data that gives information regarding senior high school students' experiences of sedentary tests, their levels of test-anxiety, and how physical motion breaks positively affected them in a test situation. With regard to the MMR design used, the collection of both quantitative and

qualitative data is a strength of this study as the qualitative data gives greater richness and

depth to our understanding of students' experiences than quantitative data alone (Aaron,

2011). As well, the diversity of the study population included (in terms of their linguistic

backgrounds and their academic standings) enables the quantitative findings to be more

generalizable to a broader population (Kelley et al., 2003, January). At the same time,

there are some limitations that need to be acknowledged.

First, the information given by this study was drawn from a limited number of

participants in a single geographic location who volunteered to participate in this study.

Hence, these participants may not be fully representative of the larger body of grade

eleven students in Quebec.

Second, the data was drawn from "mock" test situations, meaning that students were

aware that their performances would have no impact on their grade in their course. As

such, students' levels of test-anxiety were surely lower than they would have been on an

actual high-stakes exam. Also, their levels of concentration and effort that they applied

to the study were likely lower than they would have been for a true assessment.

Therefore, the ability to extrapolate the results to the effect such a modification would

have on a high-stakes exam is diminished and remains theoretical.

Third, missing data is a factor that weakens the weight of the quantitative data and the

ability to draw conclusions related to all the research questions. Although the thirty-four

questionnaires completed gives a significant amount of information (Hesse-Biber, 2010),

incomplete questionnaires were submitted primarily from male students. As this study

sought to understand the impact of modifying a test situation along gender lines, this fact

lessens the possibility of drawing firm conclusions related to gender.

Fourth, more students from the "excelling" demographic volunteered qualitative

information on the questionnaires and in the follow-up focus group than did those from

the "succeeding" and "at-risk" groups. Thus, their opinions may be over-represented,

although, from an academic standpoint, they are the group that is least in need of

modifications to traditional exam situations.

Fifth, the use of focus groups, though beneficial for creating a comfortable

environment in which there can be a free-flow of information (Anderson & Arsenault,

1998), may have created a situation where some students contributed more qualitative

information than did others because of their personality types or proclivity towards oral

communication. Thus, information may be missing from those who are less comfortable

with this type of a forum.

Sixth, students were drawn from two different teachers. The "teacher factor" may

have impacted the data collected for a couple of reasons (Hewitt, 2003). First, the

teachers' levels of motivation and priorities may have affected the ways that they

communicated with their students about this study. Second, nearly all of the

questionnaires returned from one teacher were complete, whereas those with missing data

were submitted by the students of the other teacher. Thus, the fact that students were

drawn from two teachers may have affected levels of completion of questionnaires and

contributions of qualitative information.

6.3 Future Research Directions and Contributions

As described above, this study is interdisciplinary and has contributed to several fields of study including the effects of test-anxiety, student experiences of sedentary tests and exams, the connection between physical activity and academic performance, and gender differences in relation to academic achievement. As well, the MMR design allowed for the gathering of multiple sources of data that gave both breadth and depth to the information collected. The details of this design may be helpful for future researchers seeking ways to combine data collection instruments in an MMR design. At the same time, the results of this present study suggest directions for future research in order to ensure that all students have the best chances to succeed on important assessments.

First, this study drew information from "mock" test situations, meaning that students were aware that the tests would have no impact on their scores. This fact certainly led to lower levels of test-anxiety than would be felt in authentic test situations. It likely also diminished the motivation of some to participate and to offer thorough information. A further way to evaluate the effect of integrating physical motion into an exam situation could be to concentrate on the impact of such a modification during an actual evaluation.

Second, Trudeau and Shepard (2009) and Hillman et al. (2009) provided evidence that connected periods of exercise prior to performing intellectual tasks to increased mental efficiency among elementary school aged children. A follow-up study could explore the methodology for including physical motion by placing the physical motion at the start of the tests instead of integrating it throughout in order to compare the results of such a study on high school students with the results of those on younger students.

Third, originally I wished to use my own students in this study, reasoning that the nature of the relationships formed between an educator and her students could be significant in terms of positively impacting student motivation and participation (Hewitt, 2003). However, McGill's Research and Ethics board voiced concerns that classroom research by a teacher could create a conflict of interest. Should such research be allowed, a future study could use similar methodology to evaluate whether the results are consistent between a situation in which the researcher is a stranger and one in which the researcher is an insider. This study could also evaluate whether allowing a teacher to perform classroom research has an impact on student motivation and completion levels in relation to data collection.

Fourth, this study investigated strategies to enable students who struggle on sedentary exams to have a greater chance at success. Whereas the enriched students, who do not struggle to the same extent as others, offered a lot of qualitative information, those in at-risk group offered less. A further study could use different instruments to prompt greater participation from the at-risk demographic.

Fifth, the participants themselves suggested directions for further research when they gave recommendations of other modifications that they would like to be allowed during exams. In particular, they communicated that they believe being able to listen to music and being able to eat would enable them to perform better. Future studies could explore the impact of allowing students these modifications on their scores, levels of test-anxiety, and senses of well-being.

6.4 Implications of this study

This study has implications for senior high school teachers, administrators, and policy

makers.

6.4.1 Implications for educators

Students have little power over the content of their assessments or the environment in

which they are required to write (Shohamy, 2001, p. 375). At the same time, many

researchers have established that there are important positive reasons to continue to use

tests and exams, even if their use is imperfect (Burger & Krueger, 2002; Madaus &

Russell, 2010/2011; Peterson & West, 2003). Thus, the responsibility lies with those

closest to students to ensure that each one is given the best opportunities to perform as

well as possible (Hattie, 2012), and those closest to students are their teachers. It is the

responsibility of teachers to use assessment strategies and methodologies that are well

supported by research and data, and to continuously evaluate their practices in order to

seek greater ways to impact student success (Hattie, 2012). This study offers a new

strategy – a new tool – to teachers to empower their more kinesthetic learners. With

regard to the implications of this study, one possible way in which the information could

be applicable could be in the ways classroom teachers develop and administer

assessments. The quantitative data from the questionnaires points to the idea that many

students did find physical motion breaks to help them to regain focus and combat test-

anxiety. In addition, the majority of those involved did agree that physical motion breaks

should be included on future assessments either to benefit themselves or their peers.

Therefore, teachers could use this information to offer their students the option of

physical motion breaks on classroom tests or quizzes.

6.4.2 Implications for administrators

Administrators set the direction for their teaching staff by outlining what key ideas

represent their learning environments (Zmuda, Kuklis, & Kline, 2004, p. 6). In this

capacity, these leaders have the opportunity to encourage their teachers to engage with

developing fields of research that can enhance their practice and increase the chances of

success of their students. When considering what methodology is optimal for student

assessment, administrators have the responsibility to make sure everyone on the team is

assessing in a way that truly allows students to show what they have learned (Davies,

Herbst, & Reynolds, 2011). This can mean simply providing teachers with opportunities

to gain awareness of fields related to assessment methodology while encouraging them to

engage with significant ideas and to find ways to make them practical (White & Smith,

2010). This study is one among many in the field of assessment that administrators could

draw from when encouraging teachers to embrace data-supported research in relation to

assessment practices. By attending to the indications that some students benefit from

physical motion breaks, administrators may benefit from this research by encouraging

their teaching staff to offer such a modification during test situations.

6.4.3 Implications for Policy Makers

Policy makers hold an immense amount of power over students in that they are the

ones who design the instruments and procedures to be used during high-stakes

evaluations (Shohamy, 2001). As Stiggins (2002) explained, policy makers must look

beyond using high-stakes evaluations as a method for organizing and analyzing student

and teacher productivity. Instead, policy makers should look at assessment through the

lens of the ultimate goal of education: exams are tools to enhance student learning.

Stiggins described a transformative idea regarding assessment, encouraging politicians to

envision empowering students by assessing them in ways that *"accurately reflect student*

achievement…" and *"build students' confidence …"* (2012, p. 5). Should this be the case,

evaluations would no longer require all students to perform the same tasks under the

same conditions. Rather, they would incorporate our understanding of student diversity

in order to provide each unique student with the best conditions for success. Following

this logic, both the instruments and the methodology involved in high-stakes exams

would reflect a greater attempt to facilitate optimal performance by all students.

In Quebec, the MELS does show an awareness of the research on multiple learning

styles in the guidelines for the Secondary Five (grade eleven) English Language Arts

exam. In particular, students are encouraged to benefit from brief discussion periods with

their peers in order to clarify their ideas and plans for writing. Thus, the MELS indicates

that it is aware that some students learn more effectively through interpersonal

interactions.

Policy making bodies such as the MELS could benefit from research such as that

described in this study in that it gives quantitative and qualitative information

emphasizing that kinesthetically oriented students would benefit from motion breaks.

This could open the door to modifying policies such that, along with procedures oriented

to benefiting interpersonal learning styles, procedures could be adopted to empower

kinesthetically minded students.

6.5 Chapter Summary

To conclude, this study is unique in that it explored allowing physical motion breaks

on tests and exams by focusing on the experiences of senior high school students. In

addition, it drew on interdisciplinary literature and therefore was situated in multiple

perspectives.   Both quantitative and qualitative information indicated that some students

do benefit from these breaks by feeling mentally refreshed and more relaxed. The

quantitative data shows that the majority of participants found these breaks to be

beneficial, with more males than females responding positively. This study has

augmented our understanding of the relationship between physical activity and student

achievement and contributes grounds for increasing the link between these two in

assessment circumstances.

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Appendix A :

Likert Scale Questionnaire for Pilot Study

COVER PAGE FOR QUESTIONNAIRE: PERSONAL INFORMATION

Please complete this questionnaire as honestly and accurately as possible. Your responses are greatly appreciated, as they will contribute to a study on how certain conditions impact students as they write exams. Thank-you for your time and input.

-Abigail Lawrence

A. BACKGROUND QUESTIONS

1.   Please state your grade level: _____

2. Please state your age: _____

3. Please put an 'x' in the box that best applies to how you identify your gender:

I am female	I am male	I am other than male or female	I prefer not to say

4. Please put an 'x' in the box that best applies to your average in the course so

far:

0%-49.9%	50%-59.9%	60%-69.9%	70%-79.9%	80%-100%

For the following questions, please <u>circle the number</u> that best applies to your experience.

1	2	3	4	5
Strongly Disagree	**Disagree**	**Undecided**	**Agree**	**Strongly Agree**

B. LEARNING STYLE AND EXPERIENCE OF

PHYSICAL MOTION IN THE CLASSROOM

1.   I learn best by listening:

   1   2   3   4   5

   <u>Describe what you mean:</u>

2. I learn best by seeing an example, image, or diagram:

   1   2   3   4   5

   <u>Describe what you mean:</u>

3. I learn best by physically doing something:

   1   2   3   4   5

   <u>Describe what you mean:</u>

4. I like it when the teacher explains the lesson in detail:

   1   2   3   4   5

   <u>Describe what you mean:</u>

   :

5. I like it when the teacher shows an example, image, or diagram:

    1   2   3   4   5

    Describe what you mean:

6. I like it when I have to move or do something to learn:

    1   2   3   4   5

    Describe what you mean:

C. YOUR EXPERIENCE OF TEST-TAKING

For the following questions, please <u>circle the number</u> that best applies to your experience.

1	**2**	**3**	**4**	**5**
Strongly Disagree	**Disagree**	**Undecided**	**Agree**	**Strongly Agree**

1. I usually score above 80% when I have to sit and write a test:

    1   2   3   4   5

    Comments:

2. I usually score between 70% and 79% when I have to sit and write a test:

    1   2   3   4   5

    Comments:

3. I generally score between 60% and 69% when I have to sit and write a

    test:

    1   2   3   4   5

Comments:

4. I usually score below 60% when I have to sit and write a test:

   1   2   3   4   5

   Comments:

5. I like sitting and taking tests:

   1   2   3   4   5

Describe what you mean:

6. I don't mind sitting and taking tests:

   1   2   3   4   5

Describe what you mean:

7. I find it easy to sit still and focus while writing tests:

   1   2   3   4   5

Describe what you mean:

8. When I write tests, I take breaks to stretch or regain my focus:

   1   2   3   4   5

Describe what you mean:

9. I think sitting to write tests is a good way to show how much I know:

1   2   3   4   5

<u>Describe what you mean:</u>

10. I am good at preparing myself for tests:

1   2   3   4   5

<u>Describe what you mean:</u>

11. When I study for tests, I study by sitting and focusing on the material:

1   2   3   4   5

<u>Describe what you mean:</u>

12. When I study for tests, I often get up and move around, or I study while

moving around:

1   2   3   4   5

<u>Describe what you mean:</u>

13. I do not usually study before tests:

1   2   3   4   5

<u>Describe what you mean:</u>

14. I usually get very stressed before a test:

1   2   3   4   5

<u>Describe what you mean:</u>

15. I usually do not feel very stressed before tests:

    1   2   3   4   5

Describe what you mean:

16. Feeling stressed often prevents me from doing well on tests:

    1   2   3   4   5

Describe what you mean:

17. Although I feel stressed before tests, I know how to manage my stress to

   do well on the test:

    1   2   3   4   5

Describe what you mean:

D. EXPERIENCE DURING THE SEDENTARY MOCK EXAM

For the following questions, please <u>circle the number</u> that best applies to your experience.

1	2	3	4	5
Strongly Disagree	**Disagree**	**Undecided**	**Agree**	**Strongly Agree**

1. My teacher gave me the necessary information to do well on this test:

    1   2   3   4   5

Describe what you mean:

2. I studied and felt prepared for this test:

    1   2   3   4   5

Describe what you mean:

3. I understood what I needed to do on the test:

   1   2   3   4   5

Describe what you mean:

4. I was able to complete the test in the time provided:

   1   2   3   4   5

Describe what you mean:

5. I scored well on this test (80% or above):

   1   2   3   4   5

Describe what you mean:

6. I scored reasonably well on this test (60%-79.9%)

   1   2   3   4   5

Describe what you mean:

7. My score shows that I could improve on this test (score below 60%):

   1   2   3   4   5

Describe what you mean:

8. I found it easy to focus for 75 minutes in a row:

1   2   3   4   5

Describe what you mean:

9. I found it easy to sit still and write for 75 minutes in a row:

1   2   3   4   5

Describe what you mean:

10. I frequently lost my focus during the test:

1   2   3   4   5

Describe what you mean:

11. When I took breaks to think or rest, I remained still:

1   2   3   4   5

Describe what you mean:

12. When I took breaks to think or rest, I moved a bit (by, for example,

stretching hands or legs, tapping pen, etc.):

1   2   3   4   5

Describe what you mean:

13. While I was writing the test, I frequently moved (by stretching, tapping

pen, moving legs, etc.):

1   2   3   4   5

Describe what you mean:

14. Sitting and writing this test allowed me to show how much I know:

1   2   3   4   5

Describe what you mean:

15. I felt very stressed before this test:

1   2   3   4   5

Describe what you mean:

16. I felt very stressed throughout this test:

1   2   3   4   5

Describe what you mean:

17. Although I felt stressed, I was able to manage my stress to do well:

1   2   3   4   5

Describe what you mean:

18. I did not feel stressed during this test:

1   2   3   4   5

Describe what you mean:

E. EXPERIENCE DURING THE MOCK EXAM INCLUDING

PHYSICAL MOTION

For the following questions, please <u>circle the number</u> that best applies to your experience.

1	2	3	4	5
Strongly Disagree	**Disagree**	**Undecided**	**Agree**	**Strongly Agree**

1. My teacher gave me the necessary information to do well on this test:

     1   2   3   4   5

<u>Describe what you mean:</u>

2. I studied and felt prepared for this test:

     1   2   3   4   5

<u>Describe what you mean:</u>

3. I understood what I needed to do on the test:

     1   2   3   4   5

<u>Describe what you mean:</u>

4. I was able to complete the test in the time provided:

     1   2   3   4   5

<u>Describe what you mean:</u>

5. I scored well on this test (80% or above):

     1   2   3   4   5

Describe what you mean:

6. I scored reasonably well on this test (60% to 79.9%):

    1   2   3   4   5

Describe what you mean:

7. My score shows that I could improve on this test (score below 60%):

    1   2   3   4   5

Describe what you mean:

8. I found it easy to focus for 75 minutes in a row:

    1   2   3   4   5

Describe what you mean:

9. My score was higher on this test than on the one where we sat for the

    whole time:

    1   2   3   4   5

Describe what you mean:

10. My score was lower on this test than on the one where we sat for the

    whole time:

    1   2   3   4   5

Describe what you mean:

11. The researcher advised me when it was time to get up and move in a way

that did not break my focus or progress:

1   2   3   4   5

Describe what you mean:

12. While I was writing the test, I frequently moved (by stretching, tapping

pen, moving legs, etc.):

1   2   3   4   5

Describe what you mean:

13. When we were asked to get up and move, I chose to do high-intensity

movements (like jumping jacks, push-ups, or squats):

1   2   3   4   5

Describe what you mean:

14. When we were asked to get up and move, I chose to do low-intensity

movements, like stretching, walking in place, or balancing on one foot:

1   2   3   4   5

Describe what you mean:

15. When we were asked to get up and move, I alternated between high and

low intensity movements equally:

1   2   3   4   5

Describe what you mean:

16. It felt strange each time I had to get up and move:

    1   2   3   4   5

Describe what you mean:

17. At first it felt strange to get up and move, but I got use to it:

    1   2   3   4   5

Describe what you mean:

18. By the end, I felt comfortable and normal getting up to move:

    1   2   3   4   5

Describe what you mean:

19. It didn't seem strange at any point to get up and move:

    1   2   3   4   5

Describe what you mean:

20. I found getting up to move distracted me from my thought process:

    1   2   3   4   5

Describe what you mean:

21. I found getting up to move interrupted my progress:

1   2   3   4   5

Describe what you mean:

22. When I sat back down after our movement breaks, I found it easy to

continue writing:

1   2   3   4   5

Describe what you mean:

23. When I sat back down after our movement breaks, I felt mentally

refreshed:

1   2   3   4   5

Describe what you mean:

24. When I sat back down after our movement breaks, I felt more relaxed than

before:

1   2   3   4   5

Describe what you mean:

25. When I sat back down to write after our movement breaks, I found it

difficult to start writing again:

1   2   3   4   5

Describe what you mean:

26. Taking a break to move had no impact on how I felt after:

    1   2   3   4   5

Describe what you mean:

27. Moving during the test helped me to score better than I usually do:

    1   2   3   4   5

Describe what you mean:

28. Moving during the test made me score worse than I usually do:

    1   2   3   4   5

Describe what you mean:

29. Taking movement breaks helped me to feel less stressed than I usually do

during tests:

    1   2   3   4   5

Describe what you mean:

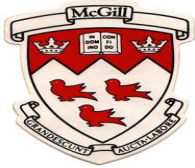30. Taking movement breaks made me feel more stressed than I usually do

during tests:

    1   2   3   4   5

Describe what you mean:

31. I think we should take movement breaks during every test:

Appendix B:

Consent Letter for First Focus Group in Actual Study

September, 2013

Dear parents and legal tutors,

My name is Abigail Lawrence. I am a Master's student in the Department of Integrated Studies in Education at McGill University.

I am interested in conducting a study to investigate the relationship between physical motion and taking tests and exams. The purpose of this study is to explore whether including physical motion during a test or exam will impact the scores students achieve, how stressed they feel, and how positively or negatively they experience tests and exams.

In order to develop a questionnaire that is informed from the reality of student perceptions on taking exams, I am inviting students to participate in a focus group. This group would meet 1-2 times before the two "mock" exams.

The focus group would meet during the portion of class time designated for independent work. Thus, students would not miss instructional time, but may need to catch up on independent work done by other students during their absence.

The focus group will work to help revise my original questionnaire in the following ways: to make it more clear in providing opportunities for students to express how they feel about taking tests/exams, and to provide input to help create a more teen-familiar survey template to be completed online.

Students' participation is completely voluntary and will have no impact on their grade whatsoever. I will not note who says what in my notes or in my thesis, and will remind students that any comments made during the Focus Group should remain confidential.

Data from this study will be disseminated in my Master's thesis, as well as possibly in scholarly articles.

If you have any questions, please do not hesitate to contact me by e-mail at Abigail.Lawrence@mail.mcgill.ca. You may also contact my supervisor, Professor Carolyn Turner, by email at Carolyn.turner@mcgill.ca. If you have any questions or

concerns regarding your child's rights or welfare as a participant in this research study, please contact the Manager of Research Ethics at 514-398-6831.

Thank you for your time.

Consent Form

I have read the description of the research project and hereby agree to my son/daughter's participation in the <u>focus group</u>. I am aware that the results will be used for research purposes only, that my son/daughter's identity will remain anonymous, and that I can withdraw at any time, if I wish.

Name of student concerned: _____

I consent to my son/daughter's participation in the focus group:

yes

Parent/Legal Tutor's Name: _____   Date: _____
Parent/Legal Tutor's Signature: _____

Appendix C:

Assent Letter for participation in First Focus Group in Actual Study

September, 2013

Dear student,

My name is Abigail Lawrence. I am a Master's student in the Department of Integrated Studies in Education at McGill University.

I am interested in conducting a study to investigate the relationship between physical motion and taking tests and exams. The purpose of this study is to explore whether including physical motion during a test or exam will impact the scores students achieve, how stressed you feel, and how positively or negatively you experience tests and exams.

In order to develop a questionnaire that is informed from the reality of student perceptions on taking exams, I am inviting you to participate in a focus group. This group would meet 1-2 times before the two "mock" exams.

The focus group would meet during the portion of class time designated for independent work. Thus, you would not miss classroom instruction, but may need to catch up on independent work.

The focus group will work to help revise my original questionnaire in the following ways: to make it more clear in providing opportunities for students to express how you feel about taking tests/exams, and to provide input to help create a more teen-familiar survey template to be completed online.

Your participation is completely voluntary and will have no impact on your grade whatsoever. I will not record who says what in my notes or thesis, and request that, if you participate, you keep comments made during the Focus Group confidential.

Data from this study will be disseminated in my Master's thesis, as well as possibly in scholarly articles.

If you have any questions, please do not hesitate to contact me by e-mail at Abigail.Lawrence@mail.mcgill.ca. You may also contact my supervisor, Professor Carolyn Turner, by email at Carolyn.turner@mcgill.ca. If you have any questions or

concerns regarding your rights or welfare as a participant in this research study, please contact the Manager of Research Ethics at 514-398-6831.

Thank you for your time.

Assent Form

I have read the description of the research project and hereby agree to my participation in the <u>focus group</u>. I am aware that the results will be used for research purposes only, that my identity will remain anonymous, and that I can withdraw at any time, if I wish.

I assent to my participation in the focus group:

<div align="center">yes</div>

Student's Name: _____   Date: _____
Student's Signature: _____

Appendix D:

**Consent Letter for Participation in Mock Tests and Questionnaires (both Pilot
and Actual Studies)**

September, 2013

Dear parents and legal tutors,

My name is Abigail Lawrence. I am a Master's student in the Department of Integrated
Studies in Education at McGill University.

I am interested in conducting a study to investigate the relationship between physical
motion and taking tests and exams. The purpose of this study is to explore whether
including physical motion during a test or exam will impact the scores students achieve,
how stressed they feel, and how positively or negatively they experience tests and exams.

Those who agree to participate in this study will be asked to take part in two "mock"
exams. These will be written during class time in October and November, 2013.

During one session, students will be asked to write continuously for 75 minutes (one
class period) while sitting. During the other, students will be asked to stand up and move
(by doing activities of their choice, like jumping jacks, pushups, stretches, etc.) every
twenty minutes. I will let students know before asking them to get up and move. They
will have to close their booklets, do the physical activity for fifteen seconds, then sit back
down and continue to write.

Following the "mock" exams I will ask students to complete an online questionnaire on
Survey Monkey in order that their answers will remain anonymous. This questionnaire
will ask students to reflect on the experience in terms of whether adding physical motion
to a test situation altered their scores, stress levels, and overall sense of well-being.

The "mock" exams will be done during class time and will be similar to the format of the
Response Synthesis that students will write for their Ministry exam.

Though I will provide students with feedback and hypothetical marks from the MELS
rubric, these marks will not be used towards their English grade. I will provide
hypothetical marks in order to see whether students' grades change between the "mock"
exam in which they sit and the one in which they get up and move.

Students' participation is completely voluntary and will have no impact on their grade whatsoever.

For students who choose not to participate in the "mock" exams, or for whom consent is not given, they will have the option to remain in class in order to write the "mock" exams, thus giving them the same practice time and feedback. They will not be asked to get up and move during the session including physical motion.

The consent forms and test scores will only be available to myself and my supervisor. All questionnaires are anonymous. All data will be stored in a locked, secure location. You can of course withdraw your son/daughter from the study at any time without consequences.

Data from this study will be disseminated in my Master's thesis, as well as possibly in scholarly articles.

If you have any questions, please do not hesitate to contact me by e-mail at Abigail.Lawrence@mail.mcgill.ca. You may also contact my supervisor, Professor Carolyn Turner, by email at Carolyn.turner@mcgill.ca. If you have any questions or concerns regarding your child's rights or welfare as a participant in this research study, please contact the Manager of Research Ethics at 514-398-6831.

Thank you for your time.

Consent Form

I have read the description of the research project and hereby agree to my son/daughter's participation. I am aware that the results will be used for research purposes only, that my son/daughter's identity will remain anonymous, and that I can withdraw at any time, if I wish.

Name of student concerned: _____

I consent to my son/daughter's participation in the mock exams and questionnaires:

                                        yes

Parent/Legal Tutor's Name: _____   Date: _____
Parent/Legal Tutor's Signature: _____

Appendix E:

**Assent Letter for Participation in Mock Tests and Questionnaires (both Pilot
and Actual Studies)**

September, 2013

Dear student,

My name is Abigail Lawrence. I am a Master's student in the Department of Integrated
Studies in Education at McGill University.

I am interested in conducting a study to investigate the relationship between physical
motion and taking tests and exams. The purpose of this study is to explore whether
including physical motion during a test or exam will impact the scores students achieve,
how stressed you feel, and how positively or negatively you experience tests and exams.

If you agree to participate in this study you will be asked to take part in two "mock"
exams. These will be written during class time in <u>October and November, 2013</u>.

During one session, you will be asked to write continuously for 75 minutes (one class
period) while sitting. During the other, you will be asked to stand up and move (by doing
activities of your choice, like jumping jacks, pushups, stretches, etc.) every twenty
minutes. I will let you know before asking you to get up and move. You will have to
close your booklets, do the physical activity for fifteen seconds, then sit back down and
continue to write.

Following the "mock" exams I will ask you to complete a questionnaire online on Survey
Monkey in order that your answers will remain anonymous. This questionnaire will ask
you to reflect on the experience in terms of whether adding physical motion to a test
situation altered your scores, stress levels, and overall sense of well-being.

<u>The "mock" exams will be done during class time and will be similar to the format of the
Response Synthesis that you will write for your Ministry exam.</u>

Though I will provide you with feedback and hypothetical marks from the MELS rubric,
your work will not be used towards your English grade. I will provide hypothetical
marks in order to see whether your grades change between the "mock" exam in which
you sit and the one in which you get up and move.

Your participation is completely voluntary and will have no impact on your grade whatsoever.

For students who choose not to participate in the "mock" exams, or for whom consent is not given, you will have the option to remain in class in order to write the "mock" exams, thus giving the same practice time and feedback. You will not be asked to get up and move during the session including physical motion.

The consent forms and test scores will only be available to myself and my supervisor. All questionnaires are anonymous. All data will be stored in a locked, secure location. You can of course withdraw from the study at any time without consequences.

Data from this study will be disseminated in my Master's thesis, as well as possibly in scholarly articles.

If you have any questions, please do not hesitate to contact me by e-mail at Abigail.Lawrence@mail.mcgill.ca. You may also contact my supervisor, Professor Carolyn Turner, by email at Carolyn.turner@mcgill.ca. If you have any questions or concerns regarding your rights or welfare as a participant in this research study, please contact the Manager of Research Ethics at 514-398-6831.

Thank you for your time.

Assent Form

I have read the description of the research project and hereby agree to my participation. I am aware that the results will be used for research purposes only, that my identity will remain anonymous, and that I can withdraw at any time, if I wish.

I assent to my participation in the mock exams and questionnaire: yes

Student's Name: _____   Date: _____
Student's Signature: _____

Appendix F:

Consent Letter for participation in Follow-Up Focus Group in Actual Study

September, 2013

Dear parents and legal tutors,

My name is Abigail Lawrence. I am a Master's student in the Department of Integrated Studies in Education at McGill University.

I am interested in conducting a study to investigate the relationship between physical motion and taking tests and exams. The purpose of this study is to explore whether including physical motion during a test or exam will impact the scores students achieve, how stressed they feel, and how positively or negatively they experience tests and exams.

Following their participation in two "mock" tests as well as their participation in a questionnaire, I would like to interview several students to expand upon questionnaire data. These interviews would be one-on-one and would be done during the independent work part of class time. Thus, students would not miss classroom instruction, though may need to catch up on independent work.

During the interviews, I will use the questionnaire questions and ask students to expand upon their answers.

Interviews will be audio-taped using my personal recording device and the audio files will be stored on a USB key locked in my advisor's research office at McGill University and will only be available to my advisor and myself.

Students' participation is completely voluntary and will have no impact on their grade whatsoever. Any input that they give will remain anonymous.

Data from this study will be disseminated in my Master's thesis, as well as possibly in scholarly articles.

If you have any questions, please do not hesitate to contact me by e-mail at Abigail.Lawrence@mail.mcgill.ca. You may also contact my supervisor, Professor Carolyn Turner, by email at Carolyn.turner@mcgill.ca. If you have any questions or concerns regarding your child's rights or welfare as a participant in this research study, please contact the Manager of Research Ethics at 514-398-6831.

Thank you for your time.

Consent Form

I have read the description of the research project and hereby agree to my son/daughter's participation in the interview. I am aware that the results will be used for research purposes only, that my son/daughter's identity will remain anonymous, and that I can withdraw at any time, if I wish.

Name of student concerned: _____

I consent to my son/daughter's participation in the interview:

<div align="center">yes</div>

Parent/Legal Tutor's Name: _____   Date: _____
Parent/Legal Tutor's Signature: _____

Appendix G:

Assent Letter for participation in Follow-Up Focus Group in Actual Study

September, 2013

Dear student,

My name is Abigail Lawrence. I am a Master's student in the Department of Integrated Studies in Education at McGill University.

I am interested in conducting a study to investigate the relationship between physical motion and taking tests and exams. The purpose of this study is to explore whether including physical motion during a test or exam will impact the scores students achieve, how stressed you feel, and how positively or negatively you experience tests and exams.

Following your participation in two "mock" tests as well as your participation in a questionnaire, I would like to interview several students to expand upon questionnaire data. These interviews would be one-on-one and would be done during the independent work part of class time. Thus, you would not miss classroom instruction, but may need to catch up on independent work.

During the interviews, I will use the questionnaire questions and ask you to expand upon your answers.

Interviews will be audio-taped using my personal recording device and the audio files will be stored on a USB key that will be locked in my advisor's research office at McGill University and will only be available to myself and my advisor.

Your participation is completely voluntary and will have no impact on your grade whatsoever. Any input that you give will remain anonymous.

Data from this study will be disseminated in my Master's thesis, as well as possibly in scholarly articles.

If you have any questions, please do not hesitate to contact me by e-mail at Abigail.Lawrence@mail.mcgill.ca. You may also contact my supervisor, Professor Carolyn Turner, by email at Carolyn.turner@mcgill.ca. If you have any questions or

concerns regarding your rights or welfare as a participant in this research study, please contact the Manager of Research Ethics at 514-398-6831.

Thank you for your time.

Assent Form

I have read the description of the research project and hereby agree to my participation in the interview. I am aware that the results will be used for research purposes only, that my identity will remain anonymous, and that I can withdraw at any time, if I wish.

Name of student concerned: _____

I assent to my participation in the interview:

<div align="center">yes</div>

Student's signature: _____   Date: _____

Appendix H :

Revised Questionnaire used in Actual Study

QUESTIONNAIRE ABOUT
PHYSICAL MOTION AND EXAMS

Please complete this questionnaire as honestly and accurately as possible. Your responses are greatly appreciated, as they will contribute to a study on how certain conditions impact students as they write exams. Thank you for your time.

-Abigail Lawrence

F. BACKGROUND QUESTIONS

5.   Please state your grade level: _____

6. Please state your age: _____

7. Please identify the languages that you speak: _____

8. Please identify your gender: _____

9. Please put an 'x' in the box that best applies to your average in the course so

far:

0%-49.9%	50%-59.9%	60%-69.9%	70%-79.9%	80%-100%

G. LEARNING STYLE AND EXPERIENCE OF

PHYSICAL MOTION IN THE CLASSROOM

7.   In class, I learn best (circle all that apply):

   a. By listening to an explanation

   b. By seeing an example, image, or diagram

   c. By physically doing something

Explain:

_____

8. During class, I like it when (circle all that apply):

    a. We listen to the teacher and take notes

    b. We work in pairs or in groups

    c. We get up to move around or do something

Explain:

_____

H. YOUR EXPERIENCE OF TEST-TAKING

18. On tests, I usually score:

    a. 80% and above

    b. Between 70% and 79%

    c. Between 60% and 69%

    d. Below 60%

Explain:

_____

_____

19. I like sitting and taking tests:

                        agree / disagree

Explain:

_____

_____

20. I find it easy to sit still and focus while writing tests:

agree / disagree

Explain:

_____

_____

21. When I write tests, I take breaks to stretch or regain my focus:

agree / disagree

Explain:

_____

_____

22. When I study for tests:

     a.   I study by sitting and focusing on the material

     b. I often get up and move around, or I study while moving around

     c. I do not usually study before tests

Explain:

_____

_____

23. I usually get very stressed before a test:

agree / disagree

Explain:

_____

_____

24. Feeling stressed often prevents me from doing well on tests:

agree / disagree

Explain:

_____

_____

25. Although I feel stressed before tests, I know how to manage my stress to

do well:

agree / disagree

Explain:

_____

_____

I. EXPERIENCE DURING THE SEDENTARY MOCK

EXAM

19. I was able to complete the test in the time provided:

agree / disagree

Explain:

_____

20. I scored:

    a.   80% or above

    b. between 60% and 79%

    c. below 60%

21. I found it easy to focus for 75 minutes in a row:

<div align="center">agree / disagree</div>

Explain:

_____

_____

22. During the test:

    a. I found it easy to sit still and write for 75 minutes in a row

    b. I frequently lost my focus during the test:

Explain:

_____

_____

23. When I took breaks to think or rest, I moved (for example, by stretching

hands or legs, tapping pen, etc.):

<div align="center">agree / disagree</div>

Explain:

_____

_____

24. Sitting and writing this test allowed me to show how much I know:

agree / disagree

Explain:

_____

_____

25. Circle all that apply:

    a. I felt very stressed before this test

    b. I felt very stressed throughout this test

    c. Although I felt stressed, I was able to manage my stress to do well

    d. I did not feel stressed during this test

Explain:

_____

_____

J. EXPERIENCE DURING THE MOCK EXAM

INCLUDING PHYSICAL MOTION

32. I was able to complete the test in the time provided:

agree / disagree

Explain:

_____

_____

33. I scored:

    a.   80% or above

    b. between 60% and 79%

    c. below 60%

34. I found it easy to focus for 75 minutes in a row:

agree / disagree

Explain:

_____

_____

35. My score was higher on this test than on the one where we sat for the

whole time:

agree / disagree

Explain:

_____

_____

36. The researcher advised me when it was time to get up and move in a way

that did not break my focus or progress:

agree / disagree

Explain:

_____

_____

37. Circle the statement that best applies:

    a. When we were asked to get up and move, I chose to do high-intensity movements like jumping jacks, push-ups, or squats

    b. When we were asked to get up and move, I chose to do low-intensity movements, like stretching, walking in place, or balancing on one foot

    c. Both a and b

Explain what you did and why:

_____

_____

38. It felt strange each time I had to get up and move:

agree / disagree

Explain:

_____

_____

39. At first it felt strange to get up and move, but I got use to it:

agree / disagree

Explain:

_____

_____

40. By the end, I felt comfortable and normal getting up to move:

agree / disagree

Explain:

_____

_____

41. I found getting up to move distracted me from my thought process:

agree / disagree

Explain:

_____

_____

42. When I sat back down after our movement breaks, I found it easy to

continue writing:

agree / disagree

Explain:

_____

_____

43. When I sat back down after our movement breaks, I felt mentally

refreshed:

agree / disagree

Explain:

_____

_____

44. When I sat back down after our movement breaks, I felt more relaxed than

before:

agree / disagree

Explain:

_____

_____

45. Moving during the test helped me to score better than I usually do:

agree / disagree

Explain:

_____

_____

46. Taking movement breaks helped me to feel less stressed than I usually do

during tests:

agree / disagree

Explain:

_____

_____

47. I think we should take movement breaks during every test:

agree / disagree

Explain:

_____

_____

48. Are there other things that you believe could help you to do better during

exams?

List and explain your ideas:

_____

_____

Appendix I:

MELS 2013 English Exam Rubric

	LEVEL 5 ADVANCED	LEVEL 4 THOROUGH	LEVEL 3 ACCEPTABLE
	The reader demonstrates a superior understanding of the task; a preference is supported with perceptive references to the texts, presenting a discerning world-view when interpreting, synthesizing and justifying critical ideas about the preferred text.	The reader demonstrates a thorough understanding of the task; a preference is supported with relevant references to the texts, defining a firm position when interpreting, synthesizing and justifying critical ideas about the preferred text.	The reader demonstrates an acceptable understanding of the task, a preference is indicated with general references to the texts, offering opinions when interpreting, synthesizing and justifying critical ideas about the preferred text.
Meaning	The reader interprets the texts; provides perceptive and concise content; draws extensive meaning from the texts with attention to the guiding question; analyzes the purpose and audience of the texts.	The reader interprets the texts; provides thoughtful and clear content; draws thorough meaning from the texts with attention to the guiding question; identifies the purpose and audience of the texts.	The reader interprets the texts; provides commonplace and insubstantial content; draws straightforward meaning from the texts with attention to the guiding question; refers to the purpose and audience of the texts.
Codes and Conventions	The reader critiques the codes and conventions of the texts and indicates preferred text; evaluates the codes and conventions of the texts; justifies own preferences with perceptive references to the texts (synthesis).	The reader critiques the codes and conventions of the texts and indicates preferred text; identifies the codes and conventions of the texts; supports own preference with thoughtful references to the texts (synthesis).	The reader critiques the codes and conventions of the texts and indicates preferred text; refers to the codes and conventions of the texts; explains own preference with vague or general references to the texts (synthesis).
Connections	The reader makes connections, putting the preferred text in context; makes perceptive connections to the preferred text and other texts, world issues and/or events (synthesis).	The reader makes connections, putting the preferred text in context; makes interpretive connections to the preferred text and other texts, significant issues and/or events (synthesis).	The reader makes connections, putting the preferred text in context; makes general connections to the preferred text and other texts, general issues and/or events (synthesis).
Judgment	The reader judges the preferred text within the context of the guiding question; offers a discerning judgment about the effectiveness of the preferred text with reference to the guiding question.	The reader judges the preferred text within the context of the guiding question; offers a thoughtful judgment about the effectiveness of the preferred text with reference to the guiding question.	The reader judges the preferred text within the context of the guiding question; offers a sensible judgment about the effectiveness of the preferred text with reference to the guiding question.

Score	5+	5	4+	4	4-	3+	3	3-
	100%	95%	88%	83%	77%	72%	67%	60%

RUBRIC FOR SCORING RESPONSE/SYNTHESIS

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