

**Student Post-Secondary Success Via Physical Exercise Activities**

by

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**Dedication**

I would like to dedicate this work to my parents. Thank you for the values and opportunities you have offered me.

**Abstract**

A research gap exists regarding the association between physical exercise and academic success within the post-secondary demographic as reported by post-secondary students. This study aimed to understand this gap through a cross-sectional mixed-methods study using a questionnaire and facilitated group discussions. The interdisciplinary research applied theories and constructs from communications studies and psychology to assess intrapersonal and interpersonal communication among participants. Through semi-structured questions in the facilitated group discussions, the research explored the mental, physical, and social impacts of exercise in relation to one's academic performance. Through the assessment of motivations and student definitions of what academic success means, the research has shown that there are multiple outcomes from exercise that contribute as transferable elements and skills for their academic success such as increased confidence, focus, routine, etc. This study impacts post-secondary students, post-secondary institutions, and the fitness industry by providing opportunities to develop partnerships that create social and economic change.

*Keywords:* Academic success, exercise, post-secondary, physical activity

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## **Chapter 1: Introduction**

### **Student Post-Secondary Success via Physical Exercise Activities**

This dissertation examines the association between the academic success of post-secondary students connected to their perceptions and experiences through the implementation of physical exercise within their lives. The interdisciplinarity of the study incorporates psychology and communication studies as its main disciplines; these disciplines are the basis of the research theories best suited for the study as the research examines self-realization as well as group interactions.

This dissertation follows a traditional monograph structure which contextualizes the purpose of the study and research questions. The interdisciplinarity of the study is seen within the literature review, the theoretical framework implemented, and the methodology applied. The dissertation analyzes the findings, provides discussion on the results, and suggests possibilities for further research. This dissertation also reviews the contributions this research has to the change process and new knowledge generation.

The primary objective of this research is to obtain self-reported data from post-secondary students regarding outcomes achieved from physical exercise that connects directly with their personal views of academic success. The secondary objective of this research is to engage with students on whether they believe post-secondary institutions should promote physical activity tailored to academic success. The research focus expresses the need for a mixed-methods approach using a questionnaire and facilitated group discussions. In conducting this study, the research design identifies student motivations to exercise as well as identifies student learnings that come from group discussions.

### **Positionality**

The researcher, Trisha Sarker, is currently an instructor at MacEwan University, where the study has taken place. Trisha is also the Executive Director of Fitness Industry Council of Canada, the not-for-profit trade association representing the fitness industry in Canada. Trisha's role requires dedication to public policy, communication, COVID-19 operation strategies, and national fitness initiatives. This study benefit the researcher's positionality post data gathering as a means of finding opportunities for dissemination in the two fields: fitness and education. The objective of the study is for post-secondary institutions across Canada and the Canadian fitness industry to have an opportunity to partner and potentially create applied programs for a young adult student demographic.

### **Research Purpose**

The research investigates student experiences and motivations in connection with exercise and academic success, the awareness students have of the association, and the role that group discussion can play in enhancing awareness of, motivation to, and the impact of physical exercise for academic success. The importance of this research is grounded in the findings from multiple studies that indicate how exercise can enhance an individual's memory, focus, and emotional regulation, while also helping individuals to better cope with anxiety and self-esteem issues (Colley et al., 2011). Scientific studies have found that "regular exercise of moderate intensity can substantially improve cognitive function" (Alkadhi, 2018, p. 3113) allowing exercise to influence brain plasticity (growth of new brain tissue), which is beneficial to memory retention resulting in learning as "exercise is responsible for the majority of the positive brain changes seen with environmental enrichment, including in the size of the [brains] cortex"

(Suzuki, 2015, p. 133). Therefore, conducting a study on a particular demographic that has the potential to benefit from the outcomes stated in previous literature allows space for further knowledge generation.

Research into the combined fields of education, neuroscience, psychology, and physiology has been primarily focused on children in grade school (aged between 3 and 17) where research has found that daily exercise improves motor development, cognitive development, psychological health, cardiometabolic health, bone/skeletal health, and much more (Westfall et al., 2017). However, there is a gap in research and an opportunity to develop further knowledge for an older young adult student demographic. The physical and cognitive benefits from exercise studied in children are likely to be transferable to an older demographic but requires further empirical study. Therefore, this study relates to a young adult student demographic (aged 18 to 25) with the aim to support the outcomes of the study to be able to reveal benefits specific to post-secondary students. The sample group for this study are young adults who are post-secondary students that are physically active on a daily basis.

Research has found that when it comes to extrinsic motivations to exercise, individuals do so to connect with peers, for enjoyment, and to build interest through interaction (Hagger & Chatzisarantis, 2007). Therefore, when it comes to conducting a study on exercise for a young adult demographic, by applying various group learning theories to this research, the study gauges awareness and harnesses reflections in a demographic that is peer-oriented, where they may learn from each other's experiences. The study requests that participants be "encouraged to communicate with one another, exchanging ideas and comments on each other's experiences or points of view" (Wong, 2008). This method of provoking conversation during group discussions

outlines various attitudes and perceptions that are developed through interaction with others as group discussions “[show] dimensions of understanding that often remain untapped or inaccessible by other forms of data collection” (2008, p. 256). The contribution to data from facilitated group discussions to determine awareness is connected to the interdisciplinarity of the study.

### **Research Questions**

The aim of this research is to cultivate knowledge that is currently unavailable by striving to understand the association between exercise, motivation, group learning, and the concept of success for post-secondary students. The new knowledge is to be acquired by examining student interpretations of *success* in relation to student academic performance (i.e., higher grade point average, improved memory retention, confidence in presenting in class, being less tired during lectures, etc.).

The research questions are as follows:

#### ***RQ1***

What outcomes and experiences resulting from physical exercise influence personal post-secondary success (as identified by students)?

#### ***RQ2***

What motivates post-secondary students to participate in physical exercise?

#### ***RQ3***

In what ways might group discussions impact student awareness regarding their views of how exercise may be associated with their post-secondary success?

**RQ3a.** In what ways does group discussion impact a student’s motivation to exercise?

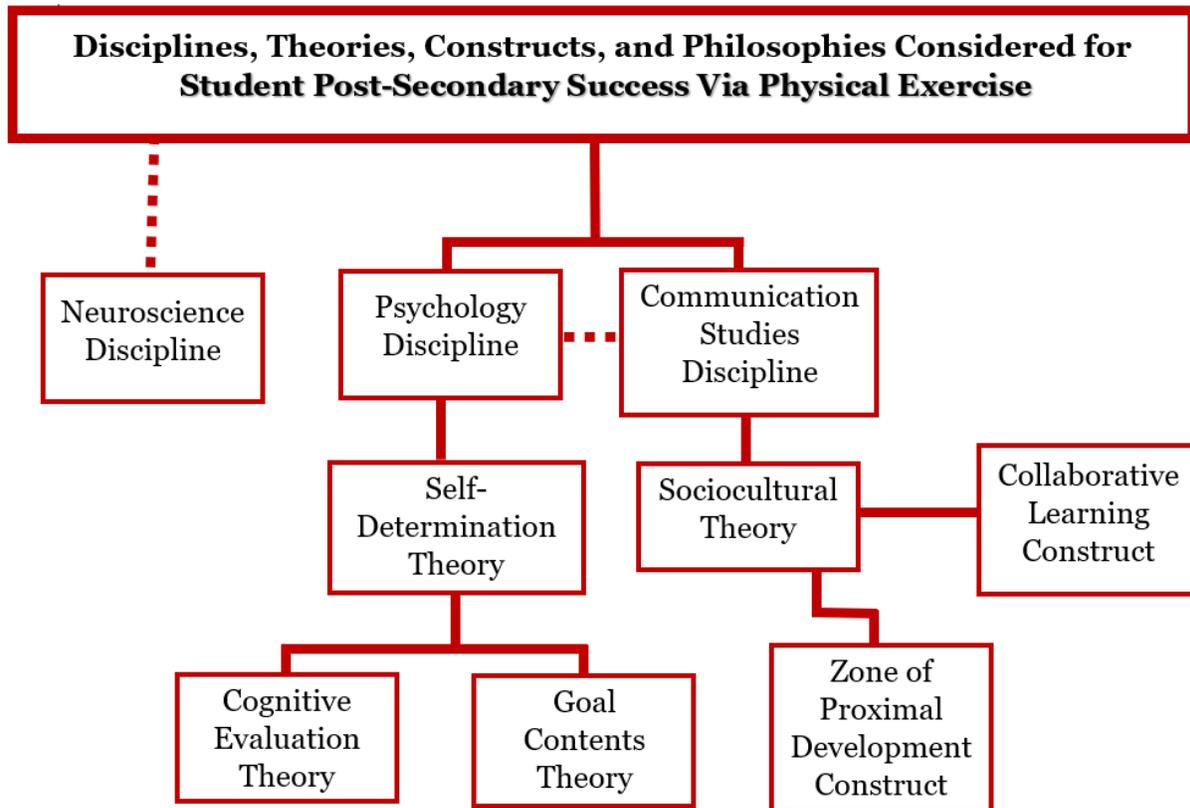
**Research Interdisciplinarity**

In order to build knowledge, different disciplines have influenced the research approach and process by determining how the data is collected as well as how the data is interpreted. Social science domains that are relevant to this research include the use of methods and theories from communication studies and psychology, along with literature that follows neuroscience. The use of these domains establishes how students connect with each other through the principles of self-reflection and dialogue by articulating their experiences in order to foster cognitive awareness on their understanding of how they believe exercise translates into supporting their academic success. Self-determination theory (SDT) (Ryan and Deci, 2000) and sociocultural theory (Bonk & Kim, 1998; Mahn, 1999; Mercer & Howe, 2012; Scott & Palincsar, 2013) further guide to supplementary theories. The main disciplines of communication studies and psychology contribute to the data collection process (through questionnaires and facilitated group discussions) and its analysis.

Figure 1, *Sarker's Interdisciplinary Framework: Disciplines, theories, constructs, and philosophies considered for student post-secondary success via physical exercise*, displays the interdisciplinary connections within the research.

**Figure 1**

*Sarker’s Interdisciplinary Framework: Disciplines, theories, constructs, and philosophies considered for student post-secondary success via physical exercise*



The use of self-determination theory is based on psychology. Sociocultural theory and collaborative learning construct are also connected to psychology yet have deep roots in communication studies. Sociocultural theory is composed of many different areas of educational disciplines and research (Bonk & Kim, 1998). Therefore, sociocultural theory contributes well to the interdisciplinary of the research.

Within the research, the theories within the disciplines provide specific methodological purposes. Communication studies and human interaction allow individuals to have the ability to build conversation and relate to others in an information-seeking manner (within the facilitated

group discussions using sociocultural theory and collaborative learning) and psychology allows for interpretations of motivations when focusing on behavioral aspects and personal experiences (within the questionnaire by using the sub-theories of cognitive evaluation theory and goal contents theory within SDT). When it comes to interdisciplinary research, there are two key processes that need to take place between the disciplines, “the first is knowledge transfer, in which knowledge is transferred from one discipline to another... to develop the receiving discipline” and “the second is knowledge creation, in which knowledge from [the] two disciplines is connected together to produce new understandings” (Siedlok & Hibbert, 2014, p. 199). In the research, the knowledge gained from the interaction between communication studies and psychology means both disciplines work together in the thematic analysis using a systematic approach to come to a collective outcome that applies to both disciplines (p. 199). Taking into consideration that “interdisciplinary research often integrates separate bodies of specialized data, methods, tools, concepts, or theories, in order to create a synthetic view or common understanding of a complex issue or problem” (Huutoneimi et al., 2010, p. 83), the research applies methods and theories from communication studies and psychology (which are both influenced by bridging theoretical constructs) in tandem with literature from not only these disciplines but also from neuroscience.

An interdisciplinary approach is a collaborative process in which two or more disciplines integrate aspects of their processes together to answer research questions (Aboelela et al, 2007). The interdisciplinary approach in this study evaluates the current findings in neuroscience and psychology research and assesses those findings to what students believe to be beneficial outcomes of exercise in a post-secondary environment through two social science disciplines:

psychology and communication studies. The research aim is to identify the motivations that encourage post-secondary students to exercise, as well as account for group learning and recognition of outcomes of exercise that may influence their awareness of the process. The current research seeks to gather data from participants in a manner that utilizes methods including questionnaires and facilitated group discussions.

The interdisciplinary approach is best for the research as the study links physical and cognitive outcomes and experiences from exercising to how it may influence student performance in their post-secondary environment. As some theories of communication studies overlap with psychology, what identifies the study as being interdisciplinary is the way the theories within the disciplines contribute to the research by having separate methodological distinctions. The theories from communication studies inform the research through the method of using facilitated group discussions to engage in human interaction via active discussions; the theories from psychology are evident through the method of a questionnaire and determining motivational background for the demographic (see Figure 1).

The mixed-methods interdisciplinary study combines theories and methods from communication studies with psychology. The definition for interdisciplinary research is defined as “integrative research activities that combine more than one discipline, field, or body of knowledge” (Huutoniemi, 2010, p. 309). In a critical systematic literature review defining interdisciplinary research, Aboelela et al. (2007) recommends that interdisciplinary research be defined as the following:

[Research] based on a conceptual model that links or integrates theoretical frameworks from those disciplines, uses study design and methodology that is not limited to any one

field, and requires the use of perspectives and skills of the involved disciplines throughout multiple phases of the research process. (p. 341)

Figure 1, *Sarker's Interdisciplinary Framework: Disciplines, theories, constructs, and philosophies considered for student post-secondary success via physical exercise*, links together a number of theories and frameworks that associated to physical exercise and the psychological and academic influences that have the potential to be connected. The research is designed to bring together aspects from different fields of study to create a synergistic model which draws from concepts of motivation, goals, self-concept, self-efficacy, confidence, human interaction, collaborative learning, etc. The concepts in Figure 1 are integrated throughout the research process, allowing for a consistent flow of interdisciplinary research.

The SDT scale for Motives for Physical Activity Measure (MPAM-r), is the quantifiable method using the questionnaire to define motivations for the selected demographic when engaging in physical activity; however, a clear disadvantage is that it does not associate itself particularly well with understanding the rationale behind the outcomes of exercise in connection with the post-secondary students. Therefore, a qualitative method that inspires growth and awareness is implemented in the study to gauge impact and outcomes via the facilitated group discussions. The mixed-methods approach provides an opportunity for interdisciplinary research to represent student experiences in their academic environment in connection with their motivations to exercise. The interdisciplinary approach is also represented through sociocultural theory and collaborative learning. The educational implication through sociocultural theory explores student knowledge, views, and justifications (Mercer & Howe, 2012). Interacting with others and the exchange of thoughts provides an understanding of certain points and purposes

that students connect to and explore through metacognition while reflecting on their own experiences. When students work collaboratively, it develops individual “critical thinking which leads to deeper understanding, analysis, synthesis and evaluation of a certain topic” (Biström, 2005). Therefore, using a method that facilitates cognitive development within a group setting contributes vital research data. This qualitative aspect of the research plays an integral part in developing knowledge and creates associations between student interpretation of post-secondary success and experienced exercise outcomes.

Further background of the concepts shown in Figure 1 is reviewed in Chapter 2:  
Literature Review.

### **Definition of Terms**

Within this current study, there are key concepts that inform the research. The definitions of the terms identified below express the context in which they are used throughout the study.

#### ***Academics***

Academics refers to the interest “in or excelling at pursuits involving reading, thinking, and study” (Oxford English Dictionary, n.d.). The practice of academics is found in post-secondary institutions.

#### ***Academic Performance***

In this research context, academic performance refers to a research variable that is a measure of success within an academic environment. How a student performs informs their assessment of success. (See the definition of *Performance* below.)

#### ***Academic Success***

In this research context, academic success refers to a student's own personal assessment of their achievement or performance in a post-secondary environment. (The determination of success may include a range of outcomes such as a higher GPA, reduced stress, or increased confidence.) The specifics of what this term refers to is determined by the participants in this study.

### ***Constructivism***

Constructivism is an epistemological approach that characterizes learning as a process where social interaction is key to obtaining knowledge, especially in a group setting where there is participation from others (Van Bergen & Parsell, 2019).

### ***Cognitive Function***

In this research context, the concept of cognition refers to the process of obtaining knowledge; cognitive function is how the brain processes that knowledge and information. It is the activity and ability of the mind to be able to recognize things such as concepts, perceptions, or new learnings (Oxford English Dictionary, n.d.; Oxford English Dictionary, n.d).

### ***Cross-Sectional***

Cross-sectional studies are conducted in order to determine findings that are “carried out at one-time point or over a short period” in order to “indicate associations that may exist and are therefore useful in generating hypotheses for future research” (Levin, 2006).

### ***Exercise***

The concept of exercise is a category of “physical activity that is planned, structured, and repetitive and has as a final or an intermediate objective [of] the improvement or maintenance of

physical fitness” (Caspersen et al., 1985, p. 126). The term exercise is used to define a particular style of physical activity, resulting in an increased heart rate.

### ***Facilitated Group Discussion***

Facilitated group discussion is an interactive method of data collection where participants share their knowledge and experiences with other group members through active dialogue (Abusabha et al., 1999). The role of the facilitator is to ensure a comfortable environment for open discussion as well as lead the discussion topic by encouraging critical thinking (1999). The participants involved in the group are offered guidelines to follow in order to conduct a safe and respectful exchange of information during the discussion process (1999).

### ***Fitness***

Physical fitness includes health-related components such as “(a) cardiorespiratory endurance, (b) muscular endurance, (c) muscular strength, (d) body composition, and (e) flexibility” (Caspersen et al., 1985, p. 126).

### ***Group Learning***

Group learning is where participants are gathered and data is collected on “the activities through which individuals acquire, share and combine knowledge through experience with one another” (Argote et al., 2001, p. 370).

### ***Health***

In this research context, multiple aspects of health is examined (the general condition of the body), which may be broken down into physical, mental, and/or emotional health (Oxford English Dictionary, n.d.).

***Mixed-Methods***

Mixed-methods research is identified as the third research community (Teddlie & Tashakkori, 2009). In order to enhance understanding, it includes both quantitative and qualitative methods within its research approach (2009). The research questions within the study determine the need for a mixed-methods approach (2009).

***Motivation***

In this study, motivation is defined as “what people desire, what they choose to do and what they commit to do” (Keller, 2010, p.3). Motivation is the crux of numerous theories including Self-Determination Theory (Ryan & Deci, 2000), which is the underpinning of this study.

***Performance***

Performance refers to the quality of the execution of a certain action or process that is evaluated by its capability to be measured against a determined standard (Oxford English Dictionary, n.d.).

***Physical Activity***

Physical activity “is defined as any bodily movement produced by skeletal muscles that results in energy expenditure;” thus, “physical activity in daily life can be categorized into occupational, sports, conditioning, household, or other activities” (Casperson et al., 1985, p. 126). Therefore, a version of physical activity is exercise, which may result in fitness.

***Post-Secondary***

This term is used to describe a stage in education that comes after secondary school and is further formal education (such as university or college) (Oxford English Dictionary, n.d.).

***Student***

A student is an individual who is pursuing higher knowledge and education in an academic institution (Oxford English Dictionary, n.d.). In the context of this study, the participants are all students enrolled in a post-secondary institution.

***Success***

Success is a measure of good or bad fortune in a specific situation (Oxford English Dictionary, n.d.). In this current research, participants identify the meaning of *good* success from their individual perceptions.

***Young Adult***

Young adult refers to an age group of individuals who are in their late teens to early twenties (Oxford English Dictionary, n.d.). The participants in this current study are students aged between 18 years and 25 years old, which fall under the young adult category.

## **Chapter 2: Literature Review**

This section reviews current literature that informs the current research on the study of physical activity for academic success. The purpose of the literature review is to gather an understanding of the background knowledge available to support the need to fill a current gap in research. When reviewing the literature, it was found that when examining the impact of exercise on cognition, many studies are focused on children or older adults and not as many on young adults; however, the findings from these studies are applicable across demographics as the research explores overall human brain development/plasticity in connection to physical and cognitive results.

The literature review is sectioned into four parts; the first part is the theoretical framework the research is based on and draws from, such as self-determination theory and sociocultural theory. Also included in this first part is a review exploring motivation and cognitive enhancement in connection to post-secondary success through group learning. The second part of the review identifies the research interdisciplinarity of the study in relation to the theories and methods the research draws from. The third part of the literature review examines neuroscience and brain function associated with physical exercise activity. The fourth part of the literature review focuses on studies conducted in three demographics: the impact of exercise on cognition for children, the impact of exercise on cognition for younger adults, and the impact of exercise on cognition for older adults. The first two parts go through the concepts with support from literature, whereas the second two parts review specific literature within each of the sections. The insight gained from the following concepts and literature inform the current study as they provide findings and methodology considered when constructing the purpose of the research and the research design.

## **Theoretical Framework**

This section reviews concepts displayed in Figure 1, *Sarker's Interdisciplinary Framework: Disciplines, theories, constructs, and philosophies considered for student post-secondary success via physical exercise*. The research is based in the disciplines of psychology and communication studies. From those disciplines, there is a focus on self-determination theory and sociocultural theory, with influences from constructs such as Zone of Proximal Development and collaborative/group learning.

### ***Self-Determination Theory***

This section of the literature review provides insight into what self-determination theory is and how it and its sub-theories guide the current research. Developed by psychologists Edward Deci and Richard Ryan, the theoretical framework of self-determination theory (SDT) identifies human growth in connection to intrinsic and extrinsic motivations (Ryan & Deci, 2000). SDT examines completing actions based on participant goals and values, such as exercising, to be successful in academics.

Within SDT, there are six mini-theories, two of which fit the current research: cognitive evaluation theory and goal contents theory. Cognitive evaluation theory looks at how rewards (i.e., personal accomplishment of having a great workout) and ego (i.e., self-care) factor into one's intrinsic motivation to complete certain activities (Ryan & Deci, 2000, p. 70). In contrast, goal contents theory adapts extrinsic motivation associated with image, well-being, and success (i.e., receiving good grades, having confidence, being stress-free, etc.) (Ryan & Deci, 2000). Both autonomous and controlled motivations of individuals were examined and questioned to cultivate reasoning behind actions. Ryan and Deci developed a questionnaire titled Motives for Physical Activity Measure (2019) which examines the motives for why individuals participate in

physical activity. In a study conducted by Friedrichs et al. (2015), the authors profiled the motivation of physical activity through self-determination theory and found questionnaires were a good measure for collecting data specific to working with the SDT framework (2015). Additionally, a systematic review on exercise and physical activity has shown that the perspective of SDT has grown substantially over the years when examining both autonomous and controlled motivational factors that support exercise and its outcomes (Teixeira et al., 2012). Therefore, based on the history of SDT on exercise studies, this framework is considered an integral component of this research. SDT is integrated into the current research through the questionnaire available through the Center for Self Determination Theory, titled Motives for Physical Activity Measure (Center for Self-Determination Theory, 2019; The Motives for Physical Activity Measure questionnaire can be found in Appendix A). The questionnaire method provides the groundwork for the current study when examining the motivations of post-secondary students to participate in physical exercise.

### ***Sociocultural Theory***

This section of the literature review provides background on what sociocultural theory entails and its position within the current research. Sociocultural theory assists in identifying and assessing knowledge sharing in a group setting. Lev S. Vygotsky is recognized as the founder of sociocultural theory, where “the core of Vygotsky’s work examines humans as meaning makers” (Mahn, 1999, p. 342). The theoretical perspective of Vygotsky’s sociocultural theory is the basis of conducting facilitated group discussions as a method of data gathering within the current research. Sociocultural theory indicates that someone’s social interactions inspire and create individual cognitive development (Bonk & Kim, 1998). Studies have also found that

sociocultural learning for adults has been successful through interactive and collaborative learning within small group discussions. Research has found that when individuals are able to consult with each other, they are able to cultivate a process for enhanced learning (Schein, 1996). Therefore, the use of facilitated group discussions and the knowledge exchange between participants have the opportunity to spark awareness within participants. The purpose of analyzing student learning in a social setting is in connection to how discussions raise student awareness of their own motivations and behaviors, in turn, contributing to their recognition of the possible association between exercise and academic success.

**Zone of Proximal Development.** Vygotsky's zone of proximal development (ZPD) was considered when analyzing participants in the facilitated group discussions as "cognitive development is studied by examining the processes that one participates in when engaging in shared endeavors and how this engagement influences engagement with other activities" (Scott & Palincsar, 2013, p. 3). Vygotsky states that "learning awakens a variety of internal developmental processes that are able to operate only when [individuals are] interacting with people in [their] environment and in cooperation with [their] peers" (Vygotsky, 1978, p. 90); therefore, the structure of the current research allows participants to each play both roles within ZPD, as the learner cultivating information and knowledge from their peers within a zone of development (an area where they may lack knowledge), as well as have a turn as the guide who provides knowledge to those within the zone of development. When students participate in sharing their experiences with one another about exercise outcomes associated with academic success, this process of discussion on shared experiences may impact how other participants reflect on their personal connection on their personal association between exercise and academic

success. Therefore, ZPD informs the research by assessing how group discussions inspire student awareness and perceptions.

**Collaborative Learning.** Laal et al., (2013) define collaboration as “a philosophy of interaction and personal lifestyle where people are accountable for their action, including learning and respect the abilities and contributions of their peers” (p. 1427). When participants interact with each other, the concept of collaborative learning aligns with group learning as an “instruction[al] method in which students at various performance levels work together in small groups toward a common goal. The students are responsible for one another’s learning as well as their own” (Gokhale, 1995, p. 1). This type of accountability on an individual’s learning has the opportunity to influence personal investment. Collaborative learning states that “the active exchange of ideas within small groups not only increases interest among participants but also promotes critical thinking” (Gokhale, 1995, p. 22). Therefore, group learning is often used in higher education as “students are capable of performing at higher intellectual levels when asked to work in collaborative situations than when asked to work individually” (p. 28). Similarly, Schein’s philosophy of process consultation (created in collaboration with the works of Lewin) contributes to organizational development by establishing group experiences as a core process involved when participants try to understand *what is happening* around them by consulting with one another (Lambrechts et al., 2009). Therefore, conducting facilitated group discussions allows for group learning, collaborative learning, and process consultation by the stimulation of thought and cognizant recognition.

### ***Cognitive Enhancement Through Group Learning***

This section of the literature review provides highlights on cognitive enhancement through group learning. Group learning and collaborative learning are constructs that are important to the research when viewing group interactions. In 1999, Amy C. Edmondson defined group learning as “an ongoing process of reflection and action, characterized by asking questions, seeking feedback, experiments, reflecting on results, and discussing errors or unexpected outcomes of actions” (Wilson et al., 2007, p. 1042). As the research implements a qualitative piece using group discussions, it is vital to investigate the concept of group learning. When participants speak to each other, they inspire new thoughts as well as teach each other different and new things (which is expanded on in the coming sections). Although group learning has many definitions from multiple theorists, the definition that aligns with the current research is from 2001 by Argote et al., (2001) in which they state group learning is “defined as ‘the activities through which individuals acquire, share and combine knowledge through experience with one another’” (Wilson et al., 2020, p. 1042). On group learning, Wilson et al. (2020), share that there are three features to group learning; the first is sharing, which is when “new knowledge, routines, or behavior becomes distributed among group members” (p. 1044); the second is storage, which is where the new knowledge from group members is retained in memory (p. 1047); and the third is retrieval, where the group members have the ability to take the new knowledge and apply it themselves (p. 1050).

The enhancement of knowledge through a group setting is also a concept shared in Lewin’s (1947) theory of group decisions. Literature outlining Lewin’s work states that individual decisions are often based on discussions during group settings (Wang, 1976). Viewing

literature on group decisions identifies potential areas of knowledge development by participants.

A point of interest is the realizations that the participants make when in a group setting.

The literature on group learning was observed specifically around the impact of group discussions on individual realizations. The cognizant participation of participants supported the research inquiry regarding group discussions and their impact on student awareness regarding their views of how exercise may be associated with their post-secondary success.

### **Interdisciplinary Framework**

In reviewing the literature available on the outcomes of exercise on academic performance, much of the literature is based on the disciplines of exercise psychology, and/or neuroscience. The research in these disciplines provides well-documented data on the cognitive and physical effects of exercise, which is beneficial as it provides findings on how “higher levels of aerobic fitness [has] been linked to learning and memory” (Kantomaa et al., 2016, p. 432) and how regular exercise has both physical and psychological benefits associated to health (Teixeira et al., 2012). However, even though these studies examine the outcomes of exercise, the literature contains gaps in research when the personal experiences of these benefits in the particular demographic in question (young adults who are post-secondary students).

Data analysis uses thematic analysis, a fundamental method of both psychology and communication studies to code and review findings. Particularly, the use of a theoretical (deductive) approach to thematic analysis as the data collected specifically investigates outcomes connected to a certain topic (Braun & Clarke, 2006). Both communication studies and psychology are integrated during the encoding and decoding process in order to answer the research questions for this study.

As mentioned in the theoretical framework, the theory within communication studies (which originally stems from psychology) that is integrated into the current research is Vygotsky's (1978) sociocultural theory. From sociocultural theory, the two concepts explored include the zone of proximal development (ZPD) and collaborative learning. These principles address how individuals engage with one another in order to share and gain knowledge from each other (Gokhale, 1995). With the use of facilitated group discussions, these principles work for the research by sharing experiences and thoughts among others with the opportunity to build on knowledge and formulate responses based on ideas shared within the group (1995). Student engagement in group discussions and active participation encourages students to develop new knowledge from their peers in order to enhance their own awareness and thinking (1995). Therefore, with facilitated group discussions, a guided conversation between peers encourage an increase in self-disclosure when participants can relate and build on their responses with those who may encounter similar exercise outcomes. It also becomes a rich method for collecting data from a homogeneous group (close in age, participates in exercise/sport, is a post-secondary student, etc.).

In the research, it is beneficial to promote discussion to enhance the understanding of participant experiences through communication. In this case, the facilitated group discussion method also interrelates with communication studies and human interaction through collaborative learning. The use of small groups works to identify patterns that emerge from a common purpose (Davis, 2016). The common purpose that the participants would have for the current study is to be successful in a post-secondary environment.

Similarly, a theory from psychology that is integrated into this interdisciplinary study is SDT. This theory is an approach that assists in the understanding of motivation, which is a salient and continuous topic in the discipline of psychology (Ryan & Deci, 2000). SDT is distinguished between intrinsic and extrinsic motivation, which is based on various reasons such as “doing something that is inherently interesting or enjoyable” (intrinsic) or “doing something because it leads to a separable outcome” (extrinsic) (Ryan & Deci, 2000, p. 55). This theory is suitable for the research as it looks at how much and what kind of motivation one may have (2000). SDT has been applied to many previous studies examining exercise and behavioural outcomes, such as a systematic review that examined empirical literature of 66 studies on the association between physical activity and SDT which found positive results for autonomous motivation to perform exercise (Teixeira et al., 2012); or the cluster analysis study of 2473 individuals examining the motivational profiles of adults on physical activity motivation based on SDT which also found that autonomous motivation was important for physical activity behavioral outcomes (Friedrichs et al., 2015). The application of SDT on similar topics have been used to guide previous studies (such as in Friedrichs et al, 2015, etc.) based on quantifiable results. Previous studies have either used survey or experimentation methodologies, resulting in statistical analysis. However, since there is a lack of qualitative research on the topic, the current research aims to fill that gap in knowledge by also including the qualitative component.

The main disciplines within the interdisciplinary research come from social science academic fields and uses models of data gathering and analysis that intersect and support each other through shared publications (Aboelela et al., 2007). As such, by framing the research topic from the current literature, and drawing from various theories and methodological practices, the

research follows a structure for an appropriate interdisciplinary research approach that may be considered for multiple different disciplinary publications.

As previously mentioned, SDT hosts sub-theories such as cognitive evaluation theory (focusing on intrinsic motivation) and goal content theory (focusing on extrinsic motivation) (Center for Self-Determination Theory, 2019). Cognitive evaluation theory states that there are basic universal psychological needs associated with motivation that need to be met which include autonomy (willingness through value and choice), competence (confidence in what you are doing), and relatedness (personal connection to others) (Ryan & Deci, 2000). However, goal contents theory is associated with image, well-being, and success (i.e., receiving good grades, having confidence in actions, being stress-free, etc.) (Center for Self-Determination Theory, 2019). An interesting component of the research identifies the type of motivations that students have that connect with their specified exercise outcomes. An advantage of this disciplinary approach is that it has the opportunity to connect with social cognitive theories of self-concept and self-efficacy based on the metacognitive awareness and confidence related to developing one's motivations. Cognitive processes and motivational processes regulate human function for self-efficacy as someone's self-appraisal and assessment of capability influences goals that are set for themselves (Bandura, 2010). These set of theories assist in understanding the motivations students have when working towards gaining certain outcomes from exercise for the purpose of feeling successful in their post-secondary environment.

**Neuroscience and Brain Function Associated with Physical Activity**

A study by Alkadhi (2018) examined the brain structure and influences that exercise has on both animals and humans (elderly, children, disabled, etc.) which confirmed that “regular exercise of moderate intensity can substantially improve cognitive function” (p. 3113). It was found that both voluntary and/or forced exercise influenced the plasticity of the brain when it came to memory or learning. However, it was also found that too much activity could overstimulate the brain and cause exhaustion resulting in memory impairment (p. 3113).

Although the ideal amount of physical exercise to increase cognition is yet to be determined, Medina (2014), a developmental molecular biologist and founder of two brain research institutes, states that “in a laboratory, the gold standard appears to be aerobic exercise, 30 minutes at a [time], two to three times a week. [Adding] a strengthening regimen [provides] even more cognitive benefit” (p. 25).

Suzuki (2015), a neuroscientist and professor of neuroscience at New York University, found that “long-term exercise can increase the number of new cells in the hippocampus and might significantly improve [the] ability to lay down new memories” (p. 126). However, similarly to Alkadhi (2018), Suzuki (2015) provides limitations and acknowledges that “we don’t know what kind of exercise works best, what duration and activity level is best, or if men and women have different optimal exercise regimes for optimal brain health” (p. 119). However, Suzuki’s study provides evidence that “exercise is responsible for the majority of the positive brain changes seen with environmental enrichment, including increases in the size of the [brain’s] cortex,” (p. 133).

When identifying the significance neuroscience has within the intended study about exercise, it is vital to note that brain health influences cognitive function. As such, it is important to understand the connection between the brain, the body, and overall performance.

### **The Impact of Exercise on Cognition for Children**

This section of the literature review highlights research that identifies how exercise affects cognitive development in children. Many studies have been reviewed examining the physical activity of children within journals such as *Brain and Cognition*, *Neuroscience*, *Developmental Cognitive Neuroscience*, *Health Behaviour and Policy Review*, *European Physical Education Review*, *Journal of Research on Adolescence*, etc. Key themes and focused topics that emerge from these studies include how the brain responds directly to exercise, as well as what physical activities connect to positive results in student academics.

The neuroscience research presented by Hillman et al. (2009) indicates that the effects of exercise on the brain is consistent with findings from additional literature which aims to understand how the brain responds to exercise. For example, a study from the University of Illinois found that when students in primary school preformed 20-minutes of physical activity immediately preceding an exam, they excelled in both reading comprehension and math. This study explains how “neuroscience research suggests that exercise powers up brain areas associated with executive functions that support thinking associated to learning and memory” (Hillman et al., 2009, p. 1045). Understanding the effects of exercise connected to learning is vital information to consider when informing the current study as performing well in school tends to be a high motivator for post-secondary students (due to the motivation for potential

awards and scholarships); therefore, research which ties together exercise and academic success through various levels of education is applicable as background information.

A study examining how exercise improves executive function in children aged seven to eleven from 2003 to 2006, who are also overweight, revealed that there is a sensitivity between a child's cognitive development and aerobic activity and as such, there is a relation to better grades, especially in mathematic achievement (Davis et al., 2011, p. 91). This study also cited that "children's cognitive and neural development may be sensitive to physical activity" and that "in children, vigorous physical activity has been associated with better grades, physical fitness with academic achievement (p. 92). A conclusion from this study was that "aerobic activity may prove to be an important ethos of enhancing aspects of children's mental functioning that are central to cognitive development" (p. 102). This study informs the current research as it outlines various conclusions from multiple sources on the impact of physical activity on cognitive development.

Ratey and Hagerman (2008) discuss a case study between exercise and the brain in grade-school children. The case study is based on a program titled Zero Hour PE at Naperville District 203 in Illinois, USA. This program consisted of a group of students attending an organized physical activity course prior to their first class of the day (p. 10). The students were provided with heartrate monitors and were encouraged to work on their own personal best scores while keeping up with the recommended heart rate level for their body mass index (pp. 10 - 11). According to the findings, the additional morning exercise heightened awareness and focus, making the students more receptive to learning (p. 15). The participating students increased "biological changes that encourage brain cells to bind to one another" (p. 10) making them more

receptive to learning. The Zero Hour PE program showed “a 17 percent improvement in reading and comprehension, compared with a 10.7 percent improvement among the other literacy students” (p. 11) who did not participate in the Zero Hour PE program. Ratey and Hagerman (2008) determined that the “focus on fitness plays a pivotal role in [a students] academic achievements” (p. 15). Although the current research is not a longitudinal study and does not use monitors, the findings from this study inform the research as it provides background to the outcomes of exercise which were points of interest associated with the success of post-secondary students (such as increased focus in class). The background information provided by the literature has the potential to support the research question which asks about the outcomes and experiences resulting from physical exercise that influence personal post-secondary success.

Multiple studies have revealed that a child’s physical aerobic activity levels may result in better course grades. For instance, a study by Davis et al. (2011) tested a hypothesis regarding the increase of exercise being linked to improved executive function for overweight children. The study found that when the researchers assessed cognition and academic achievement, there was a benefit created from exercise that resulted in mathematic achievement.

When researching brain function in children, Medina (2014) found that when children were provided with physical education, they “did better on language, reading, and [a] basic battery of tests” (p. 33). The study highlighted by Medina shows that when children engage in physical activity, they do better on several basic academic skills including language and reading (p. 33). As such, information regarding the type of exercise post-secondary students partake in comparison to the type of courses or the discipline participants are enrolled in are points of interest.

In another study on children, Stylianou et al. (2015) begins with the research question asking, about the attempt teachers make in including classroom-based physical activity in their daily teachings (p. 391). This study was part of a school health and physical activity project, where teachers worked with children from kindergarten to grade five by collecting self-reported data as well as conducting interviews (2015). The study focused on the experiences of the teachers who added class-based physical activity rather than just a physical education class. The study found that it was highly recommended to include classroom-based physical activity; however, suggests that teachers gain training prior to incorporating class-based physical activity (2015). This study informs the current research as it highlights that in order to improve the health of students, guidance is required.

Cox et al., (2011) identified the importance of physical activity in primary school settings and how researchers should connect with “school governance leaders (school board members, superintendents, and senior administrators)... because they can introduce and advocate for policies that can favorably influence student health” (p. 1). The research determined that “understanding key issues that influence how school board members perceive student physical activity and its impact on academic achievement is critical to gaining support for policies to improve physical activity” (p. 5). This study is beneficial to the current research as it provides insight into how those who have authority and may implement various programs can influence health-related changes among students.

A study by Drollette et al. (2014) examined how acute exercise impacts brain function and cognition in children. The study was created to fill a gap in research which showed that despite all the findings stating the benefits of exercise for mental and physical health, a child’s

school day seemed to be declining in the amount of physical activity incorporated throughout the day (2014). The study reviewed the amount of time needed to see the benefits of exercise on 40 grade-school children aged 8 to 10 (2014). Trials were conducted through neuroelectric assessments and cardiorespiratory assessments and found that “a single, acute bout of moderate aerobic exercise facilitates cognitive performance” (p. 59). This literature informs the current study as it shows that not a long period of time is needed in order for individuals to feel and recognize the outcomes of exercise on their cognition, which may be transferable to academic cognition.

A study by Donnelly et al. (2016), conducted a systematic review of physical activity, fitness, cognitive function, and academic achievement in children. The aim of the study was to investigate two things; first, if physical activity influenced aspects connected to student cognition and learning in children aged five to 13 years old, and second, if physical education and sport influenced academic achievement and concentration in that same demographic. Articles were collected on the topic based on certain criteria and grouped into various categories. The first aim collected 64 eligible articles and the second aim collected 73 eligible articles. The systematic review found that for the first aim, there was an improvement and overall positive effect on executive function when acute bouts of physical activity and fitness was applied; however, the study also found that increasing physical education had a neutral effect on student academic achievement. The study also included a clearly defined list of terms that were frequently used in the study. The list of definitions was insightful in gathering a proper understanding of the research in relation to the language applied within a study in the field of academics and physical activity.

Cacciotti et al. (2015) developed a critical review on physical activity and childhood academic achievement. For the study, the researchers searched databases for specific terms relevant to the study within specific literature databases to find 10 articles connected to academics, executive, cognitive function, health, and fitness. The literature review found that “exposure to a significant physical [exercise] will have a desirable effect on the academic achievement of children” (p. 39) The study further notes that even though exercise generally has a positive outcome on academic achievement, the type of exercise, intensity, and duration is not the same for all. This study informs the current research as it not only summarizes literature from other studies, providing helpful background information; but also provides a clear understanding of gaps in knowledge.

Kantomaa et al. (2016) conducted a study where they examined the association between academic achievement had between sedentary behavior and physical activity. The study was conducted in Finland and included 8,061 children who were chosen at infancy and then provided a question when they reached around 16 years of age. The participants were also requested to provide self-reported data on overall physical activity, sports memberships, TV habits, sleep habits, etc. The results from this research found that participants who participated in high levels of physical activity and lower levels of sedentary behavior tended to have a good academic achievement according to their academic grade and grade point average. This study informs the current research as the participants in the study were close in range to the eligible opening age of those in the current study; the participants in the study were at the age where the next academic step for students would be to enter post-secondary education.

### **The Impact of Exercise on Cognition for Young Adults**

This section of the literature review provides research highlights on the impact of exercise on cognition for a young adult demographic. As the current research focuses on young adults (aged 18 to 25), a literature review on individuals from this demographic who are enrolled in post-secondary education was investigated. Research that shows the continuity of exercise throughout the ages makes it possible to better understand student motivations to exercise. When examining young adults in comparison to grade-school students, there was evidence within the literature linking the two demographics. This link is evident in statistics that show when grade-school students are in the habit of exercising, they are more likely to continue exercising as adults (Ratey & Hagerman, 2008, p.13).

A study conducted by Budzynski-Seymour et al. (2020), collected data in a cross-sectional study. The study examined the physical activity, mental and personal well-being, social isolation, and perceptions of academic attainment and employability of 11,462 post-secondary students in the United Kingdom. The study used a survey as their method of data collection and found that 51% of students did not reach the recommended activity levels compared to the general population of young adults aged 16 to 24 years old. However, the study found that those who engaged in physical activity had a positive association with factors such as mental, social, personal well-being. The study suggests that the level of physical activity in a post-secondary students life directly impacts their perceived employability, which is a motivating factor for the post-secondary age group. This study informs the current research as it provides background to the outcome and impact of physical activity for a young adult demographic.

In 2017/2018 a study was published by UK Active claiming that physical activity holds the key to improving the mental health of post-secondary students (2018). The joint report by joint-report from ukactive, British Universities & Colleges Sport, Precor, and Scottish Student Sport surveyed 6,891 students from 104 different post-secondary institutions. The report “found that promoting physical activity, including sports participation and gym membership, improves student’s personal well-being, mental well-being, social inclusion, and perceived academic attainment and employability” (UK Active, 2018). In a time where mental well-being due to mandatory isolation (due to the COVID-19 pandemic) has become a concern to many, understanding how physical exercise can impact ones overall well-being is significant in the overall outcome to ones developing lifestyle and career path.

When focusing on a post-secondary demographic, literature was reviewed to understand how researchers conducted their study with post-secondary students and what the gaps in research are for this particular demographic. In a study that focused on graduate students and physical activity, the researchers used mixed-methods to measure the amount of exercise a student participated in compared to their GPA (Gonzalez et al., 2014). The research design for the study by Gonzalez et al. (2014) included an initial survey that identified their target demographic as well as self-reported physical activity and GPA. From there, the researchers sent the students further questionnaires to answer. This study used a questionnaire in order to gain further insight into the initial findings. Gonzalez et al. was very clear in stating the challenge they encountered and providing suggestions for achieving better results. These suggestions were considered when approaching the current research. This study was “prompted by studies of physical activity and its relationship with academic performance because graduate students are concerned with their academic success” (p.164). The research recognized that future studies need

to address a larger range of benefits of physical activity associated with academic performance rather than just GPA (p. 164). This concept inspired the reasoning behind why the current research looks at a range of outcomes considered as academic success rather than just GPA. The current study focuses on experiences and outcomes of exercise that connect with academic performance in various ways as deemed as being important to students, by students. Gonzalez et al. (2014) concluded that “academic performance comes at the cost of reducing time for and resources spent on extracurricular activities that encourage physical activity. Therefore, future studies need to address other benefits of physical activity for students in professional programs” (p. 164). This statement is encouraging as it identifies an existing research gap in this field of study, as well as provides insight on further considerations on conducting research in this field.

There are few studies in this domain of inquiry between exercise and academic success for the young adult demographic. Suzuki (2015) uses her own students as research participants to identify the relationship between exercise and the brain (2015, chapter 5). She created a course called “Can Exercise Change your Brain?” where she guided physical exercise for the first half of the class and lectured for the second half. Then, she compared the results of the course to a similar course with no exercise. Her book provided significant insight into the core structure and thought process for the intended study. Suzuki (2015) believes that the reason that this demographic is underrepresented is because “it is generally thought that healthy young adults are at the height of their brain power” (2015, p. 119) whereas “the cognitive decline in aging is a normal occurrence, so there is a larger window of possible improvement in this group relative to younger adults” (Suzuki, 2015, p. 119). Suzuki’s study displays a clear presentation of her methodology and understanding of the scope and limitations that come from this specific

demographic. Suzuki's book is significant to the current study as it speaks to current development in cognitive research in the post-secondary demographic.

Several studies have claimed that not enough is known about the use of exercise in relation to post-secondary students (e.g., Alkadhi, 2018; Colcombe & Kramer, 2003, 2018; Drollette et al., 2013; Medina, 2014; Suzuki, 2015). Therefore, the current study investigates the young adult post-secondary student demographic specifically with the aim of advancing and contributing to knowledge regarding the association between academic performance and its connection to the various outcomes of exercise.

### **The Impact of Exercise on Cognition for Older Adults**

This section of the literature review provides research highlights on the impact of exercise on cognition for older adults. The older adult demographic was examined in order to gain insight into the potential findings that may result or be transferable in a young adult demographic. Journals reviewed for the literature review include the *International Journal of Behavioral Nutrition and Physical Activity*, *Association for Psychological Science*, *Medicine and Science in Sports and Exercise*, *American Journal of Epidemiology*, etc. Collaborative evidence from several studies identifies that the adult population exhibits a larger benefit through the influences of physical activity by doing tasks that require extensive amounts of cognitive control and function (Hillman et al., 2009, p. 1047). As the demographic for the study focuses on young adults, the effects of physical activity on an overall adult population were examined for transferability purposes.

Improvements in human cognition is a positive outcome in any demographic. Medina (2014) examined the possibility of physical activity and its influences on cognitive skills among

adults who were conditioned with a sedentary lifestyle versus an active lifestyle (p. 21). He found that with the elderly, an active lifestyle improved cardiovascular fitness which increased an individual's likelihood to reach age 90 while in good condition (p. 23). Medina also examined research on adults aged 35 to 55 and determined that poor physical activity also resulted in poor cognitive abilities (p. 24). These findings inform the research as participants are asked to report on a variety of results connected to their academic success they determine as being influenced by physical activity, which may include cognitive abilities.

Medina (2014) also notes that benefits are created when adult employees exercise as their health is improved, which minimizes the potential for chronic diseases and increases workplace focus) with a reduction in healthcare costs (p. 34). He identifies in his book that regular exercise among business workers “improves problem-solving abilities, fluid intelligence, and even memory – sometimes dramatically so” (p. 34). Therefore, these outputs of exercise may be transferable to a post-secondary audience as exercise may be used as a tool to increase cognitive abilities (brainpower).

Previous studies have highlighted the impact of exercise on older adults. Colcombe and Kramer (2003) examined the effects of exercise in older adults by reviewing published works, books, peer-reviewed articles, and online databases “using combinations of the following keywords: age, aging, age differences, older, elderly, exercise, fitness, cardiovascular, aerobic exercise, cognitive, cognition, and longitudinal” (p.126). The results found that “the online and manual searches yielded 167 articles, which were then reviewed to assess their appropriateness for their study” (p.126). In 2018, Colcombe and Kramer revisited their 2003 article where they provided insight regarding the information on the subject matter that they did not previously

have, such as exercise protocols (p. 214). The authors were “happy that [their] meta-analysis has encouraged additional research into the important topic of exercise effects on cognition” (p. 216). This literature informs the study as it amplifies the relations between physical exercise and mental performance, as well as identifies exercise protocol. These are all factors that are explored in the qualitative portion of the study which pertains to recognizing the outcomes and experiences resulting from physical exercise that has the potential to influence personal post-secondary success.

### **Health Reports and Government Statistics**

The component of the current research that identifies the outcomes of exercise that students find beneficial to their success can be assessed through academic literature and public health reports. Health reports state that exercise leads to lower cases of chronic diseases, resulting in lower health care costs due to less sick leave, medical costs, etc. (Colley et al., 2011):

Regular physical activity is associated with a reduced risk of cardiovascular disease, some types of cancer, osteoporosis, diabetes, obesity, high blood pressure, depression, stress and anxiety. As well, strong evidence suggests that higher levels of physical activity are associated with health benefits; in fact, the more activity, the greater the health benefit. (Colley et al., 2011, p. 7)

The effects of exercise on the body are pieces of critical knowledge for all shareholders, including, post-secondary students, post-secondary institutions, the government, and the fitness industry. When individuals are exercising daily, no matter what their motivations, they are improving and/or maintaining multiple aspects of their health (Colley et al., 2011). Studies have also identified the economic benefits of increased physical activity. For example, a 1994-1997

U.S. panel study found that moderate increases in physical activity (three or more times per week) among adults resulted in lower health care charges of approximately \$2,000 U.S. dollars annually (Martinson et al., 2003). When considering a young adult post-secondary demographic, new knowledge in this field, has the opportunity to inspire the well-being of students which may assist the government with net health care costs longitudinally. More physically active post-secondary students may also potentially miss fewer school days due to illness.

The Government of Canada's *Physical Activity and Sport Act* (2017) identifies three objectives, (1) "to promote physical activity as a fundamental element of health and well-being;" (2) "to encourage all Canadians to improve their health by integrating physical activity into their daily lives;" and (3) to assist in reducing barriers faced by all Canadians that prevent them from being active" (p. 2). The *Act* (2017) which is current to November 2, 2020, also states that "the Government of Canada wishes to encourage cooperation among the various governments, the physical activity and sports communities and the private sector in the promotion of physical activity" (p. 1) and that an objective they have is to assist in research or studies with respect to physical activity (p. 3). Therefore, any type of knowledge that emerges that has an impact on well-being or creates a shift in lifestyle for Canadians (such as students in post-secondary institutions benefiting from the research-driven by their peers in relation to exercise outcomes) creates a potential contribution to both social and economic change.

### **Chapter 3: Methodology**

This chapter provides an overview of the methods and tools used to conduct the research. The purpose of the research, research questions, and instruments applied are identified prior to discussing the study's *three-phased approach*. The three phases of the research included identifying the participant sample/eligibility and methods of data gathering. The three-phased approach included the following:

Phase I: the eligibility form

Phase II: the questionnaire and consent form

Phase III: the facilitated group discussion

It is important to note that the current research study submitted two ethics reviews that were both approved. The first was for Royal Roads University, the university executing the research, and the second was for MacEwan University, the university whose students were used in the research.

### **Purpose**

The purpose of this research was to cultivate knowledge that is currently unavailable by striving to understand the association between exercise and academic success by examining the motivations of post-secondary students. The new knowledge was acquired by examining student interpretations of *success* in relation to student academic performance (i.e., higher grade point average, improved memory retention, confidence in presenting in class, being less tired during lectures, etc. [as informed by the literature review]).

**Research Questions Revisited**

The following are the research questions for this study:

***RQ1***

What outcomes and experiences resulting from physical exercise influence personal post-secondary success (as identified by students)?

***RQ2***

What motivates post-secondary students to participate in physical exercise?

***RQ3***

In what ways might group discussions impact student awareness regarding their views of how exercise may be associated with their post-secondary success?

**RQ3a.** In what ways does group discussion impact a student's motivation to exercise?

**Instruments Applied**

This study uses the following instruments for data collecting purposes for Phases I-III:

Phase I and II: Survey Monkey – Eligibility Form; Questionnaire MPAM-r

Phase II: Questionnaire – Motives for Physical Activity Measure (MPAM-r)

Phase III: Zoom: Online facilitated group discussions with participants

***Phases I and II: Survey Monkey***

Survey Monkey is an online tool that was used as an instrument twice in this study.

Survey Monkey is cloud-based software that allows an individual to create online surveys which provide multiple options for data collection (i.e.: weblink, email, buying targeted audiences, social media, etc.). The first use of Survey Monkey for this study was for the eligibility form in Phase I (see Appendix B). The second use of the Survey Monkey was to provide the

questionnaire in Phase II (MPAM-r) (see Appendix A) to participants. Weblinks to these two surveys were provided via weblink to participants. Survey Monkey has the means to calculate various analytics for each question as well as the average time it takes participants to answer the survey. Survey Monkey also employs ethical responsibilities by ensuring that information collected via Survey Monkey protects the privacy of participants; the collected responses are securely stored in an accredited database with all transmitted data protected over a secure connection (Survey Monkey, 2021).

***Phase II: Questionnaire: Motives for Physical Activity Measure***

The Motives for Physical Activity Measure questionnaire (MPAM-r) (Center for Self-Determination Theory, 2019), is structured to gain quantifiable information about the participant's motivations to engage in physical activity, such as what their purpose is for exercising, what benefits they gain from exercising, etc. This study used the revised and extended version of the questionnaire developed and validated in 1997 by Ryan et al., (1997). The revised questionnaire identifies five motives: fitness, appearance, competence/challenge, social, and enjoyment (Motives for Physical Activity Measure, 2019). Therefore, the questionnaire assists in answering the first research question that gauges student motivations to exercise. This questionnaire was provided via email through a secure Survey Monkey link. The questionnaire took approximately two to five minutes to complete. Beginning the study with a questionnaire allowed students to engage privately with the general topic and assist in understanding the association between their personal motivations to exercise prior to sharing their thoughts and opinions with the group on the outcomes of exercise in connection with their

personal academic success. (A copy of the Motives for Physical Activity Measure (MPAM-r) questionnaire can be found in Appendix A.)

### ***Phase III: Zoom Video Communications***

Due to the state and conditions of the COVID-19 pandemic, all interactions with students were made to be virtual. Therefore, the facilitated group discussions were conducted through Zoom Video Communications (Zoom), a virtual video/audio/chat software communications platform. The use of Zoom allowed for safety measures such as requiring a password to enter the discussion along with having to wait until the “host” (researcher) entered the participant into the discussion. The participants in the facilitated group discussions consented to the discussions being recorded. The first form of consent was through a signed research consent form, and the second was an automatic recording notification provided by Zoom; Zoom sends a notification to participants to inform them that they are being recorded (Zoom, 2021). During the facilitated group discussion, participants had the option to leave their video on or turn it off based on their comfort level. Participants also had the opportunity to change their name to maintain anonymity. Zoom uses end-to-end encryption for its video, audio, and screen sharing abilities to ensure that the information exchange between all participants is kept private and secure while also having an option to ensure that the chat function is encrypted for safety measures if needed (Zoom, 2021). Zoom was an excellent instrument to use for this study during a time when face-to-face gatherings were not advised due to public health risks.

## Research Participants

Participants for this study are post-secondary students, currently enrolled in a post-secondary program, between ages 18 and 30, who exercise three or more times a week, not on a professional or post-secondary sports team, and not a current student of the researcher.

### Table 1

#### *Number of Participants*

Number of potential participants who completed the eligibility form	60
Number of eligible participants invited to participate in the research	43
Number of participants who completed the consent form	37
Number of participants who completed the questionnaire	34
Number of participants who attended the facilitated group discussions	27

From the 60 potential participants who completed the eligibility form, the total number of participants contributing to the findings of the research are 34 individuals who completed the questionnaire and 27 individuals who attended the facilitated group discussions. All the participants who attended the facilitated group discussions completed the questionnaire and submitted consent according to the consent form.

### Phase I: Eligibility Form

In Phase I, post-secondary students were provided the eligibility forms via email. During Phase I, various departments leaders at MacEwan University were provided an initial email to inform the students about the research that linked to the study's eligibility form. The leaders from the departments sent out the email to students to assist in recruiting participants for the study. Phase I determined which participants were suitable for Phase II. This initial form identified the mandatory requirements for participants to be selected for the study (i.e., students

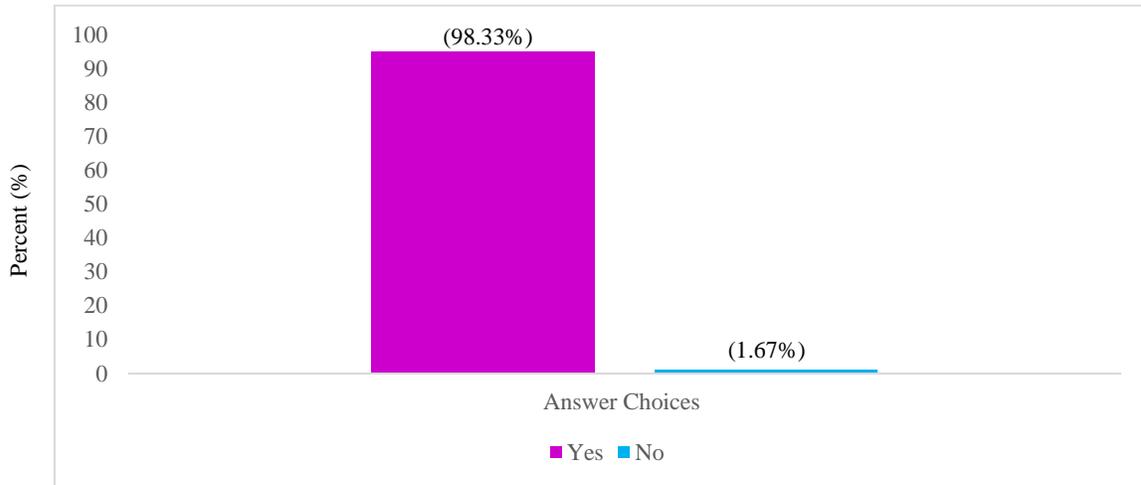
aged between 18 to 30, who are enrolled in an undergraduate program, who visit a fitness facility or engage in sporting activities, who have no prior/current association with the researcher, etc.). This method of participant selection was determined through purposive sampling, where potential participants were from a specific target demographic (Garfield, 2012). Teddlie and Tashakkori (2009) state that “purposive sampling addresses specific purposes related to research questions; therefore, the researcher selects cases that are information rich in regard to those questions” (p. 173). With purposive sampling, it can be confirmed that the participants fit the requirements and eligibility for the study. The Phase I participant eligibility form was sent through a Survey Monkey link that was provided to various faculties/departments at MacEwan University to share with their student database via email.

Eligibility for and access to this research was open from March 7, 2021, to April 12, 2021. As mentioned, multiple emails were sent through MacEwan University’s various faculties/departments throughout this period. (See Appendix B for the eligibility form.) A total of eight questions were asked; however, the results of the last question are not listed in this assessment as the last question required contact information from potential participants. To ensure anonymity, no participant contact information was shared in this report.

Each question asked in the eligibility form served a purpose for the participant selection. The purpose for each question is noted below each of the following figures (Figures 2-8). From the results of the eligibility form, 43 individuals were contacted to participate in Phase II of the study.

**Figure 2**

*Are you currently a student enrolled in a post-secondary program?*

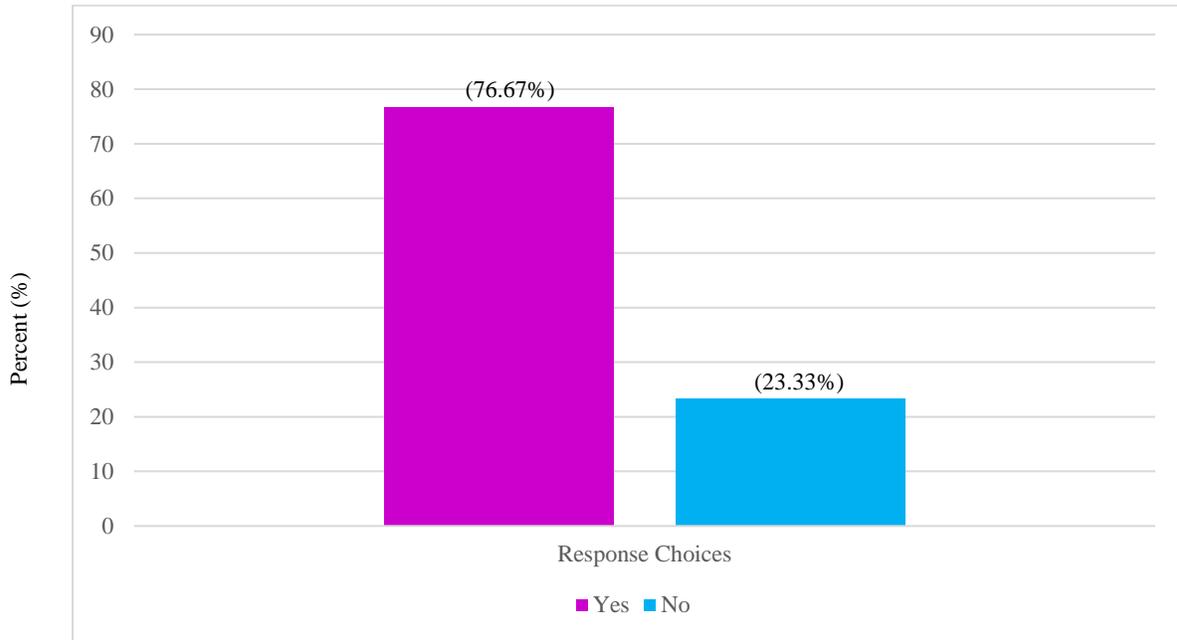


Answer Choices	Responses (percentage)	Responses (numbers)
Yes	98.33%	59
No	1.67%	1
<b>TOTAL</b>		<b>60</b>

To be eligible, all participants in this study were required to be a student enrolled in a post-secondary program. Out of the 60 potential participants who completed the eligibility form, 59 individuals were eligible under the requirement of being a post-secondary student (see Figure 2).

**Figure 3**

*Is your age between 18 to 30 years old?*

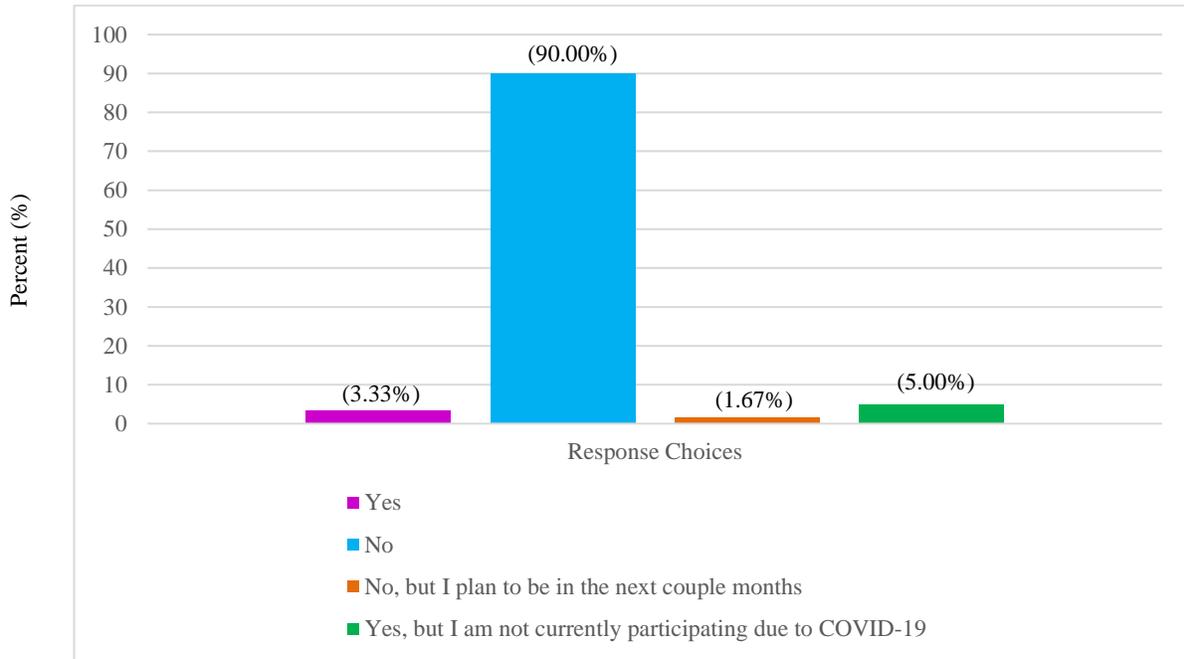


Answer Choices	Responses (percentage)	Responses (numbers)
Yes	76.67%	46
No	23.33%	14
<b>TOTAL</b>		<b>60</b>

To be eligible, all participants in this study had to be between 18 to 30 years of age. Of the 60 potential participants who completed the eligibility form, 46 individuals were eligible under the requirement of being a young adult within the age demographic of the study (see Figure 3).

**Figure 4**

*Are you currently involved in a professional or post-secondary sports team?*



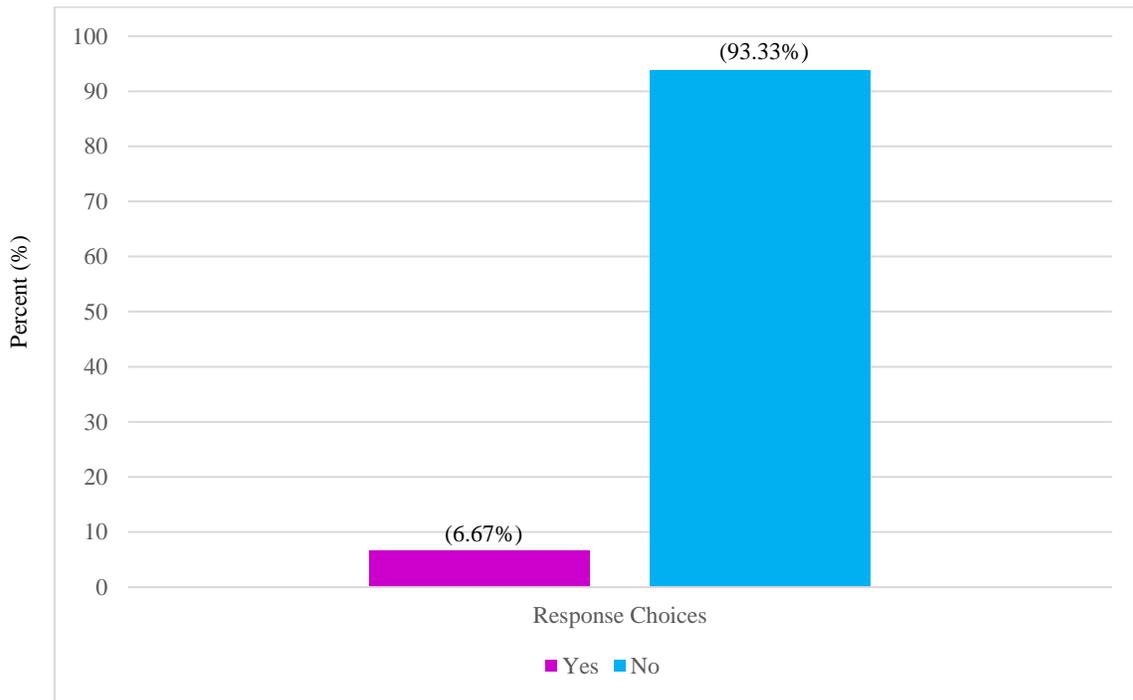
Answer Choices	Responses (percentage)	Responses (numbers)
Yes	3.33%	2
No	90.00%	54
No, but I plan to be in the next couple months	1.67%	1
Yes, but I am not currently participating due to COVID-19	5.00%	3
<b>TOTAL</b>		<b>60</b>

To be eligible, participants in this study were not currently on a professional or post-secondary sports team. Of the 60 potential participants who completed the eligibility form, 54 individuals confirmed that they were not currently part of a professional or post-secondary sports team. One individual responded that they plan on being on a professional or post-secondary sports team in the next couple of months, and three individuals responded that they are currently

not participating on a professional or post-secondary sports team due to COVID-19. Therefore, 58 individuals were eligible for the requirement of not being currently part of a professional or post-secondary sports team (see Figure 4).

**Figure 5**

*Is Trisha Sarker one of your current instructors at MacEwan University?*



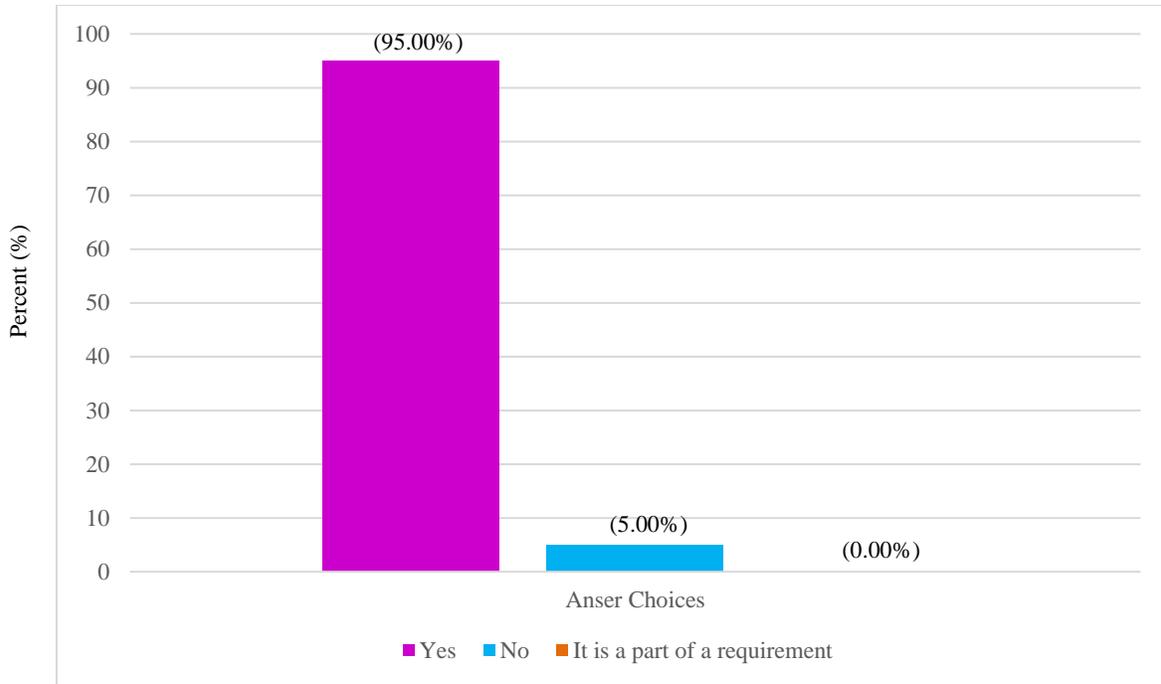
Answer Choices	Responses (percentage)	Responses (numbers)
Yes	6.67%	4
No	93.33%	56
<b>TOTAL</b>		<b>60</b>

To be eligible, participants in this study were not currently a student of the researcher (Trisha Sarker). Not being a current student of the researcher ensured distance from potential conflicts of interest or power relationships. Of the 60 potential participants who completed the

eligibility form, 56 individuals were eligible under the requirement of not being a current student of the researcher (see Figure 5).

**Figure 6**

*Do you exercise out of your own free-will/motivation?*

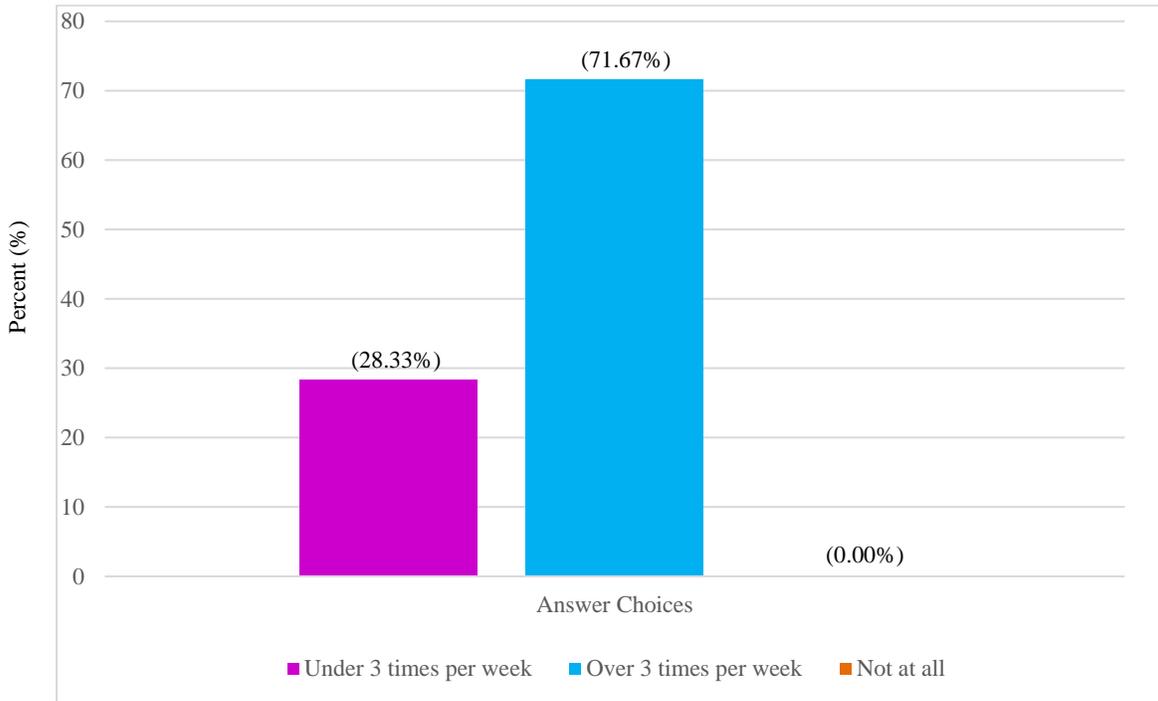


Answer Choices	Responses (percentage)	Responses (numbers)
Yes	95.00%	57
No	5.00%	3
It is part of a requirement	0.00%	0
TOTAL		60

To be eligible, all participants in this study exercised out of their own free-will or motivation. Of the 60 potential participants who completed the eligibility form, 57 individuals were eligible under the requirement to exercise according to their free-will/motivation (see Figure 6).

**Figure 7**

*On average, how many times per week do you try to exercise?*

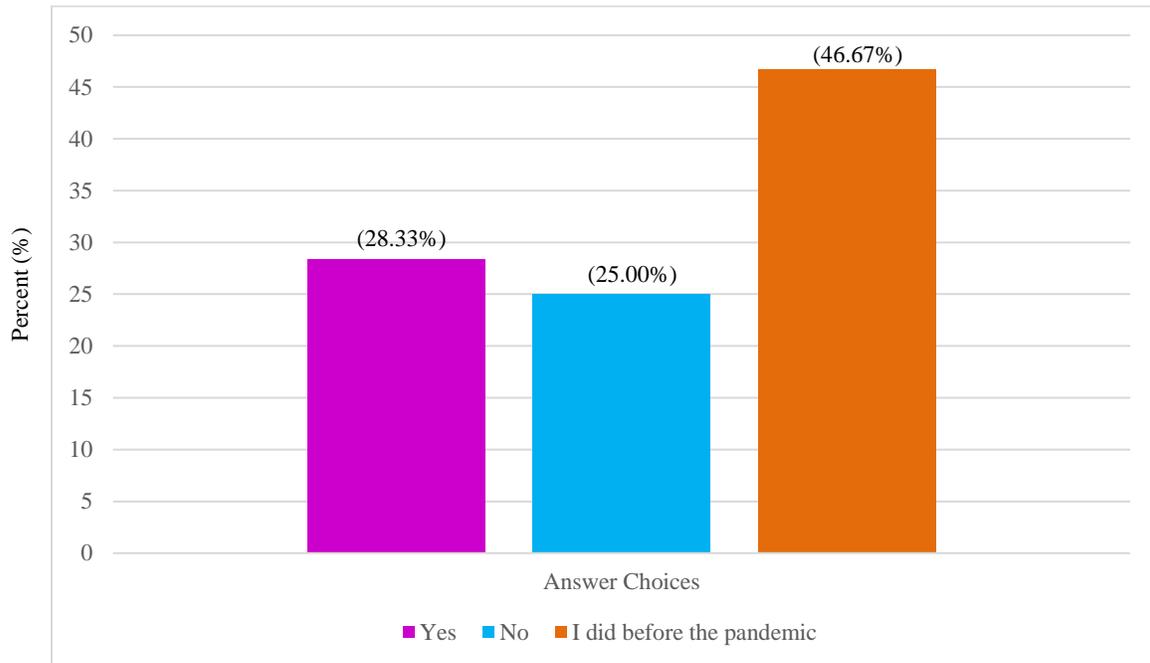


Answer Choices	Responses (percentage)	Responses (numbers)
Under 3 times per week	28.33%	7
Over 3 times per week	71.67%	43
Not at all	0.00%	0
TOTAL		60

To be eligible, all participants were consistently physically active through exercise. Of the 60 potential participants who completed the eligibility form, 43 individuals were eligible under the requirement of someone who exercised over three times a week (see Figure 7).

**Figure 8**

*Do you go to a fitness facility to exercise?*



Answer Choices	Responses (percentage)	Responses (numbers)
Yes	28.33%	17
No	25.00%	15
I did before the pandemic	46.67%	28
TOTAL		60

As a study conducted during the COVID-19 pandemic, this question was included to gauge where participants exercise (see Figure 8). Of the 60 potential participants who completed the eligibility form, all individuals were eligible to participate.

The completed eligibility forms of potential participants who submitted the online form through Survey Monkey were assessed through purposive sampling according to the factors listed for each question. Out of the 60 potential participants who completed the eligibility form, 43 potential participants were identified as eligible for the study. Once identifying the ideal participants for this research, the viable participants were contacted to participate in Phase II.

**Phase II: Online Questionnaire**

Phase II of the research study included emailing all eligible participants requesting them to complete three activities: (1) sign the research consent form (the consent form can be found in Appendix C); (2) complete the Motives for Physical Activity Measure (MPAM-r) (Center for Self-Determination Theory, 2019) questionnaire (the questionnaire can be found in Appendix A); and (3) confirm a time over email from the provided time slots available to participate in the facilitated group discussion (Phase III). Each of the 43 eligible participants were sent the “invitation to Phase II” email. (The email sent to students for Phase II can be found in Appendix D). Out of the 43 eligible participants, 37 participants responded by providing consent to participating in the study and selecting a time to join the facilitated group discussion.

Consent was provided by participants prior to conducting the study. If participants did not have access to a scanner/printer, they could digitally sign the consent form and/or respond back to the researcher over email indicating consent to participate in the study. Due to COVID-19 and potential technology barriers, a clear indication of consent over email was sufficient.

It was clearly indicated in the email that to complete the questionnaire, the participant needed to first provide consent to participate in the study. Of the 37 individuals who provided consent, 34 individuals completed the Motives for Physical Activity Measure (Center for Self-Determination Theory, 2019) questionnaire.

***Instrument: Motives for Physical Activity Measure***

Motives for Physical Activity Measure (MPAM-r) (Center for Self-Determination Theory, 2019), is structured to gain quantifiable information about the participant's motivations to engage in physical activity, such as their purpose for exercising, benefits they gain from exercising, etc. This study used the revised and extended version of the questionnaire developed and validated in 1997 by Ryan et al., (1997). The revised questionnaire identified five motives: fitness, appearance, competence/challenge, social, and enjoyment (Motives for Physical Activity Measure, 2019). Therefore, the questionnaire assisted in answering the first research question that assesses student motivations to exercise. This questionnaire was provided via email through a secure Survey Monkey link. On average, this 30-question questionnaire took participants around five minutes to complete.

The questionnaire was adapted slightly to clearly indicate the levels of the seven positions in the Motives for Physical Activity Measure (Center for Self-Determination Theory, 2019) Likert scale. The original scale has seven positions ranging from "not at all true for me" to "very true for me" with no indicating statements for the five interior scale options. Therefore, to enhance clarity within the range of options, the scale was adjusted to add the following labels in between the two labels on each end of the scale: Could be true for me, a little true for me, neutral, somewhat true for me, and true for me.

The Likert scale was introduced to the participants on Survey Monkey with the following introduction:

The following is a list of reasons why people engage in physical activities, sports, and exercise. Keeping in mind your primary physical activity/sport, respond to

each question (using the scale given), on the basis of how true that response is for you. –

Motives for Physical Activity Measure (Center for Self-Determination Theory, 2019)

### **Phase III: Facilitated Group Discussions**

The third phase of this research included a set of facilitated group discussions which were digitally recorded and transcribed. There was a total of seven group discussions and 27 participants. (Data saturation was reached once seven group discussions were completed.) Each group discussion ranged between four and six participants per discussion; as “the ideal group size [for discussions] is between four and eight people” (Kitzinger, 1995, p, 301). This number of participants per group ensured that each group had enough members to generate conversation, while ensuring no participant opinions are left out and group participation was maximized (Davis, 2016). Each facilitated group discussion was approximately 60-minutes in length.

The purpose of using groups for this research was to enable communication and interaction between a homogeneous group where ideas and concepts may be further developed through peer support, and without the pressure of one-on-one interviews (Davis, 2016). The intention for group interaction is to provide richer contextual data to supplement the questionnaire. The questions asked during the facilitated group discussions were semi-structured. The style of semi-structured questions guided open responses and inspired side discussions instead of yes-no or generic answers; however, with this flexibility, semi-structured questions also ensured that the discussion topic remained in focus (Longhurst, 2003). Examples of the semi-structured questions asked to the groups include questions about how they rank the importance of participating in physical activity while being a student, whether they consider themselves successful as a post-secondary student, what being successful in post-secondary

means to them, what type of physical or cognitive outcomes they believe stem from exercise, etc. (A copy of the semi-structured questions for the facilitated group discussions can be found in Appendix E.)

Due to the current COVID-19 pandemic, the facilitated group discussions for the qualitative component of the research were conducted virtually through a secure link over Zoom. The conversations between participants in response to the semi-structured questions were keenly observed (and video recorded through Zoom). All participants consented to the recording of the discussion. The video recording assisted in reviewing and understanding how interactions and ideas develop in agreement or disagreement about the topic and questions (Kitzinger, 1995; Longhurst, 2003). The student interaction within the facilitated group discussions were monitored for student awareness of motivations, emerging themes, as well as any proclaimed gain in student knowledge. The thematic analysis focused on participant experience, views, and objectives.

The data was transcribed and sorted using open and axial coding within a grounded theory approach. The transcriptions were edited to remove any disfluencies from speech. The data was then reviewed through an open coding process which closely examined the words being used to identify concepts and ideas of importance and relevance to the topic (Strauss, 1987). Specifically, during the open coding process, axial coding was applied. Axial coding is the “intense analysis done around one category at a time ... This results in cumulative knowledge about relationships between that category and other categories and subcategories” (Strauss, 1987, p. 32). As “axial coding is needed to investigate the relationships between concepts and categories that have been developed in the open coding process” (Kaiser & Presmeg, 2019,

p.87), axial coding was well suited for analyzing the facilitated group discussion data and in identifying complementary or conflicting thoughts from participants about the specific outcomes from exercise and its relation to post-secondary success. Axial coding allowed for the findings to focus on the essential data shared by the participants.

## Chapter 4: Results

This chapter provides a review of the findings from the Motives for Physical Activity Measure questionnaire (MPAM-r, see Appendix A) as well as the facilitated group discussions. The results identify the responses from the questionnaire as well as apply open and axial coding to the relevant data transcribed from the facilitated group discussions.

The questionnaire was completed by participants soon after they received their confirmation of eligibility (see results of eligibility form in Chapter 3: Methodology). Depending on participant availability, the facilitated group discussion was booked one week or one month after completing the questionnaire. Students who had a larger gap between when they completed the questionnaire to when they attended the facilitated group discussion were encouraged to review the content from the questionnaire once again prior to attending the discussion.

### Results Summary of Key Findings for Motives for Physical Activity Measure

The following summary of results reviews the top (up to three) selections that participants made from *each* question asked in the questionnaire. These selections are provided in a rounded percentage (no decimal points). The full breakdown of results for each question can be seen in the graph and charts following the summary.

#### *MPAM-r: Question 1 (See Appendix A, Figure 9, and Table 2)*

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they want to be physically fit included 18 individuals who found it *very true* for them, which is 53% of the participants.

***MPAM-r: Question 2 (See Appendix A, Figure 9, and Table 2)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because it is fun included 14 individuals who found it *true for them*, which is 41% of participants; nine individuals selected *very true for them*, which is 26% of participants.

***MPAM-r: Question 3 (See Appendix A, Figure 9, and Table 2)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they like engaging in activities that physically challenge them, 12 individuals responded that it is *very true for them*, which is 35% of participants; and 11 participants responded that it is *true for them*, which is 32% of participants. One participant did not respond to this question.

***MPAM-r: Question 4 (See Appendix A, Figure 9, and Table 2)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they want to obtain new skills, 12 individuals responded that it is *very true for them*, which is 35% of participants; and seven individuals responded that they are *neutral*, which is 21% of participants.

***MPAM-r: Question 5 (See Appendix A, Figure 9, and Table 2)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they want to look or maintain weight so they look better, 14 individuals responded that it is *very true for them*, which is 41% on participants; and nine responded that it is *true for them*, which is 26% of participants.

***MPAM-r: Question 6 (See Appendix A, Figure 9, and Table 2)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they want to be with their friends, seven individuals responded *not at all true for them*, which is 21% of participants; seven responded *a little true for them*, which is 21% of participants; and six responded that they were *neutral*, which is 18% of participants.

***MPAM-r: Question 7 (See Appendix A, Figure 9, and Table 2)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they like to do this activity, 13 individuals responded that it is *true for them*, which is 38% of participants; and 11 responded that it is *very true for them*, which is 32% of participants.

***MPAM-r: Question 8 (See Appendix A, Figure 9, and Table 2)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they want to improve existing skills, 15 individuals responded that it is *true for them*, nine responded that it is *very true for them*, which is 26% of participants.

***MPAM-r: Question 9 (See Appendix A, Figure 9, and Table 2)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they like the challenge, 14 individuals responded that it is *true for them*, which is 41% of participants; and nine responded that it is *very true for them*, which is 26% of participants.

***MPAM-r: Question 10 (See Appendix A, Figure 9, and Table 2)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they want to define their muscles so they look better, 14 respondents responded that it is *very true for them*, which is 41% of participants; and nine responded that it is *true for them*, which is 26% of participants.

***MPAM-r: Question 11 (See Appendix A, Figure 9, and Table 2)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because it makes them happy, 17 individuals responded that it is *very true for them*, which is 50% of participants; and 13 responded that *it is true for them*, which is 38% of participants.

***MPAM-r: Question 12 (See Appendix A, Figure 9, and Table 2)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they want to keep up their current skill level, 14 individuals responded that it is *true for them*, which is 41% of participants; and eight responded that it is *very true for them*, which is 24% of participants.

***MPAM-r: Question 13 (See Appendix A, Figure 9, and Table 2)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they want to have more energy, 20 individuals responded that it is *very true for them*, which is 59% of participants; and eight responded that it is *true for them*, which is 24% of participants.

***MPAM-r: Question 14 (See Appendix A, Figure 9, and Table 2)*** Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities,

sports, and exercise because they like activities that are physically challenging, 14 individuals responded that it is *somewhat true for them*, which is 41% of participants; and 10 responded that it is *very true for them*, which is 29% of participants.

***MPAM-r: Question 15 (See Appendix A, Figure 9, and Table 2)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they like to be with others who are interested in the activity, eight individuals responded that it *could be true for them*, which is 24% of participants; and seven responded that it is *very true for them*, which is 21% of participants.

***MPAM-r: Question 16 (Appendix A, Figure 10, and Table 3)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they want to improve their cardiovascular fitness, 16 individuals responded that it is *very true for them*, which is 47% of participants; and nine responded that it is *true for them*, which is 27% of participants.

***MPAM-r: Question 17 (Appendix A, Figure 10, and Table 3)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they want to improve their appearance, 13 individuals responded that it is *very true for me*, which is 38% of participants; and 10 responded that it is *true for them*, which is 29% of participants.

***MPAM-r: Question 18 (Appendix A, Figure 10, and Table 3)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they think it is interesting,

nine individuals responded that it is *very true for them*, which is 26% of participants; nine responded that it is *true for them*, which is also 26% of participants; and nine responded that it is *somewhat true for them*, which is another 26% of participants.

***MPAM-r: Question 19 (Appendix A, Figure 10, and Table 3)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they want to maintain their physical strength to live a healthy life, 23 individuals responded that it is *very true for them*, which is 68% of participants.

***MPAM-r: Question 20 (Appendix A, Figure 10, and Table 3)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they want to be attractive to others, 11 individuals responded that it is *true for them*, which is 34% of participants; and seven responded that it is *somewhat true for them*, which is 21% of participants.

***MPAM-r: Question 21 (Appendix A, Figure 10, and Table 3)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they want to meet new people, seven individuals responded that it *could be true for them*, which is 21% of participants; and six responded that it is not at all *true for them*, which is 18% of participants.

***MPAM-r: Question 22 (Appendix A, Figure 10, and Table 3)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they enjoy the activity, 15

individuals responded that it is *very true for them*, which is 44% of participants; and 10 responded that it is *true for them*, which is 29% of participants.

***MPAM-r: Question 23 (Appendix A, Figure 10, and Table 3)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they want to maintain their physical health and well-being, 24 individuals responded that it is *very true for them*, which is 71% of participants; and seven responded that it is *true for them*, which is 21% of participants.

***MPAM-r: Question 24 (Appendix A, Figure 10, and Table 3)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because I want to improve my body shape, 12 individuals responded that it is *very true for them*, which is 35% of participants; and 10 responded that it is *true for them*, which is 29% of participants.

***MPAM-r: Question 25 (Appendix A, Figure 10, and Table 3)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they want to get better at their activity, 14 individuals responded that it is *very true for them*, which is 41% of participants; and eight responded that it is *true for them*, which is 24% of participants.

***MPAM-r: Question 26 (Appendix A, Figure 10, and Table 3)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they find this activity stimulating, 12 individuals responded that it is *very true for them*, and 12 responded that it is *somewhat true for them*, which is 35% of participants each.

***MPAM-r: Question 27 (Appendix A, Figure 10, and Table 3)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they feel physically unattractive if they don't, eight individuals responded that it is *a little true for them*, and eight responded that it is *somewhat true for them*, which is 24% of participants each.

***MPAM-r: Question 28 (Appendix A, Figure 10, and Table 3)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because their friends want them to, 22 individuals responded that it is *not at all true for them*, which is 65% of participants; and four responded that it is *a little true for them*, which is 12% of participants.

***MPAM-r: Question 29 (Appendix A, Figure 10, and Table 3)***

Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they like the excitement of participation, nine individuals responded that it is *somewhat true for them*, which is 26% of participants; and six responded that it is *very true from them*, which is 18% of participants.

***MPAM-r: Question 30 (Appendix A, Figure 10, and Table 3)***

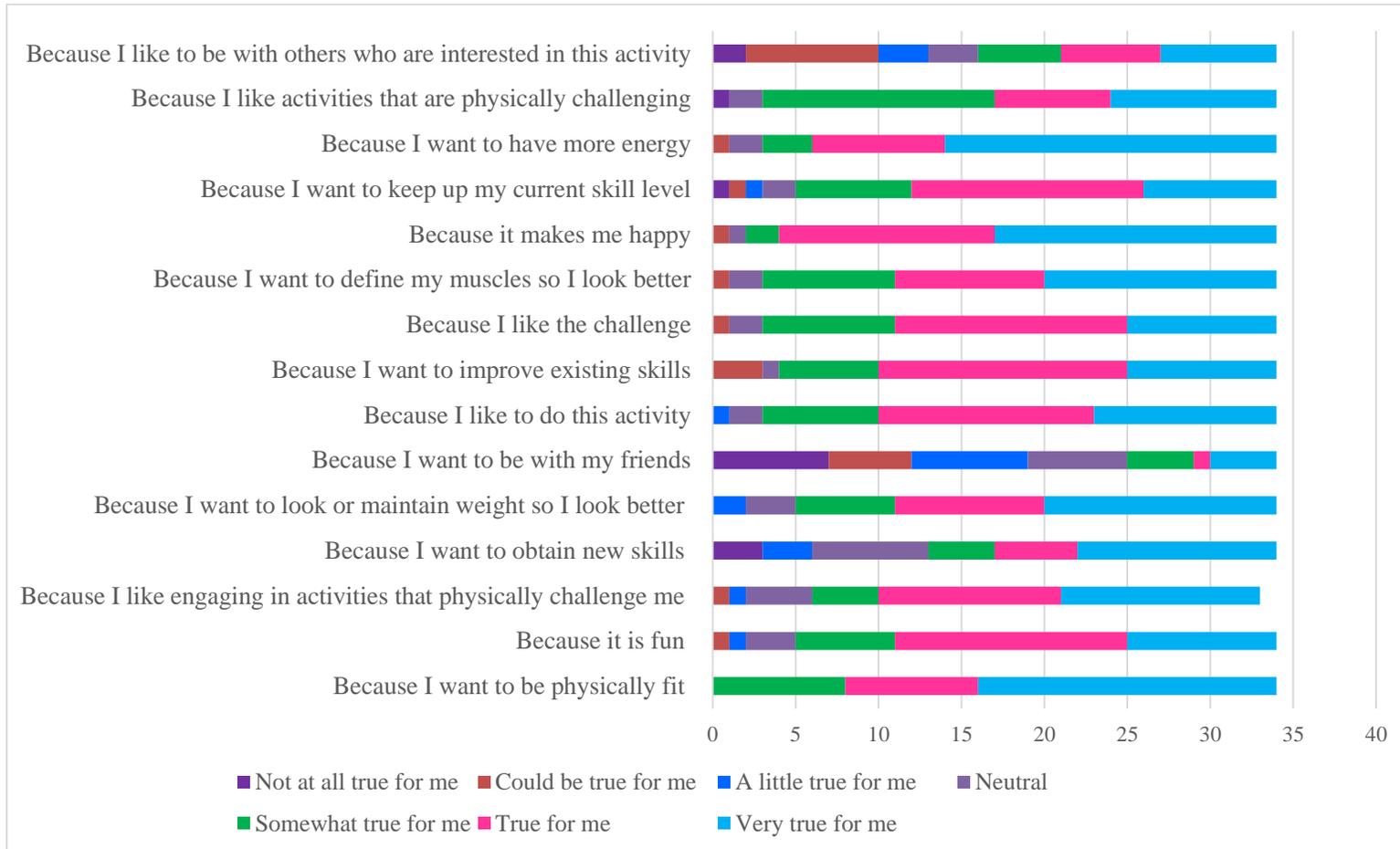
Of the 34 participants who responded to the questionnaire, responses for whether individuals engage in physical activities, sports, and exercise because they enjoy spending time with others doing the activity, seven individuals responded that it is *very true for them*, and seven responded that it is *somewhat true for them*, which is 21% of participants each.

**Completing MPAM-r Individually**

Beginning the study with a questionnaire allowed students to engage privately with the general topic and assist in understanding associations between their personal motivations to exercise; participants are able to engage with themselves privately prior to sharing their thoughts and opinions with the group on the outcomes of exercise in connection to their personal academic success. (A copy of the original Motives for Physical Activity Measure questionnaire can be found in Appendix A.)

**Figure 9**

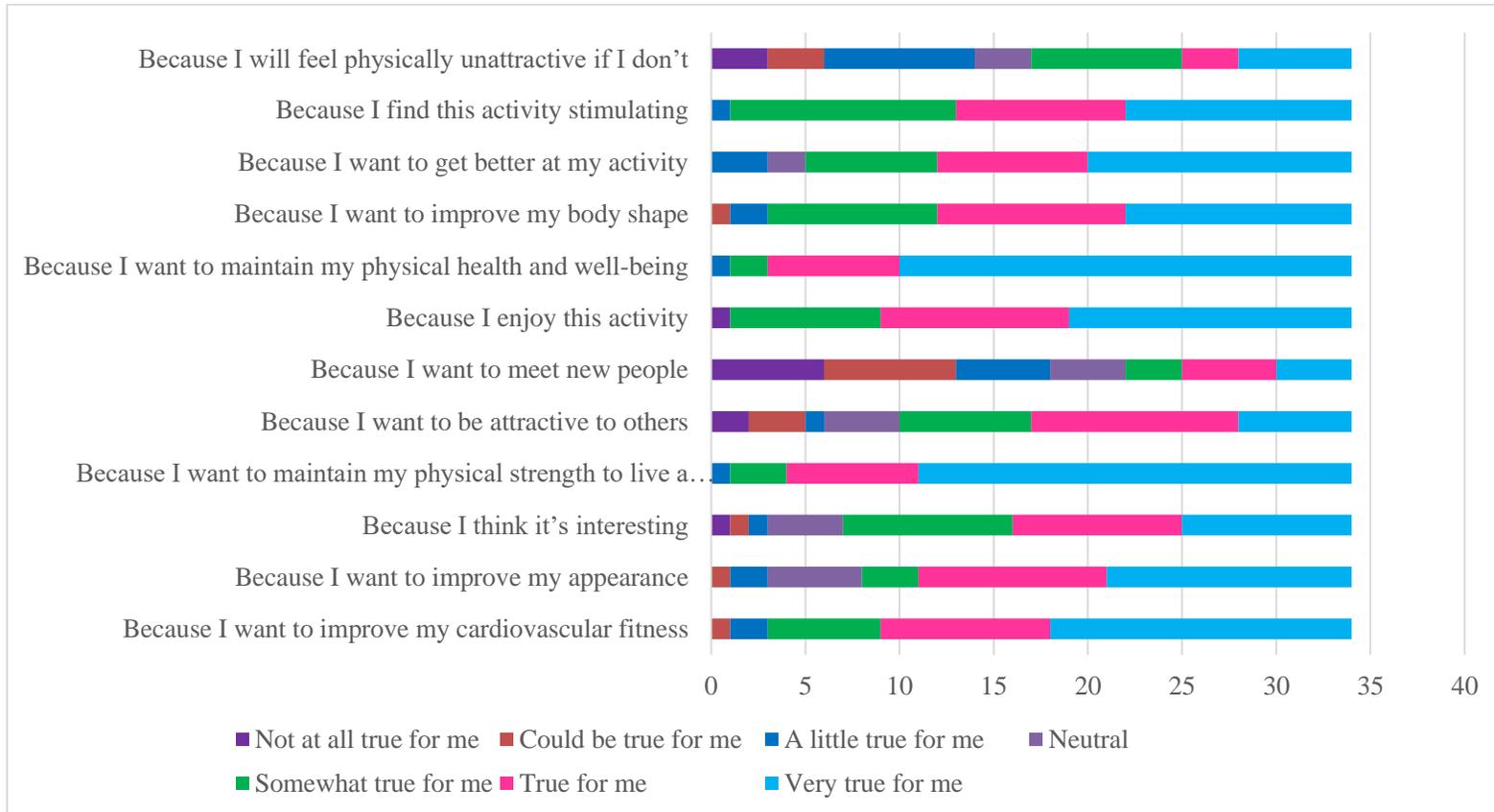
*Motives for Physical Activity Measure Questionnaire Results Graph Q1 to Q15 (N=34)*





**Figure 10**

*Motives for Physical Activity Measure Questionnaire Results Graph Q16 to Q30 (N=34)*





## **Findings from Facilitated Group Discussions**

The coding process aimed to organize emerging themes as well as points of interest from the facilitated group discussions (Phase III). The findings from the facilitated group discussions can be found in the *Results for Facilitated Group Discussions* in Appendix F. The following sections are organized according to the core categories identified during the discussions. The core categories emerging from the facilitated group discussions relating exercise to academics include physical connection, mental connection, academic connection, social connection, meanings/definitions of academic success/academic performance, overall outcomes of exercise, realizations, and recommendations.

### ***Physical Connection***

When speaking about the *physical connection* that exercise has on post-secondary students, participants identified that the majority of the physical activity they engage in is from *working out at the gym, playing sports, and/or going for runs*. Students found that their physical activities assisted in increasing their energy levels. Physical appearance played a major role in the reasoning behind why participants exercised, *making body image a major motivation*; however, many found that physical appearance was an initial reason they started exercising, yet found that their reasoning often evolved. Physical challenges faced during exercise, such as lifting heavier weights assist in making participants feel stronger and overall better; this contributed to a sense of accomplishment, pride, and confidence. The physical results from exercise assisted in developing increased lung capacity, stamina, muscle gain, and goal maintained physical appearance. Following are a few direct quotes from the facilitated group discussions regarding a physical connection to exercise (see Appendix F, Table 4):

**Participant 2.** “Getting back into that physical exercise, you can see the progress of what's happening and things getting a little bit easier, not just sitting on the couch. So, when you're going up the stairs, you're not out of breath.”

**Participant 5.** “Overall better health, increased strength, energy, sleeping better, just being able to do more physical activity... feeling better, in my body.”

**Participant 21.** “Physical looks are definitely a motivating factor for me because I discovered I can afford to eat a lot of cake now.”

### ***Mental Connection***

When speaking about the *mental connection* exercise has on post-secondary students, participants focused on how they have *noticed a change in their overall mood when they exercise*. It has been stated that exercise immediately changes their mood to a positive emotional state. With a positive mood, participants claim that they have increased energy to focus on their other work with a longer attention span. Participants also state that they often use exercise as a tool to relieve stress, anxiety, and depression. In association to the physical changes with their body with the incorporation of exercise, there is a gain in confidence as well as increased self-esteem. Following are a few direct quotes from the facilitated group discussions regarding a mental connection to exercise (see Appendix F, Table 5):

**Participant 4.** “If I start exercising for the first time in a long time, I immediately notice that I feel like a different person... I just feel so much better emotionally. My mood is a lot more stable; I have a lot more energy.”

**Participant 2.** “I get really big, negative mood swings. And when I'm exercising more frequently, they happen a lot less frequently. And they're a lot less intense.”

**Participant 9.** “Physical activity is much more important for mental health.”

**Participant 15.** “I find exercise helpful for improving my mood. So, that can be. If I have an excessive amount of worry, or a lot of stress, or a lot of anger or not feeling confident. I find that after workout. I'm just in a better headspace, mentally.”

**Participant 23.** “I think it's like a stress reliever. I feel like my mood does improve and I have less anxiety.”

### ***Academic Connection***

When speaking about the *academic connection* exercise has on post-secondary students, participants identified a number of elements associated to mental and physical transferability from physical activity to their academics. The most reoccurring themes were *the importance of mental clarity* and *knowledge application*. Under mental clarity, participants found that the positive impact exercise has on increasing self-esteem, increased confidence, and reduced stress directly impacted how they show up in an academic environment. Incorporating exercise into their lives allowed space for a clear/calm mind, where they could consider more creative ideas. These mental aspects were transferable to many facets of their lives, including academics. Participants also mentioned that the increase of energy from exercise assisted them with focusing in class, as well as improved their memory retention. Physical aspects of exercise were also transferable as they found that they had overall increased stamina as well as were more capable of performing some of the more physically challenging tasks within their discipline. The act of

studying while exercising allowed participants to be in a different environment, which was also a tool used by participants in order to remember what they were studying due to physical and mental placement association. Participants also mentioned that exercise allowed them to sleep better as well as work on their scheduling in order to maintain a more organized routine.

Following are a few direct quotes from the facilitated group discussions regarding an academic connection to exercise (see Appendix F, Table 6):

**Participant 9.** “It's helped my grades by forcing me into a schedule where I can't procrastinate.”

**Participant 7.** “I can confidently say that some of my best semesters were when I was doing the most exercise.”

**Participant 8.** “I feel like I put the energy out so now I can actually sit down for a long time and study for a while.”

**Participant 5.** “I get some of my best most creative ideas during exercise.”

**Participant 11.** “Think it's overall well-being. I feel less tense I feel like I sleep better. And then when that happens during my schooling, I feel like I have a clear mind and more like potential to do well. I feel like I can handle a lot more with school.”

**Participant 16.** “Mental benefits of exercise that transfer to the academic setting would have to be reduce stress and like having a more like calm demeanor.”

**Participant 22.** “With increased stamina from exercise, I'm able to study for longer and be in that mindset of an academic setting more.”

### ***Social Connection***

When speaking about the *social connection* exercise has on post-secondary students, participants identified *the enjoyment of spending time with peers and making friends while participating in physical activities*. The social aspect of exercise has assisted in team building as well as creating a support system for peers. The sense of not doing things alone and having companionship improved participant morale and overall confidence. Following are a few direct quotes from the facilitated group discussions regarding a social connection to exercise (see Appendix F, Table 7):

**Participant 3.** “If I’m trying to workout but I don't really understand the machines or anything, I'm just going to leave. I like to be with people. So we can support each other.”

**Participant 1.** “I like knowing that I'm not alone at the gym. I get confidence that there's people here that pretty much seem like they're thinking the same way that I am.”

**Participant 21.** “Having a gym buddy is a huge motivator on its own.”

**Participant 27.** “When my friends talk about working out or going to the gym, it makes me want to do the same.”

**Participant 26.** “I would sometimes go to the gym with classmates and we all kind of relied on each other to be there to chat. We would be like, I learned this today, what did you learn and we kind of bounced our education off of each other.”

### ***Meanings/Definitions: Academic Success/Academic Performance***

When speaking about the definition of what *academic success or academic performance* means to post-secondary students, participants identified that they associated academic

success/academic performance with two different categories: (1) *getting good grades*, including the ability to pass classes and increasing their grade GPA; and (2) *improving their understanding and applying what they have learned*, through things such as increasing efficiency and relating or adapting their learnings to different situations. For both the categories, participants considered themselves successful if they were able to retain their memory, increase their efficiency, and apply themselves. The ability to get a job was also started as an indicator of success. Improved confidence, resourcefulness, as well as comprehension were key indicators of academic success/academic performance. Following are a few direct quotes from the facilitated group discussions regarding the definitions of academic success/academic performance for post-secondary students (see Appendix F, Table 8):

**Participant 3.** “Not as much as grades, but how much you understand and can apply into the real world.”

**Participant 5.** “Accomplishing and achieving high, high levels. Not just like passing a class but getting very high marks.”

**Participant 8.** “Finding a good career afterwards is tied to academic success for me too.”

**Participant 12.** “Getting what you want out of university, whether that be building connections through school, like networking or career goals, or learning knowledge that pertains to your study of interest.”

**Participant 19.** “An understanding and my ability to integrate the knowledge and understand it, and how to do that.”

**Participant 21.** “Academic success to me is both having that knowledge and being able to use it in life in a job or internship position.”

**Participant 22.** “Academic success is doing well in school by getting like good marks in school, and also being able to apply your knowledge and your studies to other things in your life.”

**Participant 24.** “For me, it's not just about GPA, but what kind of knowledge I get from studying at university and using it for jobs later.”

### ***Overall Outcomes of Exercise***

When speaking about the *overall outcomes* of exercise that has on post-secondary students, *participants identified more outcomes related to mental aspects than physical aspects*. Participants found that exercise assisted in the following *physical outcomes*: improved body image, increased energy, increased stamina, pain management, stronger muscles, and better sleep. Participants stated many elements connected to *mental wellness* included feeling positive, increased happiness, reduced stress, reduced anxiety, mental balance, mood boost, and increased confidence. Participants stated that exercise assists with both their self-care and disciplined routines. Participants found that exercising allowed them to keep better schedules, set routines, and create habits. The overall impact of exercise also supported them in *problem-solving and conflict resolution*. Participants felt more confident and gratified with a sense of accomplishment when incorporating exercise into their lifestyle. Following are a few direct quotes from the facilitated group discussions regarding the overall impact of exercise and post-secondary students (see Appendix F, Table 9):

**Participant 2.** “I get rattled with anxiety. So, I would just take a moment to go do some yoga, or some sort of cardio just to get some excess energy out, and then I could just decompress.”

**Participant 4.** “The main reason that I do it is just because I noticed such a substantial mood boost... You feel accomplished. And it just makes me a lot happier.”

**Participant 1.** “I found that exercise has helped me with a lot of conflicts.”

**Participant 5.** “Personally love seeing myself get stronger and more like in better shape.”

**Participant 6.** “Improved body image, but also better sleep. I also find that it helps with migraines, which I have chronically so that as well in a better mood. I'm happier more energetic person when I'm exercising regularly.”

**Participant 13.** “I believe like the body is so connected to the mind so when you do something to benefit the body it's going to indirectly benefit your studies as well. Anything you do intellectually is improved.”

**Participant 19.** “Routine and self-care comes from my workouts.”

**Participant 22.** “I find that that bit of movement and like posing and stretching does help your confidence too.”

**Participant 26.** “Sometimes I associate things with how much I can lift. If I can lift heavier than before I feel like I can do anything better, including school.”

### ***Realizations***

The facilitated group discussions revealed *realizations* from participants connected to the *association that exercise has on post-secondary students*. Many participants discovered their

own connections between exercise and academics within the facilitated group discussion. These realizations include the sharing of both similar and differing experiences. The realization of similarities included an improved mood after exercise, a sense of pride, the ability to schedule and keep to a routine, as well as increased accountability to themselves and others. However, differences in experiences emerged when considering exercise as a form of relaxation, as well as the energy gained versus the energy spent. Overall, participants agreed that the improvement of body image and increase in endorphins allow them to be happier and more confident in their academic environment. Following are a few direct quotes from the facilitated group discussions regarding realizations of how exercise impacts the academic lives of post-secondary students (see Appendix F, Table 10):

**Participant 7.** “Personally, I've found a very big link between being physically active and my grades and a lot of other factors in my life.”

**Participant 5.** “Everyone measures academic success. Working out or exercising in some way, helps with academic success, whether it's because of the mental or the physical aspect or just like having that structure in our lives.”

**Participant 9.** “There's been a common theme around a few people saying that [exercise] helps them with disciplining their schedule and kind of structure which allows them to do more, be more efficient.”

**Participant 14.** “From a very young age, with my brothers and I tried to strike a balance between the two as academics and athletics, and how they can very much support each other.”

**Participant 17.** “If I don't exercise for two or three days. I don't know if it's just me but like I think I'm more irritable.”

**Participant 21.** “I didn't really realize that until mentioned by XXXX that it brings clarity to the work I have to do, and potentially memory recall.”

**Participant 19.** “I would say the main things I realized for why I exercise is the sense of accomplishment, the sense of motivation, and then mental benefits.”

**Participant 22.** “Being able to focus on physical activity, lead to being able to focus more on academics, and then being more confident because we're getting that physical activity maybe plays into more competence in our academic success.”

**Participant 24.** “I've never thought up like how physical activity and academic success like involved together, but after the hour discussion, I figured out like, it's really important to have a little bit of physical activity to help relax during tough times.”

### ***Recommendations***

The facilitated group discussions offered participants the opportunity to provide *recommendations* on what they believe would be *helpful exercises which may assist in their academics*. Recommendations included instructors providing “*movement breaks*” between classes, offering students free digital applications to track exercise according to their classes and grades, having recumbent bikes available in areas of the library, personal trainers being available for stress release physical activities with subsidized student costs, creating safe spaces for students to feel secure and welcome while focusing on their well-being, and the inclusion on mindfulness teachings as an academic norm. Following are a few direct quotes from the

facilitated group discussions regarding realizations of how exercise impacts the academic lives of post-secondary students (see Appendix F, Table 11):

**Participant 7.** “If there was general like weightlifting, like open type classes that were offered to students... and had people show them what to do.... would definitely be very helpful to students if they were offered free or at a cheaper alternative type thing.”

**Participant 5.** “I’ve read, sitting on the recumbent bike and just read. I got my homework done like my reading and stuff which I really liked.”

**Participant 14.** “If universities could do anything that makes the idea of physical activity and exercise, friendly, welcoming, safe.

**Participant 23.** “I find that when I have an app to track my progress I have more motivation to exercise. So I think in turn would also help me or motivate me to emphasize with academic success in mind, but also maybe scheduling.”

**Participant 24.** “A movement break really helps you like your brain take a break for small amount of time and then you're more focus for the next half of class.”

## Chapter 5: Discussion

The aim of this research was to uncover the various connections and outcomes that physical exercise has on the academic success of post-secondary students. This study examined a demographic that has not been widely researched due to the assumption that many individuals in the young adult demographic are at the “height of their brain power” (Suzuki, 2015). Considering the gap in research, the objective of the study was to investigate the post-secondary demographic, particularly, what post-secondary students determine to be successful outcomes of exercise in relation to their academics.

### Interpretation of Findings

When examining the *quantitative* piece of the study which used the Motives for Physical Activity Measure (MPAM-r) (2019) questionnaire (see Appendix A), the results indicated that the majority of participants participate in physical activity because they want to have more energy, it makes them happy, they want to maintain their weight so they look better, they want to obtain new skills, and they want to be physically fit. The *qualitative* aspect of the study identified a number of emerging themes from group discussions including the increase in confidence gained from exercising; the impact exercise has on one’s mood, emotions, stress, and anxiety; the joy that comes from participating in physical activities with friends and meeting new people along the way; the desired results that exercise has on one’s body, etc. The facilitated group discussions also revealed many tips and tools that participants gather from the outcomes of exercise that they see as transferring well into their academic lives. Participants provided recommendations for how post-secondary institutions can implement change as well as

realizations made throughout the group discussions revolving around what students can do to form a closer association between exercise and academics.

The questionnaire was a valuable way to conduct the study as it allowed participants to reflect on their motivations for physical activity in ways that they may not have considered before. The questionnaire stimulated intrapersonal reflection and self-assessments from participants, which stimulated their memory as well as prompted considerations along with the topic of exercise and academics prior to speaking in a group. In the facilitated group discussions, participants commented on the fact that when completing the questionnaire, participants stopped to internalize what each question was actually asking them, as many questions sounded similar, yet were different. This was demonstrated within the following examples, *because I want to be with my friends* versus *because my friends want me to*, or *because I want to improve existing skills* versus *because I want to keep up my current skill level*. Participants expressed that they needed to evaluate their experiences and consider answers to reasonings that they had not considered before. This thought process seamlessly created valuable conversation during the facilitated group discussions and added to the depth of conversation and data shared.

Upon analysis, the guiding framework from Figure 1, *Sarker's Interdisciplinary Framework: Disciplines, theories, constructs, and philosophies considered for student post-secondary success via physical exercise*, was evident throughout the study. SDT sub-theories and constructs of goal contents theory, cognitive evaluation theory, as well as sociocultural theory through the Zone of Proximal Development and collaborative/group learning (Bandura, 2010;

Bonk & Kim, 1998; Ryan et al., 1997; Ryan & Deci, 2000; Scott & Palincsar, 2013; Vygotsky, 1978) emerged as relevant to the participants' experiences in various ways.

### ***Exercise Supports Student Well-being***

*Goal contents theory* is connected to extrinsic motivation associated with image, well-being, and success (Ryan & Deci, 2000), and a common theme among participants revolved around the importance of receiving good grades and a high GPA (3.5 or higher), gaining confidence to present themselves in a certain way, as well as being physically and mentally fit. Goal contents theory was echoed in the findings in that participants, as post-secondary students, found it vital to create goals specific to their GPA's as well as to feeling comfortable in a class environment. The added benefit of noticing their increase in confidence from being physically and/or mentally more fit made for an associated focus. *Interestingly, each facilitated group discussion noted mental wellness through adjustments to mood/stress levels as one of the most important factors connected to exercise.* This piece of data is extremely vital as it suggests a positive impact on mental health through exercise, especially during a pandemic. The fact that participants mentioned that they never considered their mental health associated with exercise until the pandemic, exemplifies a shift in awareness of the importance of exercise on someone's well-being. Every participant during the facilitated group discussion identified support for their mental well-being as a major goal for their motivation to exercise. Students consider mental health to be a vital reason for exercise and post-secondary institutions should consider exercise as an important component of the well-being of their student population.

For many participants, a common goal for starting to exercise revolved around body image and looking a certain way. Using the body image goal as a starting point, participants stated that their goals quickly evolved to also include focusing on getting stronger or their overall health rather than how they looked. However, participants who were focused on losing weight or building muscle during their workouts stated that they were often very proud of themselves when they reached their goals. Traditionally, this is a concept that fitness businesses have focused on and can continue to assist with, along with support for various health goals. Therefore, there is an opportunity for stronger associations between the fitness community and academic community when it comes to potentially building programs specifically dedicated to student health and wellness. For example, Toronto Metropolitan University (formerly known as Ryerson University) has developed a program titled *Thriving In Action*, which is a program that aims to support post-secondary students through positive psychology by incorporating elements such as physical activity to assist in building student health, motivation, resilience, and academic strategies (Toronto Metropolitan University, 2022). This is an inclusive program for all students and is focused on providing students with transferable tools for both their academic and personal life through exercise. Programs such as *Thriving In Action* are a great way to create relationships between post-secondary institutions and the fitness industry in order to create a support system for students to harness their health in relation to their lives.

### ***Exercise Supports Student Motivations***

*Cognitive evaluation theory* connects rewards and ego (Ryan & Deci, 2000, p. 70) to intrinsic motivation. The concept of rewards emerged in the study when participants spoke about

how they feel after having a productive exercise session, such as feeling stronger, more motivated, more resilient, etc. As cognitive evaluation theory is connected to intrinsic motivation, a number of participants attributed the sense of accomplishment, gratification, and pride to exercise. Thus, the understanding of receiving an intrinsic reward provided internal value. Studies have found that those who are motivated through intrinsic reasons are more satisfied with themselves as a primary implication of cognitive evaluation theory is that feelings of positive gain and/or feedback are important forces contributing to the sense of reward and ego development, which is much more motivating than tangible rewards (2000). Participants stated that they felt uplifted after a great workout and gained the confidence to complete any upcoming tasks they had. The burst of energy from exercising allowed them to focus more on the tasks at hand, exemplifying the principles of cognitive evaluation. When participants found that they received a high grade (in the A range) on an assignment or exam, in part, participants credited their success to feeling driven and focused after their workout. This is an impactful piece of data as it shows a recognizable association between exercise and academics. For students, this means that there are additional tools that they have the opportunity to tap into when it comes to supporting their academic endeavours. For post-secondary institutions, there is evidence to suggest that programs such as the *Health and Wellness Programs* provided by the University of Guelph or the *Exercise is Medicine Canada* program piloted at Acadia University has the potential to align the outcomes of physical activity along with student academics.

When students are able to attribute succeeding in their academics to the focus they gained from exercising, it encourages others to do the same. In a demographic that learns from one

another, this is a vital piece that can be explored as it also connects with *sociocultural theory* as well as promotes *interpersonal communications*. The research showed that many participants were motivated by the social aspect of physical activity; therefore, building opportunities where students may learn from each other in a social setting while exercising would connect with one of the major elements of student motivation. As in the facilitated group discussions, how students were quick to make recommendations to each other, the transferability of supporting one's peers and sharing knowledge may be harnessed by academic institutions as well as fitness facilities.

Participants were also aware of their sense of ego when participating in physical activity. Each participant had a goal or reason for exercising connected to their self-interests. These self-interests were based on personal satisfaction according to values and choice. For example, choosing to exercise for enjoyment, and not because it is a requirement. The fact that exercise was not a requirement as part of the participant's academic curriculum assisted in focusing more on the self-interests of each participant. For example, if a participant saw the social aspect of exercising, they used it as such in order to interact with others by doing things such as group exercise classes or group sports; whereas if they found exercise as a method of meditation and time for self-reflection, they may do solo exercises such as running on their own. This allowed for discussions to include a variety of different physical activities specific to self-interests. Self-interest matters when it comes to motivation as often, getting something out of doing something else is a strong determinant of one's actions. In a demographic where individuals have choice, understanding what motivates them towards certain actions contributes to gauging further connections and transferability between various aspects experienced and applied. For example,

the University of Toronto has a program titled *MoveU.HappyU* which is based on the premise that “physical activity can help decrease negative mood and stress, reduce symptoms of anxiety and depression, and enhance academic success” (University of Toronto, n.d.). The research provides implications for post-secondary institutions that programs such as the *MoveU.HappyU* program which includes exercise training for students has a significant impact on academics.

### ***Exercise Supports Student Skills***

The *Zone of Proximal Development* (ZPD) examines the principle of what a learner can do on their own versus what they can do with assistance or collaboration with others. ZPD was identified in the facilitated group discussions as participants took on the role of both learner and educator while taking turns sharing their experiences with each other. At many points, participants mentioned being able to learn and build from peer observations made according to information shared. For example, a participant mentioned that because they exercise and weight train, they see the transference of skills when transitioning to their discipline of nursing via the need to be physically strong to complete certain tasks; from this shared experience, participants who were also students from the nursing program mentioned that they never realized that connection before and completely agreed with the transferability piece. The reflection associated with thinking and learning about concepts brought up by others delivered a true learner-teacher experience for each participant. Based on these findings, post-secondary students are large influences on each other; therefore, their exchange of experiences fosters the ability to reciprocate teachings to each other in a way that contains credibility and relatability. For institutional leaders and programming, the findings provide a guide to potentially transferable

skills resulting from physical exercise from various disciplines that can be harnessed in order to create focused programming based on student success.

### ***Exercise Supports Student Habits***

As the group discussions were executed in a conversational manner rather than in an interview style, participants were comfortable building from each other's comments and ideas, resulting in collaborative and group learning. A theme that emerged was how participants learned that many of them had shared experiences with their outcomes of exercise in relation to their *academic performance*. For example, a number of the participants stated that going for a walk to a quick workout allowed them clarity to think about their work in a fresh way. Things that participants collaborated on included ways they think exercise would help their academics, such as reviewing flash-cards at the gym to assist in memory by association; or doing their course readings while on a treadmill or recumbent bike in order to assist in their focus.

*Participants taught each other* (ZPD, Vygotsky, 1978) new things and provided tips to each other for what to work on especially when they want specific results associated to their academics (such as strength training for musicians who lift or balance heavy instruments; or, breathing exercises for those who tend to get nervous and speed talk during presentations; or what recommendations participants have for post-secondary institutions to offer exercise programs connected to improved academics). *Collaborative learning* was an important concept in the study as it allowed for interpersonal communication to take place as well as encouraged participants to share and learn from each other. As participants offered tips to others about various physical activities that assist them in their learning, others were eager to express their

interest in trying those things to see if it worked for them too. For example, a nursing student expressed that they often do flash-cards while at the gym and how the activity allows them to study better for memorization as they are able to associate certain parts of their studies to a specific activity. After hearing that, participants were interested in giving that method a try for when they had memorization exams. From the one tip, multiple other suggestions were provided from the group on various types of activities that can be done while they study. This exchange and collaborative learning acted as a brainstorming session where many ideas were able to come together in an environment that was safe and open to listening to each member of the group. Understanding the processes that work for students when implementing exercise into their lives for not only healthy habits, but to support their learning can be taken up and promoted by post-secondary institutions by creating programs built on options for different methods of learning which include an element of exercise.

### **Analysis of Research Question Results**

The following discussion points outline the results of the research according to each of the research questions.

#### ***RQ1. What Outcomes and Experiences Resulting From Physical Exercise Influence Personal Post-Secondary Success (as Identified by Students)?***

Participants experienced a number of outcomes from exercise that were stated to have an influence on their post-secondary success. The outcomes and connections are as follows:

#### **Reduce Anxiety, Mental Balance, Reduced Stress, and Mood Improvement.**

Interestingly, the aspect of *exercise for mental health was the most common outcome* stated in all

the group discussions. Participants often used exercise as a coping mechanism when frustrated with the pressures of their academic environment. Exercise was implemented as a tool to calm their minds during difficult times within their academic schedules. In a time like the COVID-19 pandemic, the use of exercise to support mental health and well-being was a topic of interest to many participants. Participants were able to provide examples of their mental state when exercising and when not exercising (when gyms were closed due to the pandemic). This information is impactful as it provides evidence for the need to offer programs that support mental health recovery. The wellness of the mental health of students is crucial for post-secondary institutions as mental capacity and receptive or clear cognition are required for learning and knowledge retention. For the fitness industry, being able to focus on exercises that stimulate mental health has been a prime mandate post-pandemic as a way to encourage healthy habits and the evolution of fitness businesses. Many fitness businesses are now focused more on healthcare and chronic disease prevention in order to offer solutions for individual well-being. *The need for programs to support mental health post-pandemic is something that is important to both post-secondary institutions as well as for the fitness industry in order to better cater to potential clients and students.*

**Sense of Accomplishment, Gratification, Pride, and Confidence.** Participants *connected their egos to the outcome of exercise by feeling that they are able to take on their academic work once they completed their physical workout and that's when they felt invigorated.* The sense of achievement resulting in an exercise session carried on as a positive can-do attitude towards their academics. This sense of accomplishment, gratification, pride, and confidence can

influence a student's overall academic experience. Gained confidence was one of the most talked-about outcomes of exercise within the facilitated group discussions. The fact that confidence can be gained through exercise and be transferable to other parts of their life, such as how students present themselves during academic presentations, shows a great association in how exercise and academics compliments each other.

**Improved Body Image, Stronger Physically.** As many participants admitted to originally being motivated to exercise for body image goals, they found that *an improved image also connected with their confidence when participating in group settings as well as when doing course presentations*. With an improved body image from working out, participants were more willing to participate and have a visual presence in their academic environment. With strength gain, participants discovered transferability through certain aspects, such as music students finding it easier to carry around their instruments – the impact of transferability supports the association between the outcomes of exercise and how it connects to academic performance.

Traditionally, going to a fitness facility had the connotation to be for strength training, losing weight, or gaining muscles. Although the motivations to attend a gym have expanded, body image remains a core reason why individuals go to the gym. *Therefore, in a young adult demographic, having support to shape one's body in a healthy, safe, and manageable way can be offered by the fitness industry through expert coaching, training, and programming.*

**Setting Schedules/Routines, Creating Healthy Habits, and Being Disciplined.** Participants stated that *implementing physical exercise into their daily lives automatically assisted in managing their schedules, creating healthy habits, as well as making them more*

*disciplined.* Participants stated that this assisted their academics as they found that they often had to work around their academic schedules to make time for exercise. However, when they did so, they created a routine that they could follow every day which allowed them to keep more organized and not waste time. Students mentioned that when they created a schedule to exercise in between classes on campus, they were more likely to attend the next class. This data is impactful as it provides encouragement for students to factor in attendance associated with exercise and academics. The ability to create a routine that revolves around healthy habits is a lifelong skill that can prevent many chronic illnesses, especially when the habit is created at a younger age.

**Increase in Energy, Focus, and Stamina.** *Increased energy, focus, and stamina were connected to academic success as after a workout, participants often feel rejuvenated and ready to work.* When attending classes after a workout, participants stated that they were less likely to doze off in class; they remained focused throughout. The increase in stamina was evident when participants mentioned that after a workout, they found that they could study for longer periods of time and were less tired. Participants also discussed how when they feel tired, they get up and move around in order to help them gain more energy when studying. This factored into being a great recommendation between participants – the act of providing tips and suggestions to others built through collaborative learning proved to be an encouraging factor for both those receiving the recommendation and those providing it. *As recommendations are well received by the student demographic, the concept of having trainers and coaches available in fitness centres to assist students would be an ideal program – especially if subsidized for students.*

**Sense of Happiness and Positivity.** Connected to mood, participants mentioned how they were noticeably happier and more positive when they exercise on a regular basis. Participants attribute exercise as one of the main contributors to their happiness, which makes sense with the release of endorphins that come from exercise. Some participants who suffer from anxiety and depression confessed that they were told to exercise by their doctors and initially refused to do so; however, once they started, they found their mood drastically changing, which resulted in having a large impact on their entire lives, including their academics. Participants who saw an improvement in their mood also claimed to see their grades improving as their overall state of mind changed. *As mental health is an important factor for one's well-being, the significant impact that exercise may have on one's mental state is crucial to how they present themselves in an academic setting.*

**Better Sleep and Self-Care.** *With exercise incorporated into a daily schedule, participants mentioned that they were able to sleep much better and that they got deeper and more quality sleep on the days that they exercised.* The outcome of better sleep allowed participants to be more alert and present in class. Many participants also used exercise as a form of self-care; therefore, if they chose to complete a physical activity such as yoga, they attributed that to doing something for themselves. When participants went out on solo runs, that was stated as being a form of meditation for them. This sense of self-care associated itself with academics as many students claimed that it was important to do something just for themselves in order to “get in the zone”. Much of the time they spend on their academics is completed individually, and consequently, important to care for oneself individually as well. *The implication of having fitness*

*programming based on a specific individual not only caters to their individual needs but also allows them to be comfortable without having the pressure of not knowing what to do on their own.*

**Making and Connecting with Friends.** *Participants who enjoyed working out with their peers stated that they had a more enjoyable time when they were with people. Many participants attributed that one of their biggest reasons for exercising with a study buddy, or with group exercise classes is due to the ability to socialize with others – be with their friends or make new friends. Playing team-based sports or other physical activities allowed participants to build transferable skills. Not only did they gather teamwork skills, but also gained leadership skills. The skills attained were transferred to their academics when they had to complete group projects. Having the fitness industry and post-secondary institutions develop group exercise classes that promote socialization alone with exercise would be a style of programming that could relieve other pressure from students such as going to the gym on their own.*

### ***RQ2. What Motivates Post-Secondary Students to Participate in Physical Exercise?***

The research identified many reasons that motivate post-secondary students to participate in physical activity. Responses for this question were determined both by the questionnaire as well as discussed in the facilitated group discussions. The top three motivators from the *questionnaire* (Phase II) were as follows:

- 1) Motivated to do physical exercise to maintain my physical health and well-being.
- 2) Motivated to do physical exercise to maintain physical strength to live a healthy life.
- 3) Motivated to do physical exercise to have more energy.

The top three motivators from the *facilitated group discussion* (Phase III) were as follows:

- 1) Motivated to do physical exercise to support mental health.
- 2) Motivated to do physical exercise to maintain or improve physical body.
- 3) Motivated to do physical exercise to increase confidence.

*The data collected was reflective of SDT, and the sub-theories of goal contents theory and cognitive evaluation theory. With goal contents theory, the extrinsic motivations such as physical appearance and strength were evident as important factors. With cognitive evaluation theory, the intrinsic motivations such as mental health and self-care were evident as important factors.*

Although the motives for exercise identified physical importance in both methods of data collection, mental health was a major topic of discussion during each of the facilitated group discussions. Participants identified that a large part of why they choose to exercise is to feel better about themselves (physically or mentally/emotionally), which in turn, allows them to perform better in an academic environment.

*This data is important in assessing this young adult demographic as understanding the motivations for exercise provide the fitness industry the potential to create niche programs specific to the post-secondary student demographic according to their needs and goals.*

***RQ3. In What Ways Might Group Discussions Impact Student Awareness Regarding Their Views of How Exercise May be Associated with Their Post-Secondary Success?***

A discovery made during the facilitated group discussion, was *identifying what aspect of physical exercise was important to post-secondary students for their academic success. There*

was a facilitated group discussion that included participants belonging to several different disciplines. Within that group, there was a nursing student, a business student, a biology student, a communications student, and a music student. Within their responses, it was interesting to see that the nursing student, who was specializing in psychology, was more concerned with the mental aspect connected to exercise, the business student was focused on time management and scheduling between their exercise routine and class times, the biology student commented about the impact of exercise on the physical body and how it displays itself “at school” through posture and presence, the communication student reminded the group about the social aspect of working out with peers and using exercise to motivate each other, and the music student associated building strength from exercising to how comfortable they were handling, lifting, and carrying their instrument. Each participant was able to bring forth an element that guided their understanding in their academic connection with physical activity. Through collaborative learning, participants were able to share experiences with each other as well as learn from each other. *The gained knowledge and considerations that participants shared contributed to the exchange of information as participants in playing the role of both the guide as well as the learner through ZPD.*

Participants stated to have made many *realizations* while speaking in group discussions. Discussions that intrigued participants revolved around using exercise as a tool for structured learning. Incorporating physical exercise and “movement breaks” into classes was suggested by participants in order to help with classroom fatigue as well as refocusing. This was an interesting piece of conversation as it allowed participants to speak to the need for them to have physical

breaks within classes where they sit for hours at a time. Other participants recommended doing flashcards or memorization while exercising on a treadmill or recumbent bike; this comment prompted awareness and the sharing of experiences about how participants notice the change in environmental factors assisting them with their memory when they are studying. When studying for an exam, topics such as memorization of terminology definitions while exercising seemed to be an activity that participants were doing quite successfully. This inspired other participants to want to try this method of studying. This data has the potential to inspire post-secondary institutions to consider tools to incorporate movement into daily teachings. Instructors may have the opportunity to connect with fitness professionals to gather knowledge on various physical activities that could be incorporated safely into the classroom in an inclusive way.

*As the research was conducted during the COVID-19 pandemic, factors such as gyms being shut down had an impact on how participants would normally exercise. Therefore, because of the shift in the health regulations, participants were unable to visit the gym “as usual” and started to realize how important exercise has been for their overall health, including the realization of how their mental health impacts their post-secondary success. With the disruption of the pandemic making participants more sedentary than usual, many became more aware of how not exercising affected their body, but more importantly their mental state – happiness, emotional regulation, as well as desire to complete certain tasks on time. Participants commented on feeling unmotivated to do anything, including not working out or working on their academic studies, because they simply could blame not working on the effects of the pandemic. However, a participant mentioned that when they saw their grades start to dip, they immediately knew that*

they needed to actively put in an extra effort to take care of themselves, knowing that if they worked on “self-care” (which incorporated exercise back into their daily routine) they would be able to do better in their academics. The participant who became self-aware of their situation also reported that they were able to improve their grades once they started to exercise and keep a regular schedule again. This experience shared with the group provided inspiration as well as motivation to succeed through the pandemic. *As such, as we look to rebuild and rebound from the COVID-19 pandemic, fitness centres, and post-secondary institutions have an opportunity to work together in cooperation with the Government in order to focus on the health care recovery of Canadians.* The post-secondary population is one that has a great potential to reduce healthcare costs by focusing on student health and well-being; in turn, the potential for fewer academic days missed, resulting in an opportunity for higher academic success.

***RQ3a. In What Ways Does Group Discussion Impact a Student’s Motivation to Exercise?***

Group discussions impacted student motivation to exercise as the participants displayed *encouragement* and *support* for one another. The participants were quick to offer tips, recommendations, and solutions in order to help one another potentially succeed further in their academics. Participants were understanding of each other and their individual experiences yet recognized that many of them were living through shared experiences. Participants were pleased to know that their experiences were both relatable as well as motivating to others. Determining outcomes of exercise was enlightening for many as they were able to build off responses from other participants. The act of encouragement that came from the group discussions, especially

during a time when many seem to be struggling through the pandemic provided a sense of value for personal development through peer support.

### **Change Process and Knowledge Generation**

The anticipated change process for this research contributes to three main groups: post-secondary students, post-secondary institutions, and the fitness industry. The study allows post-secondary students to benefit from the experiences shared by their peers, especially within a demographic where peer values and opinions are well regarded. The respect and value that students have for each other were evident during the group discussions in the way they were encouraging of one other. When students are successful in their academic environment, it reflects well on both themselves and the post-secondary institution that they attend. The promotion of the current research has the potential to positively impact change on how post-secondary students engage in exercise and relate to how physical activity can influence their learning and other physical and cognitive aspects that allow them to be better students – whether that means being successful by gaining more confidence, having more stamina, reducing anxiety, increasing focus, etc. Participants in the study were keen on expressing what the university does to support them through exercise and academics, such as having treadmills available to use in the library while they study. Therefore, when students are pleased with what post-secondary institutions offer them to support their learning, they have a tendency to share their testimonials with others and encourage peers to also take advantage of certain offerings that they may not be aware of. The positive reflection on post-secondary institutions has the potential to be seen both publicly and privately through post-secondary national/international recognition and enrollment rates.

Therefore, the current research may influence institutional decision-making when evaluating methods of incorporating and integrating health and wellness activities as a post-secondary norm. A potential development is to have instructors trained (in partnership with the fitness industry) in guiding their students through short physical “movement-breaks” in order to allow students to re-focus and re-engage with the academic material.

*The Canadian fitness industry has a mandate of getting more people active. The duty of the industry is to encourage exercise and promote physical activity programs. Participants identified certain types of exercises that they experienced the outcomes as being beneficial or transferable to their academics. Therefore, this research provides the fitness industry with valuable information to help work with post-secondary institutions to develop exercise programs, or even create programs at fitness facilities specifically for post-secondary students. As mentioned, there is a potential for instructors to partner with fitness professionals in order to learn some safe and quick physical activity movements to assist in student learning. The knowledge generated from this study may inspire future collaborations between post-secondary institutions and the fitness industry to pursue further interdisciplinary research in the field.*

*This research has the potential to inspire social and economic change. The creation of social change is based on the impact of how students see the outcomes of exercise as influencing their success in a post-secondary environment, as well as the ability to share that information with their peers and educational institution. This research explored student experiences, perceptions, and understandings of the association between exercise and its outcomes as it relates directly to student definitions of being successful in a post-secondary environment; as such, this*

research brings attention to certain exercise outcomes that are an integral part of a post-secondary environment which students find valuable. Inspiring and motivating post-secondary students to incorporate physical exercise into their academic schedule takes a step toward social change. Following social change, the knowledge generated from the current research also has the potential to contribute to economic change as exercise is connected to overall mental/cognitive and physical well-being, which is linked to national health care costs (as addressed in the literature review).

The research process contributes to social change by connecting the study with theoretical frameworks which are based on influence, understanding, and interaction. For example, “SDT aims to specify factors that nurture the innate human potentials entailed in growth, integration, and well-being, and [explores] the processes and conditions that foster the healthy development and effective functioning of individual, groups, and communities” (Ryan & Deci, 2000, p. 74). Therefore, the significance of the research findings is determined when the recommendations made by the participants are applied or when their experiences are widely shared to “make[s] a positive difference in peoples’ lives” (Teixeira et al., 2012). Therefore, further steps are required to create social change. The current study creates a foundation in the direction towards social change.

A news article from Toronto, ON, stated that physical activity is essential during one’s college experience as it assists in acquiring meaningful skills by setting a healthy lifestyle, developing social skills, showing passion, and showcasing teamwork (Daily Hive, 2019). The article highlighted what Centennial College, a post-secondary institution in Ontario, was doing to

provide activities through their athletics and recreation department in order to support students in developing certain skills that are desirable to employers (2019). This article is an example of how society is finding value and sharing information about the effects of exercise and how it links to successful skill development for post-secondary students. Centennial College is bringing access and information to the students about physical activity programs and the outcomes that may positively impact their lives. The article focuses on skills acquired through exercise (organized sport, group exercise classes, etc.) that assist proficiencies for employment; however, the article excludes the psychological aspect of exercise connected to academic success. Therefore, the reflections from participants of the current study are important for post-secondary institutions to understand the value that students draw from physical activity; in turn, potentially having more post-secondary institutions invest in health and wellness programs based on recommendations made by students connected to their personal success. This knowledge generation also provides the opportunity for post-secondary fitness centres to collaborate with fitness professionals to meet the needs and wants of students. The collaboration and acquisition of knowledge subsequently encourages and motivates more students to learn and understand the connection between exercise and academic success and inspire more post-secondary students to get active. The need to incorporate exercise into the lives of post-secondary students has become a priority for many Canadian institutions. Multiple Canadian post-secondary institutions such as Toronto Metropolitan University, University of Toronto, University of Guelph, Acadia University, and University of British Columbia have started to test fitness programs dedicated to promoting a healthier and more engaging lifestyle for students through physical activity.

**Alignment With Social Change**

This research for social change aligns with the mandate of Article 1 (1.7) in the *International Charter of Physical Education, Physical Activity and Sport* (UNESCO, 2015) determined by the United Nations Educational, Scientific and Cultural Organization (UNESCO) stating that “each education system must assign the requisite place and importance to physical education, physical activity and sport in order to establish a balance and strengthen links between physical activities and other components of education” (2015, a 1(1.7)). Even though this statement proceeds to identify the need for daily physical activity for children and youth, the importance of the association between physical activity to complement components of education remains. The Charter’s statement may be transferable to an older demographic and be used as supportive material in pursuing research on the general topic of physical activity and academic success. As the literature review showed, many studies have been conducted around the impact of exercise on children; however, as the research showed, the effects of exercise on academics don’t change when someone becomes an adult; in fact, it carries on through transferable skills and outcomes.

## **Chapter 6: Conclusion**

This research aimed to examine the association between the academic success, perceptions, and experiences of post-secondary students through the implementation of physical exercise within their lives. *Based on quantitative and qualitative analyses, it can be concluded that physical exercise has an overall positive impact on a student's post-secondary experience.* The impact that physical exercise has on a student's academic success is based on a number of transferable outcomes that stem from incorporating activity into one's life including gaining confidence, strength, stamina, focus, etc. As defined by students, academic success is not just based on GPA, but also includes retention of their learnings and how they are able to apply themselves in the "real world" when it comes to future careers, academic expectations, and responsibilities. Both physical and mental health were important factors in the research; as findings indicated, physical, mental, social, and emotional health were positively influenced by exercise and the overall well-being of an individual supported their academic success.

The study indicated that participants were aware of the impact of exercise on their lives and were connected to their personal motivations. Within the facilitated group discussions, many new discoveries were made including ideas for study methods or ways to refocus, along with enhanced awareness of the connections demonstrating the power of group settings and debrief/reflection opportunities in conjunction with exercise.

### **Limitations and Opportunities**

Limitations of the study included that the research is a cross-sectional study instead of a longitudinal study. Therefore, there is no follow-up with the participants to see if their opinions

or experiences have changed over time. However, the cross-sectional study allows for the opportunity to conduct further research if necessary. Another limitation of the study includes the understanding that the study was conducted during the COVID-19 pandemic. The pandemic impacted many factors such as fitness facilities being closed, post-secondary education transitioning to only virtual means during the time of the study as well as other government-mandated lockdowns or restrictions. The limitations to fitness facility access restricted the amount of exercise that some participants may normally partake in per week; therefore, the data gathered during the study was based on current circumstances. As the study was conducted during the pandemic, the awareness of the restrictions and limitations influencing one's exercise became more evident among the participants and the impact of exercise on one's social, mental, physical, and immune health became more apparent.

The entire study was completed via virtual means which was both limiting and an opportunity. The fact that the facilitated group discussions were over Zoom video constrained some non-verbal communication factors such as body language. However, with the virtual video meetings, participants were eager to interact with each other (during a time of lockdown). More participants than originally accounted for participated in the study and benefitted from contributions from the comfort of their own homes and not having to commute and account for time spent to attend the meeting.

As the research was completed within the depth of the pandemic alongside participants living the experience, a unique niche for the research was developed. An opportunity that has occurred from the COVID-19 pandemic, is that there have been more adaptations of various

kinds of post-secondary education programming in order to focus on the success of students, as well as increased dialogues revolving around mental and physical wellness.

### **Recommendations**

The study revealed many ideas and recommendations that could be implemented within an academic environment.

#### ***Recommendation One: Movement Breaks***

Recommendations to include more “movement breaks” within classes was a suggestion that many participants supported and felt would be easy for instructors to incorporate into the classroom. This recommendation would require specialized training for post-secondary instructors from fitness professionals. This creates a specific partnership opportunity for the fitness industry to work with post-secondary institutions to help provide fitness training to instructors who may be interested in the benefits that come from including “movement breaks” in their classrooms.

#### ***Recommendation Two: Exercise Equipment in the Library***

Another recommendation stems from the inclusion of more exercise equipment available for usage within libraries. As the study suggested, having treadmills and recumbent bikes available during a study session helps students to focus and be used as an energy output. Having more fitness equipment available in an environment that directly promotes education and academics would encourage more individuals to take advantage of the connection between exercise and academics.

***Recommendation Three: Gather Student Feedback***

It is also recommended to request that recreational facilities at post-secondary institutions administer a survey to their members (who are students) on how that can better serve the students. This data could also be reflective of student learning experiences and be able to tell the facilities directly what their clientele would benefit from. This has the potential to foster relationships with students and the facility by giving the facility to learn more about their clientele and possibly what to offer them in order to provide further support.

***Recommendation Four: Health Check-Ins***

Post-secondary students could also have more health check-ins in their classes where they reflect on their well-being. This could be in the form of an assignment or an in-class task that incorporates physical activity and a transferable skill stemming from an outcome of exercise that could be implemented into the classroom. For example, in a biology class, hosting a class at a gym and focusing on learning about different muscle groups while exercising those muscles; or in a communications class, using physical activity to provide examples of different styles of communication while rotating and moving around in the classroom while engaging with peers.

Incorporating physical activity does not have to be a difficult or complicated task in the classroom. It could be as simple as having a “walking” class while lecturing and going for a group walk while stopping for questions and discussions. A concern that some instructors may have is their lack of knowledge in the field of fitness or not being certified to guide students through intensive physical activities. This is where there is the opportunity to connect with and create partnerships with the fitness industry in order to have credible support as well as

**Future Research**

The research in this field could benefit from further research in two ways: (1) a longitudinal study, and (2) a post-pandemic study. As the current study was a cross-sectional study, it would be interesting to observe further research within a longitudinal study that goes through the questionnaire and the facilitated group discussion at the beginning of the study, and then encourages the participants to continue, and after a while, checks in with the participants to determine if the recommendations and experienced shared from the facilitated group discussions impacted their daily routine or their understanding of the association between exercise and their academic success. Another possible future study would be to conduct the same study post-pandemic. As this current study took place at the height of the pandemic with multiple lockdowns and restrictions, it would be interesting to see if the data differs if conducted during a time when COVID-19 was not a major concern of the study and intertwined in the daily lives of the participants. Future avenues for research on the topic of exercise and academics for post-secondary students may also find benefits in looking deeper into how students who exercise have the potential to impact the healthcare system.

Along with the two ways mentioned above, the opportunity for action research remains where research may be developed around partnerships with post-secondary institutions; departments, the fitness industry, leaders in the fields, and educators. Research can be established by looking into direct programming that assists student success in academics and perhaps further broken down to supportive programming for transferable skills dedicated to specific academic disciplines.

Questions that emerged from participants include future research on how long students should be participating in physical activity to see certain outcomes such as gained focus, similar to how research among children has stated that 20-minutes of physical activity supports memory (Hillman et al., 2009). Others were also curious about research based on a different demographic, such as post-secondary students who play sports professionally, or those who would be stepping into a gym for the first time, and if they also find benefits to exercise in their post-secondary success.

### **Contributions**

The findings from this research provides new insight into the opportunity to integrate education and health through programs to support student success. The study provides both academic and industry contributions such as the need for partnership in programming to support post-secondary students. The study provides new knowledge in the form of student insight and experiences to a few beneficiaries: post-secondary students, post-secondary institutions, and the fitness industry. It also informs the economics of health care as well as policy development by government or health bodies in their pursuit of initiatives that support the wellness of citizens. This study fills a gap in research for missing a young-adult demographic that is a major influence on the economic future. A study investigating the post-secondary demographic in relation to exercise and academic success provides support for considering one's health as a crucial factor in one's academic and future endeavours. As the data suggests, the transferable outcome from exercise assists in supporting mental, physical, and social health within an individual's academic

experience. A positive experience from transferable outcomes (such as gained confidence, routine, strength, etc.) is what creates academic success.

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**Appendix A**  
Motives for Physical Activity Measure – Revised (MPAM-r)  
 (Ryan, Frederick, Lepas, Rubio, & Sheldon, 1997)

**The Scale**

The following is a list of reasons why people engage in physical activities, sports, and exercise. Keeping in mind your primary physical activity/sport, respond to each question (using the scale given), on the basis of how true that response is for you.

1	2	3	4	5	6	7
Not at all true for me						Very true for me

Q1. Because I want to be physically fit.	Q16. Because I want to improve my cardiovascular fitness.
Q2. Because it's fun.	Q17. Because I want to improve my appearance.
Q3. Because I like engaging in activities which physically challenge me.	Q18. Because I think it's interesting.
Q4. Because I want to obtain new skills.	Q19. Because I want to maintain my physical strength to live a healthy life.
Q5. Because I want to look or maintain weight so I look better.	Q20. Because I want to be attractive to others.
Q6. Because I want to be with my friends.	Q21. Because I want to meet new people.
Q7. Because I like to do this activity.	Q22. Because I enjoy this activity.
Q8. Because I want to improve existing skills.	Q23. Because I want to maintain my physical health and well-being.
Q9. Because I like the challenge.	Q24. Because I want to improve my body shape.
Q10. Because I want to define my muscles so I look better.	Q25. Because I want to get better at my activity.
Q11. Because it makes me happy.	Q26. Because I find this activity stimulating.
Q12. Because I want to keep up my current skill level.	Q27. Because I will feel physically unattractive if I don't.
Q13. Because I want to have more energy	Q28. Because my friends want me to.
Q14. Because I like activities which are physically challenging.	Q29. Because I like the excitement of participation.
Q15. Because I like to be with others who are interested in this activity.	Q30. Because I enjoy spending time with others doing this activity.

## Appendix B

### Participant Eligibility Form

#### Student Post-Secondary Success via Physical Exercise

This form is a component of a study being conducted by Trisha Sarker from Royal Roads University for her dissertation research. This research will be conducted through MacEwan University. The purpose of this form is to determine participants who are eligible for the second phase of the study, which includes a questionnaire and a virtual facilitated group discussion.

Completing this form shows that you are interested in finding out more about the study and becoming a possible participant in the study. If eligible, you will be contacted through email from the researcher, where you will be provided an informed description of the study, a consent form, and a questionnaire. You may withdraw from this study at any time.

Date: \_\_\_\_\_

**Are you a currently a student enrolled in an undergraduate program?**  Yes  No

**Is your age between 18 to 25 years-old?**  Yes  No

**Are you currently involved in a professional or post-secondary sports team?**

- Yes  No  No, but I plan to be in the next couple months  
 Yes, but I am not currently participating due to COVID-19

**Have you ever been taught by Trisha Sarker at MacEwan University?**

- Yes  No  I don't remember

**Do you exercise out of your own free-will/motivation?**

- Yes  No  It is part of a requirement

**On average, how many times per week do you try to exercise?**

- under 3 times per week  over 3 times per week

**Do you go to a fitness facility to exercise?**

- Yes  No  I did before the pandemic

If you wish to be a participant in the next phase of this study, please provide your email address here: \_\_\_\_\_

The researcher will connect with you if you are an eligible participant. If you have any questions or concerns, please contact the researcher at [Trisha.Sarker@RoyalRoads.ca](mailto:Trisha.Sarker@RoyalRoads.ca).

*Thank you for completing the eligibility form.*

**Appendix C**  
Participant Consent Form  
Student Post-Secondary Success via Physical Exercise

**Interview**

You are invited to participate in a facilitated group discussion for a research study focused on the impact physical exercise may have on academic success.

Trisha Sarker, MA, Instructor at MacEwan University, and Executive Director of Fitness Industry Council of Canada, is conducting this qualitative study for her Doctor of Social Sciences dissertation at Royal Roads University.

**Principal Investigator (Researcher)**

Trisha Sarker, [Trisha.Sarker@RoyalRoads.ca](mailto:Trisha.Sarker@RoyalRoads.ca), 1-780-908-1710

**Purpose of Research**

The purpose of this research is to determine student self-reported experiences in relation to how and what factors of physical exercise may influence academic success. The data you provide may contribute to identifying the most influential factors resulting from exercise that impact student post-secondary success.

You will have the opportunity to share the type of exercise that works best for you, how you feel that exercise connects with academic success, and your motivations to exercise when trying to achieve academic success.

**Research Objectives**

*Objective one* – To examine outcomes of exercise which reveal how students link the association between exercise to academic success.

*Objective two* – To determine the interest levels for students to exercise as a form of improving academic success and whether they believe they would benefit from specific post-secondary programming.

**Procedures**

Steps:

- Read this Consent Form. By signing the consent form, you agree to participate in both Phase I and Phase II of the research.
- Complete the questionnaire and submit the results prior to your scheduled online facilitated group discussion.
- Participate in the facilitated group discussion and respond to the questions honestly and truthfully, to the best of your ability. This group discussion will be virtual through Google Meet or Zoom and last approximately 60-minutes.

Video recording: The virtual online group discussion will be recorded. You will have the right to withdraw your participation or any part(s) of the video recording. The researcher will also be taking detailed notes during the facilitated group discussion. (The video is for transcription and reference purposes and will only be reviewed by the researcher. The video is only a part of private notes and not for public use.)

Please feel free to ask any questions about the procedure and aim of the study and your role as a participant.

### **Funding**

There is no external funding for this research project.

### **Potential Risks**

There may be potential emotional risk when reflecting on personal experiences associated with physical fitness or academic pressure.

### **Potential Benefits**

- As you are encouraged to reflect on your academic success in relation to physical exercise, the data you provide has a potential impact on the future learning process for both students and post-secondary institution practices.
- Understanding which factors from physical exercise that may influence your academic success will assist in further research on the benefits of exercise.

### **Confidentiality/Anonymity**

To safeguard your identity, all questionnaire submissions will be anonymous and real names will not be used in the study. You will have the opportunity to choose your own pseudonym during the facilitated group discussion. All the content provided by you will correspond to the pseudonym. Although the researcher will know who you are, no identifying details will be publicly shared from this study.

All information regarding participation will be kept private. All data (video recordings, digital transcripts, and interview notes) will be encrypted and kept in a secure location on a password protected laptop in Trisha Sarker's possession. Data will not be accessible to anyone outside the direct study.

### **Right to Withdraw**

- Your participation is voluntary, and you may answer only those questions that you are comfortable with.
- You have the right to request that certain responses you make are not used in the study.
- You may withdraw from the research project for any reason, without explanation.
  - If you withdraw, your data that has not yet been aggregated will not be used for the study and will be destroyed.

**Questions and Concerns**

If you have any questions or concerns, please contact the researcher at [Trisha.Sarker@RoyalRoads.ca](mailto:Trisha.Sarker@RoyalRoads.ca).

**Questions and Concerns About Ethical Conduct**

Any questions regarding your rights as a participant may be addressed to the ethical review committee at [ethicalreview@royalroads.ca](mailto:ethicalreview@royalroads.ca).

**Documenting Consent**

My signature below indicates that I have read and understand the description provided. I have had opportunity to ask questions and my questions have been answered. I consent to participate in the research project. I am aware that my participation in the facilitated group discussion will be video recorded and only used by the researcher for transcription purposes. A copy of this Consent Form has been kept for my records.

_____	_____	_____
Name of Participant	Signature	Date
_____	_____	
Researcher's Signature	Date	

*A signed copy of this consent form will be provided to you, as well as filed by the researcher.*

## Appendix D

### Email to Eligible Participants

**Subject:** Thank you for filling out the eligibility form

Hello:

Recently, you completed an eligibility form to volunteer as a participant in a research study on academic success via physical exercise.

You have been selected as a participant for this study! **As a participant, please sign the attached consent form and email it back to either [Trisha.Sarker@RoyalRoads.ca](mailto:Trisha.Sarker@RoyalRoads.ca) or [SarkerT@macewan.ca](mailto:SarkerT@macewan.ca).** (An email response confirmation will also be accepted.)

The purpose of this research is to determine student self-reported experiences in relation to how and what factors of physical exercise may influence academic success. The data you provide may contribute to identifying the most influential factors resulting from exercise that impact student post-secondary success. This research has the potential to drive both social and economic change.

As an eligible participant for this study, the commitment is as follows:

- Complete a [questionnaire](#) (10 minutes)
- [Attend](#) a facilitated group discussion (60 minutes)

You may complete the anonymous questionnaire [HERE](#).

In order to schedule the facilitated group discussion, please let me know your availability [HERE](#). (Please write your email address in the name field and check off all availability dates.)

OR email me back stating if any of the following times work for you (all times are in MST):

April 27, 2021 – 5:30pm to 6:30pm

April 28, 2021 – 6:00pm to 7:00pm

April 29, 2021 – 6:00pm to 7:00pm

April 30, 2021 – 5:30pm to 6:30pm

*(The dates provided do not conflict with MacEwan's academic schedule; however, if none of these times work for you, please suggest a time and date that will.)*

All the information that you provide in the study will remain anonymous. If you have any questions about this study, please feel free to reach me at this email address at any time.

I greatly appreciate your assistance and look forward to connecting,

Trisha Sarker

[Trisha.Sarker@RoyalRoads.ca](mailto:Trisha.Sarker@RoyalRoads.ca)

## Appendix E

### Semi-Structured Interview Guide: Facilitated Group Discussion

- Question 1: What interested you in participating in this study?
- Question 2: What does *academic success* or *academic performance* mean to you?
- Question 3: In what ways would you consider yourself a successful post-secondary student?
- Question 4: Describe what you believe to be the positive outcomes of physical exercise.
- Question 5: What realizations did you have on your motivations for exercise when completing the survey?
- Question 6: Are there any mental benefits you have personally experienced from physical exercise? If so, please explain.
- Question 7: Are there any physical benefits you have experienced from physical exercise? If so, please explain.
- Question 8: Do you see any of these benefits as being able to influence your academic success?
- Question 9: What circumstances promote or provide barriers when implementing exercise into your academic schedule?
- Question 10: Describe the connection between exercise and your level of performance in class.
- Question 11: Does the effort level or intensity of a workout change or vary the outcome(s) of certain elements that may influence your academic performance?
- Question 12: If your post-secondary institution offered an exercise program specifically designed to engage in academic success, what kind of exercise program would interest you and why? (E.g. trainer, app, group exercise, etc.)
- Question 13: Has being a part of this facilitated group discussion provided you with any insight on your motivations for physical exercise that you may not have noticed before?
- Question 14: If we could pull three major themes from today's discussion, what would they be?
- Question 15: Do you have anything else you would like to add?

**Appendix F**

**Table 4**

*Results for Facilitated Group Discussion (Phase III) Core Category: Physical Connection*

<b>Core Category</b>	<b>Category/Axial Coding</b>	<b>Open Coding/Transcript Communication Through Facilitated Group Discussions</b>
Physical Connection	<ul style="list-style-type: none"> <li>- Sports as physical exercise</li> <li>- Workout at the gym</li> <li>- Energy increase from physical activity</li> <li>- Body image improvement</li> <li>- Perseverance</li> <li>- Challenges</li> </ul>	<p>3: I do sports. I think I've done sports since before I can remember... I grew up in sports, whether I wanted to or not. Now I can't image not having it in my life.</p> <p>1: I was playing sports in my first year, now I'm in my fourth year, in my first year, when I had too much sports going on, my grades were really lacking. So I think there is a balance and now in fourth year, I feel like I've figured it out.</p> <p>2: You can kind of see the progress. I've taken some time off of sports, just to focus on university. And getting back into that physical exercise, you can see the progress of what's happening and things getting a little bit easier, not just sitting on the couch. So, when you're going up the stairs, you're not out of breath.</p> <p>2: Like progress in the sport, where it's not just the physical progress, but being able to do stuff easier – that is always great. I love that. But like, when you workout and exercise, you are able to do stuff better – lift more or go longer.</p> <p>3: I started exercising very, very young. I started sports very young. So I didn't have a motivation for sports. Other than my mom dropped me off at the swimming pool. But then after high school, I stopped doing sports and I stopped working out because I wanted to go to university. And I did. I got a certificate and then I started working in an office and I was gaining a lot of weight and not happy. I couldn't move and my mood was down. I didn't have any energy and then my mom</p>

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stepped in, because she always does. She's like alright, let's run together.

5: Overall better health, increased strength, energy, sleeping better, just being able to do more physical activity, whether it's like going on a hard hike in the mountains, or just lifting – feeling better, in my body.

9: If I can lift a couple 100 pounds, and just feel happy. That's my goal. So that that's the physical benefits I am basically exclusively working for.

6: Seeing myself lift heavier things or running a faster mile along with that there is definitely my physical appearance.

8: Physical sense of achievement makes you feel like okay, if I ever had to run for whatever reason to escape, I could run however many kilometers before I would be too tired. So, I like a little bit of security, like survival security.

12: I find exercise just gives me more energy to spend time getting ready and getting myself more physically ready for whatever academic the thing is coming up.

11: I think like when you train fitness or exercise, and you start to believe and notice your strength improving that translates to, obviously confidence in school but, for example, in business, you're more confident giving business presentations because you accept you like the way you look, you know you're strong, you can overcome challenges at life.

17: I feel stronger and as a lifeguard not scared to pull people out of pools if I have to.

21: That physical exercise to balance the sudden change in myself. So physical looks are

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definitely a motivating factor for me because I discovered I can afford to eat a lot of cake now.

23: It's self conscious, so the physical aspect is there and for a healthier body. But because I've invigorated my body so I think I'm ready to start doing things with my mind.

22: A huge part of it for me too is just seeing how I can kind of push my body and seeing not just like the physical changes, but the like inner changes and like the increase in stamina, increasing muscle and just seeing, like, how I'm improving myself with these small actions as well.

22: Even if I can't see like huge physical changes, I'm like, well, I'm going like an extra 20 minutes every day, which is a big step up from last year so definitely finding those challenges that aren't like beating yourself down but kind of hyping yourself up.

22: I found that I actually have a better lung capacity.

26: Body image and not being in pain.

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**Table 5**

*Results for Facilitated Group Discussion (Phase III) Core Category: Mental Connection*

<b>Core Category</b>	<b>Category/Axial Coding</b>	<b>Open Coding/Transcript Communication Through Facilitated Group Discussions</b>
Mental Connection	<ul style="list-style-type: none"> <li>- Changes in mood and feelings</li> <li>- Confidence building</li> <li>- Gained focus and attention</li> </ul>	<p>4: I just noticed, if I start exercising for the first time in a long time, I immediately notice that I feel like a different person, because my mood is so much higher, my motivation is so much higher, I just feel so much better emotionally. My mood is a lot more stable; I have a lot more energy.</p>

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- Stress, anxiety and depression
  - Energy increase

4: I think I can focus a lot better. And it's really wild to me how quickly I noticed that change. And I think it does taper off. It's a lot less dramatic when I'm doing it regularly. But just that initial change after it's been a while. It's just such a large difference that I'm always like, oh, wow, I really should be doing this all the time.

2: I get really big, negative mood swings. And when I'm exercising more frequently, they happen a lot less frequently. And they're a lot less intense.

1: I find a lot of people have felt gloomy. Because it's darker outside, you get more depressed in the winter months. So, I always had working out as an outlet, so I never really had to worry about it.

4: It's a really, really nice feeling and a very noticeable change in mood when [workouts] are less frequent. I feel more stable...generally more positive.

4: With gained focus the most important things would be my schoolwork. Being able to pay attention in my classes and organizing my life, being able to like pay attention to what's going on around me – what I need to schedule and figure out... Yeah, it's just a lot easier for me to maintain my attention and keep track of things.

3: I was in that spot in my life where I didn't work out at all. I was very, very depressed and it really does affect your mood.

1: Exercise puts me in a happier mood. When you're in a better mood, I find that you are looking at things more positively.

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4: The mood boost is huge for me. The focus difference is really big. And just being able to, like, if you're really stressed out, go to the gym and let that out. You know, I find it's a really good outlet.

9: When I'm able to actually go to the gym, do athletics like go out and bike now that it's warm again, that helps my mental space, a heck of a lot more than a lot of any thing else. Physical activity is much more important for mental health.

7: Any sort of exercise helps to lift me out of any like negative kind of moods, and it obviously is tied to the endorphins. It's a way to sort of feel that I've achieved something to get a workout in; feel accomplishment – that can ride on for a little while.

6: Maybe it's like a little bit of a self esteem sort of thing to know that you can get something done in terms of physical exercise.

5: Mental benefits of dealing with a situation that you know makes you angry, or upset you can kind of run indefinitely take the edge off of that anger. And I also find it's a good time to be reflective and introspective sometimes choose what helps me with maybe a little bit of space and quiet time to think through a problem or how I'm going to approach something or make a plan, a little bit. So, the mood stabilization is a huge thing, and reflection time, because as a mom too, sometimes you'll see it's one of the only times that you are away so it's personal time.

9: It's just a huge stress and anxiety reliever to be able to go and expel some of that energy and have the time and space to think.

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12: After exercising I find my thoughts are a lot less rapid disorganized, negative and orientation I think they're more pure. It's kind of a form of meditation.

15: I find exercise helpful for improving my mood. So, that can be. If I have an excessive amount of worry, or a lot of stress, or a lot of anger or not feeling confident. I find that after workout. I'm just in a better headspace, mentally.

15: I would use exercise to improve my mood.

17: Working out a lot because it's a good stress reliever.

17: I feel strong in the gym and that kind of translates like in my head to feeling like mentally strong as well so I'm like, if you can pick up this heavyweight, you can go ask the waiter where the bathroom is.

21: I think reducing anxiety is a big one and the sense of accomplishment.

22: One of the biggest mental benefits for me is thinking of work life balance, having that dedicated time and space where I'm not encompassed by a work, but can spend time on school, family, socialization, it's just kind of have a mental balance.

23: Whenever I do take like walks or go hiking, I find that I'm more in the moment than I usually am. So I think it's like a stress reliever. I feel like my mood does improve and I have less anxiety.

26: When I'm fully exercising on a regular basis I'm usually a very happy, bubbly person. And a lot of my friends really enjoy that. The people I

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	<p>work with say that they've seen a difference. But definitely, if I'm not working out after like probably two or three irritable, I just get really ate like angered really quickly.</p> <p>25: I started getting really bad anxiety, but then I wasn't doing anything about it. I wasn't being proactive. I gotta like fix this. So then I started working out anytime I would be like beginning to feel anxious, I would just like go in a corner and do some push ups or do some sit ups or like go for a ride if I was at home, and then it kind of just changed everything. Ever since then it's been smooth sailing again, I'd haven't been getting anxious anymore and if I do work out to refresh and the feeling goes away.</p> <p>27: I'd say it helps de stress me sometimes for project at the moment and I'm just getting frustrated just me doing a little bit of exercise or just going for a run or just getting outside moving, it really helps de stress me and takes my mind off something to come back with a fresh mind.</p>
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**Table 6**

*Results for Facilitated Group Discussion (Phase III) Core Category: Academic Connection*

<b>Core Category</b>	<b>Category/Axial Coding</b>	<b>Open Coding/Transcript Communication Through Facilitated Group Discussions</b>
Academic Connection	<ul style="list-style-type: none"> <li>- Schedule and routine keeping</li> <li>- Gained motivation, memory, and confidence</li> <li>- Transference and creative ideas</li> <li>- Social connection</li> <li>- Energy and focus</li> </ul>	<p>2: Only after I started exercising, I would talk to myself in such a way like, okay, so this class is really difficult. But, if I can get myself to a point where I can have rock solid quads, then why not this paper, you know? I know it's silly, but it motivates me.</p> <p>3: I'm learning karate and it's doing other stuff for me; like, I'm not just doing karate but working on my life. Just like school, which</p>

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<ul style="list-style-type: none"> <li>- Better sleep and mental clarity</li> <li>- Clear/calm mind with reduced stress</li> <li>- Networking opportunities</li> <li>- Sense of accomplishment and pride</li> <li>- Gained stamina and self-esteem</li> </ul>	<p>means that I can approach it from different angles.</p> <p>1: With COVID, I've really seen the transition with online and my grades have really risen from that. I am able to schedule things better, when I do my classwork versus when I know I should get up and move around and step away from the computer.</p> <p>7: Overall health, which, whether directly or indirectly does positively affect my mental health, whether that's for better sleeping from, you know better self esteem, being more social being around more people directly related to academics; I would say that, myself and a lot of friends during finals in the past would step back. It will give you a second wind or like, more, more energy and focus.</p> <p>6: I think just from the aspect of being able to sleep better to being more rested having that mental clarity, and even having more energy, which makes it so I think I can focus better. And if I need to do a long study session, then I feel like it's probably not as tiring, but doesn't take as much out of me.</p> <p>9: It's helped my grades by forcing me into a schedule where I can't procrastinate I can't put aside, I have to work so that I can partake in what I enjoy, and that feeds back more and more and loops it and just makes the grade in school better because I motivate myself to stay on schedule.</p> <p>7: I can confidently say that some of my best semesters were when I was doing the most exercise.</p> <p>7: Having it ingrained into your schedule for me made me stricter in other aspects of my life,</p>
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and kind of like the mental and physical, if I had to study for a long time. I felt that physically I was I was able to sit there for hours, and stay up right and doing what I'm doing, we're losing focus at the same time.

8: I feel like I put the energy out so now I can actually sit down for a long time and study for a while.

6: I wonder what the heck I'm going to write about, and I definitely spent time on runs, thinking through an idea and coming up with a plan. It has definitely been a time for reflection and thinking about it all without pressure.

5: I get some of my best most creative ideas during exercise, I think because I'm not actually thinking about them so I just kind of let everything go and then these ideas pop in my head and I'm like okay now I need to remember this.

11: When group members aren't doing their work or to the expectations of what the class expects, or what I expect, it can build a lot of frustration. I find that exercising, makes me a lot cooler calmer and easygoing and more problem solving, and I'm just more willing to help.

11: Think it's like overall well being. I feel less tense I feel like I sleep better. And then when that happens during my schooling, I feel like I have a clear mind and more like potential to do well. I feel like I can handle a lot more with school.

13: I sleep a lot better the days I work out.

17: Have those ideas click to me is like a really big part of academic success that will then

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follow getting good grades. And also, networking as well with other students or, networking with other friends to make ensure your success.

16: Mental benefits of exercise that transfer to the academic setting would have to be reduce stress and like having a more like calm demeanor.

16: If I have the motivation to go to the gym, then I can almost force myself to find the motivation to study or make flashcards or review notes. Or have the energy, from it. When I workout first thing in the morning, I always take a pre-workout which has quite a bit of caffeine. So, I think that gives me a fair bit of energy too. It starts off my day that has school as well.

17: I would always make flashcards for classes, or like physiology and whatever and I take them to the gym with me and do them between sets. And so it was a really good way to get myself remembering things in a louder environment.

16: I think there's also the benefit of doing homework or flashcards or learning in different environments. I think that's a benefit that's been showing if you learn in different places instead of just in one place, you might do better when you read the exam like an unfamiliar environment like the gym. You remember things differently. I know I remember better that way.

19: Being physically active and kind of getting that sense of accomplishment and pride plays a role in my ability to sit down to do for school and then carrying out that sense of success, it

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just plays on itself; and then having the energy to go to class.

21: Once I've worked out, I feel like I've done something already and I feel like academics is the deciding factor of my success anymore. So, I do feel like I'm more, more confident and less looking around at other students.

23: [Exercising] is almost like a break from academics, that somehow has like a circular positive effect to academics, because it was nice to complete the day of going to classes finishing lectures, and then stepping away from it.

22: With increased stamina from exercise, I'm able to study for longer and be in that mindset of an academic setting more. I have that endurance and stamina to be able to.... think longer and study longer and be that setting longer without breaks for longer.

26: Yeah, if I'm doing cardio I actually kind of study, which is really weird, mostly like the pharmacology and the pathos, with nursing, that's where I actually like remember most of my medications.

27: But I do find when I'm doing cardio I do read and research, a bit tablet open and reading materials so I can I find I find it does help me digest it better for some weird reasons.

25: I'm a big basketball player, even in high school. Then I stopped playing to focus on school and I noticed drop in all my grades, and then it followed on and then I got into university, and I started playing a little bit, and it was good and I stopped playing again because, it got crazy in school, and then grades dropped again, and like last year, when the pre

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COVID, I was playing basketball two or three times a week at the drop-in sessions, all my grades were fine. I was doing good. So that's my I noticed like a big difference when I'm playing basketball or not. I needed to be spending time on both.

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**Table 7**

*Results for Facilitated Group Discussion (Phase III) Core Category: Social Connection*

<b>Core Category</b>	<b>Category/Axial Coding</b>	<b>Open Coding/Transcript Communication Through Facilitated Group Discussions</b>
Social Connection	<ul style="list-style-type: none"> <li>- Being with others</li> <li>- Making friends</li> <li>- Having companionship</li> <li>- Supporting each other</li> <li>- Not doing things alone</li> <li>- Confidence increase</li> <li>- Similar mindset</li> <li>- Group management</li> <li>- Enjoyment</li> <li>- Networking</li> </ul>	<p>3: I have a hard time working out by myself. I'd have to go to the gym where I'm not super comfortable. And if I'm trying to workout but I don't really understand the machines or anything, I'm just going to leave. I like to be with people. So we can support each other.</p> <p>1: I like knowing that I'm not alone at the gym. I get confidence that there's people here that pretty much seem like they're thinking the same way that I am.</p> <p>4: You are able to learn different leadership skills from being active... and different group management and mediation from it. It's about being able to gain skills from somewhere else that you can apply.</p> <p>3: My mom is a personal trainer. And she's very, very into the psychology of working out. She will go on for an hour about this kind of stuff. So she thought it would be interesting for her and for me to exercise together and we have been doing it for years. It's our thing.</p> <p>9: The social aspects, like if you're on a team. Just that's an entire social life, that you don't have, if you're not part of a team. If you go to a</p>

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gym and you're regularly seeing the same people and stuff, you build friendships and companionship with those people, it's a huge social aspect that also helps with the mental side stuff, big positive for physical activity is that it increases your social range that you wouldn't have if you didn't partake.

5: I actually just really enjoy it. I really like getting out in the sun and exercising. Especially if its with someone.

9: Some of my friends, I only see them when we were going to do an activity or go to the gym together.

17: I always liked to go with people to the gym, like with my brother.

21: Having a gym buddy is a huge motivator on its own.

20: Definitely clarity, definitely like the self pride and like the accomplishment and also one of the things that I really noticed is the mental workout. I find that I'm so much happier.

26: I have two dogs, and I have to make sure that they're getting their exercise as well so I put the two together. I go running with them. Running with them though is still a bit of a challenge but I'm working on it, but its good to have them to go with.

27: When my friends talk about working out or going to the gym, it makes me want to do the same.

26: I would sometimes go to the gym with classmates and we all kind of relied on each other to be there to chat. We would be like, I learned this today, what did you learn and we

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	kind of bounced our education off of each other so that really helped, helped to learn like the different scopes that everybody does in a non-academic place.
	26: Sometimes you can get really good friends out of [going to work out].

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**Table 8**

*Results for Facilitated Group Discussion (Phase III) Core Category: Meanings/Definitions*

<b>Core Category</b>	<b>Category/Axial Coding</b>	<b>Open Coding/Transcript Communication Through Facilitated Group Discussions</b>
Meanings/Definitions: Academic Success/Academic Performance	<ul style="list-style-type: none"> <li>- Good grades/high marks</li> <li>- Increased understanding</li> <li>- Ability to get a job /career</li> <li>- Ability to retain information</li> <li>- Ability to work and learn</li> <li>- Comprehension increase</li> <li>- GPA increase</li> <li>- Passing classes</li> <li>- Adaptable</li> <li>- Efficiency</li> <li>- Applying yourself</li> <li>- Networking</li> <li>- Resourcefulness</li> <li>- Adapting/ relating learnings to different situations</li> <li>- Confidence improvement</li> <li>- Doing your best</li> </ul>	2: The academic success is definitely through grades.  1: Dean's list.  1: [Academic success means] seeing it translate into a job. I've got a job in accounting.... In the field I am studying. So, getting those kinds of affirmations of grades wise and getting a job after is kind of active, academically successful.  2: Just like grades and any sort of gratification from that. I think academic success can also be marked as having the mental capacity to be able to actually do all of the homework that comes with everything.  3: The ability to do the work is also very important. But personally, I think understanding the material that I'm being given is important.  3: Not as much as grades, but how much you understand and can apply into the real world.  4: If I felt like I wasn't learning anything or wasn't able to apply that material in any way, I

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don't think that I would describe that necessarily as success.

4: Not just about getting good grades but being able to accept the information and learn from it.

5: [Academic success means] Accomplishing and achieving high, high levels. Not just like passing a class but getting very high marks.

6: High level of comprehension.

9: Academic success isn't just passing, it's being able to have, at minimum, like a 3.7 GPA, when you're actually having academic success is if you're like an A minus or higher or 3.7 GPA or higher that's success in my head at the very least.

8: Finding a good career afterwards is tied to academic success for me too.

7: Academic performance, would be a lot of the kind of during the semester, things like how efficient, I actually am and like how long it takes me to learn and adapt to different concepts and different teachings and success like as a general word I would say relates, similar to the others. In like accordance with the grades that I would be getting.

11: [Academic] success is being able to absorb that information and be able to apply it to my life.

12: Getting what you want out of university, whether that be building connections through school, like networking or career goals, or learning knowledge that pertains to your study of interest.

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13: Academic successes is applying the skills because it's different being in school just reading a test data but then applying it.

14: Your relationship with academics so being able to be present, be in a resourceful state when it comes time to learn. And just overall confidence when it comes to academics.

18: When I can think better and complete school and take care of my family at the same time.

19: An understanding and my ability to integrate the knowledge and understand it, and how to do that.

21: Academic success to me is both having that knowledge and being able to use it in life in a job or internship position. I would also say that, not necessarily just grades but achieving those goals.

22: Academic success is doing well in school by getting like good marks in school, and also being able to apply your knowledge and your studies to other things in your life.

23: Getting those good grades does bring like a feeling of success but I think completion is a good marker of academic success as well because, even just making it through semesters and papers, even if they're not the mark that you envisioned for yourself. It does kind of give you that measure of success that you're like okay. I've completed it. It's done. Like, that was successful.

24: For me, it's not just about GPA, but what kind of knowledge I get from studying at university and using it for jobs later.

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	<p>25: Achieving the goals that I've set out for myself. I guess that academic year or just like in long term or steps towards my ultimate goal... making it onto the deans list or just smaller goals like finishing assignments.</p> <p>26: Academic success for me this year was more around modeling my schedule and my study time, schedule 15 papers I had to write, study for the finals, and then just like actually schedule a time for myself.</p> <p>27: I think it would be passing the classes, like a B or higher but also feeling like I did my best.</p>
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**Table 9**

*Results for Facilitated Group Discussion (Phase III) Core Category: Overall Outcomes of Exercise*

<b>Core Category</b>	<b>Category/Axial Coding</b>	<b>Open Coding/Transcript Communication Through Facilitated Group Discussions</b>
Overall Outcomes of Exercise	<ul style="list-style-type: none"> <li>- Problem solving and conflict resolution</li> <li>- Positivity and energy increase</li> <li>- Sense of accomplishment and gratification</li> <li>- Gained confidence and discipline</li> <li>- Happiness</li> <li>- Reduce anxiety</li> <li>- Energy and mood boost</li> <li>- Mental balance</li> <li>- Stronger physically with improved body</li> </ul>	<p>2: I get rattled with anxiety. So, I would just take a moment to go do some yoga, or some sort of cardio just to get some excess energy out, and then I could just decompress. I can start with this little piece here. Yeah, so being able to then finish the work.</p> <p>3: My favorite thing about finishing a workout and physical exercise is just feeling where you're like, "I did it, and I get to go have a nap." It's kind of that accomplishment, but your body's tired in a good way. And you get that shakiness. The good positive kind. The next day, or you're just like, everything's satisfying.</p> <p>1: And to get that gratification when you're in a sport, and when, not only after you physically exercise, but I put that into a game point of view, when you're done your game, then I'm</p>

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<p>image and increased stamina</p> <ul style="list-style-type: none"> <li>- Better sleep and reduced stress</li> <li>- Setting schedules/routine</li> <li>- Self-care</li> </ul>	<p>not only feeling energized afterwards, because you're getting pumped up before the game. But also, after getting that exercise, you don't even feel like you're doing that exercise, because you're within a game.</p> <p>4: The main reason that I do it is just because I noticed such a substantial mood boost. Afterwards, the next day just in general, and I feel like so much more motivated to work on other aspects of my life. And just like, keep working towards something. You feel accomplished. And it just makes me a lot happier.</p> <p>3: It's very helpful with my confidence and my ability to feel like I can control situations I used to think were out of my control. Which has helped me with my self image and my ability to talk in front of people.</p> <p>2: Nice confidence booster.</p> <p>2: Meeting and working with new people and challenging myself in different settings like the gym helps me to get used to different activities... especially with all of the presentations that have to be done for school.</p> <p>1: I found that exercise has helped me with a lot of conflicts. So being in a lot of group projects, often there is some sort of conflict between two people.... I saw [a] conflict, and I was able to, you know, use my skills of trying to calm them down, to calm down people... tell them to go for a walk.</p> <p>6: We do a lot of balancing stuff. And to me that's a huge opportunity to like spend time in fitness sort of way but improving like very specific little skills.</p>
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5: Personally love seeing myself get stronger and more like in better shape. So for example, whether it's lifting heavier weights or, you know, redoing a challenging hike and it's not as difficult the second time around, things like that, but I just have a health condition that physical activity and exercise. It helps manage the pain and the other symptoms of it. So that's another motivator.

6: Improved body image, but also better sleep. I also find that it helps with migraines, which I have chronically so that as well in a better mood. I'm happier more energetic person when I'm exercising regularly.

9: Lifting weights doing exercise going for a hike or bike ride and stuff. It's great way to bend burns off energy, like, whether it's venting out stress and like hitting the reset button or venting out anger by like hitting a punching bag or like lifting heavy weights, it's a good mood reset it just lets you calm down mellow, because you're you expend the energy, you take the negative energy and push it out while you work out.

6: Think have a more pleasant person to be around, I'm just generally happier, especially because during the times in my life when I've stopped exercising it's been kind of like I'm going through stuff whether it's physically and mentally, that's preventing me and then I always want to get into exercise, so I feel like with factors that's kind of like when I am my best selves.

15: Even feel more confident sometimes after a really good workout. And I can apply that to my schooling if I have confidence in how I'm doing, physically, I find that can often also overflow to academics.

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11: I think it's also a great stress relief. And just, even if it's not a very good workout or exercise, it can still improve your day.

14: I feel that I can clear my head. I consider that to be a successful workout or a successful action.

13: I believe like the body is so connected to the mind so when you do something to benefit the body it's going to indirectly benefit your studies as well. Anything you do intellectually is improved.

12: You can tie that a lot to exercise; so things like just habits, having a daily habit, routines, consistency, discipline, patience, you know, patience is something you learn when you work out because sometimes you hit a plateau, you can't get any faster when you're running or you can't leave and find the same thing in academics.

17: Everything from like stress relief to like physiological, like I see like confidence like for me especially like I feel I'm more confident after a good workout or even just like the motivation and like extra energy throughout the day.

16: It really helps me sleep better at night too.

19: Mental clarity. Obviously, you know initially people do it for the physical benefits but no matter how kind of anxious or frustrated I'm feeling. Once I finally bring myself to do a physical fitness routine of some sort gives me mental clarity.

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21: Good sense of accomplishment, regardless of how the rest of the day pans out, I know that I did something for me.

20: The main effect that I noticed is my mood and how I'm approaching my life when working out. It's a nice reliever.

19: Routine and self-care comes from my workouts.

21: I get a sense of pride. It is very much about self-care. It is something that I do for myself.

22: I think the biggest one that I've noticed, aside from stamina is it's really regulated my sleep schedule and the quality of my studies.... I would assume or I would think that it would be like energy expenditure during the day, it's not just kind of pent up and like being stagnant but instead by releasing it I need to recharge.

22: I find that that bit of movement and like posing and stretching does help your confidence too.

26: Exercising improves the mood for sure. A lot of people can tell what I'm not exercising. They tell me I'm quite cranky.

25: Exercising creates a routine in your life. I feel like when I have that kind of routine it just makes other things like come like easier, a sense habit of knowing what to do when.

25: I'll say I think there's a big thing about like body image as well as like you feel that you look good, that you have more confidence so that you're literally flowing with confidence as well and it makes it that much easier to present to other people that you know that you don't know.

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26: They were just that group or they didn't want to put in any effort, so there's only two of us that did basically the whole project and instead of taking my anger out on them or going to the professor, I just kind of went and did my own thing I ran with my dog, and it helped me go back to them and with a calm, cool, collected type of attitude and handle it better than I would have before I did that. I was able to reorganize myself and have a different mind frame.

26: Sometimes I associate things with how much I can lift. If I can lift heavier than before I feel like I can do anything better, including school.

**Table 10**

*Results for Facilitated Group Discussion (Phase III) Core Category: Realizations*

<b>Core Category</b>	<b>Category/Axial Coding</b>	<b>Open Coding/Transcript Communication Through Facilitated Group Discussions</b>
Realizations	<ul style="list-style-type: none"> <li>- Similar experiences</li> <li>- Different ideas</li> <li>- Individualized needs</li> <li>- Body image</li> <li>- Improved mood</li> <li>- Confidence improved</li> <li>- Happier overall</li> <li>- Scheduling and routine maintained</li> <li>- Memory increase</li> <li>- Accountability</li> <li>- Sense of pride</li> <li>- Time to relax</li> </ul>	<p>4: My primary thing is mood, and motivation, energy levels, etc. But looking at the body image side of things, the social side of things, which are things that I kind of brush off as like, "all these don't really affect me at all." But to realize, oh, maybe they do, maybe they're in there, and I just don't think about it specifically... my primary motivation.</p> <p>1: For me, I wanted to make sure that when I was physical, like physical exercising, that it was definitely to either brighten up my mood, or like go back to when it was when I was playing again, at a high level, I was having fun. And I didn't really have to worry about body image because I was working out so often that it didn't really affect me too much.</p>

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2: When I first started exercising, it was for body image reasons. And then when I really got into it, I was like, “Oh, you know what, I just enjoy this.” I want to keep doing this. And I feel really good. And I feel more confident. So. I just wanted to keep going. So that was a change.

2: What I realized too, among exercising, is that body image will always be there. You will always want more, or I think that because no matter how I look, I wish I had my high school body. And I find that that's a separate issue. And once I put that apart then it wasn't as much as both body image.

3: [My mom] started getting me working out again. That helps me with my body image and helped me with my energy and I got back into shape. It gave me so much more confidence.

2: I have dealt with depression my whole life and anxiety the last 10 years or so. And I didn't really have a good way to manage it. And so, when I started exercising, like I said earlier, it was for body image reasons. But like, when I started to notice, I realise dress fit better, drastic changes in my moods, and incredible benefits, I was like, “I should definitely keep doing it,” because I found I was a lot happier, a lot more confident. If I was really feeling down, because it happens, you know, I would look at my lat muscles and be like, “I did that.”

3: And then a couple months later, after starting [to exercise], being like “I did it.” So, I think just having those, like setting those goals that are physical goals and being able to reach them is really, really fun. And, you know, fitting into cool looking clothes is also fun.

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4: If you feel like you are succeeding at something, making progress, achieving things that can be really motivating because yeah, if you are then struggling in school, it doesn't feel like that's the only thing that's going on for you. But if you do well in school, you are proud of yourself and want to keep it that way.

7: Personally, I've found a very big link between being physically active and my grades and a lot of other factors in my life.

5: Everyone measures academic success. Working out or exercising in some way, helps with academic success, whether it's because of the mental or the physical aspect or just like having that structure in our lives.

9: There's been a common theme around a few people saying that it helps them with disciplining their schedule and kind of structure which allows them to do more, be more efficient.

10: Working out and getting in the gym, it really just helps alleviate that sort of drain that mental drain that you get, and it kind of helps you just recharge and refresh.

14: From a very young age, with my brothers and I tried to strike a balance between the two as academics and athletics, and how they can very much support each other.

15: Often there's challenges or problems that before a workout I'm really concerned about and I'm not sure that I'm able to solve those problems and then after a workout. Something changes in my mind and my perception, so I feel more confident, more able to handle those problems I seem to be able to shrink, large problems into small problems through exercise.

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12: Usually when you're involved in fitness, you start to take your nutrition more seriously and making those proper nutrition choices, definitely contributes to your energy and school, your mental energy and your mental clarity on every task you do.

17: If I don't exercise for two or three days. I don't know if it's just me but like I think I'm more irritable.

20: And in comparison, to high school, and I found that as soon as like a roughly around when I started exercising again, that they increased a lot more and I realized that it was partially because I was missing out on that just kind of unwinding self care time.

19: Started for mental reasons and then you notice the physical benefits is just nice to see... the choice and the broad scope of the type of physical activity, all of it generates this kind of positive health outcomes

21: I didn't really realize that until mentioned by XXXX that it brings clarity to the work I have to do, and potentially memory recall.

20: I obviously I'm working out like I do it alone so there's nobody there really, quote unquote, clap for the year something beyond that but I do definitely get that kind of sense of accomplishment and pride and I've never really thought about it in that way so I thought that was really interesting.

19: I would say the main things I realized for why I exercise is the sense of accomplishment, the sense of motivation, and then mental benefits.

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	<p>22: I think that all of those aspects of physical activity and academic success are so important because you want to look at the social issues with physical activity like accessibility, affordability, just, like, even like distance and cost for different people in different socio economic factors, but there is also a huge part that it's just good for your body to move, and, in turn, I think that's always going to be good for academic success.</p> <p>22: Being able to focus on physical activity, lead to being able to focus more on academics, and then being more confident because we're getting that physical activity maybe plays into more competence in our academic success.</p> <p>24: I've never thought up like how physical activity and academic success like involved together, but after the hour discussion, I figured out like, it's really important to have a little bit of physical activity to help relax during tough times.</p>
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**Table 11**

*Results for Facilitated Group Discussion (Phase III) Core Category: Recommendations*

<b>Core Category</b>	<b>Category/Axial Coding</b>	<b>Open Coding/Transcript Communication Through Facilitated Group Discussions</b>
Recommendations	<ul style="list-style-type: none"> <li>- Movement breaks</li> <li>- Applications for workouts</li> <li>- Personal trainers</li> <li>- Recumbent bikes</li> <li>- Mindfulness inclusion</li> <li>- Lower prices</li> </ul>	<p>8: If I needed some more intense workout, especially when you're doing the flow classes, because then you get a little bit cardio a little bit of strength, and then the heat just like I feel like you feel so easy.</p> <p>7: If there was general like weightlifting, like open type classes that were offered to students... and had people show them what to do, people would have to book in to go to them, because I think that even if somebody thinks</p>

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that they're very, very experienced in a lot of beginners and mid level people, you want to gain the confidence that you can do the exercises to actually reap the benefits and use the gym. So I think that general weight training classes would definitely be very helpful to students if they were offered free or at a cheaper alternative type thing.

10: Guiding instructions for sure and then subsidized or free to students.

5: I've read, sitting on the recumbent bike and just read. I got my homework done like my reading and stuff which I really liked. I liked the recumbent bike because then you sort of could have your hands free. It almost makes you think of, you know, could there be more like desks.

14: If universities could do anything that makes the idea of physical activity and exercise, friendly, welcoming, safe.

19: I haven't been keeping up with my regular physical activity, and this semester has been brutal by just the ability to concentration.

23: I'm a biology student so I already know how the system's work specifically for health, it made me realize that physical exercise and stuff was actually really very important to do at least a few times a week.

23: It's being able to do exercise after or between classes, because I feel like being in that academic place like [MacEwan], made it really easy for me.

22: What I found particularly striking about us is that you mentioned you're in Biology and talked about the physiology of it, and I'm in

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communications, and mentioned the social aspect of it.

23: I find that when I have an app to track my progress I have more motivation to exercise. So I think in turn would also help me or motivate me to emphasize with academic success in mind, but also maybe scheduling.

22: I wrote down trainer led classes, but with a focus on the intensity to be grateful for class if you want to just invigorate your mind and this one would be great like after school if you want to blow off the steam and the stress of everything.

22: And then I also wrote down class incorporated physical movement because I've had a couple instructors like halfway through class get us up, get a stretching, get us doing some physical movement, and I found that that really helps kind of break up the almost sedentary state of studying and gets you back into the focus.

24: A movement break really helps you like your brain take a break for small amount if time and then you're more focus for the next half of class.

22: If Min offered something for mindfulness, like slower versions of yoga could be incorporated with mindfulness about how to like not focus on what's three months ahead but what's days ahead and kind of keeping students present in their studies.

23: The days where I don't stretch while in class, I find that I feel tight like more tired, mentally, then if I did do the stretch because I didn't give my brain a break, I just kept on going, I kept on. You actually feel more

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refreshed and more ready to be able to go into the next half of the class.

25: I learned my lesson from like that period of time where I stopped working out completely, my body just got not only unhealthy but not where it usually is, and grades dropped, stress got like extremely high. I like, I'm never gonna like not make it a priority, again.

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