CORRELATES OF STUDENT ANXIETY: CONSIDERATIONS FOR TIER 1 PREVENTION AND INTERVENTION WITHIN MULTI-TIERED SYSTEMS OF SUPPORT

by

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CHAPTER 1

Abstract

It is widely recognized that excessive anxiety has harmful effects on functioning and well-being among student populations. This is especially concerning because anxiety in students has shown to have increased over the COVID-19 pandemic. Thus, it will be critical to further the knowledge around student anxiety, it's correlates, and ways it can be managed. The aim of this study is twofold; to provide a literature review on student anxiety research from a school psychology perspective, and to test the relationship between anxiety and three variables that can be treated at a Multi-Tiered Systems of Support (MTSS) tier 1 level. Chapter 1 is a literature review on student anxiety; it describes the development of student anxiety research, highlights key correlates relevant to the school context, and discusses treatment and management options for student anxiety. Chapter 2 narrows its focus and tests whether physical activity, sleep hygiene, and self-esteem are important to self-reported anxiety in the COVID-19 context. In the results, sleep hygiene and self-esteem were individually correlated with self-reported anxiety, while physical activity was not. When all three predictor variables were used in a multiple regression model with anxiety, it was significant and accounted for thirty-four percent of the variance in self-reported student anxiety scores. Furthermore, a model using only sleep hygiene measures accounted for twenty-two percent of the variance in self-reported student anxiety scores. Results could provide simple and practical recommendations for professionals working in schools, most notably school psychologists.

Introduction

Anxiety is a natural human emotion, which is necessary for survival (Stöhle et al., 2018). It acts as a sign for potential harm, signaling to different parts of the body that the anticipated behaviour or stimulus is dangerous or inappropriate (2018). Yet, excessive amounts of anxiety can have negative effects on physical and mental health, and can lead to the development of an anxiety disorder (Mineka & Zinberg, 2006; Ströhle et al., 2018). The World Health Organization identified anxiety as a major concern globally, and estimates that, in 2019, 301 million people globally were living with anxiety disorders (World Health Organization, 2019). Anxiety disorders are extremely distressing and have a significant negative impact on quality of life (Olatunji et al., 2007; Mendlowicz & Stein, 2000). It is noted that anxiety disorders are the most common form of mental illness globally and there is data that suggests 14% of people aged 14-

65 currently have anxiety disorders (Ströhle et al., 2018). Due to the COVID-19 pandemic, anxiety is becoming an even more important area of research, as it has been reported by the World Health Organization that anxiety prevalence has increased 25% worldwide since the beginning of the pandemic (World Health Organization, 2022). This indicates a dire need for wide-access to effective psychological services and research related to understanding and treating anxiety.

This rise in anxiety is especially concerning for school-aged children and youth, as they are in a critical period of physical and psychological development. Anxiety has shown to have a high to moderate negative effect on functioning and development (Ezpeleta et al., 2001; Essau et al., 2014) and adolescent anxiety has shown to predict income, unemployment, maladjustment, coping skills, and chronic stress in later life (Essau et al., 2014). High rates of anxiety in children and adolescents show high comorbidity with depression, with rates ranging from 50% to 72% (2014). It is estimated that 58 million youth are living with anxiety disorders (World Health Organization, 2019). It has also been noted that most anxiety disorders have an early onset, which generally occurs in late childhood or adolescence (Mathew et al., 2011) and that school-age is a core risk phase for the development of anxiety disorders (Ströhle et al., 2018; Beesdo et al., 2009). Thus, it is critical to have a solid conceptualization of anxiety in students, it's key correlates, and ways it can be managed to promote healthy functioning.

Specifically, school psychologists should be informed on anxiety research so they can provide efficacious services and psycho-education to a population that is particularly susceptible to anxiety and its symptoms (Varma et al., 2021). Tracking the development of student anxiety research and its growth through the years will clarify current conceptualizations of anxiety and could inform future clinical practice with students experiencing excessive anxiety.

A great deal of research on anxiety currently exists, yet there is a lack of easily accessible reviews on student anxiety that describe the development of school-aged anxiety research, notable correlates, and current understandings around anxiety management. It would especially be helpful to have this review from a school psychology perspective to ensure the information would be relevant and informative for professionals working in schools. Therefore, it is the goal of the current review to summarize past and present literature on adolescent anxiety from a school psychology perspective. The review aims to track the development of anxiety research on students, note significant correlates of student anxiety, and discuss management of anxiety for students in the classroom and at home. Doing so through the perspective of a school psychologist will allow for an emphasis to be put in efficacious treatments of anxiety and factors that could be relevant to working in a school environment.

For the sake of the current study, it is important to distinguish between anxiety and anxiety disorders. While anxiety disorders are various diagnoses identified in the Diagnostic and Statistical Manual of Mental Disorders – Fifth Edition (DSM-V) that are related to anxiety, such as Generalized Anxiety Disorder or Separation Anxiety Disorder, anxiety is defined as the anticipation of future threat (American Psychiatric Association, 2013). Similarly, the American Psychiatric Association website defines anxiety as an emotion characterized by feelings of tension, worried thought, and physical changes (American Psychiatric Association, 2022). People who experience anxiety have intrusive thoughts or concerns that could result in avoiding certain situations, or physical symptoms, such as sweating, trembling, dizziness, or rapid heartbeat (2022). Although people who experience high levels of anxiety often have anxiety disorders, this review will use anxiety as a general term for excessive amounts of anxiety, whether diagnosed as an anxiety disorder or not.

Development of Student Anxiety Research

It has been suggested that ancient Latin and Greek philosophers recognized anxiety as a medical illness characterized by anticipation of fear (Crocq, 2015). The Latin Stoic Philosopher Cicero wrote about anxiety in the Tusculan Disputations (TD), which he called "Angor", saying that it was a constricting disorder that was marked by excessive anticipation of fear (Tusculan Disputation, Book IV, VIII via Crocq, 2015). Anxiety was also discussed by other ancient philosophers, such as Hippocrates – who described a man who experienced excessive worry and fear that was interfering with his sleep – or Seneca, who taught his contemporaries ways to treat anxiety (2015). However, it was not until Sigmund Freud's conceptualization of anxiety-neurosis in 1894 that clinical studies on anxiety really began (Spielberger, 1966). Freud described anxiety-neurosis as a clinical syndrome marked by inner emotional conflict. He believed it was an inferred unconscious process that elicits defensive maneuvers on the part of the ego and that we experience anxiety when we perceive ourselves to be helpless (Sarason, 1977). A few years later, French Psychiatrist Joseph Levy-Valensi's defined anxiety similarly, describing it as a dark and distressing feeling of expectation and included the psychological effects of worry (Crocq, 2015). Researchers continued to focus mostly on adults experiencing dysfunction related to anxiety at this time, as research on anxiety in school-aged youth wasn't common until later in the 20th century (Spielberger, 1966).

Until this time, excessive anxiety was thought to be normal during development, and adolescence was described as a natural period of "storm and stress" (Starbuck, 1901, p. 213). Some psychologists believed that anxiety was important to study in youth, such as G.S. Hall (1904) who proposed anxiety as a possible mental disorder in *Adolescence: Its psychology and its relations to physiology, anthropology, sociology, sex, crime, religion and education*. Yet, the

common conception across the psychological community was that pathological variations were normal at this time due to the imbalance brought on by puberty (Bawden, 1905).

When the DSM-I was introduced in 1952, anxiety was described as the chief characteristic to "psychoneurotic disorder", which was updated to "neurosis" in the DSM-II in 1968 (Surís et al., 2016). These were designated to adults only, however, researchers soon discovered that excessive anxiety in adults could be tied to their development. For example, Sullivan (1948) suggested excessive anxiety is first manifested in infancy, while Kasanin et al. (1942) noted that adults suffering from anxiety neurosis could recall similar anxiety states during adolescence. Erikson's theory of psychosocial development was an important contribution to child anxiety research at this time as well, since it proposed that children and adults go through a series of developmental stages, and that early stages of development were particularly vulnerable to cognitive and unconscious challenges that could promote the development of anxiety in later life (Batra, 2013).

Educators and psychologists were beginning to note that students experiencing nervousness, worry, and stress were exhibiting memory, focus, and learning difficulties. For example, one of the first experimental studies on student anxiety using human participants was completed by Sarason et al. (1960). The researchers studied elementary school children in four Connecticut towns. They split the children into two groups – high anxiety and low anxiety, using the recently developed General Anxiety and Test Anxiety scales (1960). Their performance and reported anxiety were examined during test-like situations, and the results of the two groups were reported. The researchers concluded that fantasies of bodily cues and injuries were interfering with the student's performances and functionality (1960). This was an influential study because it was the first that used a scientific experiment to identify a statistical distinction

between two groups of children based on anxiety. Spielberger (1962), in his study on the effects of anxiety on academic achievement on college students found similar results; anxious students obtained lower grades and a higher percentage of academic failures than non-anxious students of comparable ability. Later, Gueunther (1966) examined the relationship between anxiety and cognitive processes with a special focus on children and youth in the school setting, and found that anxiety had a tendency to interfere with learning, creative thinking, and overall cognitive processing. It was becoming clear that anxiety was not only a major concern for adult functioning, but it was also impacting youth and young adults in school.

During this time, researchers identified two major classes of cognitive factors which were thought to be essential to anxiety: 'Worry' and 'emotionality' (Spiegler et al., 1968). Worry was operationalized as 'cognitive concern on one's ability', and emotionality represented 'the somatic symptoms experienced before and during the assessment' (1968). It was noted that while worry remained stable across time, emotionality often varied (1968). Despite recognizing the physiological aspects of anxiety, student anxiety researchers commonly undervalued the role physiology plays in the experience of anxiety at this time. For example, Sarason (1977) defined anxiety as a type of cognitive response marked by self-doubt, feelings of inadequacy, and self-blame. This definition placed more importance on self-esteem rather than physical symptoms (e.g., heart racing, sweating).

A considerable amount of anxiety research being done with students at this time regarded test anxiety (Sarason & Mandler, 1952; McKeachie et al., 1955; Sarason et al., 1952; Sarason, 1961; Sarason et al., 1960; Atkinson & Litwin, 1960). The term test anxiety was used to describe when the characteristics of anxiety are linked to academic or evaluation situations (Sarason, 1977). Researchers at this time found that test anxiety produced physiological reactions that were

paired with worry during evaluations (Sarason, 1977), and that high test anxious children were noted to fall increasingly behind low test anxious children in reading performance (Hill & Sarason, 1966). It was also noted that self-reported measures of test anxiety were not consistent during elementary school years (1966), and that expectancy to do well was negatively correlated with test anxiety (Liebert & Morris, 1967). Test anxiety was theorized to be brought on by unrealistic academic expectations held by the students' parents and the fear of not meeting these expectations (Sarason et al., 1960; McDonald, 2001). Early studies on test anxiety helped build a foundation for further research on anxiety in schools, as it was becoming evident that test anxiety was not the only form of anxiety affecting people in this environment.

The amount of empirical research on school-aged children and anxiety was starting to become a popular research topic in the 1970's, and several researchers contributed to a more advanced conceptualization of childhood and student anxiety. In the book *Attachment and loss: Volume II: Separation, anxiety and anger,* John Bowlby was the first to label an anxiety disorder in children when he used the term 'separation anxiety' (Bowlby, 1973). It was noted that in the absence of their mothers, children were becoming distressed; they were responding to situations with acute alarm and would not return to a relaxed state until reunited with their mother. Bowlby used the term separation anxiety to describe this behaviour (1973; Runcan, 2021). This resulted in numerous theories that attempted to explain separation anxiety, and eventually led to childhood anxiety disorders being included in the DSM-III in 1980 (American Psychiatric Association, 1980; Runcan, 2021).

The DSM-III introduced three specific anxiety disorders in children and adolescents, all under the category anxiety disorders of childhood and adolescence (American Psychiatric Association, 1980). The three anxiety disorders were: Separation Anxiety Disorder, which

reflected excessive anxiety when separated from a certain individual, Overanxious Disorder, which was characterized by anxiety that is not focused on a specific situation or object, and Avoidant Disorder, which described an excessive avoidance of unfamiliar people or situations (King & Ollendick, 1989; Strauss, 1994). It was now understood that children are capable of experiencing severe negative responses to elevated anxiety, which led to more studies being done in student populations.

A number of researchers continued to demonstrate the negative effects of anxiety on student performance and well-being, such as Head & Lindsey (1983), who found that low anxious students tend to have the higher academic performance, and that behaviour modification and counseling are effective in reducing student anxiety, or Warr, who noted that anxiety is a significant predictor of student's well-being and overall functioning, with lower levels of anxiety predicting higher ratings of well-being (1978). Other researchers attempted to identify demographic correlates of anxiety in students, such as Stein and Hoover (1989) who found that significantly higher anxiety was reported in groups of students with learning disabilities when compared to students without learning disabilities, or the numerous researchers who were finding that female students tend to report higher levels of anxiety and may be more susceptible to the negative effects of anxiety (Sowa & LaFleur, 1986; Wynstra & Cummings, 1990; Wigfield & Meece, 1988).

Student anxiety research was moving well past only measuring test anxiety, as it was now widely accepted that anxiety was affecting students in situations unrelated to formal testing as well. Social Anxiety in students was beginning to receive more attention in the research, and it was acknowledged that student's peer relations were important to their emotional development and future adjustment (La Greca & Stone, 1992; Coie & Dodge, 1988; Hartman, 1983). Social

anxiety was noted to have negative effects on students' social relationships and academic functioning (King & Ollendick, 1989). Hartman (1983) theorized that social anxiety was the product of a "disorganization of feelings and cognitions about the self, about other people, and about the relations between self and others" (Hartman, 1983, p. 435). It was believed that this disorganization resulted in a narrowed capacity of experiencing other people's perspectives.

The DSM-IV was released in 1994, bringing with it many changes to the diagnostic criteria for anxiety disorders in children and youth (American Psychiatric Association, 1994). This version of the DSM was based off a stronger statistical model when compared to the earlier version (American Psychiatric Association, 2023). As a result of this, the DSM-IV made changes to the diagnostic criteria of Separation Anxiety Disorder and completely changed the names and diagnostic criteria for Avoidant Disorder and Overanxious Disorder (Kendall & Warman, 1996). Instead, the behaviour pattern described in Avoidant Disorder would now be referred to as Social Phobia. This was done because researchers were beginning to notice that children with Avoidant Disorder and people with Social Phobia were similar in all respects, except for age. Instead of having two different disorders, they used the term Social Phobia to describe this behaviour pattern, and now permitted children to receive this diagnosis, something that the DSM-III did not (1996). It was also found that the majority of children diagnosed with Overanxious Disorder were later meeting criteria for Generalized Anxiety Disorder, once they were of sufficient age for the diagnosis (1996). Thus, instead of having two distinct disorders, Generalized Anxiety Disorder was now used to describe excessive non-specific anxiety in children and youth. Much like Social Phobia, the age restrictions that were used for Generalized Anxiety Disorder were now lifted, and it was recognized that the anxiety disorders experienced in childhood are not fundamentally different from the anxiety disorders experienced in adulthood (1996). They used

the title ‘Disorders usually first diagnosed in infancy, childhood, or adolescence’ to categorize these conditions, based on the idea that most of these disorders were first noticeable in childhood (Substance Abuse and Mental Health Services Administration, 2016). This shift in the way the DSM regarded childhood anxiety disorders represents the overall change in mindset that was occurring at the time. Anxiety disorders in children were now considered more prevalent than once believed, and it was now widely acknowledged that excessive childhood anxiety must be identified and managed so future negative outcomes associated with anxiety in childhood can be prevented or limited. As a result of this, researchers began evaluating the effectiveness of programs aimed to decrease and prevent student anxiety at this time, such as Kendall (1994), whose influential randomized control trial study was the first to demonstrate the effects of Cognitive Behavioural Therapy (CBT) on youth with anxiety. This would pave the way for future research on anxiety treatment programs and lead to advancements in how anxiety is managed.

The DSM-V was released in 2013, and later the DSM-V-TR was released in 2021. These versions of the DSM introduced the title ‘Anxiety Disorders’ to include all disorders whose main feature was anxiety (American Psychiatric Association, 2021). This included Generalized Anxiety Disorder (persistent and excessive worry about various events or contexts), Separation Anxiety Disorder (excessive worry concerning separation from a caregiver), Specific Phobias (excessive fears of a specific object or situation), Social Anxiety Disorder (excessive fear of being embarrassed or humiliated in front of people), Panic Disorder (recurrent, sudden, and severe anxiety attacks), Obsessive Compulsive Disorder (OCD) (recurrent thoughts or behaviour patterns that are interfering with functioning), and Posttraumatic Stress Disorder (PTSD) (persistent stress occurring as a result of injury or severe psychological shock). Many of these

anxiety disorders can be diagnosed in children as long as a certain age range is not specified in the diagnostic criteria (2021). These were monumental changes because they represent the further advancement in attitudes around childhood anxiety disorders. No longer were they considered distinct from anxiety disorders in adulthood; they were now believed to be the same disorder, just with different age of onset. This demonstrates the progress that has been made related to research around anxiety in childhood and adolescence; in the early 1900's, it was thought that excessive anxiety was not clinically important, yet now, even the DSM acknowledges that excessive anxiety in young people is a problem and can have many negative outcomes.

Currently, student anxiety remains a popular topic in the literature, and may have become even more popular as a result of the COVID-19 pandemic. This is because there have been observations of significant increases in student anxiety since the start of the pandemic (Pragholapati, 2020; Saeed et al., 2022; Liyanage et al., 2021). Chapter 2 of the current study provides a more in-depth review of student anxiety and its relation to the COVID-19 pandemic.

Tracking the development of student anxiety research up until the COVID-19 pandemic is informative to current understandings of student anxiety because it demonstrates the immense progress the field has made in such a short time. Reviewing this research can benefit school psychologists and other mental health professionals working in schools because it can give them a well-informed conceptualization of anxiety.

Correlates of Student Anxiety

In the current research, numerous correlates of student anxiety have been identified. Reviewing key factors that associate with anxiety in the school context could inform better

identification and treatment for school psychologists and other mental health professionals working with students experiencing excessive anxiety.

Elevated anxiety is correlated with lower quality of life (Olatunji et al., 2007) and is positively correlated to future outcomes, such as unemployment, income, or maladjustment (Essau et al., 2014). Anxiety in students is negatively associated with school performance (Liyanage et al., 2021; Mazzone et al., 2007; Zhang et al., 2019) and positively associated with feelings of loneliness and depression (Danneel et al., 2019). Elevated anxiety has also shown to relate to low self-esteem and self-worth (Sowislo & Orth, 2013; Lee & Hankin, 2009; Riketta, 2004; Grills & Ollendick, 2002). Anxiety is the most common mental health issue in young people (Merikangas et al., 2010), and students are particularly susceptible to the symptoms of anxiety (Saeed et al., 2022).

Student anxiety has also been shown to relate to factors unique to the school context, such as academic pressure (Quach et al., 2015), transition periods between grades (Eccles et al., 1993; Grills-Taquechel et al., 2010), and classroom environment (Adimora et al., 2015; Li et al., 2021). Important home factors that are noted to influence anxiety are the socioeconomic status of the family (Othman et al., 2019; Lemstra et al., 2008), parenting styles (Bakhla et al., 2013), and status of familial relationships (Othman et al., 2019; Ozen et al., 2010). Social factors, such as social acceptance (Grills-Taquechel et al., 2010), perceived social support (Johnson, 2022), and peer pressure (Subroto et al., 2022) have been shown to correlate with student anxiety as well, and are especially relevant due to the inherent social demands of schools.

There are also some important health related factors that have shown to correlate with anxiety in students. Physical activity has consistently shown inverse correlations with anxiety (Kandola & Stubbs, 2020; Martinsen, 2009; Anderson & Shivakumar, 2013), and has been

proposed to be a protective factor against anxiety while in school (Bonhauser et al., 2005; Eccles & Barber, 1999). Sleep has also been shown to influence anxiety levels in students (Wong et al., 2013; Kennedy & Fernando, 2020), with students who show poor sleep reliably reporting higher levels of anxiety (Orsal et al., 2012; Augner, 2011). Correlations between diet and anxiety have also been noted in the literature, yet more research needs to be done in this area (Saha et al., 2021).

Many risk factors for anxiety have been identified in the research. Females have shown to be more vulnerable to the symptoms of anxiety, and consistently demonstrate higher levels of anxiety when compared to males (Feingold, 1994; McLean, et al., 2011; Ezpeleta et al., 2001; Jacques-Aviñó et al., 2022). This has been shown in student populations as well (Grills-Taquechel et al., 2010; Khesht-Masjedi et al., 2019; Bakhla et al., 2013). Additionally, students who identify as transgender or gender diverse report heightened anxiety when compared to cis gendered students (Hoyt et al., 2020), as have students who identify as gay, bisexual, or queer (Grant et al., 2014). The gender differences related to anxiety are sizable and must be recognized when working with students with varying sex and gender identities.

The school context is unique, therefore, professionals working in schools should have a solid understanding of the correlates of anxiety in this context. Understanding key correlates of anxiety, such as self-esteem, physical activity, or sleep habits could be helpful when working with students in schools because, not only could it help identify students at risk for excessive anxiety, but it could also suggest ways to decrease anxiety levels within this population. Having future research identify the most powerful predictors of anxiety in students could improve the screening process for anxiety and could inform interventions for preventing and decreasing harmful anxiety symptoms experienced by students.

Management of Student Anxiety

A key purpose of studying anxiety in student populations is to develop interventions that can help individuals manage anxiety symptoms. Whether it is interventions aimed at prevention, or individualized treatments for anxiety disorders, it is critical school psychologists and other mental health professionals are helping students understand ways that anxiety can be reduced, prevented, or managed. A Multi-Tiered Systems of Support (MTSS) model will guide the review of treatments and are categorized as tier 1, tier 2, or tier 3. Tier 1 refers to programs and interventions that can be facilitated at a school-wide or class-wide level. Teachers and other professionals working in the schools should be able to understand and apply tier 1 procedures without additional training or competencies. Tier 2 refers to mostly small group interventions and is usually facilitated by other professionals working in the schools, while Tier 3 refers to one-on-one intervention with a trained professional; they are more intensive and often take more time or resources. Tier 2 and 3 anxiety interventions are typically facilitated by the school psychologist or guidance counsellor in the school context.

Tier 1

Universal programs aimed to prevent mental health challenges are essential to managing anxiety in schools, given anxiety's well-established adverse effects on student functioning. These prevention services could reduce anxiety disorder incidence, as well as improve student's general psychosocial outcomes (Durlak et al., 2011). This is especially important in the school context because schools reach the majority of children in the population, and are culturally, physically, and socioeconomically diverse (Sulkowski et al., 2012). Schools have been described as having unparalleled contact with youth and can reduce or alleviate many of the common barriers to treatment, such as time, location, stigmatization, transportation, and cost (Neil & Christensen,

2009). Additionally, many individuals who receive treatment outside of school often receive it too late and fail to respond (2009). Applying tier 1 anxiety prevention programs could allow all students, despite demographic factors, the ability to recognize and manage their anxiety.

An essential component to tier 1 service delivery is, not only to provide universal education and programming, but also to evaluate current levels of anxiety across the population (Sulkowski et al., 2012). Doing so gives the school psychologist or mental health professional an understanding of students' anxiety levels and can indicate who needs further support. A universally administered behaviour screener that can identify students with elevated anxiety or other mental health difficulties is the Behavioural Assessment Scale for Children's 'Behavioural and Emotional Screening System' (BASC-3 BESS). This screener has the student, their teacher, and/or their parent rate the students' psychosocial functioning and then indicates if the student is at-risk for anxiety or other social emotional difficulties (Pearson, Web, 2023; Dever et al., 2021). Research supports adequate to strong test-retest reliability and internal consistency of overall scores and subscales scores (2021). It also correlates to concurrent and future academic and behavioural outcomes (2021). Some limitations of this assessment tool are that it requires multiple raters and may be time consuming, therefore more research into its efficacy in schools is needed. Another possible screener could be the AimswebPlus Canadian Edition, which is a screener tool for school teams in MTSS contexts that assesses and monitors progress in a variety of areas. Along with reading and math domains, this application can include measures that focus on social-emotional skills (Pearson, Web, 2023). This is a comprehensive screening package and has been shown to effectively assess internalizing and externalizing behaviour problems and can identify students who are at-risk for related issues (Sulkowski et al., 2012). School-wide administration of the Aimswebplus screener has been described as quick and easy and allows for

effective benchmarking and progress monitoring (2012). A limitation of this screener is that it does not target anxiety explicitly, meaning it may require subjective interpretation when identifying students who are experiencing difficulties with anxiety specifically (2012). A single screener has yet to be identified as the optimal tier 1 assessment of anxiety.

Aside from assessment, tier 1 programs should include a school-wide early intervention that aims to prevent or reduce student anxiety and mental health difficulties across the school. In a systematic review on school-wide early intervention and prevention programs for anxiety, it was determined that most school-wide prevention and indicated programs are effective in reducing anxiety symptoms in students, with effect sizes ranging from small to moderate (0.11-1.27) post-test and in a follow-up (Neil & Christensen, 2009).

A specific tier 1 program shown to prevent student anxiety is FRIENDS for Life (Higgins & O'Sullivan, 2015). This program is a structured intervention program for children and adolescents that addresses cognitive, physiological and behavioural processes that are seen to interact in the development, maintenance and experience of anxiety (2015). This program is based in Cognitive-Behavioural Therapy and was specifically designed to be administered at a group-level by either a mental health professional or a teacher (2015). FRIENDS can be applied to three different age groups (i.e., 4-7, 8-11, 12-16), and consists of ten one hour lessons with two follow up sessions, one after a month, and the other after three months. The lessons involve large and small group work, completing exercises in workbooks, role plays, games, activities and quizzes (2015). In a systematic review on the research on effectiveness of the FRIENDS program, all studies found that the program had a positive impact on primary anxiety outcome measures compared to control groups (2015). FRIENDS has been shown to be an effective

prevention program in various contexts and has been recommended by researchers as the best option in terms of tier 1 anxiety interventions (2015).

Other programs with some evidence in the literature are Dominique's Handy Tricks (DHT), a cognitive-behavioural program that is delivered using a combination of storybooks and workshop sessions (Bouchard et al., 2013), or Thiswayup Schools Anxiety Intervention, which blends online and offline cognitive-behavioural therapy programming and can be administered by classroom teachers (Wong et al., 2014). Both of these interventions need more research before being considered evidence-based (Werner-Seidler et al., 2021). More quality research studies are needed before a specific program can be declared well established, however, it appears that FRIENDS has the most data backing up its benefits to managing student anxiety. No matter the intervention, most of the established early interventions for anxiety are based on Cognitive-Behaviour Therapy (CBT) principles (Neil & Christensen, 2009). This includes exposure therapy, cognitive restructuring, relaxation training, diaphragmatic breathing, progressive muscle relaxation, contingent reinforcement, and modeling (Sulkowski et al., 2012). Regardless of the program selected, it should be based in CBT principles and reflect evidence-based treatment for anxiety.

In the current Canadian context, there are some inefficacious programs in place at schools that aim to target and prevent student anxiety. It is important for school psychologists and other professionals in the field of education to understand that these programs don't appear to be preventing or reducing student anxiety. One of such programs is the Zones of Regulation, a program aimed to teach self-regulation and prevent mental health and behaviour difficulties. In a research review of the Zones of Regulation program, it was determined that the Zones of Regulation does not meet the standards for an evidence-based practice, and that there is very

little evidence showing the efficacy for the Zones of Regulation program (Mason et al., 2023). The time and resources required of this program would be better spent on evidence-based screeners and interventions that can reliably target anxiety and other social emotional difficulties in students. As school psychologists or mental health professionals working in schools, it will be important to advocate for better tier 1 programming for student social emotional well-being.

Tier 2

Once a student has been identified as having significant anxiety concerns, tier 2 methods should be implemented. First, it is recommended that a more in-depth assessment be done to determine the student's anxiety problems, since assessment methods used in tier 1 would not be sufficient in determining the significance of an individual's anxiety (Sulkowski et al., 2012). This can be done by having students, who have been identified as anxious, complete more focused rating scales. These would be less general than the screeners used in tier 1 and would target anxiety and other social emotional difficulties more explicitly (Jones et al., 2019). Some common tier 2 behaviour rating scales could be the Behavior Rating Scale for Children – Third Edition (BASC-3) or the Conners – Third Edition (Conners-3) (Sulkowski et al., 2012). These rating scales would be appropriate for tier 2 service delivery because they are not too specific but do have outcome variables related to anxiety. These rating scales can be completed relatively quickly and can distinguish between issues that might act like anxiety but are really something else, such as ADHD or Depression. Other valid measures of anxiety which can be used at the tier 2 level are the Multidimensional Anxiety Scale for Children – Second Edition (MASC-2) and the Beck Anxiety Inventory (BAI). These scales focus on anxiety specifically and evaluate the degree to which someone is experiencing elevated anxiety (Sulkowski et al., 2012; Leyfer et al., 2006). These are effective screeners for identifying elevated anxiety in students but should not be

used alone to determine if an individual has an anxiety disorder (Fraccaro et al., 2015; Creamer et al., 1995; Leyfer et al., 2006). These screeners could be useful in schools, yet, might also be suited for tier 3 service delivery, when a full assessment is being done.

After a more in-depth anxiety screening, students who continue to exhibit elevated anxiety should receive tier 2 intervention. Much like the tier 2 screeners, these would be more focused on specific anxiety symptoms and would only be administered to groups of students that demonstrate elevated anxiety. In terms of tier 2 anxiety treatment for students, Cognitive Behaviour Therapy (CBT) appears to be the best choice. Generally, CBT combines interventions such as psychoeducation about anxiety, self-monitoring of symptoms, somatic exercises, cognitive restructuring, gradual exposure, and relapse prevention to help individuals reduce stress by changing cognitive and behavioural responses (Arch & Craske, 2009). In schools, this can be done in small groups and is usually administered by a mental health professional, such as a school psychologist (Jones et al., 2019). CBT is considered a well-established treatment of anxiety for students of all ages at the tier 2 level (Jones et al., 2019; Higa-McMillan et al., 2016).

A popular tier 2 anxiety intervention is the Coping Cat program (Kendall & Hedtke, 2006; Lenz, 2015). This program is based in CBT and has participants recognize thoughts, feelings, and bodily reactions to anxiety. It also helps students identify and challenge anxious self-talk, develop coping strategies, evaluate effectiveness of skill use, and reward themselves for successes (Lenz, 2015). Coping Cat is run in small groups over the course of 16 sessions and is facilitated through the use of a standardized manual (2015). The program is meant for children ages 7-13, yet there is a version for adolescents as well, titled 'C.A.T Project', with similar features (The California Evidence-Based Clearing House for Child Welfare, 2023). School psychologists or trained guidance counsellors would typically be administering these programs

in the tier 2 context. Coping Cat is considered well-supported by the research and is recommended for use in settings such as schools (2023). Although more research is needed to identify other well-established tier 2 anxiety treatments, Coping Cat is an excellent option in the meantime (The California Evidence-Based Clearing House for Child Welfare, 2023; Lenz, 2015).

Tier 3

Individuals who continue to demonstrate highly elevated anxiety, or who begin to show serious impairment as the result of anxiety, should be considered for tier 3 service delivery. At the third tier, school psychologists and other mental health professionals must recognize that this anxiety should be addressed immediately. A multi-method approach that combines different assessments with different formats should be used in tier 3 because it gives a more complete picture of how the student might be experiencing their anxiety (Sulkowski et al., 2012). It is suggested that school psychologists or other professionals combine data from structured observations, interviews, and behaviour rating scales to acquire a clearer indication of the student's level of dysfunction, and next steps. A structured interview which could be used at this stage could be the Parent Interview for Childhood Symptoms (PICS). This is a structured interview that has a school psychologist interview a parent about a child's behaviour and functioning. The PICS has a module that targets emotional concerns and includes anxiety related questions. Similar structured interviews could also be done with the student, their teacher, or other people in their lives. Having in depth information on the student and their anxiety, when in combination with rating scales, such as the MASC-2 or BAI, could give a more complete picture of the anxiety they are experiencing. Behavioural observations may also be useful in tier 3 so that school psychologists and other professionals working in schools can evaluate the

antecedents and contextual factors that could be influencing the anxiety. Overall, tier 3 anxiety assessment must be multi-faceted and individualized so an effective treatment plan can be established (Jones et al., 2019).

Tier 3 interventions for student anxiety would be more targeted than interventions used in the second tier of the MTSS model and would be put in place for students with highly elevated anxiety, despite having participated in previous anxiety interventions. This level of intervention would be individualized to the student and would be completed in one-on-one sessions with the school psychologist, social worker, or guidance counsellor (2019). Much like tiers 1 and 2, CBT has been identified as a well-established method of intervention for individualized anxiety treatment at the tier 3 level (Higa-McMillan et al., 2016). These treatments typically last between 8 and 16 weeks and would be more intensive than a small-group CBT program (Jones et al., 2019). CBT programs used as tier 2 interventions, such as Coping Cat, can be implemented at the tier 3 level, but are considered more intensive since they are being administered to only one student.

Medication is also considered an appropriate tier 3 intervention for elevated anxiety. Selective Serotonin Reuptake Inhibitors (SSRIs) have been established as an effective treatment for reducing childhood anxiety (Dobson et al., 2019) and are the most common medication prescribed for anxiety disorders in youth (Bushnell et al., 2018). Other medications, such as Selective Norepinephrine Reuptake Inhibitors (SNRIs), are also used to treat anxiety disorders in children, but have demonstrated inferior reductions in anxiety symptoms when compared with SSRIs (Strawn et al., 2020). Thus, SSRIs are typically used as an initial pharmaceutical treatment for anxiety (2020). Pharmaceutical interventions for anxiety in students have been shown to have large effects, and when in combination with CBT show even greater reductions in anxiety

(Wehry et al., 2015). School psychologists lack the training and competency to prescribe medication or make recommendations regarding pharmaceutical interventions, yet they should be aware of effective pharmaceutical interventions so they can understand when to refer further and have informed conversations.

Conclusion

Anxiety has an effect on students learning and functioning, therefore it is critical to continue researching anxiety in the school context and identifying factors that may be associated with anxiety or could help in its prevention. The current chapter briefly reviewed the development of student anxiety research, key correlates of student anxiety, and treatments for anxiety management in schools from a school psychology perspective. This could improve understandings of student anxiety, it's associations with other variables, and ways to prevent or manage anxiety in the school context. The following chapter 2 will narrow its focus and review the effects of the COVID-19 pandemic on student anxiety, while also performing analyses to determine the degree to which student anxiety relates to previously identified correlates in this context. Together, these chapters will give school psychologists and other mental health professionals a solid knowledge base in relation to student anxiety and will suggest future directions needed in the area of student anxiety research.

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CHAPTER 2

Introduction

The COVID-19 pandemic has had a significant effect on Canadians, drastically transforming all areas of contemporary life. With these changes has come an increase in anxiety across populations worldwide (Javed et al., 2020). Large sample studies done in the UK, United States, and Australia found significantly elevated rates of anxiety when compared to population norms or a sample before the pandemic (Pierce et al., 2020; Twenge & Joiner, 2020; Holmes et al., 2020). Students are no different, with recent research showing that student anxiety has increased significantly over the course of the COVID-19 pandemic (Liyanage et al., 2021) and that globally, younger people are more vulnerable to anxiety during the COVID-19 pandemic (Varma et al., 2021). In a study which looked at anxiety levels before and after the start of the pandemic, it was found that, of the 137 participants who were below a clinical cutoff score for generalized anxiety in February 2020, 50 of them (36.5%) were above the cutoff in April 2020 (Zimmerman et al., 2021). Other research has found that nearly one quarter of students have experienced an increase in anxiety during the pandemic (Pragholapati, 2020), and that even after mandatory lockdowns were ended, anxiety remained high and formed a spatially contiguous pattern with depression, stress, and fear of COVID-19 (Di Blasi et al., 2021). Students were also identified as the group with highest prevalence of anxiety during the pandemic, behind healthcare workers (Saeed et al., 2022).

This is a concern for educators, students, and professionals working in schools because anxiety has shown to have severe negative outcomes and can inhibit learning, as well as overall functioning (Liyanage et al., 2021). Ensuring students are not being hindered by anxiety is critical so they can reach their educational and developmental goals.

The topic of student anxiety during the COVID-19 pandemic is especially relevant to the practice of school psychology. It is the school psychologist's responsibility to provide knowledge, resources, and services to students and staff aimed to promote learning and healthy development in the school system, therefore it will be important to understand students' experience in the global pandemic context. This could provide a clearer picture of student anxiety during the pandemic and inform how to effectively provide services during challenging circumstances. It also aims to identify important factors in the prevention and reduction of anxiety during the COVID-19 pandemic.

Three factors that have been tied to anxiety in the available literature are physical activity, sleep hygiene, and self-esteem. The current study will aim to add to the current research by seeing if these factors relate to student anxiety during the COVID-19 pandemic. The three factors used in the current model are lifestyle factors that can be manipulated without medication, consultation, or assistance from a professional. Instead, these factors are simple lifestyle changes that can be made in the life of a student that could prepare them to be less anxious during stressful events or situations.

Results of the current study could provide school psychologists an understanding of current levels of student anxiety and could inform recommendations that school psychologists and other student support staff could offer educators that are within a teachers' scope of practice. Given Nova Scotia's current adherence to the Multi-Tier System of Support (MTSS) model, these results will be especially relevant because each factor could be addressed through tier 1 intervention. Examples could be anything from integrating more physical exercise into the classroom, providing class-wide interventions that target self-esteem, or educating students on ways to improve sleep hygiene.

Physical activity

Physical activity has been shown to have a negative linear relationship with several emotional impairments, such as anxiety, while also showing a positive linear relationship with overall well-being and quality of life (Anderson & Shivakumar, 2013; Yoshikawa et al, 2016, Omorou et al, 2013). Physical activity is also correlated with fondness for school, higher than expected GPA, and a greater likelihood of being enrolled in post-secondary education (Eccles & Barber, 1999). Research has shown that cultural, physical, and economic capital are significant factors in the degree of involvement in physical exercise for young people (Dagkas & Stathi, 2007) and that the correlations seen between exercise and quality of life, education, or mental health may be the result of larger, more systematic factors. That being said, in experiments done when socioeconomic status was controlled for, similar benefits of exercise are seen (Rachetti et al., 2013; Bonhauser et al., 2005; McDowell et al., 2017). For example, in a study done among low socioeconomic high school students in Chile, researchers found that the low-socioeconomic status students who participated in a school-based program to improve physical exercise achieved significant benefits to their mental health and functioning when compared to a group of students who did not participate in this program (Bonhauser et al., 2005). This could indicate that the promotion and accessibility of physical exercise opportunities among at-risk groups could be particularly essential. The benefits of physical activity have also been demonstrated in animal studies, such as in the Rachetti et al. (2013) study, where a group of rats participated in a physical activity program and showed significant improvements in cognitive functioning and neuroplasticity when compared to rats that did not participate in a program (Rachetti et al., 2013). Thus, physical exercise appears to have a positive relation to cognitive functioning and mental health, not only in humans across the socioeconomic spectrum, but also in other species.

Due to social isolation requirements and several lockdowns, the COVID-19 pandemic has influenced students' ability to practice physical activity. In a systematic review on the differences in physical activity before and during the pandemic, the majority of studies found significant decreases in physical activity during the pandemic, and an increase in sedentary behaviours across several populations (Stockwell et al., 2021). Specifically, significant differences were found in relation to vigorous physical activity, moderate activity, and walking, in all age groups (Maugeri et al., 2020). This reduction in physical activity may have influenced perceptions of anxiety. In a study on the longitudinal associations of physical activity and anxiety during the pandemic, Young et al. (2022) found that participants in the lowest physical activity category had the highest anxiety scores. Also, a significant positive correlation between the variation of physical activity and well-being was found by Maugeri et al. (2020), who found that individuals who were exercising regularly during the pandemic exhibited considerably fewer anxiety symptoms (2020). Other research has found similar negative relationships between physical activity and anxiety during the pandemic, such as Xiang et al. (2020), who found that high levels of physical activity were significantly associated with low anxiety, Stanton et al. (2020), who found that negative changes in physical activity were associated with higher anxiety, or Alsharji (2020), who found that a multiple regression analysis using physical activity significantly predicted anxiety levels during the pandemic.

Several explanations exist to help conceptualize this association. For example, research has shown that intense physical exercise can reduce anxiety because it diverts the individual's attention from what they are anxious about (Lago et al., 2019). Other research has that cardiovascular exercise causes heart rate to increase, which in turn increases blood flow to the brain. This has shown to enhance local inhibitory mechanisms in the hippocampus, leading to an

increase in activation of hippocampal interneurons and an increase in extracellular GABA, which are used to reduce stress (Schoenfeld et al., 2013). The release of endocannabinoids, as well as the neurotransmitter serotonin, have also shown to increase with exercise, and have been shown to be modulators in the reduction of anxiety (Brellenthin et al., 2017). Physical activity has also been shown to optimize brain-derived neurotrophic factor, which is essential to the survival, growth, and maintenance of neurons (Phillips, 2017). Overall, there are many neuro-biological mechanisms tied to physical activity in the research, and it was theorized that the evidence-based health benefits, along with its positive psychological effects associated with regular physical activity, would be important factors when looking at anxiety during COVID-19 pandemic.

Sleep Hygiene

Another factor that could be associated to anxiety during the COVID-19 pandemic is sleep hygiene. Sleep hygiene refers to the behaviours or activities that promote or disrupt sleep (Nam et al., 2018). Examples of sleep hygiene could be the consistency of an individual's bedtime, their eating habits at night time, or if they play video games before trying to sleep. Sleep quality and quantity are both strongly related to sleep hygiene and are vital to the optimal functioning of brain activity in regulating emotions, and have been shown to effect nearly every organ system, as well as every physical process in the human body (Wong et al., 2012; Suen et al., 2008; Kennedy & Fernando, 2020). Poor sleep hygiene has been linked to cognitive problems, mood alterations, reduced job performance, and reduced motivation (Lock et al, 2018). Additionally, complex mental processes, such as emotional regulation and problem solving have been shown to have a significant relationship with an individual's sleep hygiene (Kennedy & Fernando, 2020).

Although research has yet to clarify all the exact mechanisms involved in sleep, it has been suggested that the negative relationship between sleep hygiene and anxiety levels could be because maintaining good sleep hygiene behaviours produces satisfaction that improves well-being and buffers depressive symptoms (Peach et al., 2015). Also, sleep is critical to waking cognition, meaning that it affects an individual's ability to sustain attention, remain alert, and practice clear thinking (Worley, 2018). Furthermore, sleep has been shown to relate to memory (2018), with research suggesting that sleep allows for the consolidation of memories, and the encoding of new long-term memories (Rasch & Born, 2013). This could relate to anxiety because it could influence their access to positive memories or experiences that challenge their anxious thinking.

In a recent study, sleep quality was reported to be significantly poorer in all participants during the pandemic. It was also noted that the pandemic has created a significant delay in relation to time it takes to fall asleep and time it takes to get up in the morning, resulting in circadian misalignment (Salehinejad et al., 2020). In a multivariate linear regression, insomnia was strongly associated with sleep hygiene, as well as anxiety, during the pandemic (Bacaro et al., 2020). Specifically, there is evidence of sleep hygiene having an effect on anxiety during the pandemic, with Stanton and colleagues (2020) finding that negative changes in sleep were associated with higher anxiety symptoms. Also, Song et al. (2022) recently found that anxiety was significantly associated with sleep disturbance and late-night smartphone use during the COVID-19 pandemic in a sample of students.

Sleep hygiene is also important for the demographic of this study due to the fact that post-secondary students show very poor sleep hygiene, with some studies finding up to 65% of University students experiencing poor sleep (Saat et al, 2020). Furthermore, it has been

suggested that students appear to have limited knowledge about sleep hygiene and the behaviours that support sleep health (Dietrich et al., 2016). Students may be a specific population that benefits from sleep hygiene education programs or interventions.

Self-Esteem

Self-Esteem is another factor that could relate to anxiety levels during the pandemic. Although definitions of self-esteem vary in the literature, the current study's understanding is in correspondence with recent literature around self-esteem, defining the concept as 'a person's subjective value of themselves' (Cingel et al., 2022). Research has suggested that self-esteem is a positive correlate of happiness (Cheng & Furnham, 2004), and has a negative relation with depression and other adverse psychological symptoms (Orth et al., 2009). Multiple studies have reported significant negative correlations between self-esteem and anxiety, with participants identified as having low self-esteem typically showing higher rates of anxiety (Rosenberg, 1962; Sowislo & Orth, 2013; Lee & Hankin, 2009; Riketta, 2004). It has also been suggested that COVID-19 lockdowns have had a significant effect on psychological well-being and that high self-esteem may have been a protective factor. For example, Gao et al. (2021) found that high self-esteem in young people is related to relatively low anxiety and that self-esteem can act as a protective factor against anxiety in some circumstances. Additionally, Germani et al., (2020) demonstrated that self-esteem is positively linked with anxiety severity during the COVID-19 pandemic and proposed that intervention and supportive programs based on improving self-esteem should be offered during and after the pandemic. Similarly, Rossi et al. (2022), it a large sample study done in Italy, found that self-esteem moderated the negative effects of the COVID-19 pandemic on anxiety levels.

When researching self-esteem, it is important to recognize the research that suggests it has no clinical use and is unimportant to study. Studies have found weak to no correlations between self-esteem and behaviour (Kohn, 1994; Rosenberg et al., 1978; Schroeder et al, 1993) and arguments have been made against its relevance to positive functioning (Kohn, 1994). For example, Schroeder et al., (1993) studied the relationship between self-esteem and drug abuse and found no significant relationship between tendency to use drugs and self-esteem. This could suggest that self-esteem is not something that has significant effects on behaviour, and may not be important in regards to intervention. Yet, self-esteem has extensively shown negative correlations with anxiety (Rosenberg, 1962; Sowislo & Orth, 2013; Lee & Hankin, 2009; Riketta, 2004), and while no studies have found causation between self-esteem and anxiety, it could still be a necessary component to its presentation. There have also been criticisms of programs used to raise students' self-esteem due to the research that has shown short-lived effects and because improving self-esteem has not shown to directly cause any positive benefits (Kohn, 1994). Yet, a meta-analytic review on interventions aimed at self-esteem indicated significant improvement in children and adolescents' self-esteem and significant changes in behavioural functioning (2010). These same improvements were also noted in a meta-analytic review on adult self-esteem programs (Niveau et al., 2021). Overall, scholars appear to be split in regards to self-esteems relevance. Including self-esteem in this study could indicate if self-esteem is worth further research and will, at least, provide an indication as to how the participants are currently feeling about themselves and if that relates to their anxiety levels, physical activity, or sleep hygiene.

Another important note is that, during the COVID-19 pandemic, socialization was drastically reduced and isolation requirements/quarantines were enforced. This could relate to

self-esteem because individuals were not getting the same opportunity for social reinforcement, and because research has shown that isolation inversely predicts self-esteem (Porter et al, 1993). It will be important to examine students' self-reports of self-esteem to determine what typical self-esteem levels for students in the pandemic might look like and how they relate to anxiety.

No previous study has investigated student anxiety during the COVID-19 pandemic using physical activity, sleep hygiene, and self-esteem as predictive variables. Each predictive variable has shown a negative relationship with anxiety in the literature, but have been shown to effect anxiety through different mechanisms. Physical activity is said to decrease anxiety because it improves cardiovascular functioning and increases blood flow to the brain, sleep hygiene is related to waking cognition and memory consolidation, and self-esteem is related to self-concept and way of thinking.

This study intended to determine the significance of physical activity, sleep hygiene, and self-esteem in relation to self-reported anxiety levels. Results could suggest what variables are important to coping during challenging times, whether individually, or in combination with each other. This could inform future tier 1 strategies and support to help reduce or prevent student anxiety during stressful events or circumstances.

Hypotheses

1- It was hypothesized that there would be a significant negative correlation between physical activity and anxiety levels during the pandemic.

2- It was hypothesized that there would be a significant correlation between sleep hygiene and student anxiety, with the participants showing strong sleep hygiene showing lower levels of anxiety.

3- It was hypothesized that there would be a significant negative correlation between self-esteem and anxiety.

4- It was hypothesized that the model which uses all three independent variables together will account for more variance in anxiety levels than any of the variables individually or in combination with one other variable.

Generally, each of these independent factors have shown to be related to anxiety in different ways, therefore, it was hypothesized that they would all demonstrate associations with anxiety. Additionally, by combining them into a multiple regression model, they were theorized to account for significant variation in student self-reported anxiety levels during the COVID-19 pandemic.

Methods

Participants

The study had 162 participants (n = 162). Participants consisted of individuals who were students during the pandemic and ages ranged from 17 to 40, with the mean age of 25 and a standard deviation of 4.835. As part of the inclusion criteria, participants must have been enrolled in either high-school or post-secondary education between February 2020 and March 2023. Participants were recruited between February 24, 2023 and March 17, 2023, via online advertisements on social media. For demographics of the sample see Table 1.

Procedures

This study was approved by the University Research Ethics Board (UREB) at Mount Saint Vincent University in February 2023 (see Appendix B). Consent was obtained and data was collected through an online survey, hosted by Lime Survey, an online survey hosting service, from February 2023 to March 2023. The study was advertised via social media (i.e.,

Facebook) in February 2023. The online advertisement contained information about the study, (i.e., description of the study, inclusion criteria, contact information) and a link to the online survey (see Appendix C). Upon clicking the link, participants were directed to the survey, where they were informed about the study and consent was obtained (see Appendix D). The survey included a demographic questionnaire and four scales. The four scales included in the questionnaire were the Hospital Anxiety and Depression Scale – Anxiety (HADS-A), the International Physical Activity Questionnaire, the Sleep Hygiene Index (SHI), and the Rosenberg Self-Esteem Scale (RSE). Upon completion of the study, participants were thanked for their participation and were offered a chance to enter a draw for a 100$ Visa Gift Card (see Appendix E). Results were analyzed using SPSS software version 27.

Measures

Demographic Questionnaire. The demographic questionnaire collected information on participant's sex, gender, sexual orientation, and age. The Demographic questionnaire followed the SAGER guidelines, which are designed to promote systematic reporting of sex and gender in research (Heidari et al., 2016) (see Appendix F).

The Hospital Anxiety and Depression Scales – Anxiety (HADS-A). The HADS-A is a 7-item self-report measure of anxiety. The HADS-A is a universally used assessment for anxiety and has been acknowledged as an effective stand-alone measure of anxiety (Julian, 2011). Scores range from 0 to 20 with higher scores indicating higher levels of anxiety. Internal consistency for the HADS-A ranges from 0.84 to 0.90 and has been done in large samples of varying demographics (2011). Concurrent validity of the HADS-A was found to be "good to very good" in a comprehensive literature review, and its sensitivity and specificity for anxiety symptoms was

0.80 (Bjelland et al., 2002). The HADS-A is a copyrighted test from Nfer Nelson and permission for its use was granted in October, 2022 via eProvide, a research tool database (see Appendix G).

International Physical Activity Questionnaire (IPAQ). The IPAQ – Long Format is a 27-item self-administered version of the International Physical Activity Questionnaire. This is a measure of health-related physical activity that asks the respondent to think back on the last seven days of their life. Results are calculated into an MET score, which is a ratio of working metabolic rate relative to resting metabolic rate, with higher MET scores indicating higher levels of self-reported physical activity. The IPAQ – Long Format has been proven to have well-established reliability (Spearman's correlation coefficient = 0.80), and validity that is comparable to other self-report measures of physical activity (r = 0.30). The IPAQ is widely used and is accepted as an appropriate measure of physical activity in many settings and cultures (Helou et al., 2017; Chu & Moy, 2015; Oyeyemi et al., 2014; MacFarlan et al., 2011; Craig et al., 2003) (see Appendix H).

Sleep Hygiene Index (SHI). The Sleep Hygiene Index is a 13-item measure of sleep hygiene that uses a 5-point (0-4) Likert scale. Respondents are asked to read a statement and indicate how accurate it is by selecting a response. Total scores range from 0 to 52 with higher scores representing poorer sleep hygiene. This test has shown acceptable internal reliability (Cronbach's coefficient = 0.66, test-retest coefficient = 0.71) with sufficient construct and convergent validity (Mastin et al., 2006; Setyowati et al., 2020) (see Appendix I).

The Rosenberg Self-Esteem Scale (RSE). The RSE is a 10-item, self-administered scale that measures global self-esteem. Respondents are asked to read a statement regarding how they feel about themselves and then indicate to what degree they agree or disagree with the statement. Total scores range from 10 to 40, with higher scores representing lower self-esteem, and lower

scores representing higher self-esteem. The RSE has a considerable research base backing up its reliability and validity, with Fleming and Courtney reporting a coefficient alpha of 0.88 with its use among college students and a test-retest coefficient of 0.82 (Fleming & Courtney, 1984). It has also been shown to have strong internal consistency reliability, with a Cronbach coefficient of 0.82 across 53 countries and sufficient convergent, discriminant, and concurrent validity (Sinclair et al., 2010; Schmitt & Allik, 2005; Hagborg, 1993). It has been acknowledged as a concise self-report measure of global self-esteem for research purposes (Gray-Little et al., 1997; Monteiro et al., 2022) (see Appendix J).

Analyses

A descriptive analysis was performed to examine the distribution of each variable. Associations between self-reported anxiety and self-reported physical activity, sleep hygiene, and self-esteem were tested using a Pearson's correlation coefficient. A stepwise multiple regression was used to test the associated variance between anxiety and the factors of physical activity, sleep hygiene, and self-esteem and overall fit of the model to the data.

Results

Descriptive Statistics

The descriptive statistics for the Hospital Anxiety and Depressions Scale – Anxiety (HADS-A), International Physical Activity Questionnaire (IPAQ), Sleep Hygiene Index (SHI), and Rosenberg Self-Esteem scale (RSE) are reported in Table 1. Schapiro-Wilk tests of Normality determined HADS-A (.985), IPAQ (.862), SHI (.994), and RSE (.962) to be approximately normal. Distributions for each variable are depicted through histograms in Figures 1, 2, 3, and 4.

Table 1

Descriptive Statistics for Measures

Measure	Mean	SD	95% CI	Minimum	Maximum	Range
HADS-A	9.10	3.798	8.507-9.693	0	20	20
IPAQ	10806.82	9728.714	9287.809-12325.836	0	40122	40122
SHI	21.62	7.289	20.486-22.763	1	43	24
RSE	27.51	3.993	26.883-28.129	17	38	21

Figure 1

Frequencies of responses in hospital Anxiety and Depression Scale – Anxiety (HADS-A)

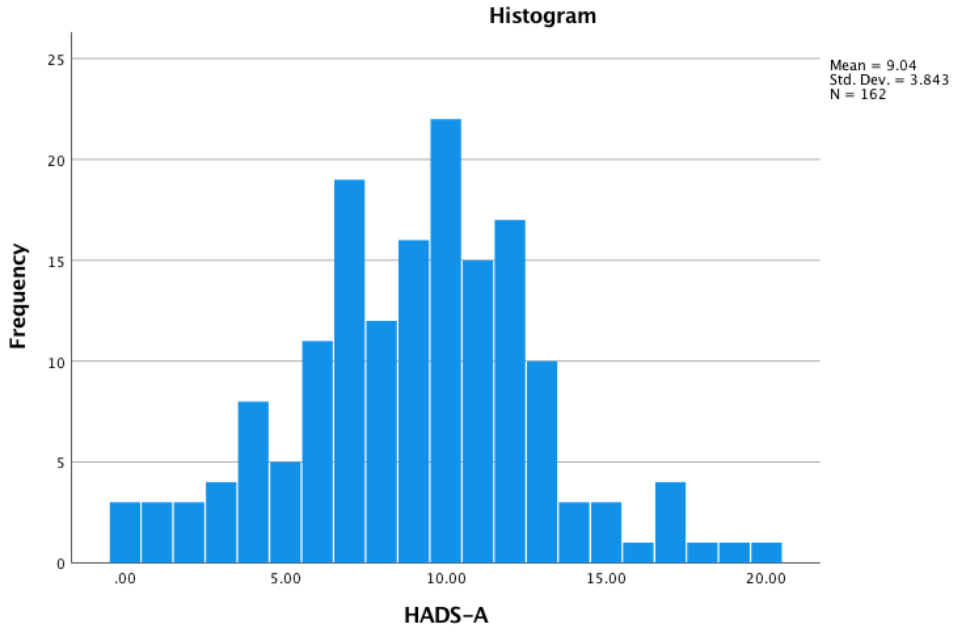


Figure 2

Frequencies of MET scores reported in the International Physical Activity Questionnaire (IPAQ)

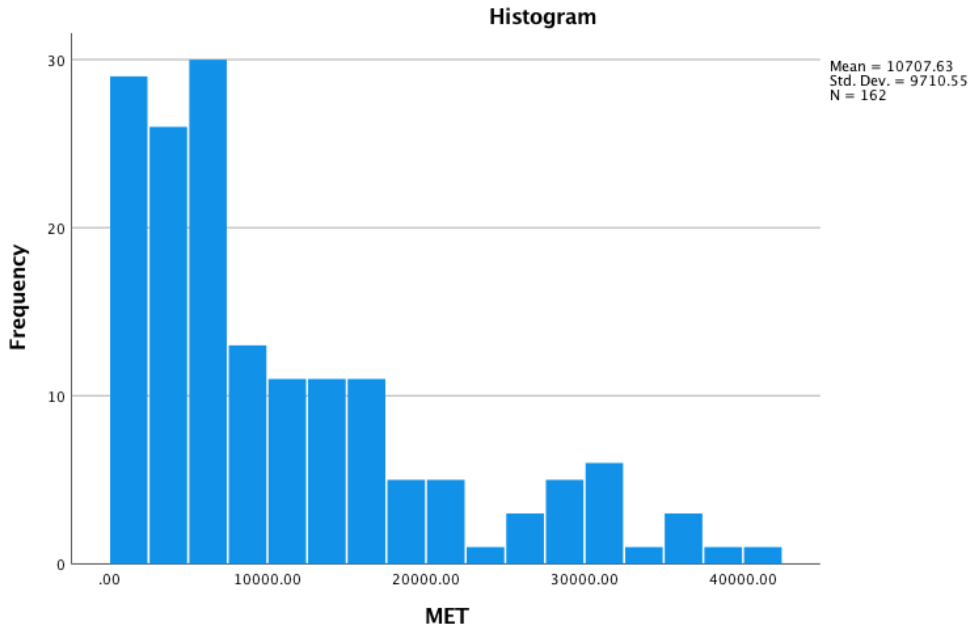


Figure 3

Frequencies of responses in Sleep Hygiene Index (SHI)

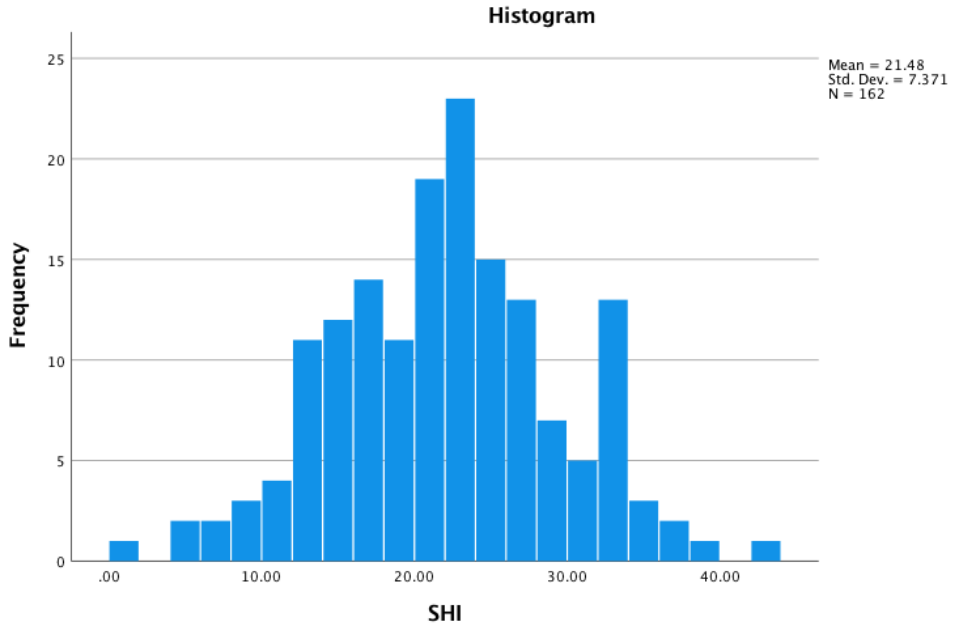
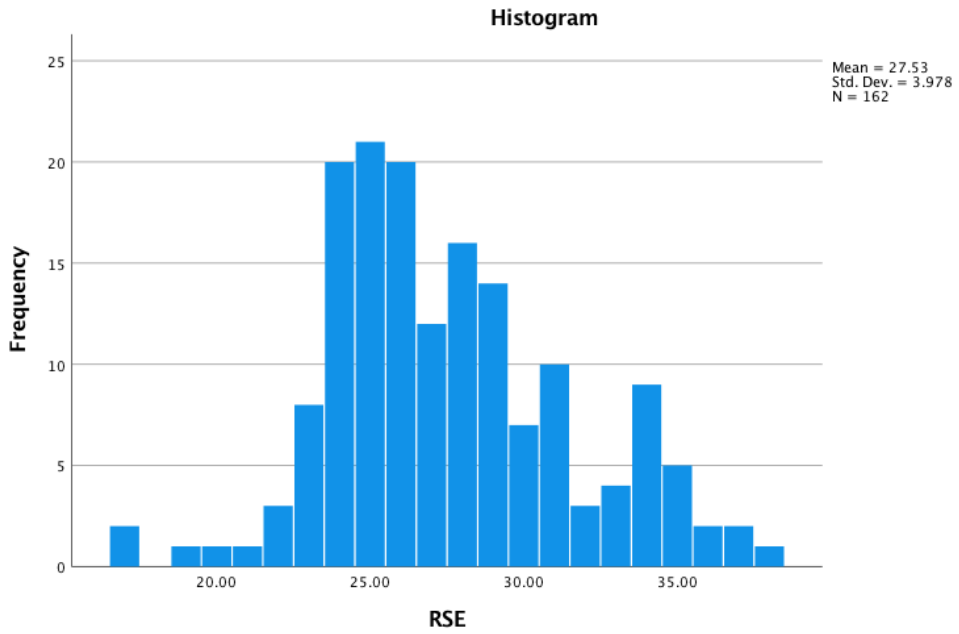


Figure 4

Frequencies of responses in the Rosenberg Self-Esteem Scale (RSE)



Demographics

Females reported higher levels of anxiety ($\mu = 9.383$) than males ($\mu = 8.533$). They had a significant mean difference of 1.586 ($p = < 0.001$) with medium effect sizes (Cohen's $d = 0.506$). The racial group with the lowest reported levels of anxiety was Euro-Canadian ($\mu = 8.889$), and highest levels of anxiety were in participants who identified as Euro-Canadian and Afro-Caribbean ($\mu = 11.000$), Euro-Canadian and Mi'kmaq ($\mu = 10.000$) and South-East Asian ($\mu = 10.286$). On average, participants who identified as heterosexual/straight reported lower levels of anxiety ($\mu = 8.552$), when compared to participants who identified as homosexual/gay/lesbian ($\mu = 12.111$), bisexual ($\mu = 10.000$), Asexual ($\mu = 11.500$), or queer ($\mu = 10.000$).

Correlations

Self-Reported anxiety scores were significantly associated with self-reported sleep hygiene scores ($p = .480$) and self-reported self-esteem scores ($p = -.440$) at the .01 level. No significant correlations were found between self-reported physical activity and self-reported anxiety ($p = .063$). Pearson correlations are in Table 2.

Multiple Regression

Thirty-four percent of the variance in student's self-reported anxiety scores was explained by self-reported physical activity, sleep hygiene, and self-esteem scores ($f = 3.123$, $p = < .001$, Adjusted R Square = .337). In a stepwise regression, the full model accounted for more variance in self-reported anxiety scores than a regression model that excludes one or more of the independent variables. Effect sizes for the multiple regression are reported in Table 3. Stepwise regression results are reported in Table 4.

Table 2

Results of Pearson Correlation Analysis Between Variables

	Anxiety	Physical Activity	Sleep Hygiene	Self-Esteem
Anxiety	1.000	.063	.480**	-.440**
Physical Activity	.063	1.000	.395**	-.196*
Sleep Hygiene	.480**	.395**	1.000	-.306**
Self-Esteem	-.440**	-.196*	-.306**	1.000

** Correlations are significant at the < 0.001 level (2-tailed)
* Correlations are significant at the < 0.005 level (2-tailed)

Table 3

Results of Multiple Regression Analysis – Effect sizes

	Std. Error	Beta	t	Sig
(Constant)	2.171		6.341	<.001
Physical Activity	.000	-.179	-2.541	.012
Sleep Hygiene	.038	.447	6.157	<.001
Self-Esteem	.065	-.338	-4.979	<.001

a. Dependent Variable: Anxiety

Table 4

Results of Stepwise Regression Analysis

Model	R	R Square	Adjusted R Square	Std. Error
1*	.478	.228	.223	3.391
2*	.568	.323	.314	3.187
3*	.591	.349	.337	3.133

* Model is significant at the < 0.001 level (2-tailed)

1. Predictors: (Anxiety), Sleep Hygiene
2. Predictors: (Anxiety), Sleep Hygiene, Self-Esteem
3. Predictors (Anxiety), Sleep Hygiene, Self-Esteem, Physical Activity

Discussion

There is growing concern that, since the beginning of the COVID-19 pandemic, there has been an increase in anxiety worldwide (Javed et al., 2020) and that students may be a population that is particularly vulnerable in such challenging contexts (Saeed et al., 2022; Varma et al., 2021; Javed et al., 2020; Liyanage et al., 2021). The objective of the current study was to investigate anxiety levels for students and how self-reported anxiety relates to concepts that have the potential to be addressed at a tier 1 level in a Multi-Tier Systems of Support (MTSS) model at schools. Physical activity, sleep hygiene, and self-esteem were used as predictor variables due to their distinct relevance to anxiety in psychological research, as well as their practical applicability. The study aimed to provide further insight into student anxiety during the COVID-19 pandemic. It also aimed to determine the significance of physical activity, sleep hygiene, and self-esteem in relation to student anxiety and used a multiple regression model. Results were intended to inform tier 1 supports related to preventing or reducing anxiety and to extend the literature on student anxiety and the COVID-19 pandemic.

Anxiety

Results of the current study reflect the current academic literature on anxiety and demonstrate that students are experiencing elevated anxiety. The Hospital Anxiety and Depression Scale – Anxiety (HADS-A), classifies scores from 0-7 as normal levels of anxiety, 8-10 as borderline abnormal levels of anxiety, and 11-21 as abnormal levels of anxiety. The mean anxiety score on the HADS-A for the sample used in this study was 9.037, indicating that the participants have slightly elevated levels of anxiety in relation to the norms established in the HADS-A questionnaire. Additionally, when comparing mean anxiety scores for the population with studies done before the COVID-19 pandemic, there is an apparent elevation in student

anxiety. For instance, in a large scale (n = 750) 2018 study investigating anxiety levels among medical and non-medical students, the average score for the HADS-A was 6.32 for medical students, 5.78 for nonmedical students, and 6.11 for all students (Moreira de Sousa et al., 2018). Similarly, Argyropoulos and colleagues' identified the mean anxiety score for undergraduate University students using the HADS-A as 6.302 (2018). The seemingly elevated anxiety scores observed in the current study reiterates recent studies, which suggest that student anxiety levels have elevated since the start of the COVID-19 pandemic and remain elevated in the current context (Liyanage et al., 2021; Pragholapati, 2020; Zimmerman et al., 2021; Saeed et al., 2022). This all corresponds with a recent systematic review on student anxiety research during the pandemic which demonstrated that since COVID-19 began, anxiety is highly prevalent among the student population (Jehi et al., 2022).

Female sex participants reported higher levels of anxiety than male participants in the sample. This corresponds with the research which suggests that females typically experience more anxiety than males and are more susceptible to anxiety (Ohannessian et al., 2017; Liyanage et al., 2022; Bahrami & Yousefi, 2011; McLean et al., 2011). Researchers have suggested biological explanations for this association, such as McLean and Anderson who suggest that male endocrine systems are more responsive to acute threat, while females are more responsive to potential threat (McLean & Anderson, 2009) and Li and Graham, who propose that women may be more prone to anxiety as the result of "a complex association between sex hormones and anxiety, whereby periods of heightened oestradiol and progesterone can be both protective as well as increase vulnerability, depending on the particular cognitive or behavioural process occurring at the time of hormonal change" (Li & Graham., 2017, p. 7). Socialization factors have also shown to contribute to the gender differences in anxiety levels, and that environmental

factors counteract anxious tendencies in boys, but support them in girls (McLean & Anderson, 2009). For instance, if a young girl is climbing a tree, she may be warned of the dangers of tree climbing and encouraged to come down, but if it were a young boy, he may not receive the same amount of concern. Females are constantly objectified in popular media and are held to unrealistic standards in terms of physical appearance and behavioural expectations. Also, sexism likely contributes to this relationship, as females are often victims of sexual discrimination or sexual violence and are significantly more likely than men to have experienced both gender-based and sexual harassment in Canada (Giglio et al., 2022). The cause for these gender differences in anxiety levels appears to be complex and multi-factorial. Whatever the explanation, supporting girls and gender diverse students will be critical to effective practice in schools.

Participants who identified as Euro-Canadian and Afro-Caribbean, South-East Asian, and Euro-Canadian and Mi'kmaq showed the highest levels of anxiety in the sample. This echoes research that has shown white Canadians as having lower levels of anxiety than students from communities of color. For example, a recent study done by Kogan and colleagues found that black Canadians are more likely to endorse clinically significant levels of anxiety symptoms when compared to white Canadians (Kogan et al., 2022) and in a recent study on anxiety in the COVID-19 context, higher anxiety severity was reported among Indigenous youth and individuals from countries in the Middle East and North Africa, with lower levels reported by white Canadians (Plett et al., 2022). In fact, Indigenous students have been shown to consistently experience higher prevalence of anxiety when compared to white Canadians (Wo et al., 2020). Several factors likely contribute to these differences. In a meta-analysis on the literature investigating the effects of racism on psychosocial outcomes, racism has been shown to have a

positive association with anxiety (Pieterse et al., 2012). Racial discrimination and racial macroaggressions have been shown to predict anxiety symptoms in the Canadian context and are noted to be commonplace in Canadian society (Kogan et al., 2022). Additionally, racially motivated attacks against Asian American's have increased during the pandemic, which could explain some of the elevated anxiety observed in the South-East Asian population (Gover et al., 2020). For Mi'kmaq and other indigenous students, the elevated anxiety could also be associated to the generational trauma experienced from decades of horrific discrimination towards them, such as with the Sixties Scoop and the Residential School System (Williams et al., 2022; Thorne & Moss, 2022). COVID-19 brought on a greater need for access to healthcare and government services, therefore it is logical that the populations who have been historically disadvantaged by these agencies experience more anxiety during this time.

The observed differences in anxiety levels across racial identities suggest that professionals in the schools need to support students by using materials that reflect diverse cultures and races. By providing the students with exposure to many races and belief systems, it could teach respect and minimize intolerance. Anti-racist programs have shown to have some effect on decreasing racism and prejudice, and in a meta-analysis on the effects of anti-racist programs, it is suggested that intergroup contact interventions can significantly reduce racism (Ben et al., 2020). More research is needed in regards to preventing racism and prejudice in the Nova Scotian context. School psychologists and other school-based mental health professionals must provide culturally sensitive service and be educated regarding resources for students with diverse cultural or racial identities. For example, the African Nova Scotian support worker will be an extremely helpful resource when working with black students in Nova Scotian schools. They will have the perspective and experience that an individual who is not from this community

lacks, while also having the ability to guide service in a culturally sensitive manner. Other professionals who could be helpful promote cultural competence could be the Mi'kmaq/Indigenous support worker for students who are Mi'kmaq, or school settlement workers for students who are recent immigrants. It will also be critical for school psychologists to remain up to date with the literature in relation to improving cultural competency and removing systemic barriers associated with race and culture.

Students who identified as gay, queer, bisexual, or Asexual reported higher levels of anxiety than students who identified as straight in the current study. This reflects several research studies, which have shown that students in the 2SLGBTQIA+ community are more vulnerable to anxiety, and that on average, they report significantly higher levels of anxiety in schools (Gill & McGuillan, 2022; Parchem et al., 2021). These higher rates of anxiety are likely the result of the historical unfair treatment towards members of the 2SLGBTQIA+ community and the intolerance a person can be submitted to for not adhering to traditional Euro-Christian beliefs (Nestor et al., 2022). 2SLGTBQIA+ students are shown to experience higher rates of victimization, bullying, and discrimination when compared to straight cis gender youth (Esteban Mora et al., 2022; Seelman et al., 2016) This highlights the need to protect and support these students, as the current study demonstrates that self-reports of anxiety among 2SLGBTQIA+ youth remain high in the current COVID-19 context.

To support these students, researchers have suggested enumerating sexual orientation and gender identity in anti-bullying law so that acts of discrimination related to sexual orientation is punished sufficiently to discourage similar behaviours in the future (James, 2021). At the school level there are also ways to promote inclusivity. For example, having spaces where these students can feel safe and supported, such as Gender Sexuality Alliances (GSAs) will be one of

many supports that can be offered to these students. In a study investigating the effect of social support from Gender Sexuality Alliances/Gay-Straight Alliances in the relationships among homophobic cyberbullying and anxiety among 2SLGBTQIA+ adolescents, high social support as a result of these groups buffered against anxiety symptoms resulting from being victimized (Wright et al., 2022). Representation is also important for these students, as having materials that encourage inclusion of 2SLGBTQIA+ individuals could promote acceptance of the diverse way there are to love, while also demonstrating to the 2SLGBTQIA+ students that they are important and respected in society. School based employees should be also familiar with effective ways to challenge and respond to homophobia and racism. It will be critical that these instances are handled adequately so that the student victimized is being supported in the moment, and the individual who committed the act is met with appropriate consequences. 2SLGBTQIA+ students appear to be experiencing higher rates of anxiety, therefore it is essential that they are protected from the further harm hateful acts can cause.

It is also important to note the intersectionality of students in the Canadian context. This refers to the fact that many cultural identities intersect and create unique perspectives (Alvi & Zaidi, 2019). For example, a student may be a female from India who identifies as bisexual, making their cultural identity unique and not something that can be defined by a single category. Therefore, it is important for school psychologists and other professionals working in the schools to recognize that a student's culture is multi-faceted and multi-layered. Some students may have many aspects of their identity that make them particularly susceptible to unfair treatment, which can have negative mental-health effects.

It has been suggested that the overall rise in anxiety among all students could be a result of back-and-forth transitions between online and in-person learning, isolation requirements, or

the general worry that exists around contracting or transmitting COVID-19 (Pragholapati, 2020). Additionally, in Jehi and colleagues' systematic review; living in rural areas, experiencing economic hardship, working full-time, being isolated, worrying about infection for themselves and others, having uncertainty of the future, poor sleep quality, and transitioning to online learning were identified as factors associated with increased anxiety during this time (Jehi et al., 2022). The differential effects of COVID-19 on anxiety levels appears to be complex and needs more research.

The heightened anxiety observed is important for professionals working in schools to recognize because it could improve their understanding of student populations and what may be influencing student's learning, well-being, and relationships. Also, it demonstrates the importance of using evidence-based approaches and strategies within schools that promote well-being and can reduce anxious thoughts and behaviours. An evidence-based intervention that appears to be effective in preventing and reducing anxiety symptoms across populations is the FRIENDS program described in Chapter 1 (Higgins & O'Sullivan, 2015; Werner-Seidler et al., 2021; Neil & Christensen, 2009). This could be beneficial in schools because it is universal, can be applied to children and youth aged 4-16, and can be administered by teachers in their own class, if they have received the proper training (Higgins & Sullivan, 2015). No matter the intervention, it is important that it is based in evidence and reflects the established cognitive behavioural principles (Sulkowski et al., 2012). The interventions which show a large effect in treating anxiety are often conducted in group sessions, based at the school, and involve activities such as role play, modelling and reinforcement. They also use clinical methods such as social skills training, psychoeducation, and exposure (Cordier et al., 2021). Implementing an evidence-

based, tier 1 anxiety intervention that includes these characteristics could be warranted based on the evidence that there is student-need.

Physical Activity

It was hypothesized that physical activity would be significantly associated with student anxiety. According to the results, this was not the case, as physical activity failed to be a significant factor in relation to anxiety levels (r = .049). This indicates no significant association between the amount of self-reported physical activity and self-reported anxiety within the study population. This suggests that the amount of physical activity in which an individual partakes does not have any influence on their anxiety, therefore, promoting physical activity in schools may not be important to preventing student anxiety. This contrasts the literature which consistently demonstrates a significant correlation between physical activity and anxiety (Xiang et al, 2020; Stanton et al., 2020; McDowell et al., 2017). The results of the current study are even contrasted by recent studies specifically looking at the relationship between physical activity and anxiety during the COVID-19 pandemic (Stanton et al., 2020; Puccinelli et al., 2021; Han et al., 2023; Alves et al., 2021). In a systematic review on the association between physical activity and anxiety during the COVID-19 pandemic, Wolf and colleagues concluded that people who reported higher volumes and more consistent physical activity showed less symptoms of anxiety (Wolf et al., 2021). Similar results were found in a systematic review done by Marconcin and colleagues, who found that physical activity is associated with higher well-being, quality of life, as well as lower anxiety and stress during the COVID-19 pandemic (Marconcin et al., 2022). The results of the current study, however, are not totally unique. Chootong and colleagues found that levels of physical activity were not significant factors in relation to mental health status during the COVID-19 pandemic (Chootong et al., 2022). Similarly, Bauer and colleagues

found that positive changes in physical activity were not significantly associated with anxiety levels (Bauer et al., 2022). Despite these results, the majority of research investigating the relationship between physical activity and anxiety have shown significant associations between the two variables (Wolf et al., 2021; Marconcin et al., 2022; Anderson & Shivakumar, 2013).

The lack of association between physical activity and anxiety in the current data could be the result of using self-report measures. It is suggested that many self-reports related to physical activity are overestimated (Prince et al., 2008; Schaller et al., 2016) and that age, sex, culture, socioeconomic status, language, and body mass index are all influential to the accuracy of self-reported ratings of physical activity (Schaller et al., 2016; Cerin et al., 2016). Specifically, a study done in Brazil found that the IPAQ-long form, the physical activity measure used in the current study, overestimates levels of physical activity for both males and females and concluded that the instrument has problems in measuring levels of physical activity (Sebastiao et al., 2012). This could be the case in the current study as well, due to many reports not reflecting a realistic amount of physical activity. Further discussion of this limitation is discussed later.

The authors of the IPAQ-long form recognized overestimation as a possible confound to their measure. In the guidelines, it is suggested that reported activity bouts of more than 3 hours are truncated, resulting in each category having a maximum activity time of 21 hours a week. In the results of the current study, many of the responses (n = 32) had to be truncated, as several students reported excessive bouts of physical activity for certain items. This again reflects the challenges associated with self-report measures of physical activity. More inexpensive, accurate, and accessible measures of physical activity should be available so non-funded research can accurately measure physical activity.

Sleep Hygiene

It was hypothesized that sleep hygiene would be significantly associated with student anxiety in the COVID-19 context. This hypothesis was supported (r = .480). This demonstrates the significance of sleep hygiene to student mental health, and reiterates previous literature identifying sleep hygiene's relation to anxiety experienced by students. Previous literature has suggested that strong sleep hygiene relates to better sleep quality as well as better overall functioning while awake (Kennedy & Fernando, 2020 Wong et al., 2012; Suen et al., 2008). The current data would corroborate these beliefs by showing that students with higher levels of anxiety also scored higher on the sleep hygiene index, indicating poor sleep hygiene. Promoting strong sleep hygiene at the tier 1 level, whether in the classroom or through community-wide campaigns, could decrease student anxiety or act as a protective factor against anxiety and its negative correlates. Certain sleep hygiene intervention programs have shown to significantly improve sleep hygiene (Lin et al., 2018), but are mostly done at the tier 2 or tier 3 level. For instance, in a randomized control trial study, adolescents attended four small group sessions where they participated in education and activities around behaviours that promote sleep. After both a one month and six month follow up, individuals who participated in the sleep hygiene sessions showed improved sleep hygiene when compared to the control group. The intervention was said to have a mediating effect on sleep hygiene's impact on general health (Lin et al., 2018). It could be beneficial to modify a similar program to be available at their tier 1 level so that all students have the opportunity to experience the benefits associated with improving sleep hygiene. In a systematic review looking at school-based sleep education programs, there was mixed results related to school-based programs effect on sleep behaviours (Gruber, 2017). More research identifying effective sleep hygiene programs is needed.

For school psychologists it will also be important to advocate for healthy sleep behaviours. Understanding ways students and their families can improve sleep, whether through behaviour recommendations or by connecting them with resources, will be critical to helping them improve functioning. For example, if a student is reporting having sleep difficulties or not sleeping enough, school psychologists should be able to give actionable, evidence-based recommendations, such as not eating an hour before bed, waking up at a consistent time, or keeping your phone in another room while you sleep. These could be put into the recommendations section of a psycho-education assessment report, or provided informally during counselling. School psychologists can also provide helpful resources to families of students who are experiencing sleep difficulties. Websites like the National Institutes of Health (NIH) and the Centers for Disease Control and Prevention (CDC) have various resources for improving sleep, such as educational videos, healthy sleep guidelines, or information on sleep disorders. A tool that could be helpful for students to improve their sleep hygiene could be a sleep diary. This is a semi-structured fillable document that has the individual track their quality of sleep as well as the behaviours that preceded them falling asleep. This can offer the individual a clearer picture of their sleep hygiene behaviours, and will allow them to see the direct associations between certain behaviours and their quality of sleep. It can also be useful to review with a physician if the individuals' sleep is clinically impairing (National Institutes of Health, 2023). In the research, using a sleep diary has been shown to increase self-knowledge of sleep hygiene and has been shown to improve health outcomes (Smith et al., 2004; Blake & Kerr, 2010). School psychologists and other mental health professionals in schools should be aware of resources and services that promote strong sleep hygiene so that students can experience the benefits of having healthy sleep.

Self-Esteem

It was hypothesized that self-esteem would have a negative relationship with anxiety in the current study. This hypothesis was also supported (r = -.440). Generally, participants who reported high levels of self-esteem were more likely to have lower levels of anxiety. Again, this reflects the literature that suggests that anxiety and self-esteem are closely related and usually show an inverse relationship (Rosenberg, 1962; Sowislo & Orth, 2013; Lee & Hankin, 2009; Riketta, 2004). It has been proposed that heightened anxiety is often the result of an individual's challenges surpassing their skills (Mao, et a., 2020). Therefore, if a student's self-esteem is low, then they may become anxious more quickly than someone with higher self-esteem, because they believe that the challenge has outgrown their abilities. This could explain the observed relationship between anxiety and self-esteem in the current study, however, significantly more research needs to be done on the nature of this relationship before researchers can confidently describe the associations between these two variables.

The legitimacy of the concept of self-esteem has been questioned in previous research due to the fact that it can be difficult to operationalize and is not a concrete factor that can be directly observed or measured. Yet, results of this study further support previous research to suggest that supporting student self-esteem is worthwhile in school settings.

Evidence-based prevention and intervention program should be used to support student self-esteem. Tier 1 leadership training programs have shown to improve self-esteem in female participants (Wong et al., 2012), and a class-wide life-skills based program has shown to significantly improve self-esteem in young boys (Zangirolami et al., 2018). Also, some online based programs have been shown to improve self-esteem in certain populations, such as the Cyperprogram 2.0 in Spanish adolescents (Garaigordobil & Martinez-Laderry, 2015) and a

modified self-esteem intervention in the computer program 'Second Life' for women with spinal cord injuries (Robinson-Whelen et al., 2020). Other tier 1 interventions, such as youth empowerment programs, have shown no effects on self-esteem (Morton & Mongomery, 2013). Programs that target self-esteem vary largely in their length, intensity, form, and approach, making identifying the determinants of an effective self-esteem program difficult (Bos et al., 2006). More research into tier 1 self-esteem programs should be done before a specific program or strategy can be confidently recommended.

Schools and communities could also target self-esteem by offering students opportunities to participate in programs or activities that can indirectly increase self-esteem and confidence. Sport teams, art clubs, or choirs are some examples of potential self-esteem building opportunities. In studies done on extra-curricular activities, it was found that the students who participated in activities outside of the classroom had higher self-confidence, stronger self-concept, and show greater leadership skills (Saqib et al., 2018; Christison, 2013). Extra-curricular participation can give students the opportunity to discover strengths that they may not have in typical academic environments. This could improve self-esteem and help them to have a more balanced understanding of their overall abilities. It is recommended that schools provide programs and opportunities that support self-esteem in student populations.

Physical Activity, Sleep Hygiene, and Self-Esteem

Lastly, the current study hypothesized that applying a multiple regression model using physical activity, sleep hygiene, and self-esteem would account for significant variation in student anxiety scores during the COVID-19 pandemic. This hypothesis was supported, as the model which used all three independent variables with the dependent variable anxiety was significant ($p = < .001$) and accounted for more variance than any other models individually or in

combination with one other variable (Adjusted R square = .337). This implies that an individual's sleep hygiene, self-esteem, and physical activity levels are important factors to consider when trying to understand an individual's subjective experience of anxiety during and after the pandemic. It also indicates a possible benefit to promoting sleep hygiene, physical activity, and self-esteem at a class-wide or school-wide level.

It should also be noted that the regression model that excluded physical activity, and used sleep hygiene and self-esteem as independent variables only accounted for slightly less variance when compared to the full model (Adjusted R square = .314), which suggests that if there are two areas that should be promoted in order to protect against student anxiety, it should be sleep hygiene and self-esteem.

Also, due to the muddled research that suggests programs that target self-esteem are not effective in increasing self-esteem, perhaps if one area is to be targeted, it should be sleep hygiene. Sleep hygiene accounted for twenty-two percent of the variance of student anxiety when it was the only independent variable used in a linear regression (Adjusted R square = .223). Sleep hygiene may have been the strongest predictor of student anxiety for several reasons. Perhaps the students who are most anxious are not practicing good sleep hygiene because they are behaving in ways that might help cope with anxiety in the moment, but do not lead to long-term benefits. For example, a sleep hygiene behaviour that has been noted as important is not using cell phones bright before trying to sleep. This requires self-control, which has been shown to be inhibited by anxiety, and doing so does not allow the individual to distract themselves from their anxious thoughts or somatizations. Therefore, a student might rather go on their phone or watch TV before they go to sleep so they can avoid these thoughts and feelings. Yet, this is indirectly causing more harm, since looking at screens before trying to sleep has been shown to

interfere with sleep quality (He et al., 2020). Other sleep hygiene behaviours that may be difficult for people with excessive anxiety to practice could be not using alcohol, caffeine, or drugs within four hours of going to bed, doing important work before bedtime, or not thinking planning, or worrying in bed. It is thus not overly surprising that this relationship is observed in the current study, and it indicates that improving sleep hygiene for students with anxiety may be challenging.

When an individual is experiencing excessive amounts of anxiety and also demonstrates poor sleep hygiene, perhaps it could be helpful to focus on improving one sleep hygiene behaviour at a time in a scaffolded approach. For example, the individual could solely work on cutting out caffeine within four hours before bed, then once they have successfully done so, they could work on another behaviour such as not using screens before trying to sleep. This would then continue as further healthy sleep behaviours are mastered. In this approach, the individual is focusing on one behaviour at a time and not overwhelming themselves or having unrealistic expectations.

Another way that sleep hygiene can be intervened in this context could be to target self-regulatory capacity (Kor & Mullan, 2010). This is proposed as a method of intervention for sleep because practicing good sleep hygiene requires strong self-regulation, as seen in Kor and Mullan's study, when it was found that response inhibition was the strongest predictor of sleep related behaviours (2010). Universal self-regulation based interventions used in schools have been shown to have positive outcomes on numerous health and social measures, such as mental health and behavioural problems (Pandey et al., 2018). School-based self-regulation interventions, taught in classes by teachers, demonstrate consistent improvements in self-regulation when compared to control groups. These interventions would use strategies such as

role play activities, cognitive modeling, and psychoeducational lessons (Pandey et al., 2018). Other interventions that have been sown to improve self-regulation in adolescents and students are mindfulness interventions (Flook et al., 2014; Parker et al., 2014), family-based interventions (Fosco et al., 2013; Feinberg et al., 2013), and physical activity interventions (Butzer et al., 2016; Chen et al., 2014; Costigan et al., 2016). Perhaps teaching the students ways to resist behaviours that discourage good sleep, such as using substances or cell phones before trying to sleep, will be critical to their perceived anxiety.

The current results infer that targeting and promoting sleep hygiene with students appears to be most salient to self-perceived anxiety when compared to physical activity and self-esteem. More research on the effects of tier 1 sleep hygiene interventions could determine the utility and accessibility of specific sleep-hygiene programs or programs that may indirectly improve sleep hygiene.

Limitations

There were notable limitations to the current study. All data used in the study was self-reported, and could be vulnerable to self-report issues, two of the most prominent being negative affectivity bias and social desirability bias. For instance, scales that measure somatic symptoms or health complaints have been shown to be inflated by negative affectivity bias (Vassend, 1989). This suggests possible negative affectivity bias in the self-reports of anxiety from the current study. In future research it could be useful to include a negative affectivity measure to control for negative affectivity bias. Yet, since negative affectivity is a common characteristic of individuals with anxiety (Lonigan et al., 1994), perhaps this would be futile.

Self-report results can also be effected by social desirability bias, which can occur consciously or unconsciously (Van de Mortel, 2008). In particular, measures that evaluate

socially desirable behaviours, such as participation in physical activity, may be most vulnerable to this bias (Razavi, 2001). This relates to the data set because numerous reports of activity levels appeared to be abnormal and could be the consequence of social desirability bias. Additionally, accurate self-reporting physical activity has been noted to be difficult, even when social desirability is controlled for (Sallis et al., 2000). In a systematic review on the accuracy of self-reported measures of anxiety, most studies revealed inaccurate estimations of the absolute amount of physical activity and suggested that when absolute amounts of physical activity are to be measured, it should be done with objective, physiological measures – such as a pedometer or heart rate monitor (Sallis et al., 2000). Without funding, using objective measures of physical activity is very difficult and thus impractical for a graduate level thesis.

Furthermore, it has been argued that self-esteem is not something that can be directly measured and requires self-report measurement, which has been said to reflect how the person wants to see themselves, rather than how they really do (Kohn, 1994). As a result of these limitations, the current data may have to be interpreted with caution.

Future Research

Several recommendations have been made regarding future research. Most notably, future research should investigate tier 1 intervention programs that target sleep hygiene or self-esteem. It may be most beneficial to study sleep hygiene or self-regulation programs. Although evidence of certain program's efficacy exists, more data detailing the benefits would allow school psychologists' the confidence to recommend their implementation in the school context. Also, research identifying accurate and accessible measures of physical activity would be useful for future non-funded research. Lastly, future research should investigate why the notable correlates of anxiety, such as the predictor variables used in the current study, relate to student

anxiety after COVID-19. Being able to confidently describe these relationships and label the mechanisms that explain the associations would allow for a greater understanding of anxiety's presentation, effects, and potential treatment in the current context.

Conclusion

The current study demonstrated that anxiety among post-secondary students is highly prevalent in the Nova Scotia context, and is especially high for female students, students from communities of color, and students from the 2SLGBTQIA+ community. Sleep hygiene and self-esteem were both significantly associated with self-reports of anxiety, while physical activity was not. Using all three of the independent variables together accounted for more variance in student anxiety than any other combination or individually. Yet, a model that used sleep hygiene individually, and excluded self-esteem and physical activity, accounted for only slightly less variance in student anxiety. Accessible interventions targeting sleep hygiene may help prevent and manage student anxiety in the current context, yet more research on the efficacy of such interventions should be done before they can be confidently recommended or implemented in schools.

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Appendix A.

PANEL ON
RESEARCH ETHICS
Navigating the ethics of human research

TCPS 2: CORE

Certificate of Completion

This document certifies that

Ben MacGillivray

has completed the Tri-Council Policy Statement:
Ethical Conduct for Research Involving Humans
Course on Research Ethics (TCPS 2: CORE)

Date of Issue: **20 January, 2020**

Appendix B.

University Research Ethics Board (UREB)

Certificate of Research Ethics Clearance

☒	Clearance	☐	Secondary Data Clearance	☐	Renewal	☐	Modification	☐	Change to Study Personnel

Effective Date	**February 14, 2023**	**Expiry Date**	**February 13, 2024**

File #:	**2022-160**
Title of project:	Understanding Student Anxiety: Exploring factors for implications for tier 1 prevention and intervention within a multi-tiered systems of support
Researcher(s):	Ben MacGillivray
Supervisor (if applicable):	Daniel Seguin
Co-Investigators:	n/a
Version :	1

COVID-19 - Researchers are reminded that they and their research team must abide by all **Public Health** directives and **MSVU** requirements (Resumption of Human Research (msvu.ca)) regarding in-person contact with participants. In-person research requires additional clearance and may not proceed until the second level clearance is obtained.

The University Research Ethics Board (UREB) has reviewed the above-named research proposal and confirms that it respects the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans* and Mount Saint Vincent University's policies, procedures and guidelines regarding the ethics of research involving human participants. This certificate of research ethics clearance is valid for a period of **one year** from the date of issue.

Researchers are reminded of the following requirements:	
Modification to Protocol	Any changes to approved protocol must be reviewed and approved by the UREB **prior** to their implementation. **Form: REB.FORM.002** **Info: REB.SOP.404** **Policy: REB.POL.003**
Changes to Research Personnel	Any changes to approved persons with access to research data must be reported to the UREB immediately. **Form: REB.FORM.002** **Info: REB.SOP.404** **Policy: REB.POL.003**
Annual Renewal	Annual renewals are contingent upon an annual report submitted to the UREB **prior** to the expiry date as listed above. You may renew up to four times, at which point the file must be closed and a new application submitted for review. **Form: REB.FORM.003** **Info: REB.SOP.405** **Policy: REB.POL.003**
Final Report	A final report is due on or before the expiry date. **Form: REB.FORM.004** **Info: REB.SOP.406** **Policy: REB.POL.003**
Privacy Breach	Researchers must inform the UREB immediately and submit the Privacy Breach form. The breach will be investigated by the REB and the FOIPOP Officer. **Form: REB.FORM.015**
Unanticipated Research Event	Researchers must inform the UREB immediately and submit a report to the UREB within seven (7) working days of the event. **Form: REB.FORM.008** **Info: REB.SOP.404** **Policy: REB.POL.003**
Adverse Research Event	Researchers must inform the UREB immediately and submit a report to the UREB within two (2) working days of the event. **Form: REB.FORM.007** **Info: REB.SOP.404** **Policy: REB.POL.003**

*For more information: http://www.msvu.ca/ethics

[redacted]

Brenda Gagné, Research Ethics Coordinator
University Research Ethics Board

[redacted]

Appendix C.

IN SCHOOL DURING THE COVID-19 PANDEMIC?

WE WANT TO HEAR FROM YOU!

STUDY INFORMATION

- **TITLE**: UNDERSTANDING STUDENT ANXIETY: EXPLORING FACTORS FOR IMPLICATIONS FOR TIER 1 PREVENTION AND INTERVENTION WITHIN MULTI-TIERED SYSTEMS OF SUPPORT
- **PURPOSE**: TO EXPLORE STUDENT ANXIETY LEVELS DURING THE COVID-19 PANDEMIC AND FACTORS WHICH COULD RELATE TO ANXIETY (PHYSICAL ACTIVITY, SLEEP HYGIENE, SELF-ESTEEM)
- **INCLUSION CRITERIA**: AGE 17 OR OLDER & ATTENDED HIGH SCHOOL OR POST-SECONDARY BETWEEN 2019-2023
- STUDY CAN BE COMPLETED ONLINE IN 10-15 MINUTES

PARTICIPANTS ARE ENTERED INTO A DRAW TO WIN A 100$ VISA GIFT CARD!

FOLLOW THE LINK OR SCAN THE QR CODE BELOW TO JOIN

https://bmmsvuresearch.limesurvey.net/421323?lang=en

MOUNT SAINT VINCENT UNIVERSITY

Questions or Concerns?

Reach out to the research team by emailing [redacted]

Appendix D.

Informed Consent

Thank you for your participation in our study. Before you consent, it is important to understand the purpose of the study, the risks and benefits, and how it will be carried out. The information and consent form will describe the details of the study.

Study Title:

Understanding Student Anxiety: Exploring Factors for Implications for Tier 1 Prevention and Intervention within Multi-Tiered Systems of Support *(Study title was changed to its current title in June 2023)*

Researchers:

Principal Investigator: Ben MacGillivray, BA

PSYC 4499 Student, Mount Saint Vincent University

Supervising Investigator: Daniel Séguin, PhD

Professor, Department of Psychology, Mount Saint Vincent University

Chair, University Research Ethics Board, Mount Saint Vincent University

Committee Member: Dr. Krista Ritchie, PhD

Associate Professor, Mount Saint Vincent University

Information and Consent

You are invited to participate in a research study that will be investigating anxiety among students during the COVID-19 pandemic. The study is being conducted by Ben MacGillivray, a Graduate Student in the Department of Education for his Master's Thesis project. This study will be done online, through LimeSurvey, a secure online survey database. You may participate in this study because you are enrolled in classes at a recognized educational institution, or were previously enrolled in class during a point in the COVID-19 pandemic. The following will contain information on the study.

Purpose: The purpose of this research study is to add to the research on anxiety levels among students during the COVID-19 pandemic, and to further inform factors that are related to anxiety in the COVID-19

context. Gaining a better understanding of these related factors could further inform strategies and programs which could be implemented to reduce or prevent anxiety during similar circumstances. The study is also being completed to fulfill the Thesis requirement of the Masters of Arts, School Psychology Program, in the Department of Education, at Mount Saint Vincent University. This research is being supervised by Dr. Daniel Séguin, professor at Mount Saint Vincent University, and current thesis supervisor for Ben MacGillivray.

Participation Information: If you choose to participate in this study, you will be asked a series of questions in the form of an online survey, that ask you to answer questions or vignettes addressing anxiety, physical activity, sleep hygiene, and self-esteem. The survey should take 15 minutes to complete.

Taking part in this study is not mandatory, and your participation is entirely your decision. You do not need to answer any questions that make you uncomfortable and are welcome to stop participation in the study at any time. To do so, all you have to do is close the browser in which the survey was being completed.

Any incomplete surveys will not be included in the final analyses of the project. However, if you complete your survey, provide your email, and then decide that you do not want your data included in the research, you have until March 31, 2023 to contact the researcher and request your data be removed.

Data: Data will be de-identified during data analyses. This indicates that any identifiers attached to your responses will be disregarded and a new ID code will be assigned to each survey completed. Only the researchers directly involved in this study will have access to the data. All data will be held on a secure Mount Saint Vincent OneDrive Server and will be erased after five years, as per research standards.

Risks: Reflecting on personal anxiety could be a potential risk for this study since doing so could elicit distressing emotions or memories. If you feel that this could be an issue, it is recommended that you do not complete the survey. Otherwise, the risks associated with this study are no greater than those you encounter in your everyday life. The time required to participate in this study could prove difficult for some. There are mental health resources available for participants who may experience distress while completing the survey. These are listed below.

Benefits: Participants of the study are offered the chance to enter a draw to win a 100$ Visa gift card. Other benefits of participating in the study could be the experience you will gain and the opportunity to participate in a psychological study. Also, if the findings in the study prove to be significant, the study could benefit society because it will add to our knowledge of student anxiety and its contributing factors. Otherwise, there are no direct benefits to participation in this study.

The information for the Mount Saint Vincent University Counselling Services and Health Resources, as well as for Wellness Together Canada are being provided in case you feel uncomfortable or overwhelmed at any point.

Mount Saint Vincent University Counselling Services

Email: counselling@msvu.ca,

Mount Saint Vincent University Health Office

Location: Assisi Hall, 2nd floor

Wellness Together Canada

Website: https://www.wellnesstogether.ca

Phone number: (866) 585-0445

If you have any questions about this study you may contact the principal investigator Ben MacGillivray at [redacted] The ethical components of this research study have been reviewed by the University Research Ethics Board and found to be in compliance with Mount Saint Vincent University's Research Ethics Policy. If you have questions about how this study is being conducted and wish to speak with someone not directly involved in the study, you may contact the Chair of the University Research Ethics Board (UREB) c/o MSVU Research Office, at 457-6350 or via e-mail at research@msvu.ca.

If you freely agree to take part in the study according to the terms outlined in this Consent Form, click the following to continue:

I have read the study and consent information given in the previous pages

___ Yes ____ No

I understand the nature of the study and I understand the potential risks and benefits

____ Yes ____ No

I understand that, if I provide my email at the end of the study, I have the right to request that my data is withdrawn from the study and that I have until March 31st, 2023 to request this

____ Yes ____ No

Appendix E.

Thank you!

You have successfully contributed to psychological research!

Thank you for participating in our research study titled Understanding Student Anxiety: Exploring Factors for Implications for Tier 1 Prevention and Intervention with a Multi-Tiered Systems of Support.

If you would like to be entered into a draw for a 100$ Visa Gift card, please fill out the following:

Email _____

If you are eligible to receive bonus points towards a course at MSVU for participating in this study, please fill out the following:

Course name and number: _____

Email: _____

If you have any questions or concerns about this study you may contact the student researcher.

Mount Saint Vincent University has counselling and health resources available that you may contact if you felt uncomfortable at any point. Their contact information is listed below.

Mount Saint Vincent University Counselling Services

Email: counselling@msvu.ca

Health Office

Assisi Hall, 2nd floor

Wellness Together Canada

Website: https://www.wellnesstogether.ca

Phone: (866) 585-0445

If you have submitted your email with your responses and decide you would like to remove your data please contact xxx.xxx@xxx.ca by March 31st, 2023.

Thanks again!

Appendix F.

Demographics Form

Please respond to the following demographic items.

1. **With which racial and ethnic group(s) do you identify?** ***(Mark all that apply)***

❍ African Canadian ❍ South-East Asian ❍ Chinese

❍ First Nations, Métis, or Inuit ❍ Indo-Canadian ❍ East Indian

❍ Middle Eastern or North African ❍ Hispanic, Latino, or Spanish Origin ❍ Euro-Canadian

❍ Another race or ethnicity not listed above _____

2. **How do you describe your gender identity?**

_____

3. **How do you describe your sex?**

❍ Male

❍ Female

❍ Intersex

4. **How do you describe your sexual identity?** ***(Mark all that apply)***

❍ Heterosexual / straight ❍ Homosexual / gay / lesbian ❍ Bisexual

❍ Asexual ❍ A sexuality not listed _____

5. **Your Age:** _____

Appendix G.

HADS Work Order

Work order No. 2213619 **Under Master User License Agreement**

This Work Order is issued under the Master User License Agreement by and between Mapi Research Trust ("MRT") and Mount Saint Vincent University ("User"). Upon execution by both Parties, together with the **Master User License Agreement dated** 13 October 2021 ("MULA"), this Work Order identifies and governs the licensing by MRT of the COA referenced herein ("COA"), and is made a part of and is subject to the MULA.

This Work Order ("WO") is in addition to any and all previous Work Orders under the MULA.

This WO includes the terms and conditions of the MULA, which are hereby incorporated by this reference as though the same was set forth in its entirety and shall be effective as of the WO Effective Date set forth herein.

All capitalized terms which are not defined herein shall have the same meanings as set forth in the MULA.

This WO, including all attachments and the MULA contain the entire understanding of the Parties with respect to the subject matter herein and supersedes all previous agreements and undertakings with respect thereto. If the terms and conditions of this WO or any attachment conflict with the terms and conditions of the MULA, the terms and conditions of the MULA will control, unless this WO specifically acknowledges the conflict and expressly states that the conflicting term or provision found in this WO controls for this WO only. This WO may be modified only by written agreement signed by the Parties.

1. User information

MULA Reference	Mount Saint Vincent University_CA_389190_MULA_20210923_FE
User name	Ben MacGillivray
Category of User	Student
User address	[redacted]
User VAT number	
User email	[redacted]
User phone	[redacted]
Billing information (if different from the above)	Legal form: Address: Country: VAT number (if applicable): Addressee: PO number of internal reference (if applicable):

2. WO information

WO Number	2213619
WO Effective Date	Last date of signature of this WO by the Parties

DocUUID : 577fde3a-cf5a-42ee-839f-221872cf6a8a

WO Expiration Date ("Term")	• Fixed-term license: upon completion of the Stated Purpose, as defined in 4.1
Name of User's contact in charge of the WO	Ben MacGillivray

3. Identification of the COA

Name of the COA	HADS - Hospital Anxiety and Depression Scale
Author	Snaith RP; Zigmond AS;
Copyright Holder	GL Assessment Ltd
Copyright notice	HADS copyright © R.P. Snaith and A.S. Zigmond, 1983, 1992, 1994. Record form items originally published in Acta Psychiatrica Scandinavica 67, 361–70, copyright © Munksgaard International Publishers Ltd, Copenhagen, 1983.Published by GL Assessment Limited, 1st Floor Vantage London, Great West Road, London TW8 9AG, UK. All rights reserved. GL Assessment is part of the GL Education Group.
Bibliographic reference	Snaith RP. The Hospital Anxiety And Depression Scale. Health and Quality of Life Outcomes. 2003 Aug, 1:29 (Full text article) White D, Leach C, Sims R, Atkinson M, Cottrell D. Validation of the Hospital Anxiety and Depression Scale for use with adolescents. Br J Psychiatry. 1999 Nov;175:452-4 Herrmann C. International experiences with the Hospital Anxiety and Depression Scale - a review of validation data and clinical results. Journal of Psychosomatic Research 1997;42(1):17-41 Zigmond AS, Snaith RP. The Hospital Anxiety and Depression Scale. Acta Psychiatr Scand 1983;67:361-370
Module(s)/version(s) needed	• HADS

4. Context of use of the COA

The User undertakes to use the COA solely in the context of the Stated Purpose as defined hereafter.

4.1 Stated Purpose

Other project

Title	Using physical activity, sleep hygiene, and self-esteem to predict student anxiety during the Covid 19 pandemic
Disease or condition	Anxiety
Planned Term*	Start: 11/2022 End: 02/2023

Description (including format or media)	

4.2 Language Versions

4.2.1 Country and languages

MRT grants the License to use the COA on the following countries and in the languages indicated in the table below:

Language	For use in the following country	Availability
English	Canada	Available

5. Price and payment terms

In consideration for the License granted under this WO, the User agrees to pay the following amount:

MRT Fees	Royalty fees	Total
FREE OF CHARGE	FREE OF CHARGE	FREE OF CHARGE

For the review and approval of the Screenshots of the original version of the COA, the User shall sign a Proposal for Screenshots review with MRT and pay the associated fees.

6. Specific requirements for the COA

- The Copyright Holder of the COA has granted ICON LS exclusive rights to translate the COA in the context of commercial studies or any project funded by for-profit entities. ICON LS is the only organization authorized to perform linguistic validation/translation work on the COA.
- In case the User wants to use an e-Version of the COA, the User shall send the Screenshots of the original version of the COA to MRT or ICON LS for review and approval. The Screenshots review may incur additional fees.
- In case the User wants to use an e-Version of the COA, ICON LS shall update (if needed) and populate the COA translations into the User's or IT Company's system and the User shall send the Screenshots of the translations of the COA to ICON LS for approval. The update (if needed), population of translations and the Screenshots review may incur additional fees.
- The User shall ensure that all persons administering the COA are qualified personnel or are working under the supervision of one or more appropriately qualified persons.
- Please include cost of the **HADS Manual** at **€62.95 per copy (plus shipping)** in any quote: Yes ☐ No x

DocUUID : 577fde3a-cf5a-42ee-839f-221872cf6a8a

HADS Work Order

- Quantity required: ……
- **TOTAL MANUAL/S COSTS: €** [……]
- **MRT's processing fees: €** [……]
- **TOTAL SHIPPING COSTS: €** [……]
- **TOTAL COST: €** [……..]
- Ship to (*name, address, phone, email required)*:
- Please note that neither GL Assessment (GLA) nor the Mapi Research Trust (MRT) hold the rights to the following translated **HADS** questionnaires:
- **GERMAN** language translation of the HADS. If you require the German translation of the HADS, please contact Sylvia.Schlutius@hogrefe.ch at Hogrefe AG, Bern, Switzerland.
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Appendix H.

INTERNATIONAL PHYSICAL ACTIVITY QUESTIONNAIRE

We are interested in finding out about the kinds of physical activities that people do as part of their everyday lives. The questions will ask you about the time you spent being physically active in the **last 7 days**. Please answer each question even if you do not consider yourself to be an active person. Please think about the activities you do at work, as part of your house and yard work, to get from place to place, and in your spare time for recreation, exercise or sport.

Think about all the **vigorous** and **moderate** activities that you did in the **last 7 days**. **Vigorous** physical activities refer to activities that take hard physical effort and make you breathe much harder than normal. **Moderate** activities refer to activities that take moderate physical effort and make you breathe somewhat harder than normal.

PART 1: JOB-RELATED PHYSICAL ACTIVITY

The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you did outside your home. Do not include unpaid work you might do around your home, like housework, yard work, general maintenance, and caring for your family. These are asked in Part 3.

1. Do you currently have a job or do any unpaid work outside your home?

☐ *Yes*

☐ No → ***Skip to PART 2: TRANSPORTATION***

The next questions are about all the physical activity you did in the **last 7 days** as part of your paid or unpaid work. This does not include traveling to and from work.

2. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, digging, heavy construction, or climbing up stairs **as part of your work**? Think about only those physical activities that you did for at least 10 minutes at a time.

_____ **days per week**

☐ No vigorous job-related physical activity → ***Skip to question 4***

3. How much time did you usually spend on one of those days doing **vigorous** physical activities as part of your work?

_____ **hours per day**

_____ **minutes per day**

4. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like carrying light loads **as part of your work**? Please do not include walking.

_____ **days per week**

☐ No moderate job-related physical activity → ***Skip to question 6***

5. How much time did you usually spend on one of those days doing **moderate** physical activities as part of your work?

_____ **hours per day**

_____ **minutes per day**

6. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **as part of your work**? Please do not count any walking you did to travel to or from work.

_____ **days per week**

☐ No job-related walking → ***Skip to PART 2: TRANSPORTATION***

7. How much time did you usually spend on one of those days **walking** as part of your work?

_____ **hours per day**

_____ **minutes per day**

PART 2: TRANSPORTATION PHYSICAL ACTIVITY

These questions are about how you traveled from place to place, including to places like work, stores, movies, and so on.

8. During the **last 7 days**, on how many days did you **travel in a motor vehicle** like a train, bus, car, or tram?

_____ **days per week**

☐ No traveling in a motor vehicle → ***Skip to question 10***

9. How much time did you usually spend on one of those days **traveling** in a train, bus, car, tram, or other kind of motor vehicle?

_____ **hours per day**

_____ **minutes per day**

Now think only about the **bicycling** and **walking** you might have done to travel to and from work, to do errands, or to go from place to place.

10. During the **last 7 days**, on how many days did you **bicycle** for at least 10 minutes at a time to go **from place to place**?

_____ **days per week**

☐ No bicycling from place to place → ***Skip to question 12***

11. How much time did you usually spend on one of those days to **bicycle** from place to place?

_____ **hours per day**

_____ **minutes per day**

12. During the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time to go **from place to place**?

_____ **days per week**

☐ No walking from place to place → ***Skip to PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY***

13. How much time did you usually spend on one of those days walking from place to place?

_____ **hours per day**

_____ **minutes per day**

PART 3: HOUSEWORK, HOUSE MAINTENANCE, AND CARING FOR FAMILY

This section is about some of the physical activities you might have done in the **last 7 days** in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

14. Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like heavy lifting, chopping wood, shoveling snow, or digging **in the garden or yard**?

_____ **days per week**

☐ No vigorous activity in garden or yard → ***Skip to question 16***

15. How much time did you usually spend on one of those days doing **vigorous** physical activities in the garden or yard?

_____ **hours per day**

_____ **minutes per day**

16. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, sweeping, washing windows, and raking **in the garden or yard**?

_____ **days per week**

☐ No moderate activity in garden or yard → ***Skip to question 18***

17. How much time did you usually spend on one of those days doing **moderate** physical activities in the garden or yard?

_____ **hours per day**

_____ **minutes per day**

18. Once again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** activities like carrying light loads, washing windows, scrubbing floors and sweeping **inside your home**?

_____ **days per week**

☐ No moderate activity inside home → ***Skip to PART 4: RECREATION, SPORT AND LEISURE-TIME PHYSICAL ACTIVITY***

19. How much time did you usually spend on one of those days doing **moderate** physical activities inside your home?

_____ **hours per day**

_____ **minutes per day**

PART 4: RECREATION, SPORT, AND LEISURE-TIME PHYSICAL ACTIVITY

This section is about all the physical activities that you did in the **last 7 days** solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.

20. Not counting any walking you have already mentioned, during the **last 7 days**, on how many days did you **walk** for at least 10 minutes at a time **in your leisure time**?

_____ **days per week**

☐ No walking in leisure time → ***Skip to question 22***

21. How much time did you usually spend on one of those days **walking** in your leisure time?

_____ **hours per day**

_____ **minutes per day**

22. Think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **vigorous** physical activities like aerobics, running, fast bicycling, or fast swimming **in your leisure time**?

_____ **days per week**

☐ No vigorous activity in leisure time → ***Skip to question 24***

23. How much time did you usually spend on one of those days doing **vigorous** physical activities in your leisure time?

_____ **hours per day**

_____ **minutes per day**

24. Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis **in your leisure time**?

_____ **days per week**

☐ No moderate activity in leisure time → ***Skip to PART 5: TIME SPENT SITTING***

25. How much time did you usually spend on one of those days doing **moderate** physical activities in your leisure time?

_____ **hours per day**

_____ **minutes per day**

PART 5: TIME SPENT SITTING

The last questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television. Do not include any time spent sitting in a motor vehicle that you have already told me about.

26. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekday**?

_____ **hours per day**

_____ **minutes per day**

27. During the **last 7 days**, how much time did you usually spend **sitting** on a **weekend day**?

_____ **hours per day**

_____ **minutes per day**

This is the end of the questionnaire, thank you for participating.

Appendix I.

SLEEP HYGIENE INDEX (SHI)

Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale to make your choice.

0	1	2	3	4
Never	**Rarely**	**sometimes**	**Frequent**	**Always**

1. I take daytime naps lasting two or more hours.	0	1	2	3	4	_____
2. I go to bed at different times from day to day.	0	1	2	3	4	_____
3. I get out of bed at different times from day to day.	0	1	2	3	4	_____
4. I exercise to the point of sweating within 1 hr of going to bed.	0	1	2	3	4	_____
5. I stay in bed longer than I should two or three times a week.	0	1	2	3	4	_____
6. I use alcohol, tobacco, or caffeine within 4hrs of going to bed or after going to bed.	0	1	2	3	4	_____
7. I do something that may wake me up before bedtime (for example: play video games, use the internet, or clean).	0	1	2	3	4	_____
8. I go to bed feeling stressed, angry, upset, or nervous.	0	1	2	3	4	_____
9. I use my bed for things other than sleeping or sex (for example: watch television, read, eat, or study).	0	1	2	3	4	_____
10. I sleep on an uncomfortable bed (for example: poor mattress or pillow, too much or not enough blankets).	0	1	2	3	4	_____
11. I sleep in an uncomfortable bedroom (for example: too bright, too stuffy, too hot, too cold, or too noisy).	0	1	2	3	4	_____
12. I do important work before bedtime (for example: pay bills, schedule, or study).	0	1	2	3	4	_____
13. I think, plan, or worry when I am in bed.	0	1	2	3	4	_____

Total score =_____

Appendix J.

ROSENBERG SELF-ESTEEM SCALE

Reference:

Rosenberg, M. (1965). Society and the adolescent self-image. Princeton, NJ: Princeton University Press.

Description of Measure:

A 10-item scale that measures global self-worth by measuring both positive and negative feelings about the self. The scale is believed to be uni-dimensional. All items are answered using a 4-point Likert scale format ranging from strongly agree to strongly disagree.

Abstracts of Selected Related Articles:

Gray-Little, B., Williams, V.S.L., & Hancock, T. D. (1997). An item response theory analysis of the Rosenberg Self-Esteem Scale. *Personality and Social Psychology Bulletin*, *23*, 443-451.

The Rosenberg Self-Esteem Scale, a widely used self-report instrument for evaluating individual self-esteem, was investigated using item response theory. Factor analysis identified a single common factor, contrary to some previous studies that extracted separate Self-Confidence and Self-Depreciation factors. A unidimensional model for graded item responses was fit to the data. A model that constrained the 10 items to equal discrimination was contrasted with a model allowing the discriminations to be estimated freely. The test of significance indicated that the unconstrained model better fit the data-that is, the 10 items of the Rosenberg Self-Esteem Scale are not equally discriminating and are differentially related to self-esteem. The pattern of functioning of the items was examined with respect to their content, and observations are offered with implications for validating and developing future personality instruments.

Baumeister, R. F., Campbell, J. D., Krueger, J. I., & Vohs, K. D. (2003). Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles? *Psychological Science in the Public Interest, 4*, 1-44.

Summary – Self-esteem has become a household word. Teachers, parents, therapists, and others have focused efforts on boosting self-esteem, on the assumption that high self-esteem will cause many positive outcomes and benefits—an assumption that is critically evaluated in this review.

Appraisal of the effects of self-esteem is complicated by several factors. Because many people with high self-esteem exaggerate their successes and good traits, we emphasize objective measures of outcomes. High self-esteem is also a heterogeneous category, encompassing people who frankly accept their good qualities along with narcissistic, defensive, and conceited individuals.

therapeutic interventions or school programs) causes benefits. Our findings do not support continued widespread efforts to boost self-esteem in the hope that it will by itself foster improved outcomes. In view of the heterogeneity of high self-esteem, indiscriminate praise might just as easily promote narcissism, with its less desirable consequences. Instead, we recommend using praise to boost self-esteem as a reward for socially desirable behavior and self-improvement.

Ciarrochi, J., Heaven, P. C. L., & Fiona, D. (2007). The impact of hope, self-esteem, and attributional style on adolescents' school grades and emotional well-being: A longitudinal study.

We examined the distinctiveness of three "positive thinking" variables (self-esteem, trait hope, and positive attributional style) in predicting future high school grades, teacher-rated adjustment, and students' reports of their affective states. Seven hundred eighty-four high school students (382 males and 394 females; 8 did not indicate their gender) completed Time 1 measures of verbal and numerical ability, positive thinking, and indices of emotional well-being (positive affect, sadness, fear, and hostility), and Time 2 measures of hope, self-esteem, and emotional well-being. Multi-level random coefficient modelling revealed that each positive thinking variable was distinctive in some contexts but not others. Hope was a predictor of positive affect and the best predictor of grades, negative attributional style was the best predictor of increases in hostility and fear, and low self-esteem was the best predictor of increases in sadness. We also found that sadness at Time 1 predicted decreases in self-esteem at Time 2. The results are discussed with reference to the importance of positive thinking for building resilience.

Scale:

Instructions

Below is a list of statements dealing with your general feelings about yourself. Please indicate how strongly you agree or disagree with each statement.

1. On the whole, I am satisfied with myself.

Strongly Agree Agree Disagree Strongly Disagree

2. At times I think I am no good at all.

Strongly Agree Agree Disagree Strongly Disagree

3. I feel that I have a number of good qualities.

Strongly Agree Agree Disagree Strongly Disagree

4. I am able to do things as well as most other people.

Strongly Agree Agree Disagree Strongly Disagree

5. I feel I do not have much to be proud of.

Strongly Agree Agree Disagree Strongly Disagree

6. I certainly feel useless at times.

Strongly Agree Agree Disagree Strongly Disagree

7. I feel that I'm a person of worth, at least on an equal plane with others.

Strongly Agree Agree Disagree Strongly Disagree

8. I wish I could have more respect for myself.

Strongly Agree Agree Disagree Strongly Disagree

9. All in all, I am inclined to feel that I am a failure.

Strongly Agree Agree Disagree Strongly Disagree

10. I take a positive attitude toward myself.

Strongly Agree Agree Disagree Strongly Disagree

Scoring:

Items 2, 5, 6, 8, 9 are reverse scored. Give "Strongly Disagree" 1 point, "Disagree" 2 points, "Agree" 3 points, and "Strongly Agree" 4 points. Sum scores for all ten items. Keep scores on a continuous scale. Higher scores indicate higher self-esteem.