PREDICTING LONELINESS FROM ACADEMIC PERFORMANCE OF PUBLIC AND

PRIVATE HIGH SCHOOL STUDENTS: A LINEAR REGRESSION ANALYSIS

by

Jeffrey Wolford

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

Liberty University

2024

PREDICTING LONELINESS FROM ACADEMIC PERFORMANCE OF PUBLIC AND

PRIVATE HIGH SCHOOL STUDENTS: A LINEAR REGRESSION ANALYSIS

by Jeffrey Wolford

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

Liberty University, Lynchburg, VA

2024

APPROVED BY:

Jeffrey Savage, EdD, Committee Chair

Treg Hopkins, EdD, Committee Member

ABSTRACT

The purpose of this quantitative correlational study was to examine the relationship between academic indicators (grade point average, Scholastic Assessment Test score, and type of school) and student reported loneliness. Weiss' theory of loneliness was used as the foundation for this quantitative, correlational study. This study was conducted to create a framework for teachers, mentors, or other educational leaders to be able to locate and address student loneliness in a timely manner by understanding the educational indicators that are related to student loneliness. Loneliness is correlated to a variety of negative mental and physical health problems, along with increasing risky health behaviors. The sample of high school students was collected from public and private schools in Central Virginia. An online survey was conducted to gather the data, with a utilization of the UCLA loneliness measurement instrument. The results were analyzed using a multiple regression analysis to determine strength of relationship between variables and assess the model's strength in predicting the outcome variable. The study provided evidence that a predictive, correlational relationship does exist between the predictor variables (SAT score, GPA, type of school) and the criterion variable (self-reported loneliness score). Students in public school with lower GPAs, self-reported under 3.25 weighted, were the correlating factor to a higher degree of loneliness. Future research on this topic should include adding additional predictor variables, such as race, gender, socio-economic status, examining other types of anxieties associated with loneliness, and examining GPA of specific academic areas.

Keywords: loneliness, grade point average, academic success, public school, private school

Dedication

I want to dedicate this research to my wife and children. They have supported me throughout this journey and shed great insights into how this research will be both impactful and beneficial not only in an academic way, but also being applicable. My wife's generous heart for the welfare of children stretched me in being a foster parent for many years, in which I was able to see how interventions can greatly improve the outcomes for those who are less fortunate. Likewise, my two children adopted from foster care, proved to me that regardless of the initial odds given to children, when a loving and kind support system is given, children are resilient enough to push past the statistics that only show what their limitations might be. In light of these influences in my life and the support my family provided, I was able to passionately explore this topic with hopes of allowing other families, with the support of their school systems, increase the number of their statistical limitation and strive for excellence.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

Attention Deficit Hyperactivity Disorder (ADHD)

Autism Spectrum Disorder (ASD)

Body Mass Index (BMI)

Coronavirus (COVID, COVID-19)

Digital informal learning (DIL)

Fear of Missing Out (FOMO)

Grade Point Average (GPA)

Institutional Review Board (IRB)

Scholastic Assessment Test (SAT)

Standards of Learning (SOL)

University of California Los Angeles (UCLA)

CHAPTER ONE: INTRODUCTION

Overview

The purpose of this quantitative correlational study is to examine if a relationship exists between perceived loneliness and the academic success indicators of grade point average, SAT test scores, and type of academic institution at which a student attends. Chapter One will examine the background with specific mention of the historical context, the social context, and the theoretical framework. The problem and purpose statements will be addressed in scope of the current literature regarding this topic. The significance of this study and research question will be detailed with the possible impacts in the learning environment. Finally, the chapter concludes with a listing of key terms and their associated definitions.

Background

Loneliness is a substantial problem in the academic environment as it affects all facets of a student's health, ranging from emotional to social to physical and even to spiritual well-being (Shovestul et al., 2020). These same effects prove to be academic stressors in which grade point average and test scores are negatively impacted (Okoedion et al., 2019). Further, as Yan (2021) notes about the global pandemic caused by COVID-19, the usage of technology and remote learning has increased dramatically. Schools can reach more students by utilizing technology, virtual learning environments, and social media by reducing physical presence. While loneliness itself did not change historically, technology has forced the stressors that create loneliness more prevalent. Students and teachers are forced to rethink social connections as high school to college transitions occur due to learning environment designs. Social media's influences have changed students' levels and potentials for perceived loneliness.

Historical Context

     Loneliness is not a new emotion experienced by students but rather accentuated due to increasing stressors. One of the main stressors has been utilizing technology and social media in the learning environments. Some research has indicated that social media and technology are beneficial to bridging the problem of physical proximity in the learning environment (Cavus et al., 2021; Luo et al., 2020). However, this usage must be systematic and targeted to match the curriculum being taught. Luo et al. (2020) describe how teachers must promote technology to be effective, focusing on the time usage of these media outlets.

     The usage of social media affects all students in different ways. Female students have been noted as experiencing more stress when utilizing social media platforms for academic purposes. The problem lies in that social media is a predominant social outlet for peer relationships (Shi et al., 2020). This issue becomes a stressor on students when separation of academic and social purposes cannot be separated or isolated (Cavus et al., 2021; Luo et al., 2020). When this cannot be accomplished or contained, too much technology or social media usage becomes evident.

     Social media usage promotes fear of missing out in high school and college-aged students as technology increases. This fear perpetuates social anxieties and leads to psychological and physical reactions (Orben, 2020). Students often feel depression, anxiety, low self-esteem, loneliness, and physical sickness when they are isolated from others in the virtual social setting (Malik et al., 2020; Shi et al., 2020). These factors have been shown to accentuate the problems of social media overload and social media fatigue. These behaviors and experiences stem from the overuse of social media platforms, far more than what is required for a classroom curriculum (Luo et al., 2020). Shi et al. (2020) discovered that overuse of social media caused mental and

physical exhaustion in students; it also isolates students, leading to experienced loneliness in the classroom (Malik et al., 2020).

Society-at-Large

Loneliness is present in students regarding their transition from high school to higher education institutions. Students transition to a new set of student-teacher, peer, and parental relationships during this time. Loneliness becomes present as old relationships are minimized and new ones form (Jefferson et al., 2023). Additionally, certain academic areas in the college transition face a higher level of loneliness. Students in the social sciences have been shown to have a higher social isolation and loneliness level than other areas of study (Diehl et al., 2018; Gestsdottir et al., 2021).

Loneliness also becomes heightened in the social context when physical distance invades relationships. The COVID-19 pandemic forced students to work remotely and physically distance themselves from others. Loneliness was very prevalent amongst college students (Labrague et al., 2020). To compensate for this risk, many teachers and institutions implemented social media for connecting students. This mitigation strategy was shown to work in moderation when explicitly focused on classwork (Thomas et al., 2020). However, loneliness became evident when the same technology and social media were used for personal intentions, even if paired academically (Thomas et al., 2020).

Theoretical Framework

The theory of loneliness describes and defines loneliness within a psychological context. Weiss (1973) explains loneliness as a two-part model. In each part, loneliness is directly related to relationships that may or may not exist with an individual. Social loneliness is defined as the absence of specific social networks needed for an individual's overall health (Weiss, 1973).

Emotional loneliness is then explained to be the absence of these relationships. Further, this theory narrows the need to prevent loneliness into six categories (Weiss, 1973). These include nurturance, social integration, attachment, reassurance of work, guidance from others, and reliable alliance. It can be deduced that each of these categories describes the relationships between individuals and others.

Loneliness can be measured in empirical manners. It is not defined solely in subject manners (Jones, 1987). Relationships with others are a crucial indicator of the presence of perceived loneliness. Jones (1987) explained that the lack of specific relationships would cause experienced loneliness. These relationships span individual to peer, mentor (teacher, coach, employer), or individual to family.

Loneliness can be explained by the lack or damage of relationships between individuals and others (Eccles et al., 2020). Under this assumption, attachment theory becomes essential in defining the cause of the perceived loneliness. Attachment theory was initially described by Bowlby (1969) as to how an individual bonds with their caregiver. This was expanded to include specific types of bonds between individual and caregiver (Ainsworth, 1989). The different attachment types include a healthy relationship of a secure attachment and unhealthy attachments defined as anxious-resistant, anxious-avoidant, and disorganized-disoriented. (Ainsworth, 1989; Kennedy & Kennedy, 2004).

Problem Statement

Students experience loneliness in the classroom in a variety of ways. These can initiate from the environment, class makeup, separation of students based on learning level, social interactions, and the usage of technology (Ferguson & Ryan, 2019; Islam & Kumar, 2019; Lemay et al., 2019). Current academic trends show growth in technology usage as remote and

distance learning become more pronounced. Likewise, creating academic courses (such as honors courses or special learning sections) maximizes student engagement. However, each of these trends also isolate students, indicating the presence of loneliness (Morin, 2020). The presence of loneliness does not increase a student's level of self-efficacy (Dagnew & Dagne, 2019; Mikkelsen et al., 2020). The stressors can come from a variety of strained relationships or environments. If not recognized or mitigated, the stressors will evoke lower academic achievement and perceived loneliness in the student's physiological manner (Shovestul et al., 2020). When students are not operating at their optimal ability, their academic scores will be lower due to stressors (Quílez-Robres et al., 2021). Therefore, academic stressors can produce lower test scores (Delgado et al., 2019) and evoke feelings of loneliness (Ferguson & Ryan, 2019). Abuhassan et al. (2020) indicate that emotional well-being, including being lonely, is related to academic success in college-aged students, but that further research is needed on a broader scope of students, including first-year and soon-to-be first-year college students. Morin (2020) states that classroom factors and academic factors need to be addressed with regards to loneliness experienced by students. Likewise, academic success in student transitions to upper-level high school and university level academia with respect to loneliness has been identified as an area of future research (Diehl et al., 2018; Gestsdottir et al., 2021). The problem is that the literature has not fully addressed the academic success indicators of public and private educational institutions in light of a student's perceived loneliness.

Purpose Statement

The purpose of this quantitative correlational study examines if a relationship exists between perceived loneliness and the academic success indicators of grade point average, SAT test scores, and type of academic institution at which a student attends. Loneliness is described as

the perception of discrepancy of social connectedness, intimacy, and companionship (Buecker et al., 2020). Grade point average is the localized measurement of mastering educational classes and the SAT test is an indicator of overall academic mastery; Both of these variables are indicators of predicated academic achievement (Seider et al., 2020). The type of academic institution will be measured by public or private school. Public and private schools offer a different experience in the flexibility and parent expectations which create a differing learning atmosphere (Musaddiq et al., 2022). Students will self-report academic achievements (predictor variable) of grade point average and SAT scores. The population will include eleventh and twelfth-grade students at public and private high schools (an additional predictor variable) in Central Virginia. The criterion variable, perceived loneliness, will be reviewed on a scalar level utilizing the UCLA Loneliness scale.

<div align="center">**Significance of the Study**</div>

Loneliness has often been described as a psychological outcome of students who do not perform well academically, but the reverse has not been considered -- whether academic performance can be an indicator of loneliness (Morin, 2020; Shi et al., 2020). Likewise, examining the correlation between loneliness and academic success will create a foundational linkage as future methods are made in the learning environment to boost educational achievements and ensure students learn at their optimal level. Research has been placed into what dictates loneliness in various psychological contexts. These studies focus on college situations as remote learning and social media usage appears to be more pronounced (Cavus et al., 2021; Labrague et al., 2020). Therefore, physical distancing is present to create isolation and a natural breeding ground for loneliness. However, how this created state for the growth of loneliness correlates to academic achievement is unknown. Schools lack the knowledge to create

optimal learning environments in remote/virtual learning and design for social isolation to mitigate the onset of loneliness. Mitigating this issue will allow for more knowledge transfer and subsequent higher indicators of academic success.

Research Question(s)

RQ1: How accurately can loneliness be predicated from a linear combination of academic indicators (grade point average, SAT score, type of school) for high school students?

Definitions

1. *Grade Point Average* – The average of final grade accumulation for an individual's high school tenure (Kuncel et al., 2005)

2. *Loneliness* – A negative subjective feeling in which one feels disconnected from relationships (Labrague et al., 2020)

3. *Perceived loneliness* – A personal experience in which personal relationships are experienced in deficit (Jefferson et al., 2023)

4. *Scholastic Assessment Test (SAT)* – A national test that is a general predictor of academic success (Tellakat et al., 2019)

5. *Social Media* - The usage of technology to communicate to others in an online and digital format to include blogs, instant messaging, video/photo sharing, and social network sites (Luo et al., 2020).

6. *Social Media Fatigue* – A subjective feeling of tiredness and exhaustion when utilizing technology to communicate to others (Malik et al., 2020).

7. *Social Media Overload* – A state in which the overuse of social media creates problems and behavioral changes within an individual (Shi et al., 2020)

8. *Transition* – The ability to navigate change (Thomas et al., 2020)

CHAPTER TWO: LITERATURE REVIEW

Overview

A systematic review of the literature was studied to determine how loneliness affects the cumulative academic success of college and high school students. Theories associated with this topic include the theory of loneliness, attachment theory, and the theory of hierarchal needs. The second section of this review focuses on how loneliness can occur and how different circumstances create the stressors that create loneliness. The stressors are viewed specifically from a proximity, social, and emotional vantage point. This review examines social isolation, academic influences, and socio-economic issues associated with individual loneliness in the learning environment. Additionally, examining the literature associated with the impacts of the COVID-19 global pandemic is detailed as it relates directly to the stressors affecting loneliness and academic performance. After performing the review, a gap will be identified relating loneliness to academic performance and creating a viable need for this study.

Theoretical Framework

Several different theories address loneliness within the academic context. Weiss (1973) developed a theory of loneliness that details how loneliness manifests itself and its outward appearance. The theory focuses on an individual's relationships with others and the healthy state needed within those relationships. This idea is further examined in Bowlby and Ainsworth's attachment theory. Attachment theory describes the basic foundations of healthy relationships from infancy through adulthood. Attachments are made at a foundational level and affect an individual's emotions and mental health. While attachments are developed at a young age, creating and maintaining healthy relationships continues throughout an individual's lifetime. Pulling these two theories together is Maslow's theory of hierarchical needs. An individual must

have basic needs met, such as social and emotional, to overcome feelings such as depression, anxiety, and loneliness. Only then can a person excel in other areas of life, such as in a work or academic environment.

Theory of Loneliness

The loneliness theory describes the causes and state of loneliness in a psychological context without specific mention of academic impacts. However, loneliness resides within the educational learning environment. Weiss (1973) developed the theory of loneliness by examining the empirical studies that existed at his theory formulation. These studies provide the parameters for when the state of loneliness can and will occur. Likewise, the theory of loneliness describes two forms of loneliness and six types of related relationships (Weiss, 1973). There is a distinct focus upon relationships and deficits within these relationships.

Weiss (1973) describes two distinct types of loneliness within his theory: emotional loneliness and social loneliness. Emotional loneliness defines the lack of relationship between an individual to others. Relationships span from peers to leaders to intimate partners (Weiss, 1973). Social loneliness occurs when a social network does not exist for an individual. Weiss (1973) relates the network to contain close interactions and not simplistic friendships.

Additionally, Weiss (1973) relates the theory of loneliness to six emotional needs. These needs are also identified as critical needs in Maslow's Hierarchy of Needs. These six needs include attachment, social integration, nurturance, reassurance of work, sense of reliable alliance, and the guidance available in situations where stress is present (Weiss, 1973). These needs can develop into deficits when an individual does not have a relationship to sustain the need. For example, if an attachment with parents is in deficit regarding family relationships, loneliness will

be experienced. In the academic setting, if a relationship between an individual and teacher does not exist positively, nurturance of guidance during stress will be in deficit.

The theory of loneliness is further clarified in Jones' (1987) critique of Weiss. Jones (1987) argues that loneliness being deemed "subjective does not imply that it is unimportant or not real". He supports Weiss' theory by examining interpersonal failures as an originator of loneliness (Jones, 1987). While addressing some of the nuances of the theory of loneliness, Jones also describes the deficits in relationships as an indicator of the presence of loneliness. Therefore, while questioning if the existing empirical data can show loneliness, there are indicators that relationships affect the overall state of loneliness that an individual exhibits or experiences. Therefore, loneliness develops from a breakdown of relationships, as described by Weiss (Jones, 1987).

The theory of loneliness plays an important role in describing stressors that can affect academic success. As Weiss (1973) theorized, loneliness occurs within individual and social settings. The academic learning environment consists of peer interactions and individualized work/assessments. Further, students have relationships on various levels that may affect their academic progress. These include parent-student, student-teacher, and peer relationships. The theory of loneliness describes these similar relationships and the adverse effects when they are in deficit (Eccles et al., 2020; Jones, 1987; Weiss, 1973).

Attachment Theory

Attachment theory was developed initially to describe infant relationships with their caregivers, most often their mothers (Ainsworth, 1989; Bowlby, 1969). The bond between these two individuals demonstrates how healthy attachment and the ability to sustain healthy relationships in later years of life can occur (Bowlby, 1969). Damage at the infant level can lead

to fractured relationships in the school setting and beyond (Kennedy & Kennedy, 2004), causing deficits that Weiss (1973) described leading to loneliness.

Attachment theory has been refined over several decades by several prominent researchers. Bowlby (1969) initiated the attachment theory without using empirical evidence from specific studies. Ainsworth (1989) provided the first set of empirical evidence to support infant attachment theory. The strange situation procedure was developed to test how an infant will react when separated from their primary caregiver (Ainsworth, 1989). Ainsworth performed a battery of tests and the data acquired clarified attachment theory to include three types of attachment.

Four distinct types of attachment have been defined within the attachment theory. Secure attachment was found when infants were stressed during separation but exhibited relief when reunited with their caregiver. Ainsworth (1989) describes this as a healthy attachment. Anxious-resistant attachment was noted as having a higher stress level during separation with anger upon reunification (Ainsworth, 1989). Finally, Ainsworth (1989) described anxious-avoidance attachment as a high level of separation stress followed by avoiding the primary caregiver upon reunification. An additional type of attachment was later described as disorganized-disoriented from research conducted by Kennedy & Kennedy (2004). This additional attachment type was defined as having no relatable consistency of reaction. The fourth type and the high-stress types defined by Ainsworth are considered non-normal and need intervention (Kennedy & Kennedy, 2004).

Kennedy & Kennedy (2004) further apply the attachment theory into the academic learning environment. Children who exhibit secure attachment are more likely to function with success in the educational setting. These children have a more positive view of themselves, take

instruction from teachers easier, and function positively with their peers (Kennedy & Kennedy, 2004). This is a product of the healthy relationships and networks for these children with secure attachments. Children who exhibit anxious-resistant attachments often appear to have attributes associated with attention deficit disorders or learning disabilities. They will appear to have low self-esteem, difficulty understanding directions and staying on task as instructed by the teacher (Kennedy & Kennedy, 2004). Further, Kennedy & Kennedy (2004) describe these children as socially isolated from their peers in the classroom. Anxious-avoidance attachment is displayed in children who distrust their peers and cannot make healthy friendships (Kennedy & Kennedy, 2004). They also do not rely on their social network for support, which emotionally isolates them from their peers and teachers (Kennedy & Kennedy, 2004).

While initially developed for infant-caregiver relationships, attachment theory describes the healthy relationships needed for students to succeed in their academic setting. Attachments with teachers, mentors, and parents create a network that allows students to feel supported. Further, attachment theory can be applied to students and their peer relationships in which they also feel secure and supported. Without support, loneliness becomes a factor due to deficits in relationships (Weiss, 1973).

Maslow's Theory of Hierarchical Needs

Maslow (1943) described a pyramidical design of human needs that were required for survival. These needs contained five elements, with the foundational need being a prerequisite for the higher-level need. These needs include physiological, safety, belonging/love, esteem, and self-actualization. These needs directly relate to Weiss' theory of loneliness due to the relationship component of all but one of the needs. The physiological need for food, water, and shelter, are not related to interpersonal relationships. However, feeling safe, being part of a

healthy social group, and feeling positive about oneself all tie directly into the health of relationships experienced by individuals.

In the academic realm, the second foundational item of Maslow's Hierarchy of Needs can be fulfilled through the feeling of not being socially isolated. When social isolation occurs, bullying can manifest itself (Kashy-Rosenbaum & Aizenkot, 2020). The threatening nature of bullying puts the safety need at risk. Healthy relationships and social understandings prevent the feeling of isolation (Thijs & Zee, 2019) and therefore promote the need for safety.

The psychological needs of belonging/love and esteem build upon the basic needs to create a healthy environment for an individual (Maslow, 1943). Students who fit into successful peer groups experience less detrimental emotions such as anxiety and depression (Robb et al., 2020). Without the negative stressors, students will gain confidence in interactions with parents, teachers, and the educational environment (McLeod & Anderson, 2023).

Self-actualization is the top level of Maslow's Hierarchy of Needs pyramid. Maslow (1943) defines this as achieving one's full potential in all areas of life. This would be equivalent to performing well on academic indicators and reporting low presence of detrimental factors, such as anxieties, depression, isolation, and loneliness within the learning environment. As Weiss (1973) notes, positive relationships decrease perceived loneliness. Ainsworth (1989) also describes healthy attachments as result of healthy relationships. Therefore, self-actualization requires healthy and positive relationships in order to achieve personal success.

Related Literature

Loneliness is pervasive throughout the learning environment in a variety of contexts (Jefferson et al., 2023). Jefferson et al. (2023) also notes that loneliness can be found in social settings where learning level and placement in the hierarchical peer order dictate the level of

isolation experienced. Academic influences such as the classroom or environmental aspects also place barriers in student relationships with peers and teachers (Morin, 2020). Similarly, classroom demographics of culture and racial background affect how students perceive their loneliness in an academic setting (Achdut & Refaeli, 2021).

With the onset of the COVID-19 pandemic, students experienced loneliness due to the virus infiltration and the associated mitigation strategies employed by governments and academic institutions (Branje & Morris, 2021). Also, according to Branje and Morris (2021), social isolation and physical distancing are successful strategies that were employed. Unfortunately, with the removal of social settings, physical interactions, and a change in traditional educational environments, mental health challenges, including loneliness, became prevalent (Gazmararian et al., 2021).

Loneliness and Health Implications

Loneliness is an important emotion for individuals as it has substantial influence upon mental health, physical health, and the health risks that one will take when feeling this emotion (Gyasi et al., 2022; Pengpid & Peltzer, 2021). People who identify as having loneliness crave social connections but respond with negative emotions to stimuli and avoid social interactions (Preece et al., 2021). Inevitably, an individual with prolonged loneliness or with a high degree of loneliness will worsen their own general health status (Gyasi et al., 2022; Pengpid & Peltzer, 2021). Loneliness has further been shown to be more problematic for adolescents than in any other age group (Cañas et al., 2020). Loneliness has been found to be more prevalent in the adolescent age range than any other age range, including the elderly (Christiansen et al., 2021). Since loneliness stems from a lack of quantity and quality of social interactions, the factors involving loneliness have imperative effects at the adolescent age (Lemay et al., 2019).

Christiansen et al. (2021) also indicate that social formations are highest in adolescents who are actively forming peer groups, in which social groupings are built in mass and in effectiveness (Christiansen et al., 2021).

Loneliness and Mental Health

Loneliness increases negative mental health concerns (Preece et al., 2021). When loneliness is experienced, a variety of negativities in the mental health area develop (Haikalis et al., 2021). These mental health issues become more pronounced as the duration and intensity of loneliness persists (Preece et al., 2021). Depression and anxiety in several different forms are the initial mental health responses that occur (Christiansen et al., 2021; Pengpid & Peltzer, 2021). Lowered self-esteem, lowered self-efficacy and disturbed sleep patterns are also directly related to feelings of loneliness (Gyasi et al., 2022). Insomnia provokes physical health concerns, but also affects mental health capacities negatively (Pengpid & Peltzer, 2021). Studies have also shown that more intense mental health challenges are present when loneliness is experienced (Preece et al., 2021). Being hyper vigilant to social threats, long term mental illnesses, and lower cognitive functioning have all been associated with loneliness experienced by different age ranges (Christiansen et al., 2021; Pengpid & Peltzer, 2021; Preece et al., 2021).

Loneliness and Physical Health

Loneliness also has negative impacts upon the physical health of an individual (Gyasi et al., 2022; Hu et al., 2021). With loneliness tied closely with stress and anxiety, some of the physical health effects are an outward appearance of the mental health issues (Eccles et al., 2020). The overall risk of loneliness is comparable to chronic smoking or obesity (Gyasi et al., 2022). A higher likelihood of obesity and a larger body mass index (BMI) are both correlated to feelings of loneliness (Hu et al., 2021). Therefore, physical effects of obesity and loneliness are

similar as they two items are related (Gyasi et al., 2022). Further, increased feelings of loneliness are related to lowered physical activity, including exercise (Hu et al., 2021). Lowered physical activity and risks for obesity also attribute more severe physical health issues as pointed out in the aforementioned studies. Loneliness has been shown to be a predicator to higher rates of cardiovascular disease (Hu et al., 2021). Hypertension and tinnitus are also physical health issues that arise when an individual feels loneliness (Christiansen et al., 2021). Some of these more severe physical health conditions are also experienced in long term situations. Christiansen et al. (2021) notes that asthma, migraine, and arthritis are all correlated to an individual who experiences loneliness.

Higher Health Risks from Loneliness

Not only does loneliness affect mental and physical health, it also contributes to increased health risks of an individual. Loneliness creates a habitual emotional regulation pattern that increases the feeling of loneliness (Preece et al., 2021). Thus, it can be deduced that loneliness creates loneliness. One of the ways in which this occurs is in the increased avoidant behaviors that is present in individuals with experienced loneliness (Preece et al., 2021). Preece et al. (2021) also notes that loneliness is attributed with rumination and self/other blaming. Each of these behaviors negatively impacts the risks that an individual takes in regard to their overall health (Landi et al., 2022). Individual's experience increases in unhelpful cognitive patterns which affect their holistic health (Preece et al., 2021). Retreating into oneself in a lethargic manner allows risky health behaviors to flourish (Landi et al., 2022). This is enhanced by the sedentary lifestyle that many who have loneliness experience (Gyasi et al., 2022). The risky health behaviors manifest themselves in alcoholism and cyclical patterns of self-creating

loneliness. These are prevalent more in younger aged individuals – more so in adolescent/younger adult than in older adults (Christiansen et al., 2021).

Social Loneliness in Learning Environment

Social loneliness has roots in the learning environment, causing changes in students' behaviors (Geukens et al., 2021). Social isolation occurs by design in many classrooms where autonomy of academic mastery is needed (Lemay et al., 2019). This isolation often drives students to change their behaviors due to not missing out on social or educational successes (Lemay et al., 2019). However, actively searching for social groups and where individuals fit into the peer hierarchy can shape loneliness regardless of other behaviors (Antonopoulou et al., 2019).

Social Isolation in the Classroom

Social isolation occurs naturally in the classroom due to the increase in the autonomy of independent work and the trend of decreasing close confidants (Lemay et al., 2019). Coursework often requires students to work independently due to the nature of the subject matter or the physical limitations of the learning environment. Lemay et al. (2019) describe the increasing need for autonomy and its correlation with other aspects of the learning environment or the psychological vantage of the student. Autonomy and loneliness are positively correlated, while autonomy and academic performance are negatively correlated (Lemay et al., 2019). The correlation between loneliness and academic performance was insignificant (Lemay et al., 2019), which is noteworthy as this deviates from the expected correlation.

Social isolation further delineates itself as peer groups and friendships are refined. This is most obvious in the adolescent years preceding the high school age cohort (Antonopoulou et al., 2019). As students make or fail to make healthy relationships with their peers, isolation and

loneliness are affected. Antonopoulou et al. (2019) note the high-quality peer friendships in the school setting as being protectors against peer rejection and isolation within the learning environment. Chen and Jinliang (2020) detail a relationship between the feeling of loneliness and social anxiety. Further, self-esteem and openness to emotional abuse are present within their study. The causal-comparative study of Chen and Jinliang (2020) discovered that lowering loneliness and increasing self-esteem caused a decrease in both social anxieties and potential for emotional abuse.

Social isolation and social anxieties also have relationships that affect the presence of loneliness. Robb et al. (2020) relate the negative relationship between loneliness and social anxieties. This study presents the data from a vantage point of older adults who would typically be in social situations but were forced to be physically isolated due to the COVID-19 pandemic. Therefore, translating the ideas to a classroom setting is relevant to students as their situations were forced to physical isolation. Robb et al. (2020) further describe anxieties as correlated to social anxieties. Therefore, social isolation, social anxieties, and loneliness have profound and negative effects on individuals (Chen & Jinliang, 2020; Robb et al., 2020).

Fear of Missing Out

Another indicator of loneliness is the concept of the fear of missing out. Lemay et al. (2019) positively correlate the fear of missing out with academic performance, finding that the drive to be included tends to offset perceived loneliness, creating a drive for more robust academic performance for students to fit in with others (Lemay et al., 2019). Therefore, it can be concluded that the fear of missing out drives individuals to seek inclusiveness, the opposite of loneliness. Further, academic performance is increased by seeking to overcome loneliness (Lemay et al., 2019). This is important as students look for internal motivations to stay connected

with their peers. Keeping strong social ties prevents the feeling of being excluded and not connected to their classmates' current thoughts and motivations (Van Den Beemt et al., 2020). Not being included drives a large fearful emotional drive within the student-aged child. This can manifest in other negative causing emotions in the form of anxieties and depression.

The fear of missing out also drives students to seek to fit into peer groups at a higher rate than those without the associated fear (Fioravanti et al., 2021). Students seeking peer affirmation will be drawn to participate in the various social avenues available. Lemay et al. (2019) support this idea that seeking to create and maintain a peer network drives students to behaviors not indicative of loneliness. Students want to be associated with peers, and this satisfies a need that drives them in many facets of development (Han et al., 2022). Further, Han et al. (2022) details that social, academic, and athletic areas are examples where the drive to be part of a group or team motivates students. Van Den Beemt et al. (2020) found that students experiencing a high level of fear of missing out utilized social media at higher levels to create their social network. This usage seeks to overcome the lacking physical nature of being part of a social group. As Fioravanti et al. (2021) point out, social media and other digital means cannot match the proximity factor those physical interactions maintain. Therefore, students tended to utilize social media more when seeking a social group (Van Den Beemt et al., 2020). This drive, however, introduced negative social and emotional feelings within students. Likewise, these students also experienced more stress, seeking social media and technology for social interactions (Fioravanti et al., 2021).

Social Groups and Peer Levels

Social standing or peer hierarchy amongst classmates affects loneliness experienced within the academic environment. Both Engels et al. (2019) and Ferguson and Ryan (2019)

found that social standing amongst classmates creates a relationship to loneliness. However, the relationship is not linear but changes based on the student's social level (Engels et al., 2019). There are three levels mentioned by Engels et al. (2019), which include the prevalent, the normative group, and the unpopular grouping. The normative group indicates no perceived loneliness, while the other groups do report some level of loneliness. This trend is found similarly in the curvilinear relationship between popularity and loneliness, as described in the study by Ferguson and Ryan (2019). Therefore, students with typical, healthy peer networks do not report loneliness, whereas students without networks or artificial relationships report perceived loneliness within the school setting (Ferguson & Ryan, 2019).

Social projection creates a psychological description of how social groups and social levels are created and maintained (Heck & Krueger, 2020). Children seek to understand how they should fit socially through their projections of what their peers think (Seddig, 2020). These assumptions either reaffirm or create social isolation due to the alignment of perception and reality. Thijs and Zee (2019) describe how students with poor social projections cannot read their peers' social dynamics. These incorrect social projections lead to misplacement in the social hierarchy. Therefore, misunderstanding social dynamics can negatively affect poor peer relationships amongst children (Thijs & Zee, 2019).

Another shaping factor of social group formation and their sustaining ability focuses on social interactions, specifically bullying (Z. Han et al., 2021). Students who experience being bullied in an online format indicate that their level of perceived belonging in the classroom is diminished (Kashy-Rosenbaum & Aizenkot, 2020). Age and gender were non-factors as this perception exists between all school age levels and across all reported genders (Kashy-Rosenbaum & Aizenkot, 2020). The social climate was changed in the classroom due to the

shaping of the social groups from outside factors Kashy-Rosenbaum & Aizenkot, 2020). Kashy-Rosenbaum and Aizenkot (2020) describe the implications of social isolation from cyberbullying in the educational setting. Z. Han et al. (2021) describes a lowered mental well-being, negative emotions, and school functioning were all impacted areas. Further, Loneliness and specific academic performance were not addressed as potential impacts of social group formation and social isolation due to cyberbullying (Z. Han et al., 2021).

Influence of Academic Setting

The academic setting is often set based on the specific needs of the students and the logistics of the classroom design (Feuchter & Preckel, 2021; Papachristou et al., 2022). Due to this, students are often placed in differing courses and physical classrooms based on academic potential and location (Feuchter & Preckel, 2021; Papachristou et al., 2022). Students with special needs are often placed into smaller class sizes and removed from the mainstream class settings (Papachristou et al., 2022). These scenarios require a high level of academic adjustment. Dagnew and Dagne (2019) have shown that successful academic adjustment and loneliness negatively correlate. Family support, connectedness, and positive social relationships predict positive academic adjustment (Dagnew & Dagne, 2019) and, therefore, less loneliness.

According to Alivernini et al. (2020), smaller class sizes have distinct advantages, which lead for both high level and lower level academic settings. When class sizes are smaller for high-level students, the ability to push students further and create challenges that do not fit into standard classes becomes available by an increase in confidence (Alivernini et al., 2020). Likewise, students who require more one-on-one attention to keep pace with the general population of the student body can only be attained in the lowered numbers within a classroom (Alivernini et al., 2020). These two types are often utilized and can create a risk of social

isolation simply by the number of children physically present within the classroom environment (Einav & Margalit, 2022).

Special Needs

Schools often place students in special classrooms where medical conditions require teaching outside of mainstream classrooms (Alivernini et al., 2020). Physically removing students increases the potential for loneliness as physical isolation occurs and social isolation (Einav & Margalit, 2022). When isolated, finding close friends for an individual's network is diminished. McLeod and Anderson, (2023) note that students who lack close friends experience a higher level of loneliness and lower academic performance. Academic success was not measured other than in self-report. Students with an Autism Spectrum Disorder (ASD) diagnosis reported comfortable with academics regardless of social isolation or perceived loneliness (McLeod & Anderson, 2023). This report is contrary to students in similar regard who are only diagnosed with learning disabilities in that they do report lower academic performance and comfort (Einav & Margalit, 2022). Students with ASD also note that they receive additional educational assistance, which could be a factor in higher academic performance and comfort (McLeod & Anderson, 2023).

Attention Deficit Hyperactivity Disorder (ADHD) has similar academic isolation and special attention in the learning environment as with other medical conditions, such as Autism Spectrum Disorder. Laslo-Roth et al. (2022) show that ADHD-diagnosed children and loneliness are not positively correlated. As with the McLeod & Anderson (2023) study, students with ADHD self-reported getting additional support academically from their school. One particular note stressed by Laslo-Roth et al. (2022) is that students with ADHD did not perceive a lower friend network even if one existed. Therefore, according to Laslo-Roth et al. (2022) perceived

network versus actual network might play a role in students determining the scale of their peer network and loneliness. Students with only learning disabilities and no medical conditions reported lower academic success in contrast (Einav & Margalit, 2022).

Academic Technology Usage

In a technologically connected world, academics are employing online networking and social media to engage students for social connectedness. Islam and Kumar (2019) clearly show that social media usage, specifically Facebook, decreases academic achievements for specific hours per day and increases the feeling of loneliness. This data is consistent with Mahoney et al.'s (2019) findings that note that Twitter users often publicly express feelings of loneliness. It would logically seem ironic that students or individuals engaging in social media and connecting with others virtually would feel disconnected. However, there are often stark contrasts of positive tweets versus tweets of loneliness in their makeup and word usage (Mahoney et al., 2019). Social media or technology usage creates difficulties in determining the overall effect of the technologies on genuine feelings of loneliness.

Schools that seek to employ social media or technologies for academic purposes more than for social connectedness have found effectiveness in subsets of usage (Mahoney et al., 2019). Islam and Kumar (2019) indicate that using Facebook for over one hour per day decreases students' grade point average. However, less than an hour of usage indicates no effect upon the grade point average (Islam & Kumar, 2019). Further, as time spent on social media increases, the overarching academic impact are more pronounced. Islam and Kumar (2019) show that using social media for more than two hours per day leads to perceived social loneliness and lower academic success. There is no relation to social media usage as several different platforms all

show an increase of loneliness when utilization is high, regardless of academic purposes or general social interactions (Islam & Kumar, 2019; Mahoney et al., 2019).

Student Demographics within the Learning Environment

The classroom or learning environment's demographic makeup can create disparities that create social isolation and perceived loneliness (Alivernini et al., 2020). Environments with minimal diversity naturally create dynamics that place minorities into unfamiliar territory. This disparity is evident when students of racial or ethnic minorities do not have others with similar cultural presuppositions available to create healthy relationships (Alivernini et al., 2020).

Ethnicity Ratios

Differences in ethnicity, in general, affect social isolation and perceived loneliness. Members of ethnic groups that are minorities in social settings or groups will experience a higher level of loneliness (Achdut & Refaeli, 2021). Several aspects weigh into this result. The main factors include socio-economic background, demographic, health, neighborhood, and perceived discrimination (Achdut & Refaeli, 2021). These cultural factors cause disconnects in a relationship experienced in the population. While not academically focused, these factors are critical indicators in many educational studies (Franssen et al., 2020). The differences often change the outcome of studies. Therefore, ethnicity is a determinant in the level of perceived social isolation and loneliness felt by individuals (Franssen et al., 2020). Achdut and Refaeli (2021) note that these perceptions will impact the function, relationship, and social network of the members of the ethnic minority.

Ethnicity and its composition within the classroom are indicators of loneliness experienced by students. Class size, composition, and majority ethnicity create social loneliness within the learning environment. Achdut and Refaeli (2021) enhanced previous research that

showed ethnic minorities experienced a higher level of loneliness within the classroom. Several factors account for this experience. Larger class sizes and lower numbers of similar ethnic minorities predicate increased loneliness (Achdut & Refaeli, 2021). Similarly, Achdut and Refaeli (2021) describe higher percentages of equal ethnic minorities eliciting lower loneliness levels. Franssen et al., (2020) note that adolescent students build relationships with peers similar to themselves, with ethnicity being a factor. Having fewer students to create positive relationships with, ethnically minority students often feel isolated and lonely (Franssen et al., 2020).

Effects of perceived loneliness carry forward throughout later in life in the form of retained learning for minorities (Zahodne, 2021). Achdut and Refaeli (2021) stop short in relating loneliness experienced by ethnic minorities, Zahodne (2021) builds upon this dynamic. Cognitive ability and reading skill level are examined in older adults concerning perceived loneliness (Okely et al., 2019). While not occurring in the academic setting, this study does tangentially build upon learning skills that should have already happened for the participants in the study. Zahodne (2021) finds that loneliness influences cognitive ability in older adults. Further, reading levels are lower in older adults who experience loneliness. While noting this dynamic exists, Zahodne (2021) does not find evidence that race causes more learning difficulties due to loneliness. However, social isolation causes loneliness (Hehir et al., 2021). Therefore, social isolation would affect learning retention overall (Hehir et al., 2021).

Racial Makeup of Classroom

Differences in race account for differing levels of loneliness (Byrne et al., 2021). This is true simply in general terms and with specific reference to the academic learning environment. Chang (2017) studied the effects of loneliness on African American college-age students in

predicting depression and anxiety. Loneliness was a predictor of depression and anxiety in African American college students (Hager et al., 2022; Mehus et al., 2023). This to be true for Asian Americans (Hager et al., 2022; Mehus et al., 2023). Further, Hager et al. (2022) found that minority students who placed significant stress upon themselves academically experienced higher levels of depression and anxiety. Students additionally felt the stressors of being a minority in the classroom (Munniksma et al., 2022). Not having similarities with others in the academic environment forced isolation on the minority student (Munniksma et al., 2022). Therefore, according to Nishina et al. (2019) stressors placed upon oneself in the classroom manifest similar behaviors as loneliness. Minorities who report loneliness indicate stress and deficits in certain relationships cause behaviors/emotions that are obstacles to academic success (Munniksma et al., 2022; Nishina et al., 2019). Having reduced opportunities for healthy and abundant peer relationships negatively impacted the loneliness experienced by minority students in the learning environment setting (Mehus et al, 2023).

Davis et al. (2020) show that minority students placed into gifted education classes also experience the stress associated with loneliness. Logic would indicate that differences in relatable qualities create social isolation. African American and Latino males make up a small number of gifted education classes (Davis et al., 2020). As students are placed into these courses, their drive for perfectionism increases (Hager et al., 2022; Mehus et al., 2023) which adds to being unlike others in the classroom. Davis et al. (2020) clearly state that small numbers of minorities within a classroom setting will evoke loneliness in those individuals. Social isolation by racial identity occurs and is an essential stressor on the learner (Davis et al., 2020). These two studies also detailed the feelings of being different and not being able to relate with peers in a social aspect is a challenge for minority students. While students in gifted education typically

have the drive to push themselves to experience academic success (Davis et al., 2020), this does not preclude the socio-emotional experiences needed to be managed by the students. Minority students in gifted education are not less driven than others (Johnsen, 2021), but rather face stressors that students of the same race, culture, and socio-economic majority in the classroom feel to a lesser degree.

COVID-19 Pandemic

The spread of COVID-19 as a global pandemic forced a change in daily life for everyone across the globe (Ahrens et al., 2021). This virus has officially declared a pandemic on March 11, 2020 (Kochuvilayil et al., 2021). The mitigation strategies employed to stop the spread of this deadly virus were focused on distancing oneself physically from others to avoid close enough contact to spread the virus potentially (Ahrens et al., 2021). Further, those who contracted the virus were highly encouraged to quarantine in an individualistic manner. This social distancing and isolation brought about many concerns surrounding mental health and academic performance (Ahrens et al., 2021; Tomasik et al., 2021). Likewise, places of employment and schools reverted to remote functions to encourage social distancing (Goldberg et al., 2022). Goldberg et al. (2022) as describes how workplaces transitioned from in-person office settings to that work from home models and how schools also shifted from traditional in classroom learning environments to remote classrooms and distance learning options. Online video and audio communication mechanisms were also utilized in the physical distancing environments that were being used (Ahrens et al., 2021; Goldberg et al., 2022).

Social Isolation and Loneliness

In a study performed by Landmann and Rohmann (2022), over half of all participants stated that they had experienced physical distancing since the COVID-19 pandemic. Therefore,

most of the population had effects of this form of isolationism. Loneliness was the highest dimension that was experienced from the imposed physical isolation (Landmann & Rohmann, 2022). In the same premise, lowered physical interactions also occurred outside of isolation (Norbury, 2021). There are multifactorial reasons for the issues discovered from social isolation, but the restrictive movements appear to impact loneliness the greatest. Norbury (2021) also notes that over half of the study participants indicate a feeling of loneliness. The main reasons for these feelings were the enforced social restrictions, with loneliness being the top emotional state being elevated significantly (Norbury, 2021). Loneliness was just one of several mental health issues that arose since the onset of the COVID-19 pandemic.

While COVID-19 distancing impacted the desired and actual relationships that students experienced, loneliness was not the only mental health concern addressed (Branje & Morris, 2021). These isolated feelings created a discrepancy in other mental health areas leading to experienced loneliness (Buecker et al., 2020). Areas such as anxieties, worry, and physical ailments were also indicated (Branje & Morris, 2021; Gazmararian et al., 2021; Kochuvilayil et al., 2021). Goldberg et al. (2022) These mental health concerns were increased in the school setting due to the shift from in-person learning to online/digital learning (Silva et al., 2921). The sudden change to a socially isolated construct may have contributed to the elevated experiences of loneliness as described by Silva et al. (2021) as the sustained nature of the pandemic would indicate that the results of these various studies concerning mental and physical health are derived from the state of isolation, not simply from the change towards physical and social isolation.

Mental Health Impacts from Social Isolation

The social isolation experienced during the pandemic brought out an emotion of worry as detailed in the studies from Gazmararian et al. (2021) and Haikalis et al. (2021). This worry was for the impacts of contracting the virus and for how the pandemic would affect everyday life; one significant impact that caused worry for students was how their educational success would be diminished (Gazmararian et al., 2021). Additionally, the social disruptions that would occur with isolation from teachers and peers caused students distress and anxiety (Haikalis et al., 2021).

Worry impacted high school students directly and according to Gazmararian et al. (2021), the impact of worry was reported by one-fourth of the students sampled. These students in Gazmararian et al. (2021) study reported that they felt extremely or very worried concerning the pandemic's effects upon themselves. The percentage of students feeling the worry was significantly higher in racial minorities, ethnic minorities, female students, and those in older grades (Gazmararian et al., 2021).

Whether the area of concern was socially or academic, students also reported that worry increased the stresses of other mental health issues (Gazmararian et al., 2021; Haikalis et al., 2021). Worry increased stress and anxiety amongst high school students (Gazmararian et al., 2021). Other mental health challenges resulting from worry, specifically concerning the pandemic and isolation, included depression and loneliness (Haikalis et al., 2021).

Influence on Student Anxieties

The physical isolation caused by the pandemic, either by catching the virus or in containment and mitigation strategies, caused anxieties to increase throughout the population (Goldberg et al., 2022). These were not limited to online or digital learning students but permeated all throughout society (Kochuvilayil et al., 2021). Students not only had to continue their learning in a different manner, but the entire environment changed (Goldberg et al., 2022;

Klosky et al., 2022). Technology challenges, social disruptions, and independent learning requirements pressed upon high anxieties that were felt from the very beginning of the pandemic (Klosky et al., 2022). The sudden change of methodology and context were immediately felt by students as there was limited time to mitigate and employ change management strategies (Haikalis et al., 2021).

Students expressed concerns about the impacts upon their learning and academic achievements (Ellis et al., 2020). These concerns were heightened explicitly for upper high school and college-aged students (Haikalis et al., 2021). Students in this age range are more reliant on physical peer interactions academically and socially (Haikalis et al., 2021). Their learning goals and achievements predicated potential movements into future education and employment opportunities (Ellis et al., 2020). Impacts on these areas would have profound effects on students' futures in the high school and college-age range. Therefore, the anxiety experienced within this age group became more impactful (Klosky et al., 2022).

The anxieties of disrupted social interactions and potential academic achievements created additional mental health challenges. In students' high school and college age range, loneliness was reported higher amongst online learners (Besser et al., 2020). With the mitigation strategies of the pandemic focused on social distancing and remote learning for students, loneliness was more prevalent due to the higher level of online learning environments (Besser et al., 2020).

Loneliness may be the most significant risk factor that increases adverse outcomes in the educational area in association with the COVID-19 pandemic (Haikalis et al., 2021). Physical isolation, lack of peer interactions, and the prevalence of independent learning all became predictors of student-experienced loneliness (Gazmararian et al., 2021). Students identified

loneliness as the highest risk factor that leads to other mental health issues (Palgi et al., 2020). The relationship between loneliness and other mental health issues, including anxiety, was positively related (Haikalis et al., 2021). If depression, stress, or anxiety were present regarding the social and academic isolation from the pandemic, loneliness was also present (Palgi et al., 2020).

Anxiety and loneliness were both top-experienced mental health issues for students (Gazmararian et al., 2021). These are identifiable causes of concerns without regard to social isolation or a distanced educational environment (Palgi et al., 2020). Students were experiencing these risk factors directly. Online learning increased the stressors felt by students (Besser et al., 2020). This learning mode was utilized by most school districts in the United States and in the global setting (Klosky et al., 2022).

COVID-19 and Student Adjustments

COVID-19 had profound impacts on students in several different areas (Ahrens et al., 2021). Students and most of the individuals experienced pressures in social, emotional, and in learning/workplace environments; Pressures were felt due to the drastic changes in which daily life had to be adjusted (Ahrens et al., 2021). High school students had impacts primarily directed at their definition of normal (Gazmararian et al., 2021). Peer interactions, their growth in individuality, and their continued educational growth changed from what they knew into a new normal (Branje & Morris, 2021). These impacts brought to light the developmental obstacles that students had to face.

The separation physically amongst high school-aged students created a difficult atmosphere in which success was harder to find. Due to this, school bonding amongst peers was described as being decreased than before COVID-19 restrictions (Maiya et al., 2021). Physical

proximity also created stresses upon areas in which shared learning was utilized as typical in-person interactions occurred in group projects and in other collaborative learning modules (Silva et al., 2021). However, with increased physical distancing, high school students experienced lower school engagement (Branje & Morris, 2021).

The lowered student-to-student engagement also affected the outlook and stamina that students had towards their academics (Tomaszek & Muchacka-Cymerman, 2022). Fifteen percent of high school students reported a decreased academic well-being (Branje & Morris, 2021). While this percentage is not the majority, other stressors negatively impacted academic achievements. Students in the same study also reported a higher level of burnout in various areas (Branje & Morris, 2021).   These areas were not solely academic in nature. Therefore, while a lowered percentage of students described decreased academic well-being, pressures in other areas which ultimately affected their academic successes were negatively impacted (Silva et al., 2021).

Depression and loneliness were significantly higher in reports than in pre-COVID-19 environments which were caused by physical distancing and a greater focus on individualized learning are attributed to these reports (Branje & Morris, 2021). In the end, academics felt negative pressures due to the adjustments needed during the pandemic mitigations (Silva et al., 2021). The outcomes of the emotional, social, and academic adjustments that were put into place did not match developmentally normal expectations (Salmela-Aro et al., 2021). Salmela-Aro et al. (2021) also state that the discrepancies that became realized further placed stressors in all facets of the students' learning environments and overall academic health.

Educational Gains during COVID-19

The onset of the global pandemic had far-reaching effects on the academic progression seen in students, teachers, and educational administrators (Krishnakumar et al., 2022). The pace of academics was brought to an immediate halt with the transition to online learning environments (Bacher-Hicks et al., 2021; Krishnakumar et al., 2022). Not all school systems were equipped to provide a seamless transition. Obstacles existed in how to facilitate the learning in an online or individualistic manner (Butt et al., 2022). Teachers and students alike were forced to find reliable technologies in order to make remote, online classrooms feasible (Su & Guo, 2021). The socio-economic level of the students created lengthened challenges to acquire and utilize the needed technologies (Bacher-Hicks et al., 2021). Additionally, the length of the closures from when traditional learning had to cease and the instantiation of online, remote learning introduced a learning gap for many students (Bacher-Hicks et al., 2021; Krishnakumar et al., 2022; Su & Guo, 2021).

The pandemic shutdown of schools and traditional learning environments affected all students, specifically those who were more financially challenged (Bacher-Hicks et al., 2021). Initial research projected significant adverse effects on learning and increased social disparities in learning during the pandemic (Kuhfeld et al., 2020). Students and school systems who could not afford to equip families to transition to the new learning environment suffered academically more than those who had the financial means to acquire the needed technologies (Klosky et al., 2022). Due to this, a disparity grew in learning during the initial stages of the pandemic in regards to the socio-economic standing of students and school districts (Kuhfeld et al., 2020). Additionally, Tomasik et al. (2021) state that COVID-19 decreased the pace of learning for all students. Therefore, students who were already disadvantaged as far as technology is concerned experienced stunted academic learning more than their peers.

The reach of the pandemic and its negative influences concerning a halt in academic learning has been seen on a smaller level in previous situations (Kuhfeld et al., 2020). These impacts have been experienced when school closures occur due to weather-related incidents (Kuhfeld et al., 2020). Kuhfeld et al. (2020) as provides examples of minor weather-related school closures for significant amounts of time to include hurricanes, earthquakes, tornados, and other naturally occurring severe weather situations. In these situations, academic environments are shut down temporarily but eventually reinstated in the manner they previously were held (Kuhfeld et al., 2020). The challenge with the COVID-19 pandemic is that the school closures were lengthier and forced an eventual change in the academic environment when learning was resumed (Tomasik et al., 2021). This shows that the effects of macro-level events can impact educational gains (Tomasik et al., 2021).

When learning returned from complete closure, pandemic mitigation strategies had to account for lowering virus transmission yet being cognizant of the best path forward to continue active learning. The educational gains seen from minimal length school closures were hard to forecast from many areas in designing newer optimal environments (Tomasik et al., 2021). Previous data did not provide clear paths of success pertaining to minority students or impacts by gender differences (Schramm et al., 2021). The challenges existed in gathering accurate data on how school closures affected students at a micro-level. Schramm et al. (2021) indicate that student assessments in digital or online formats posed the most significant risks to creating reliable learning mechanisms. Previous data could not forecast the academic impacts of long-term school closures on a broad scale (Schramm et al., 2021).

In order for students to continue at the status quo or to see academic gains during and

after the school closures, family engagement was a necessity. Students and families had to

engage drastically with the shift to digital and online learning to see an increased educational

benefit (Schramm et al., 2021). This was a difficult task for families and school systems to

account for. In fact, only a small minority of students were able to get family engagement to

realize academic benefits during and after the school closures for the pandemic (Schramm et al.,

2021).

Failing to adjust to the necessary school closures and transition to the digital and online

format negative impacted students in ways other than learning or academic achievement (Klosky

et al., 2022). Tomasik et al. (2021) also details how students saw various other areas suffer and

stall in growth due to closures and changes. Areas such as health, employment, and social

interactions experienced negative impacts (Tomasik et al., 2021). Struggles in these areas also

placed stressors back into the academic learning environments and focus of students and their

families.

COVID and Academic Concerns

Changes resulting from school closures and a different learning environment affected the

study environment, hands-on learning, and academic anxieties (Tomasik et al., 2021). As

classrooms transitioned from traditional in-person learning, the study environment also shifted to

an online and more individualistic approach (Popa et al., 2020). Likewise, learning environments

that utilized hands-on experiences struggled (Tomasik et al., 2021). The inability to maintain in-

person learning suffered as remote and online mechanisms were needed. Hands-on learning in a

remote environment created stressors for students as these situations lost functionality in the

digital emulation (Sanad, 2019). With these further changes surrounding the new traditional

learning formats, student anxieties increased and brought forth detrimental impacts (Gazmararian et al., 2021).

The altered study environment was forced to change with the formal learning environment. Many socially centered in-person settings were relegated to online and remote formats (Guppy et al., 2022; Popa et al., 2020). Others were entirely migrated to an individualistic exercise (Popa et al., 2020). The altered study environment introduced many negative impacts, including raising the anxiety level of students (Kochuvilayil et al., 2021). Further, the altered study environment posed an issue for outside-of-classroom studies that require hands-on learning. These study environments were challenging to emulate in the new digital and online format that learning was forced to occur within (Carolan et al., 2020).

Sanad (2019) describes hands-on learning and study environments posed a specific challenge to remote learning and areas such as medicine and nursing are prominent examples of academic areas needing proximity and hands-on approaches. Sanad (2019) reports that academic anxiety lowers educational success and performance permeated within the clinical practices. Many hospitals and academic medical settings were forced only to perform emergency procedures which lowered the experience that students were exposed to (Sanad, 2019). A direct translation between this and academic achievements became apparent. The greatest cause for concern was social distancing in the study environments (Sanad, 2019). Social distancing significantly impacts hands-on academics, including nursing students (Kochuvilayil et al., 2021).

With a sub-optimal learning and study environment, students struggled and experienced academic anxieties (Ahrens et al., 2021; Goldberg et al., 2022). Students reported having difficulty sleeping and eating, which contributed to generalized anxieties and educational anxieties (Kochuvilayil et al., 2021). Those in academic programs requiring hands-on learning

experienced these anxieties to a greater degree than other students (Sanad, 2019). Nursing and medicine require a large degree of social interactions to distinguish the patient's needs (Sanad, 2019). Attempting to create a distanced and remote environment can be arduous to provide the adequate education needed. Therefore, knowing that learning is impacted and the learning environment is not optimal, students in these areas were placed under internal and external stressors (Sanad, 2019). These stressors evoked feelings of anxieties that the students had to navigate around.

Increased Digital Learning

Learning during the pandemic changed quickly and forced students to become more independent (Guppy et al., 2022; Popa et al., 2020). The traditional classroom sat empty as students were forced to learn from their homes due to enacted social distancing measures. In-person learning formats were shelved as not being feasible (Guppy et al., 2022). Teachers and students were forced to become digitally aware of the new learning environments necessary to continue academics (Gawronski, 2021). These digital environments also caused a larger focus on independent learning for students (Popa et al., 2020).

The independent nature of remote learning also brought about an informal style of knowledge transformation (Gawronski, 2021). Students accustomed to being in a traditional formal classroom needed to shift their mindsets and function levels (Davidson et al., 2021). Digital informal learning (DIL) became a standard mechanism employed by school systems in reaction to the COVID-19 pandemic (Stoyanov et al., 2021). DIL, by nature, changes social interactions between students and their peers. Digital informal learning is considered a form of socially isolated learning in a digital format (Stoyanov et al., 2021). While some aspects of DIL do foster collaboration, the learning is generally completed on an individual basis.

The usage of digital technologies was not a new concept during the initial onset of the COVID-19 pandemic. Schools had used digital learning for those students with issues of proximity to the physical, academic institution (Murphy, 2020). Examples of areas where this was already a necessity were in learning environments concerning students with physical disabilities, incarcerated students, and students on active military duty. The majority of these existing programs focused on upper high school aged students and those in higher education (Heidari et al., 2020). Digital technologies, including academia, were significantly more prominent in higher education in the years leading up to the pandemic than in previous years (Heidari et al., 2020; Murphy, 2020).

Digital competence is the leading factor determining if students will be successful in the digital informal learning environment (Hubbard, 2019; Stoyanov et al., 2021). Students who had been exposed to digital learning or other digital technologies started in a place of advantage when these programs were instantiated (Hubbard, 2019). A higher digital competence can show higher success in all areas of digital learning (Stoyanov et al., 2021). Similarly, digital competence is also viewed as having the ability to use digital technologies effectively (Hubbard, 2019). Students with a higher digital competence transitioned to DIL easier and could navigate the new social mechanisms put into practice (Stoyanov et al., 2021). There is a significant relationship between digital competence and digital informal learning (Stoyanov et al., 2021).

Digital competence is predicated upon socio-economic status (Hubbard, 2019). Those who can transition from a physical, social environment to one that is composed of a digital format are able to continue academics at a higher success rate (Hubbard, 2019). Those who cannot make this social transition will feel higher levels of social isolation (Murphy, 2020). Other mental health emotions are also more prevalent to those who fail to transition to digital

informal learning quickly (Hubbard, 2019; Stoyanov et al., 2021). The range of exhibited emotions includes social anxiety, depression, sadness, and loneliness.

Summary

Loneliness theory is the foundational element for determining whether deficits in relationships cause impacts upon an individual's academic performance. Weiss (1973) describes this theory regarding deficits of relationships. The deficits can be found in peer, parental, or teacher relationships with a student. Attachment theory builds upon this ideology in describing healthy and unhealthy relationships. Ainsworth (1989) and Bowlby (1969) distinguish types of attachments that affect the defined relationships within the loneliness theory. The unhealthy state of student relationships leads to circumstances causing academic troubles (Kennedy & Kennedy, 2004). Maslow describes the relationships that need to be built healthily in his Theory of Hierarchical Needs. Maslow describes the needs that individuals are required to have for survival and growth. These needs are directly related to the relationships described in the loneliness theory, according to Weiss (1973). These needs surround peer, teacher, and parental relationships (AliceAnn et al., 2020). Further, children's basic needs around attachment are indicative of strong foundational need satisfaction as described by Maslow (1943).

Loneliness is a factor present in various situations that ultimately interact with an individual's functions and academic achievements. These functions manifest themselves in three distinct domains. First, social loneliness outlines how people feel connected through relationships with others (Ferguson & Ryan, 2019; Thijs & Zee, 2019). Second, there are influences within the learning environment that have an academic impact (Feuchter & Preckel, 2021; Papachristou et al., 2022). Third, loneliness can be determined in the socio-economic domain (Franssen et al., 2020). Loneliness displays itself in individuals within the learning

environment in the social levels of peers within the classroom (Heck & Krueger, 2020; Seddig, 2020), the fear of missing out (Lemay et al., 2019), and instances where individuals are socially or emotionally isolated. Academic influences of loneliness occur when children with special needs or learning disabilities must navigate the challenges of the learning environment (McLeod & Anderson, 2023). Further, the usage of technology and social media has increased within classrooms, which leads to social isolation (Islam & Kumar, 2019; Mahoney et al., 2019). Finally, children who cannot relate to others due to ethnicity or racially homogenous classes feel culturally isolated and thus experience loneliness (Munniksma et al., 2022).

COVID-19 has brought about an outside stressor in the academic environment changed (Goldberg et al., 2022; Klosky et al., 2022). The mitigation strategies needed to contain the pandemic virus also contributed to negative factors felt by students (Kuhfeld et al., 2020). Physical distancing (Norbury, 2021), digital and online learning (Heidari et al., 2020; Murphy, 2020; Popa et al., 2020), and changes to the academic environment forced social isolation upon the students and teachers alike (Tomasik et al., 2021). These stressors created mental, emotional, and physical strains that affected students' academic successes (Gazmararian et al., 2021; Haikalis et al., 2021). Unfortunately, challenges such as anxieties, depression, and physical proximity spurned on the feeling of loneliness and thus contributed to a decline in academic achievements (Ahrens et al., 2021; Goldberg et al., 2022; Kochuvilayil et al., 2021).

CHAPTER THREE: METHODS

Overview

This study analyzed the relationship between perceived loneliness and a student's academic success via a quantitative correlational design in twelfth grade public and private schools. This chapter begins by introducing the study's design, including complete definitions of all variables. The research questions and null hypotheses follow. The participants and research setting, instrumentation, procedures, and data analysis conclude chapter three.

Design

This research study used a quantitative, predictive correlational design. Correlational designs are used to assess relationships between the predictor and criterion variables in statistical analysis (Gall et al., 2007). The design rationale included determining if a relationship exists between the predictor variables of academic achievement (grade point average and Scholastic Assessment Test score) and school type (public or private) and the criterion variable of reported student loneliness. Previous studies have successfully used student perceptions and grade point average or Scholastic Assessment Test (SAT) scores in a quantitative correlation design (Sesmiarni et al., 2021; Tellakat et al., 2019). Likewise, student perception of loneliness is a variable well suited for correlational designs as its scalar responses allow for multiple regression analysis (Erol & Cirak, 2019). This study did not aim to determine causal relationships between the variables, rather just if and what type of relationships exist. Gall et al. (2007) describes correlational designs as most appropriate for the purpose of this study.

Utilizing a predictive correlational design was appropriate for this study as any potential relationships between loneliness and academic performance were examined in the context of private or public school children. Specifically, loneliness was examined as a criterion variable in

relation to three different predictor variables. Gall et al. (2007) notes that a correlational design will facilitate a researcher to examine multiple predictor variables, singly and in combination, in their influence on another factor, the criterion variable. This research design determined what relationship exists between the variables, not why a relationship exists (Gall et al., 2007). The examination of what relationship exists describes the variables was the basis of this research and the foundation of the research question to be examined.

Research Question

The research question for this study was:

RQ1: How accurately can loneliness be predicated from a linear combination of academic indicators (grade point average, SAT score, type of school) for high school students?

Hypothesis

The null hypothesis for this study was:

$H_0 1$: There will be no significant predictive relationship between the criterion variable (loneliness) and the linear combination of predictor variables (grade point average, SAT score, type of school) for high school students.

Participants and Setting

The population for this study included high school twelfth graders in the Central Virginia area. The participants consisted of a random selection of these individuals and adhered to set standards for number of individuals sampled. The sampling technique was a simple random sample in which no distinction is made for demographic differences (except for type of school attending). The setting of data collection was digital – online via data collection form.

Population

The population in which this study drew its participants focuses on high school twelfth

graders within Virginia. This population seeked to gather a random sample of students who show diversity in gender, race, ethnicity, and type of school attending (public or private). These schools were accredited by some overseeing board or institution and did not contain students in schools with a low population or those who are homeschooled. No distinction was made about academic level (advanced, general, or remedial). For this study, the number of participants was no less than 66 (Gall et al., 2007), as defined by the a priori power analysis. This number of participants uses the following measures for its calculation: alpha = 0.05, power = 0.7 and effect size of 0.3 (medium). This power analysis was computed for a bivariate normal model. Further, Warner (2013) states that regression analysis should adhere to the following formula for minimum number of participants with $N > 50 + 8k$, where k represents the number of predictors. In this study, with three predictor variables, N was greater than 74, such that the minimum number of participants can satisfy the a priori power analysis and Warner's participant formula.

Participants

The participants in this study encompassed a wide variety of demographics. Students who were sampled include all genders, races, and ethnicities. A balanced selection of participants was included from private and public high schools in the Central Virginia area. The sample size should reflect the current makeup of the school population as it currently exists in the 2022 - 2023 school year. While not being utilized in this study, the population included students in the following identified demographics according to the Virginia Department of Education Fall Member statistics; there are 94,398 public school twelfth graders, with 47,462 (50%) of these identifying as white, 20,098 (21%) identifying as black, and 14,215 (15%) identifying as Hispanic. The Virginia Department of Education did not have current numbers on race or ethnicity of private school enrollees or gender distribution publicly available.

Setting

This study collected data via an online form in a questionnaire format. This digital form was available via the World Wide Web and contained several web pages containing data collection forms. These forms were secured per digital standards, as will the data that is collected from them.

Instrumentation

This study determined if any relationships exist between reported loneliness and academic achievement (grade point average and Scholastic Assessment Test scores). To complete this request, the UCLA Loneliness Scale was used as the instrument to collect data on reported loneliness. Academic achievements utilized the student's self-reported grade point average (overall and from the current academic year) and the most recent Scholastic Assessment Test score.

UCLA Loneliness Scale

The criterion variable in this design was the reported loneliness from the sample. Loneliness is a feeling that is experienced resulting from a void in a social relationship (Morin, 2020). Loneliness is a complex emotion and must be examined from various perspectives (Morin, 2020). While the physical manifestations of loneliness can be examined, the emotional and psychological stressors are more difficult to determine. However, loneliness can be viewed quantitatively in a correlational design study via a self-report survey (El-Osta et al., 2021; Ferguson & Ryan, 2019). In a study of this nature, self-reported loneliness has been shown to be reliable and valid (El-Osta et al., 2021; Erol & Cirak, 2019).

This instrument measures an individual's subjective feeling of loneliness and social isolation. The UCLA Loneliness Scale is unidimensional and designed to find the degree to

which one feels lonely. The purpose was not to deconstruct or explain the causes of loneliness but rather to determine the existence of loneliness. The instrument is flexible in that it can be administered in various languages (Sancho et al., 2020) and across different ages (Panayiotou et al., 2022).

The UCLA Loneliness scale was developed in 1978 at the University of California, Los Angeles (UCLA) by Ferguson, Russell, and Peplau. The instrument has been revised several times with the purpose of making it simpler to use and easier to score (Russell, 1996). Factors that were utilized included social support, overall health, social desirability, self-esteem, and employment fatigue with the goal of separating loneliness from these factors (Russell, 1996). Further Russell (1996) uses the constructs of people and other loneliness scales in order to show internal validity; the people construct consisted of samples from elderly, nurses, teachers, and college students, while the instruments/scales compared to include the NYU Loneliness Scale, the Differential Loneliness Scale, and the Social Provisions Scale. Additionally, the dimensions explored for internal validity included that of population demographics, with focuses on age, gender, and vocation (Russell, 1996). Convergent validity was shown from comparisons to other instruments, construct validity was shown through relationships with the studied factors (Russell, 1996).

The UCLA Loneliness Scale has been tested for reliability and validity in many studies (Erol & Cirak, 2019; Martin-Maria et al., 2020; Thomas et al., 2020). Thomas et al. (2020) tested this instrument and noted that their computed Cronbach's alpha for the scale was 0.994. Cronbach's alpha was also tested in adolescent boys and those with ADHD, resulting in. results of .91 and .84, respectively. Erol and Cirak (2019) utilized the UCLA Loneliness Scale in their research on loneliness and internet usage and determined the reliability to be .834 when

computing Cronbach's alpha. Martin-Maria et al. (2020) described the utilization of this instrument in their research on chronic health problems stemming from loneliness as being valid and reliable (Cronbach's alpha = 0.88 and mean inter-item correlation = 0.7). Construct validity for the UCLA Loneliness scale has been established in the population in which this study will sample (adolescent age) (Mahon & Yarcheski, 1990; Mahon et al., 1995).

The UCLA Loneliness Scale is a 20-question instrument arranged as a Likert-type format. The questions are arranged such that there are nine reverse questions to verify accurate responses from the respondents. There are eleven negatively worded questions and nine positively worded questions. Questions 2, 3, 4, 7, 8, 11, 12, 13, 14, 17, 18 are arranged to be scored in order. Examples of these questions include: "How often do you feel alone?" and "How often do you feel isolated from others?" Questions 1, 5, 6, 9, 10, 15, 16, 19, 20 are reverse scored. There are no sub-scales present in this instrument. Examples of the reverse questions include: "How often do you feel close to people?" and "How often do you feel that there are people you can turn to?"

The scales of measurement utilize a four-point Likert scale that includes "Never," "Rarely," "Sometimes," and "Often." Responses were as follows: Never = 1, Rarely = 2, Sometimes = 3, Often = 4. The reverse questions responses were as follows: Never = 4, Rarely = 3, Sometimes = 2, Often = 1. Scores are tabulated by adding the value of each response into a survey total. The combined scores range from 20 to 80 points. A score of 20 points is the lowest possible score and would mean that minimal or no loneliness is experienced. A score of 80 points is the highest possible score and would mean that a severe degree of loneliness is experienced (Russell, 1996). Higher scores indicate a greater degree of experienced loneliness. A scorer does not have to be formally trained to utilize this instrument (Russell, 1996).

This instrument is intended to be utilized for a wide variety of individuals without regard to age, gender, race, or socio-economic background. The questions are designed to be easily understood without the need for additional explanation. Because of this simplistic approach, completing the survey can be done relatively quickly without sacrificing accuracy. The estimated time to complete the instrument is three to five minutes (Russell, 1996). Request for permission to utilize this instrument is detailed in Appendix B and permissions allowed is detailed in Appendix C.

Grade Point Average/SAT Test Scores

The predictor variables for this study included grade point average and most recent SAT score. These variables were chosen because they are valid and reliable indicators of aptitude, achievement, and academic success (need citations here to support this claim). In addition, research demonstrates that SAT scores and GPAs are accurate as self-reported by students (Cole & Gonyea, 2010; Kuncel et al., 2005; Somers et al., 2020). Further, grade point average has been utilized in quantitative correlation studies previously (Sesmiarni et al., 2021). Correlational designs have also employed SAT scores utilizing multiple regression analysis (Tellakat et al., 2019).

A student's grade point average was collected to determine one level of academic success. This data element was collected via an online form and self-reported from the student. This indicator was chosen as grade point average is often the most current indicator of a student's academic success. Grade point averages typically utilize a 4.0 scale with some increase for advanced or college-level coursework. This is a standard measurement used for college admissions and some job employments. Likewise, SAT scores are uniformly distinguished as predicting academic success. Colleges and educational scholarships for colleges are often based

on this score.

     Student self-reporting of grade point average and high-level testing has proven to be reliable and valid. Kuncel et al. (2005) determined that students who self-report grade point average do so accurately and have a relatively high validity level. Further, no statistical differences were found in grade point average reported and actual grade point average achieved (Kuncel et al., 2005). Over-reporting and under-reporting grade point average was not problematic. Additionally, high school grade point average reporting proved to have the highest level of validity and reliability (Kuncel et al., 2005).

Procedures

     For this study, formal approval was received from the Institutional Review Board and permission from the local school boards where the data was collected. This approval, including the student ascent and parental consent forms are detailed in Appendix D and E. An online form was created that collects data from students; this administration took place at the end of the fall semester to collect data from both twelfth and eleventh-grade students who have already completed the Scholastic Assessment Test (SAT). To capture the predictor variables, the researcher requested that students provide current grade point averages, last completed SAT score, and whether the school they attended was public or private. Additionally, the UCLA loneliness scale was administered in the online survey to solicit student responses about their perceived level of loneliness (the criterion variable).

     Students were asked to log into the Google Form survey in which the link was provided by their parents or via their school once consent has been given by the parents (regardless of if they are over 18 years old or not). In the case when the link was provided by the parents, students did not have to turn in a signed copy of the consent form. The first screen provided the

student ascent documentation, found in Appendix E, and required confirmation, also found in

Appendix E, that parental consent has been given. The following screen consisted of the data that

was collected. The first section contained the name of their school, self-reported grade point

average, and self-reported SAT score. The next section contained four groupings of five

questions from the UCLA Loneliness Scale. The input screens contained questions 1-5, 6-10, 11-

15, and 16-20 as indicated in the UCLA Loneliness Scale contained in Appendix A. This scale

was one of the most common data collection instruments used to determine self-reported

loneliness (Wongpakaran et al., 2020). This scale has been developed and proven valid from

multiple subsequent studies (Thomas et al., 2020; Wongpakaran et al., 2020). The scale consisted

of 20 items, and data is collected on a four-point scale from often to rarely for each item. When

the survey was completed by the students, the data was moved to a secure repository for data

storage per IRB recommendations. This data was downloaded to the researcher's computer

where the data was examined for completeness and integrity issues. Dealing with outliers

followed Field's (2018) recommendation for either trimming, winsorizing, or transforming any

problematic data. Data analysis was conducted on a local computer utilizing IBM SSPS Statistics

version 2.8 software.

Data Analysis

Multiple linear regression analysis was the statistical technique that is appropriate for this

study. Gall et al. (2007) note that linear, ordinary least squares multiple linear regression is the

best fit when examining correlational studies with multiple predictor variables and one single

criterion variable. In this specific study, grade point average, SAT score, and school type were

the predictor variables while level of loneliness is the criterion variable. Additionally, due to a

single criterion variable and three predictor variables, a multiple linear regression analysis was

the best choice instead of a simple or bivariate regression analysis (Gall et al., 2007).

Data Screening and Assumptions Testing

With the utilization of a multiple linear regression analysis, three assumption tests were

employed. The assumption of bivariate outliers was performed with a scatter plot. The predictor

variables were mapped to the x axis and the criterion variable to the y axis. Outliers were

determined from visual inspection via the box plot. A multivariate normal distribution

assumption was also tested. A scatter plot was also utilized for this test (Sher et al., 2017) in

order to visually show the relationship between the predictor and criterion variables. One

variable was presented on the horizontal axis and another variable on the vertical axis. The

plotting of the variables revealed whether a relationship exists and to what degree this

relationship is (Gall et al., 2007). Linearity was examined and the classic "cigar shape" was

tested. This test was conducted from the scatter plot visually to ensure that the data points are

roughly equal variances from each other as the data traverses the horizontal axis. If the data fits

this shape, then a normal distribution can be assumed. Finally, the assumption of non-

multicollinearity was tested to determine if more than one predictor variable is highly correlated

to another predictor variable. This test provided whether the coefficient estimates are reliable.

This assumption was calculated by determining the Variance Inflation Factor. Acceptable values

for this assumption test are between 1 and 5, with a Variance Inflation Factor of 10 or greater

violating of the assumption (Thompson et al., 2017).

Data Analysis

Multiple linear regression analysis produced three tables. First, the statistical output showed a

measure of the model's explanatory power to fit the data via the coefficient of determination

(R^2), which indicates the proportion of shared variance explained in the outcome variable by the predictors. The second part of the analysis revealed an ANOVA table that indicates if the explanatory power of R^2 is statistically significant, and finally, a table of coefficients explained which, if any, of the individual independent variables served as statistically significant predictors of the outcome variable (Field, 2018; Warner, 2013). Cohen's f^2 was used to measure the effect size for this multiple regression (Warner, 2013). Effect size measures for f-squared 0.02 (small), 0.15 (medium), and 0.35 (large) were used to assess the finding's practical significance. The Cohen's f-squared was calculated from the multiple correlation coefficient, R^2, from the formula: $f^2 = R^2 / (1 - R^2)$.

CHAPTER FOUR: FINDINGS

Overview

The current study's quantitative, predictive, correlational design was used to determine if self-reported GPA, self-reported SAT score, and type of school (public or private) could predict the degree of self-reported loneliness. The predictor variables for this study include self-reported GPA, self-reported SAT score, and type of school (public or private). The criterion variable was the self-reported loneliness score, calculated from the UCLA loneliness instrument. A multiple linear regression was utilized for the single hypothesis. This chapter includes the research question, the null hypothesis, data screening, descriptive statistics, assumption testing, and multiple linear regression analysis for a determination of the results.

Research Question

RQ1: How accurately can loneliness be predicated from a linear combination of academic indicators (grade point average, SAT score, type of school) for high school students?

Null Hypothesis

H_01: There will be no significant predictive relationship between the criterion variable (loneliness) and the linear combination of predictor variables (grade point average, SAT score, type of school) for high school students.

Data Screening

The study data was used to determine if there was a statistically significant predictive relationship between academic performance indicators (SAT and GPA scores), a denotation between public and private schools, and student self-reported loneliness. The researcher sorted and scanned the data for inconsistencies for each variable. A total of seventy-six respondents completed the survey. A total of ten survey results did not include SAT scores due to the

respondents not knowing the exact score. A Missing Value Analysis was utilized within SPSS to estimate these missing data points. The Expectation-Maximization (EM) algorithm was utilized to determine substitute values by the normal distribution process.

Descriptive Statistics

Descriptive statistics were obtained on each of the variables. The sample consisted of 76 participants (53 from public school and 23 from private school). The number of participants satisfied the a priori power analysis and Warner's participation formula. This exceeded the larger value of 74 needed participants for a 0.3 effect size with a statistical power of 0.7 and an alpha of 0.05. The school type was a Boolean variable differentiating between public and private schools, with values of 0 and 1, respectively. The SAT variable ranges between 400 and 1600 with all self-reported scores falling into this range. The GPA variable ranges between 0 and 5 with weightings being considered. All self-reported scores of GPA fell within this range. A low GPA score refers to a lower achievement and a higher GPA score refers to a higher achievement and mastery of the coursework. The loneliness score was measured using the UCLA Loneliness Scale. This scale has a range of scores of 20 to 80. A score between 20 and 34 denotes a low degree of loneliness; a score between 35 and 49 indicates a moderate degree of loneliness; a score between 50 and 64 denotes a moderately high degree of loneliness; a score above 65 indicates a high degree of loneliness. Descriptive statistics can be found in Table 1.

Table 1

Descriptive Statistics

School		n	Min.	Max.	M	SD
Public	GPA	53	2.30	4.82	3.94	.573
	SAT	53	980	1560	1251.61	158.083
	Loneliness Score	53	25	77	50.08	12.717

	Valid N (listwise)	53				
Private	GPA	23	2.00	4.20	3.23	.653
	SAT	23	455	1540	1087.51	211.455
	Loneliness Score	23	25	63	42.04	9.480
	Valid N (listwise)	23				

Assumption Testing

The primary assumption for running a multiple linear regression is that the criterion variable is continuous. This assumption was true for this study. The secondary assumption when running a multiple linear regression is that the predictor variables (two or more) are either continuous or nominal in nature. This assumption was met because all predictor variables in this study were measured continuously or nominally.

Independence of Observations

The assumption of independence of observations was tested utilizing the Durbin-Watson statistic. A value of 1.48 was calculated, which is close to the ideal value of 2 for this assumption test. Thus, the assumption of observations was tenable for this study.

Assumption of Linearity

The multiple regression requires that the assumption of linearity be met. Linearity was examined using a matrix scatter plot. The assumption of linearity was met. These plots were divided into two sections based on the Boolean variable of school type. See Figure 1 and 2 for the matrix scatter plot indicating linearity is present.

Figure 1
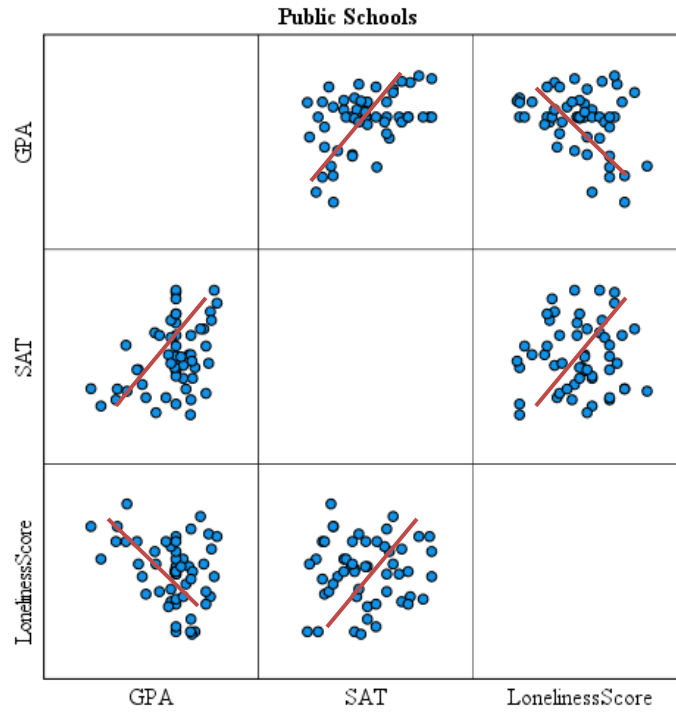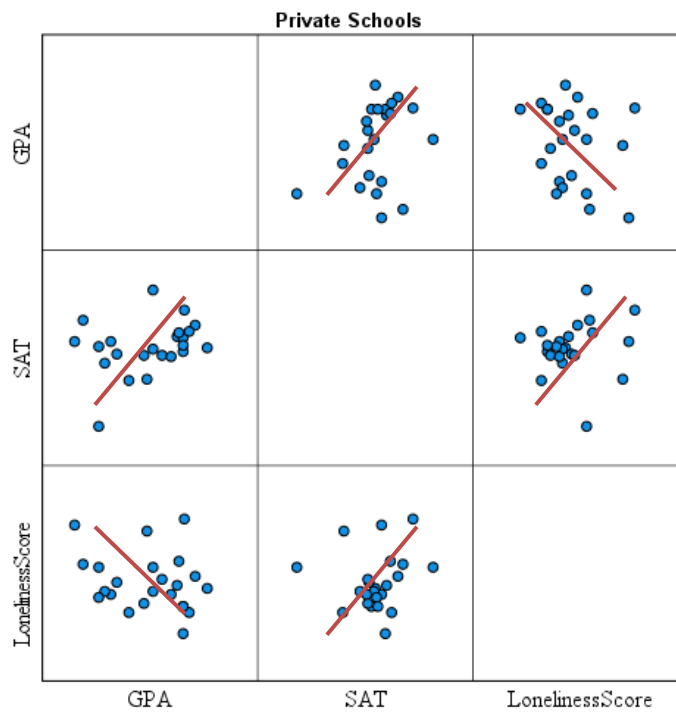
Matrix Scatter Plot: Public Schools

Figure 2

Matrix Scatter Plot: Private Schools

Assumption of Homoscedasticity

The assumption of homoscedasticity was verified using the matrix scatterplot created for assessing the assumption of linearity. The scatterplots showed that the residuals were evenly spread and therefore, the assumption of homoscedasticity was met.

Assumption of the Absence of Multicollinearity

A Variance Inflation Factor (VIF) test was conducted to ensure the absence of multicollinearity within the variables. This test was run because if a predictor variable (x) is highly correlated with another predictor variable (x), they essentially provide the same information about the criterion variable. The variables of reported SAT and GPA were examined based on the Boolean variable of school type. If the Variance Inflation Factor (VIF) is too high (greater than 10), then multicollinearity is present. Acceptable values of the VIF are between 1 and 5. When viewing the collinearity statistics from the public school participants, the VIF for self-reported SAT scores was 1.218 and the self-reported GPA was 1.218. When viewing the collinearity statistics from the private school participants, the VIF for self-reported SAT scores was 1.103 and the self-reported GPA was 1.103. The absence of multicollinearity was met between the variables in this study. See Table 2 collinearity statistics differentiated by school type.

Table 2

Collinearity Statistics

School Code	Model		Tolerance	VIF
			Collinearity Statistics	
Public	1	SAT	.821	1.218
		GPA	.821	1.218
Private	1	SAT	.907	1.103
		GPA	.907	1.103

a. Dependent Variable: Loneliness Score

Assumption of No Significant Outliers

There were no data errors or inconsistencies that were identified. A matrix scatter plot was used to detect the existence of bivariate outliers between the predictor variables (SAT, GPA, School Type) and the criterion variable (loneliness score). There were no bivariate outliers identified. See Figure 3 and 4 for the matrix scatter plots divided by the Boolean variable of school type.

Figure 3

Matrix Scatter Plot: Public Schools
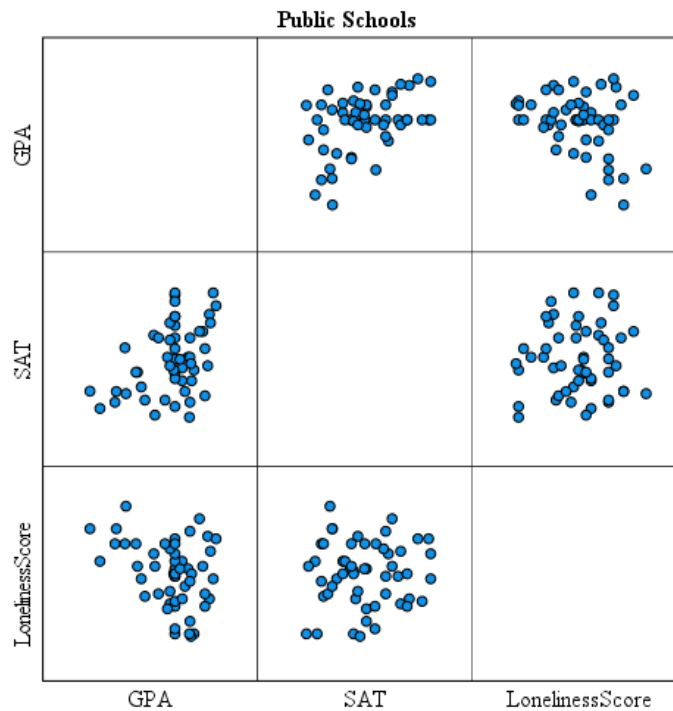
Figure 4

Matrix Scatter Plot: Private Schools
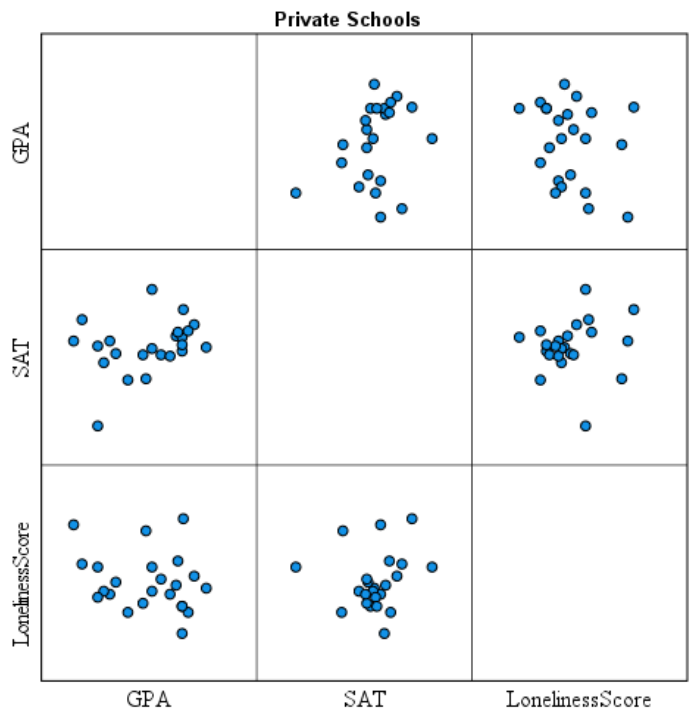
Assumption of Normal Distribution of Residuals

   The multiple regression also requires that the assumption of bivariate normal distribution be met. The assumption of bivariate normal distribution was examined using a matrix scatter plot. The assumption of bivariate normal distribution was met. See Figure 5 and 6 for the matrix scatter plot with the classic cigar shape identified.

Figure 5

Matrix Scatter Plot: Public Schools
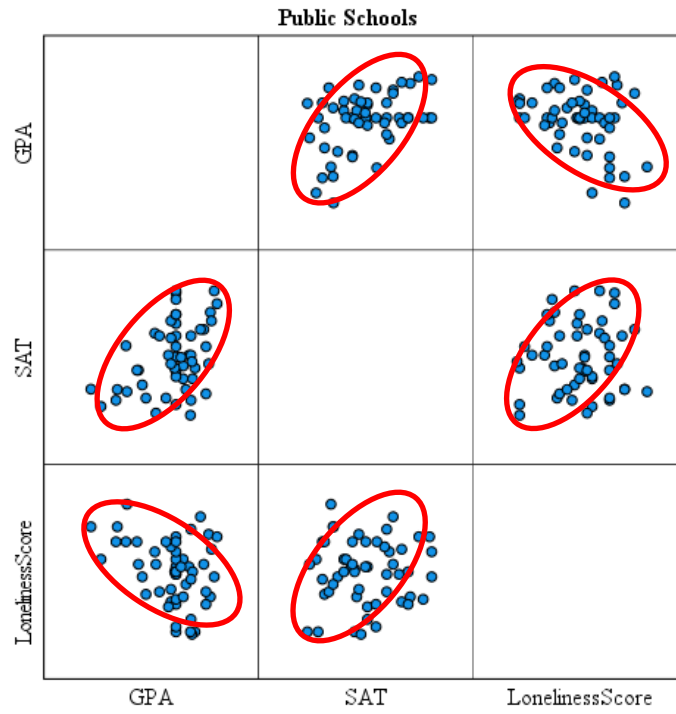
Figure 6

Matrix Scatter Plot: Private Schools

Private Schools

Results

A multiple linear regression analysis was conducted to see if there was a relationship between SAT scores, weighted GPA, school type, and self-reported degree of loneliness. The predictor variables were SAT scores, weighted GPA, and type of school (public or private). The criterion variable was the self-reported degree of loneliness. The results of the analysis rejected the null hypothesis at the 95% confidence level where $F(3, 72) = 6.42$ $p < .001$. There was a statistical relationship between the predictor variables (SAT, GPA, type of school) and the criterion variable (degree of loneliness). See Table 3 for regression model results.

Table 3

Regression Model Results

Model	SS	df	MS	F	Sig.

1	Regression	2408.875	3	802.958	6.415	<.001[b]
	Residual	9012.533	72	125.174		
	Total	11421.408	75			

a. Dependent Variable: Loneliness Score
b. Predictors: (Constant), Type of School, SAT, GPA

The model's effect size was medium where $R = .459$. Furthermore, $R^2 = .211$ indicating that approximately 21% of the variance of criterion variable can be explained by the linear combination of predictor variables. See Table 4 for model summary.

Table 4

Model Summary

Model	R	R^2	Adjusted R^2	SEM
1	.459[a]	.211	.178	11.188

a. Predictors: (Constant), Type of School, SAT, GPA

Because the results of the study rejected the null hypothesis, analysis of the coefficients was required. Based on the calculated coefficients, it was found that the type of school and GPA were the best predictor of degree of loneliness where $p < .001$. The significance of GPA was .002 and Type of School was .001. See Table 5 for coefficients.

Table 5

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	SE	β	t	Sig.
1	(Constant)	61.854	10.882		5.684	<.001
	GPA	-7.628	2.348	-.419	-3.248	.002
	SAT	.015	.008	.225	1.827	.072

Type of School	-11.013	3.261	-.413	-3.377	.001

a. Dependent Variable: Loneliness Score

CHAPTER FIVE: CONCLUSIONS

Overview

The purpose of this quantitative correlational study is to examine if a relationship exists between perceived loneliness and the academic success indicators of grade point average, SAT test scores, and type of academic institution at which a student attends. The leading theory which guided this study was the theory of loneliness as described by Weiss (1973). This theory details loneliness as being directly related to relationships that may or may not exist with an individual. This chapter studies the results and analyzes the findings of the study to see if there is indeed a relationship that exists between the perceived loneliness of students and their academic performance. The chapter begins with a discussion that examines the results and establishes a standard based on the results and data collected. Next, the implications of the study are discussed, which is then followed by the limitations of the study. The chapter concludes with the recommendations for future studies.

Discussion

This quantitative, predictive, correlational study was used to determine if there was any statistically significant relationship between academic success (SAT score and GPA), type of school (public or private) and student self-reported loneliness. This study sought to prove that SAT score/GPA and type of school can predict the degree of loneliness that a twelfth grade student reports. One research question provided guidance for the data collection and analysis of the quantitative study. The study provided evidence that a predictive, correlational relationship does exist between the predictor variables (SAT score, GPA, type of school) and the criterion variable (self-reported loneliness score). A multiple linear regression was utilized to determine statistical significance from the collected data. Google Forms was used to collect the data and

statistical analysis was performed with IBM's Statistical Package for the Social Sciences (SPSS). Self-reported loneliness was collected utilizing the UCLA Loneliness Scale.

Research Question

The null hypothesis for the research question stated: "There will be no significant predictive relationship between the criterion variable (loneliness) and the linear combination of predictor variables (grade point average, SAT score, type of school) for high school students." The findings of the study supported rejecting the null hypothesis of the research question, which was: "How accurately can loneliness be predicated from a linear combination of academic indicators (grade point average, SAT score, type of school) for high school students?" The researcher conducted a multiple linear regression analysis and the findings of the study showed a statistically significant relationship between GPA, type of school, and loneliness score. This was determined to be at a 95 percent confidence level where $F(3, 72) = 6.42$ $p < .001$. The resulting analysis showed that GPA had a significance of 0.002 and type of school had a significance of 0.001. Further, analysis showed that only one type of school had a statistically significant relationship, which was public schools with a significance of 0.014, whereas private schools had a significance of 0.335.

The diversity of the classroom settings between the two different types of school has been shown to be a factor in previous studies. Public school classrooms can be diverse in the student population and in size. Private school classroom makeups tend to be less diverse. This is due to the socio-economic, religious, race, and other factors constituting the private school makeup. Similarities amongst students in their classrooms facilitate comfort amongst their peers and lowers cultural and other diversity potential anxieties (Cañas et al., 2020). Classrooms in larger public schools also separate students based on academic potential, with advanced students in

similar classrooms and those who struggle academically in similar classrooms (Lemay et al., 2019). Private schools have less ability to do so with smaller populations of students (Lemay et al., 2019). While this division creates similarities in the public-school setting, it does not increase the classroom makeup similarities enough for students to seek to fit in for social acceptance any less (Antonopoulou et al., 2019).

Anxieties play a crucial role in the level of loneliness that an individual experiences and perceives. Being labeled as struggling academically can lead to poorer grades (Antonopoulou et al., 2019). This supports the current study's findings that GPA has a statistical significance as a predictor, whereas SAT score does not. GPA is a basis for class placement in high school, where SAT score is not utilized for this purpose. The negative effects of anxieties, along with emotional and mental stress affect the daily lives of individuals (Chen & Jinliang, 2020; Robb et al., 2020). Students with poor academic performance will manifest these areas in their cumulative GPA as this is an ongoing academic success indicator. SAT score is an academic indicator at a singular point in time.

The need to grow socially also indicates why type of school and GPA are statistically significant predictors of degree of loneliness. Han et al. (2022) describes sports and clubs as ways students can grow in their social relationships. Typically public schools have these options. Private schools, with smaller student populations, can offer more participation in these extra-curricular activities. Engels et al. (2019) and Ferguson and Ryan (2019) indicate social standing affects loneliness. The higher a student's GPA, the more academic recognitions occur, such as college acceptance, recognition of honor rolls, sports scholar athlete mentions, etc. Students with these achievements are typically viewed as having a higher social standing as students project how others view them by what they view around them (Seddig, 2020).

Theoretical Framework

For this study, the loneliness theory from Weiss was chosen as it addressed social loneliness and an individual's social relationships. An individual's relationships with others and the quality of these relationships is what defines a lower experience of loneliness (Weiss, 1973). Public schools are generally larger in size than private schools. Smaller size populations allow for more time in growing and development of relationships. Public schools are required to focus on their respective state's academic standards of learning, which guides the teaching and curriculum. Private schools have the luxury to create curriculum that can focus on relationship building learning models without focusing on standardized testing results.

Weiss (1973) describes loneliness as being both emotional and social in nature. The social aspect of Weiss' theory has a direct relationship to the foundation of this study. The high school age is where students seek to find peers that they have similarities with (Antonopoulou et al., 2019). These needs surround peer, teacher, and parental relationships (AliceAnn et al., 2020). Public schools have larger class sizes, making students interact with peers who they are not emotionally invested in, creating a neutral social relationship. Private school's smaller class sizes allow for the growth of student-student and student-teacher relationships, allowing types of healthy social relationships to flourish. This study found that private schools did not have a statistically significant predictive relationship with level of self-reported loneliness.

Implications

The results of this study indicate that there are indeed correlations between academic success indicators, school type and the degree of self-reported loneliness. Specifically, GPA can be predictive of degree of loneliness in twelfth grade students. However, this study indicates that SAT score is not a predictor of loneliness. Further, the type of school, whether public or private,

is also a predictor of student loneliness. While private school data did not show a high degree of loneliness, public school data did show that a threshold exists on the lower end of the GPA scale that correlates to a high or moderately high degree of loneliness. This study does not necessarily show a benefit to private school curriculum, but rather gives a glimpse to the difference of the nature of the parameters placed on the two different environments.

Students in public school with lower GPAs, self-reported under 3.25 weighted, were the correlating factor to a higher degree of loneliness. GPAs higher than 3.25 weighted did not show a consistent degree of loneliness as those data points spanned the entire loneliness scale. This makes sense due to several factors. Students in high school are looking to fit in and be accepted in social relationships (Han et al., 2022).   These relationships can be strained when self-perceptions and struggles ensue. A student who is not performing well academically will not see certain recognitions that their peers see. The ability to achieve college acceptance, receive honor roll recognition, and be selected for special programs are fewer for students who do not perform well academically. Social and academic anxieties show that coping mechanisms cause mental stress, depression, and a variety of other negative implications (Robb et al., 2020). These negative implications are contributors to a higher level of loneliness, even outside of the academic learning environment. It is evident that students who experience lower academic successes should receive extra attention, not only academically, but also socio-emotional support. High schools do have some flexibility to implement life skills classes as a requirement to all students to foster building strong and healthy relationships. Additionally, programs in which students can be paired with teacher or other academically strong students can increase academic achievement amongst lower performing students while also creating opportunities to form and strengthen student-teacher and student-peer relationships.

This study also indicates that SAT scores are not reliable to predict loneliness. GPA, instead, can be utilized in the predicting of perceived loneliness. SAT scores are a single snapshot in the academic career of a student. This large high-stakes test can determine amount of knowledge acquired but does not account for mastery of subject matter outside of what it tests for. Coursework in arts, athletics, certain sciences, leadership classes, etc. are not evidenced in this academic measure. GPA contains the cumulative measure of learning in whatever area of coursework that the student has been exposed to. Further, GPA can be measured by a weighting to differentiate the vigor required for more intensive academic courses. Therefore, GPA is a more reliable estimate of academic performance, especially in regards to other students' self-perceptions, including loneliness.

While private schools did not have the same correlation of academic success indicators to degree of loneliness, this study does not indicate that private schools hold an advantage over public schools. Rather, the difference can lie in the structure of the curriculum and flexibility that private schools are afforded. Public schools typically have parameters placed upon their curriculum as they are held to certain state standards in order to receive funding. This model requires teaching to have students take specific tests, such as the Standards of Learning (SOL) in the commonwealth of Virginia. Private schools that do not have these requirements can structure their curriculum and learning environments to allow for the development of more healthy relationships in the student-teacher and student-peer realm. Determining how to allow some type of this flexibility in the public school sector can be a method to mitigate the number of students reporting moderately high to high degrees of loneliness. Another consideration is the size of the student populations in comparison between public and private schools. Public schools in the Central Virginia area where this study was conducted are far larger in size than private school

populations. By sheer number of students, public schools have a larger potential for students who experience higher degrees of loneliness.

Limitations

Examining these limitations allowed the researcher to identify both internal and external validity threats that could possibly affect the study. Gall et al. (2007) describes the importance of understanding limitation and their associated threats such that the researcher can control or limit the potential negative effects that can be placed upon a research study. Two minor limitations have been identified in this study. Internal validity was limited due to the nature of the testing/collection of data. External validity was limited in the sampling that occurred.

Internal validity was limited in the location and environment in which the data was collected. The data collection occurred in two separate instances, even though the survey was located in the same internet location. One instance included the students taking the survey on their own time in their own desired location, whether this was in the classroom or at home. Another instance included students provided survey data in an organized classroom setting with a teacher present. These inconsistencies, although very small, did provide for a different environments in which the data was collected. Additionally, self-reported grade point averages and SAT scores have been shown to have high reliability (Cole & Gonyea, 2010; Kuncel et al., 2005; Somers et al., 2020). However, self-reported test scores and grade point averages were not precise for every student. Data could have been collected from the school system to verify that the self-reported academic indicators were precisely correct. This would have required abandoning the anonymity of the study, which would have proved to be problematic.

External validity was limited in the sampling bias that occurred. Some high school seniors do not take the SAT test and therefore would not have this data to report. The students

would have a valid grade point average to self-report. By requiring both academic indicators, the sample size excluded students who were looking to join the workforce, attend a higher education institution not requiring the SAT test, or those who wished to join the armed forces. Likewise, the sample was not examined in specific demographics, such as gender, race, etc. These data elements were not collected, but could have been beneficial to ensure the sample contained a diverse group indicative of the public and private school populations that were studied.

Recommendations for Future Research

Studies that focus on students' perceived loneliness and its relationship to academic success indicators are important for researchers, school administrators, and teachers. Understanding this relationship allows these types of individuals to examine how to put policies and safeguards into place in order to protect the health, safety, and academic performance of students. Scholars can utilize this information to further delve into the factors affecting students' academic successes. School leaders can create strategic frameworks and foundations to drive their schools towards academic excellence. Therefore, further research should be employed to gain a deeper understanding of student perceived loneliness and its relationship to a student's successful academic career. Topics for future research include:

1. Adding additional criteria to delve into the relationship between loneliness and student demographics, such as race, religion, gender, etc.

2. Determining if the age of the population is an important variable. Students in middle school, other level of high school students other than twelfth graders examined in this study, and college-level students should be examined.

3. Academic success indicators should be detailed in a more granular manner. An examination of success in specific subject areas, such as Mathematics, Sciences, English, etc. should be studied.

4. Loneliness is often accompanied by other anxieties. Specific types of anxieties need to be studied to determine other stressors that exist upon academic success, as well as how the combination of specific anxieties and loneliness co-exist in relationship to academic success indicators.

5. The SAT test is undergoing significant changes as this study was conducted. By going digital and by changing structure to account for the research that showed gaps in students with factors such as economic status causing lower scores (Najarro, 2024), there is a need to verify if the new structure changes the statistical relevancy of this variable as a predictor of student perceived loneliness.

REFERENCES

Abuhassan, H., Al-Rub, S. A., & Rajab, R. (2020). Using multiple linear regression and factor analysis to explore the determinants of students success at the university. *Journal of Statistical Science, 11*(1), 1-15.

Achdut, N., & Refaeli, T. (2021). An ethnocultural perspective on loneliness in young adulthood: A population-based study in Israel. *Sociology of Health & Illness, 43*(5), 1154-1174. https://doi.org/10.1111/1467-9566.13277

Ahrens, K. F., Neumann, R. J., Kollmann, B., Plichta, M. M., Lieb, K., Tüscher, O., & Reif, A. (2021). Differential impact of COVID-related lockdown on mental health in Germany. *World Psychiatry, 20*(1), 140-141. https://doi.org/10.1002/wps.20830

Ainsworth, M. (1989). Attachments beyond infancy. *American Psychologist, 44*, 709-716.

AliceAnn, C., Powell, E. A., Bradford, G. C., Magnusson, B. M., Hanson, C. L., Barnes, M. D., Novilla, M., Lelinneth, B., & Bean, R. A. (2020). Maslow's Hierarchy of Needs as a framework for understanding adolescent depressive symptoms over time. *Journal of Child and Family Studies, 29*(2), 273-281. http://dx.doi.org.ezproxy.liberty.edu/10.1007/s10826-019-01577-4

Alivernini, F., Cavicchiolo, E., Manganelli, S., Chirico, A., & Lucidi, F. (2020). Students' psychological well-being and its multilevel relationship with immigrant background, gender, socioeconomic status, achievement, and class size. *School Effectiveness and School Improvement, 31*(2), 172-191. https://doi.org/10.1080/09243453.2019.1642214

Antonopoulou, K., Chaidemenou, A., & Kouvava, S. (2019). Peer acceptance and friendships among primary school pupils: associations with loneliness, self-esteem and school engagement. *Educational Psychology in Practice, 35*(3), 339-351.

http://10.1080/02667363.2019.1604324

Bacher-Hicks, A., Goodman, J., & Mulhern, C. (2021). Inequality in household adaptation to schooling shocks: Covid-induced online learning engagement in real time. *Journal of Public Economics, 193*, 104345-104345. https://doi.org/10.1016/j.jpubeco.2020.104345

Besser, A., Flett, G. L., & Zeigler-Hill, V. (2020). Adaptability to a sudden transition to online learning during the COVID-19 pandemic: Understanding the challenges for students. *Scholarship of Teaching and Learning in Psychology*, https://doi.org/10.1037/stl0000198

Bowlby, J. (1969). Attachment and loss: Vol. 1. New York: Basic Books.

Branje, S., & Morris, A. S. (2021). The impact of the COVID-19 pandemic on adolescent emotional, social, and academic adjustment. *Journal of Research on Adolescence, 31*(3), 486-499. https://doi.org/10.1111/jora.12668

Buecker, S., Maes, M., Denissen, J. J. A., & Luhmann, M. (2020). Loneliness and the big five personality traits: A meta–analysis. *European Journal of Personality, 34*(1), 8-28. https://doi.org/10.1002/per.2229

Butt, S., Mahmood, A., & Saleem, S. (2022). The role of institutional factors and cognitive absorption on students' satisfaction and performance in online learning during COVID 19. *PloS One, 17*(6). https://doi.org/10.1371/journal.pone.0269609

Byrne, K. A., Anaraky, R. G., Dye, C., Ross, L. A., Chalil Madathil, K., Knijnenburg, B., & Levkoff, S. (2021). Examining rural and racial disparities in the relationship between loneliness and social technology use among older adults. *Frontiers in Public Health, 9*, 723925-723925. https://doi.org/10.3389/fpubh.2021.723925

Cañas, E., Estévez, E., León-Moreno, C., & Musitu, G. (2020). Loneliness, family communication, and school adjustment in a sample of cybervictimized adolescents. *International Journal of Environmental Research and Public Health, 17*(1), 335. https://doi.org/10.3390/ijerph17010335

Carolan, C., Davies, C. L., Crookes, P., McGhee, S., & Roxburgh, M. (2020). COVID 19: Disruptive impacts and transformative opportunities in undergraduate nurse education. *Nurse Education in Practice, 46*. https://doi.org/10.1016/j.nepr.2020.102807

Cavus, N., Sani, A. S., Haruna, Y., & Lawan, A. A. (2021). Efficacy of social networking sites for sustainable education in the era of COVID-19: A systematic review. *Sustainability (Basel, Switzerland), 13*(2), 808. https://doi.org/10.3390/su13020808

Chang, E. C. (2017). Perfectionism and loneliness as predictors of depressive and anxious symptoms in African American adults: Further evidence for a top-down additive model. *Cognitive Therapy and Research, 41*(5), 720-729.

Chen, C., & Jinliang, Q. (2020). Emotional Abuse and Adolescents' Social Anxiety: the roles of self-esteem and loneliness. *Journal of Family Violence, 35*(5), 497-507. http://dx.doi.org.ezproxy.liberty.edu/10.1007/s10896-019-00099-3

Christiansen, J., Qualter, P., Friis, K., Pedersen, S., Lund, R., Andersen, C., Bekker-Jeppesen, M., & Lasgaard, M. (2021). Associations of loneliness and social isolation with physical and mental health among adolescents and young adults. *Perspectives in Public Health, 141*(4), 226–236. https://doi.org/10.1177/17579139211016077

Cole, J. S., & Gonyea, R. M. (2010). Accuracy of self-reported SAT and ACT test scores: Implications for research. *Research in Higher Education, 51*, 305-319.

Dagnew, B., & Dagne, H. (2019). Year of study as predictor of loneliness among students of

University of Gondar. *BMC Research Notes, 12*(1), 240-

240. https://doi.org/10.1186/s13104-019-4274-4

Davidson, P. M., Lin, C. J., Beaman, A., Jackson, D., Reynolds, N. R., & Padula, W. V. (2021).

Global digital social learning as a strategy to promote engagement in the era of COVID-

19. *Journal of Clinical Nursing, 30*(15-16), 2366-

2372. https://doi.org/10.1111/jocn.15776

Davis, J. L., Ford, D. Y., Moore III, J. L., & Floyd, E. F. (2020). Black and gifted in rural

America: Barriers and facilitators to accessing gifted and talented education programs:

Barriers and facilitators to accessing gifted and talented education programs. *Theory &*

Practice in Rural Education, 10(2), 85–100. https://doi.org/10.3776/tpre.2002.v10n2p85-

100

Delgado, B., García-Fernández, J. M., Martínez-Monteagudo, M. C., Inglés, C. J., Marzo, J. C.,

La Greca, A. M., & Hugon, M. (2019). Social anxiety scale for adolescents and school

anxiety inventory: Psychometric properties in French adolescents. *Child Psychiatry and*

Human Development, 50(1), 13-26. https://doi.org/10.1007/s10578-018-0818-4

Diehl, K., Jansen, C., Ishchanova, K., & Hilger-Kolb, J. (2018). Loneliness at universities:

Determinants of emotional and social loneliness among students. *International Journal of*

Environmental Research and Public Health, 15(9).

https://doi.org/10.3390/ijerph15091865

Eccles, A. M., Pamela, Q., Margarita, P., Hurley, R., Boivin, M., & Tremblay, R. E. (2020).

Trajectories of early adolescent loneliness: Implications for physical health and

sleep. *Journal of Child and Family Studies, 29*(12), 3398-3407.

https://doi.org/10.1007/s10826-020-01804-3

Einav, M. & Margalit, M. (2022). The hope theory and specific learning disorders and/or attention deficit disorders (SLD/ADHD): Developmental perspectives. *Current Opinion in Psychology, 48*(1), 1-4. https://doi.org/10.1016/j.copsyc.2022.101471.

Ellis, W. E., Dumas, T. M., & Forbes, L. M. (2020). Physically isolated but socially connected: Psychological adjustment and stress among adolescents during the initial COVID-19 crisis. *Canadian Journal of Behavioural Science, 52*(3), 177-187. https://doi.org/10.1037/cbs0000215

El-Osta, A., Alaa, A., Webber, I., Riboli Sasco, E., Bagkeris, E., Millar, H., Vidal-Hall, C., & Majeed, A. (2021). How is the COVID-19 lockdown impacting the mental health of parents of school-age children in the UK? A cross-sectional online survey. *BMJ Open, 11*(5). https://doi.org/10.1136/bmjopen-2020-043397

Engels, M., Colpin, H., Wouters, S., Leeuwen, K. V., Bijttebier, P., Van Den Noortgate, W., Goossens, L., Verschueren, K. (2019). Adolescents' peer status profiles and differences in school engagement and loneliness trajectories: A person-centered approach. *Learning and Individual Differences, 75,* 1-14.

Erol, O., & Cirak, N. S. (2019). Exploring the loneliness and internet addiction level of college students based on demographic variables. *Contemporary Educational Technology, 10*(2). https://doi.org/10.30935/cet.554488

Ferguson, S. M., & Ryan, A. M. (2019). It's lonely at the top: Adolescent students' peer-perceived popularity and self-perceived social contentment. *Journal of Youth and Adolescence, 48*(2), 341-358.

Feuchter, M. D., & Preckel, F. (2021). Reducing boredom in gifted education—Evaluating the effects of full-time ability grouping. *Journal of Educational*

Psychology, https://doi.org/10.1037/edu0000694

Field, A. (2018). *Discovering statistics using IBM SPSS statistics: North American edition* (5th ed.). Sage Publications, Inc.

Fioravanti, G., Casale, S., Benucci, S. B., Prostamo, A., Falone, A., Ricca, V., & Rotella, F. (2021). Fear of missing out and social networking sites use and abuse: A meta-analysis. *Computers in Human Behavior, 122*, 106839. https://doi.org/10.1016/j.chb.2021.106839

Franssen, T., Stijnen, M., Hamers, F., & Schneider, F. (2020). Age differences in demographic, social and health-related factors associated with loneliness across the adult life span (19-65 years): A cross-sectional study in the Netherlands. BMC *Public Health, 20*(1). https://doi.org/10.1186/s12889-020-09208-0

Gall, M. D., Gall, J. P. & Borg, W. R. (2007). *Educational Research: An Introduction.* New York: Pearson.

Gawronski, J. H. (2021). Teaching during the time of COVID: Learning from mentor teachers' experiences. *Journal of Digital Learning in Teacher Education, 37*(4), 217-233. https://doi.org/10.1080/21532974.2021.1965507

Gazmararian, J., Weingart, R., Campbell, K., Cronin, T., & Ashta, J. (2021). Impact of COVID-19 pandemic on the mental health of students from 2 Semi-Rural high schools in Georgia. *The Journal of School Health, 91*(5), 356-369. https://doi.org/10.1111/josh.13007

Gestsdottir, S., Gisladottir, T., Stefansdottir, R., Johannsson, E., Jakobsdottir, G., & Rognvaldsdottir, V. (2021). Health and well-being of university students before and during COVID-19 pandemic: A gender comparison. *PloS One, 16*(12), e0261346-

e0261346. https://doi.org/10.1371/journal.pone.0261346

Geukens, F., Maes, M., Cillessen, A. H. N., Colpin, H., Van Leeuwen, K., Verschueren, K., & Goossens, L. (2021). Spotting loneliness at school: Associations between self-reports and teacher and peer nominations. *International Journal of Environmental Research and Public Health, 18*(3), 971. https://doi.org/10.3390/ijerph18030971

Goldberg, A. E., McCormick, N., & Virginia, H. (2022). School-age adopted children's early responses to remote schooling during COVID-19. *Family Relations, 71*(1), 68-89. https://doi.org/10.1111/fare.12612

Guppy, N., Verpoorten, D., Boud, D., Lin, L., Tai, J., & Bartolic, S. (2022). The post-COVID-19 future of digital learning in higher education: Views from educators, students, and other professionals in six countries. *British Journal of Educational Technology*, https://doi.org/10.1111/bjet.13212

Gyasi, R. M., Peprah, P., Abass, K., Pokua Siaw, L., Dodzi Ami Adjakloe, Y., Kofi Garsonu, E., & Phillips, D. R. (2022). Loneliness and physical function impairment: Perceived health status as an effect modifier in community-dwelling older adults in Ghana. *Preventive Medicine Reports, 26*. https://doi.org/10.1016/j.pmedr.2022.101721

Hager, N. M., Judah, M. R., & Milam, A. L. (2022). Loneliness and depression in college students during the COVID-19 pandemic: The role of boredom and repetitive negative thinking. *International Journal of Cognitive Therapy, 15*(2), 134-152. https://doi.org/10.1007/s41811-022-00135-z

Haikalis, M., Doucette, H., Meisel, M. K., Birch, K., & Barnett, N. P. (2021). Changes in college student anxiety and depression from pre- to during-COVID-19: Perceived stress,

academic challenges, loneliness, and positive perceptions. *Emerging Adulthood*

(Thousand Oaks, CA). https://doi.org/10.1177/21676968211058516

Han, J., Jiang, Y., Mentzer, N., & Kelley, T. (2022). The role of sense of community and

motivation in the collaborative learning: An examination of the first-year design

course. *International Journal of Technology and Design Education, 32*(3), 1837-

1852. https://doi.org/10.1007/s10798-021-09658-6

Han, Z., Wang, Z., & Li, Y. (2021). Cyberbullying involvement, resilient coping, and loneliness

of adolescents during covid-19 in rural China. *Frontiers in*

Psychology, 12. https://doi.org/10.3389/fpsyg.2021.664612

Heck, P. R., & Krueger, J. I. (2020). Self-enhancement error motivates social projection. *Social*

Cognition, 38(5), 489-522. https://doi.org/10.1521/soco.2020.38.5.489

Hehir, E., Zeller, M., Luckhurst, J., & Chandler, T. (2021). Developing student connectedness

under remote learning using digital resources: A systematic review. *Education and*

Information Technologies, 26(5), 6531-6548. https://doi.org/10.1007/s10639-021-10577-

1

Heidari, E., Salimi, G., & Mehrvarz, M. (2020). The influence of online social networks and

online social capital on constructing a new graduate students' professional

identity. *Interactive Learning Environments*, 1-

18. https://doi.org/10.1080/10494820.2020.1769682

Hu, J., Fitzgerald, S. M., Owen, A. J., Ryan, J., Joyce, J., Chowdhury, E., Reid, C. M., Britt, C.,

Woods, R. L., McNeil, J. J., & Freak-Poli, R. (2021). Social isolation, social support,

loneliness and cardiovascular disease risk factors: A cross-sectional study among older

adults. *International Journal of Geriatric Psychiatry, 36*(11), 1795-1809.

https://doi.org/10.1002/gps.5601

Hubbard, P. (2019). Leveraging technology to integrate informal language learning within

classroom settings. In *The handbook of informal language* learning (pp. 402-419)

Hoboken, NJ: Wiley-Blackwell. https://doi.org/10.1002/9781119472384.ch27

Islam, M. A., & Kumar, B. (2019). The relationship between social network, social media use,

loneliness and academic performance: A study among university students in

Bangladesh. *World of Media, (4)*, 25-47.

Jefferson, R., Barreto, M., Verity, L., & Qualter, P. (2023). Loneliness during the school years:

How it affects learning and how schools can help. *The Journal of School Health, 93*(5),

428-435. https://doi.org/10.1111/josh.13306

Johnsen, S. K. (2021). Diversity and developing potential. *Gifted Child Today Magazine, 44*(4),

185-186. https://doi.org/10.1177/10762175211030355

Jones, W. H. (1987). Research and theory on loneliness: A response to Weiss's

reflections. *Journal of Social Behavior and Personality, 2*(2).

Kashy-Rosenbaum, G., & Aizenkot, D. (2020). Exposure to cyberbullying in WhatsApp

classmates' groups and classroom climate as predictors of students' sense of belonging:

A multi-level analysis of elementary, middle and high schools. *Children and Youth*

Services Review, 108(1), 1-10. https://doi.org/10.1016/j.childyouth.2019.104614

Kennedy, J. H., & Kennedy, C.E. (2004). Attachment theory: Implications for school

psychology. *Psychology in the Schools, 41(2*), 247 – 259. https://doi-

org.ezproxy.liberty.edu/10.1002/pits.10153

Klosky, J. V., Gazmararian, J. A., Casimir, O., & Blake, S. C. (2022). Effects of remote

education during the COVID-19 pandemic on young children's learning and academic

behavior in Georgia: Perceptions of parents and school administrators. *The Journal of

School Health, 92*(7), 656-664. https://doi.org/10.1111/josh.13185

Kochuvilayil, T., Fernandez, R. S., Moxham, L. J., Lord, H., Alomari, A., Hunt, L., Middleton,

R., & Halcomb, E. J. (2021). COVID-19: Knowledge, anxiety, academic concerns and

preventative behaviours among Australian and Indian undergraduate nursing students: A

cross-sectional study. *Journal of Clinical Nursing, 30*(5-6), 882-

891. https://doi.org/10.1111/jocn.15634

Krishnakumar, S., Maier, T., Berdanier, C., Ritter, S., McComb, C., & Menold, J. (2022). Using

workplace thriving theory to investigate first-year engineering students' abilities to thrive

during the transition to online learning due to COVID-19. *Journal of Engineering

Education (Washington, D.C.), 111(*2), 474-493. https://doi.org/10.1002/jee.20447

Kuhfeld, M., Soland, J., Tarasawa, B., Johnson, A., Ruzek, E., & Liu, J. (2020). Projecting the

potential impact of COVID-19 school closures on academic achievement. *Educational

Researcher, 49*(8), 549-565. https://doi.org/10.3102/0013189X20965918

Kuncel, N. R., Credé, M., & Thomas, L. L. (2005). The validity of self-reported grade point

averages, class ranks, and test scores: A meta-analysis and review of the

literature. *Review of Educational Research, 75*(1), 63-82.

http://ezproxy.liberty.edu/login?qurl=https%3A%2F%2Fwww.proquest.com%2Fscholarl

y-journals%2Fvalidity-self-reported-grade-point-averages-

class%2Fdocview%2F214137233%2Fse-2%3Faccountid%3D12085

Labrague, L. J., De los Santos, J. A. A., & Falguera, C. (2020). Social and emotional loneliness among college students during the COVID-19 pandemic: The predictive role of coping behaviors, social support, and personal resilience. *Perspectives in Psychiatric Care, 1*, 1-7.

Landi, G., Pakenham, K. I., Grandi, S., & Tossani, E. (2022). Young adult carers during the pandemic: The effects of parental illness and other ill family members on COVID-19-Related and General Mental health outcomes. *International Journal of Environmental Research and Public Health, 19*(6). https://doi.org/10.3390/ijerph19063391

Landmann, H., & Rohmann, A. (2022). When loneliness dimensions drift apart: Emotional, social and physical loneliness during the COVID-19 lockdown and its associations with age, personality, stress and well-being. *International Journal of Psychology, 57*(1), 63-72. https://doi.org/10.1002/ijop.12772

Laslo-Roth, R., Bareket-Bojmel, L. & Margalit, M. (2022). Loneliness experience during distance learning among college students with ADHD: the mediating role of perceived support and hope. *European Journal of Special Needs Education, 37*(2), 220-234. https://doi.org/10.1080/08856257.2020.1862339

Lemay, D. J., Doleck, T., & Bazelais, P. (2019). Self-determination, loneliness, fear of missing out, and academic performance. *Knowledge Management & E-Learning, 11*(4), 485-496.

Luo, J., Liang, L., & Li, H. (2020). The divergent roles of social media in adolescents' academic performance. *Journal of Research in Childhood Education, 34*(2), 167-182. https://doi.org/10.1080/02568543.2019.1703124

Mahon, N. E., Yarcheski, T. J., & Yarcheski, A. (1995). Validation of the revised UCLA loneliness scale for adolescents. *Research in Nursing & Health, 18*(3), 263-270.

Mahon, N. E., & Yarcheski, A. (1990). The dimensionality of the UCLA Loneliness Scale in

    early adolescents. *Research in Nursing & Health, 13*, 45-52.

Mahoney, J., Le Moignan, E., Long, K., Wilson, M., Barnett, J., Vines, J., & Lawson, S. (2019).

    Feeling alone among 317 million others: Disclosures of loneliness on Twitter. *Computers*

    in Human Behavior, 98, 20–30.

Maiya, S., Dotterer, A. M., & Whiteman, S. D. (2021). Longitudinal changes in adolescents'

    school bonding during the COVID-19 pandemic: Individual, parenting, and family

    correlates. *Journal of Research on Adolescence, 31*(3), 808-

    819. https://doi.org/10.1111/jora.12653

Malik, A., Dhir, A., Kaur, P., & Johri, A. (2020). Correlates of social media fatigue and

    academic performance decrement. *Information Technology & People, 34*(2), 557-580.

Martin-Maria, N., Caballero, F. F., Miret, M., Tyrovolas, S., Haro, J. M., Ayuso-Mateos, J. L., &

    Chatterji, S. (2020). Differential impact of transient and chronic loneliness on health

    status. A longitudinal study. *Psychology & Health, 35*(2), 177-

    195. https://doi.org/10.1080/08870446.2019.1632312

Maslow, A. H. (1943). A theory of human motivation. *Psychological Review, 50*(4), 370–396.

    https://doi.org/10.1037/h0054346

McLeod, J. D., & Anderson, E. M. (2023). Autistic traits and college adjustment. *Journal of*

    Autism and Developmental Disorders, 53(9), 3475-3492. https://doi.org/10.1007/s10803-

    022-05632-w

Mehus, C. J., Lyden, G. R., Bonar, E. E., Gunlicks-Stoessel, M., Morrell, N., Parks, M. J.,

    Wagner, A. C., & Patrick, M. E. (2023). Association between COVID-19-related

    loneliness or worry and symptoms of anxiety and depression among first-year college

students. *Journal of American College Health, 71*(5), 1332-

1337. https://doi.org/10.1080/07448481.2021.1942009

Mikkelsen, H. T., Haraldstad, K., Helseth, S., Skarstein, S., Småstuen, M. C., & Rohde, G.

(2020). Health-related quality of life is strongly associated with self-efficacy, self-esteem,

loneliness, and stress in 14-15-year-old adolescents: A cross-sectional study. Health and

Quality of Life Outcomes, 18(1), 352-352. https://doi.org/10.1186/s12955-020-01585-9

Morin, A. H. (2020). Teacher support and the social classroom environment as predictors of

student loneliness. *Social Psychology of*

Education, 23(6). https://doi.org/10.1007/s11218-020-09600-z

Munniksma, A., Ziemes, J., & Jugert, P. (2022). Ethnic diversity and students' social adjustment

in Dutch classrooms. *Journal of Youth and Adolescence, 51*(1), 141-

155. https://doi.org/10.1007/s10964-021-01507-y

Murphy, M. P. A. (2020). COVID-19 and emergency eLearning: Consequences of the

securitization of higher education for post-pandemic pedagogy. *Contemporary Security*

Policy, 41(3), 492-505. https://doi.org/10.1080/13523260.2020.1761749

Musaddiq, T., Stange, K., Bacher-Hicks, A., & Goodman, J. (2022). The Pandemic's effect on

demand for public schools, homeschooling, and private schools. *Journal of Public*

Economics, 212. https://doi.org/10.1016/j.jpubeco.2022.104710

Najarro, I. (2024). The New Digital SAT: 4 Important Details Educators Need to Know; The

digital SAT college admissions exam launches in the United States this spring. *Education*

Week, *43*(18).

https://link.gale.com/apps/doc/A783591887/BIC?u=vic_liberty&sid=summon&xid=2fe3

eb2b

Nishina, A., Lewis, J. A., Bellmore, A., & Witkow, M. R. (2019). Ethnic diversity and inclusive school environments. *Educational Psychologist, 54*(4), 306-321. https://doi.org/10.1080/00461520.2019.1633923

Norbury, R. (2021). Loneliness in the time of COVID. *Chronobiology International, 38*(6), 817-819. https://doi.org/10.1080/07420528.2021.1895201

Okely, J. A., Deary, I. J., & Gutchess, A. (2019). Longitudinal associations between loneliness and cognitive ability in the Lothian Birth Cohort 1936. *Journals of Gerontology., 74*(8), 1376–1386. https://doi.org/10.1093/geronb/gby086

Okoedion, E. G., Okolie, U. C., & Udom, I. D. (2019). Perceived factors affecting students' academic performance in Nigerian universities. *Studi Sulla Formazione, 22*(2), 409-422. https://doi.org/10.13128/ssf-10814

Orben, A. (2020). Teenagers, screens and social media: A narrative review of reviews and key studies. *Social Psychiatry and Psychiatric Epidemiology, 55*(4), 407-414. https://doi.org/10.1007/s00127-019-01825-4

Palgi, Y., Shrira, A., Ring, L., Bodner, E., Avidor, S., Bergman, Y., Cohen-Fridel, S., Keisari, S., & Hoffman, Y. (2020). The loneliness pandemic: Loneliness and other concomitants of depression, anxiety and their comorbidity during the COVID-19 outbreak. *Journal of Affective Disorders, 275*(275), 109-111. https://doi.org/10.1016/j.jad.2020.06.036

Panayiotou, M., Badcock, J. C., Lim, M. H., Banissy, M. J., & Qualter, P. (2022). Measuring loneliness in different age groups: The measurement invariance of the UCLA loneliness scale. *Assessment (Odessa, Fla.),* https://doi.org/10.1177/10731911221119533

Papachristou, E., Flouri, E., Joshi, H., Midouhas, E., & Lewis, G. (2022). Ability-grouping and problem behavior trajectories in childhood and adolescence: Results from a U.K.

population-based sample. *Child Development, 93*(2), 341-

358. https://doi.org/10.1111/cdev.13674

Pengpid, S., & Peltzer, K. (2021). Associations of loneliness with poor physical health, poor

mental health and health risk behaviours among a nationally representative community-

dwelling sample of middle-aged and older adults in India. *International Journal of*

Geriatric Psychiatry, 36(11), 1722-1731. https://doi.org/10.1002/gps.5592

Popa, D., Repanovici, A., Lupu, D., Norel, M., & Coman, C. (2020). Using mixed methods to

understand teaching and learning in COVID 19 times. *Sustainability (Basel,*

*Switzerland), 12(*20). https://doi.org/10.3390/su12208726

Preece, D. A., Goldenberg, A., Becerra, R., Boyes, M., Hasking, P., & Gross, J. J. (2021).

Loneliness and emotion regulation. *Personality and Individual Differences, 180*.

https://doi.org/10.1016/j.paid.2021.110974

Quílez-Robres, A., Moyano, N., & Cortés-Pascual, A. (2021). Motivational, emotional, and

social factors explain academic achievement in children aged 6–12 years: A meta-

analysis. *Education Sciences, 11*(9), 513. https://doi.org/10.3390/educsci11090513

Robb, C. E., de Jager, C. A., Ahmadi-Abhari, S., Giannakopoulou, P., Udeh-Momoh, C.,

McKeand, J., Price, G., Car, J., Majeed, A., Ward, H., & Middleton, L. (2020).

Associations of social isolation with anxiety and depression during the early COVID-19

pandemic: A survey of older adults in London, UK. *Frontiers in Psychiatry, 11*(1), 1-12.

https://10.3389/fpsyt.2020.591120

Russell, D. W. (1996). UCLA loneliness scale (version 3): Reliability, validity, and factor

structure. *Journal of Personality Assessment, 66*(1), 20-

40. https://doi.org/10.1207/s15327752jpa6601_2

Salmela-Aro, K., Upadyaya, K., Vinni-Laakso, J., & Hietajärvi, L. (2021). Adolescents'
longitudinal school engagement and burnout before and during COVID-19—The role of
Socio-Emotional skills. *Journal of Research on Adolescence, 31*(3), 796-
807. https://doi.org/10.1111/jora.12654

Sanad, H. M. (2019). Stress and Anxiety among Junior Nursing Students during the Initial
Clinical Training: A Descriptive Study at College of Health Sciences, University of
Bahrain. *American Journal of Nursing Research, 7*(6), 995-999.

Sancho, P., Pinazo-hernandis, S., Donio-bellegarde, M., & Tomás, J. M. (2020). Validation of
the university of California, Los Angeles loneliness scale (version 3) in Spanish older
population: An application of exploratory structural equation modelling. *Australian
Psychologist, 55*(3), 283-292. https://doi.org/10.1111/ap.12428

Schramm, H., Rubin, I., & Schramm, N. (2021). Covid-19 and high school grades: An early case
study. *Significance (Oxford, England), 18*(2), 6-7. https://doi.org/10.1111/1740-
9713.01500

Seddig, D. (2020). Individual attitudes toward deviant behavior and perceived attitudes of
friends: Self-stereotyping and social projection in adolescence and emerging
adulthood. *Journal of Youth and Adolescence, 49*(3), 664-
677. https://doi.org/10.1007/s10964-019-01123-x

Seider, S., Clark, S., & Graves, D. (2020). The development of critical consciousness and its
relation to academic achievement in adolescents of color. *Child Development, 91*(2),
e451-e474. https://doi.org/10.1111/cdev.13262

Sesmiarni, Z., Ahida, R., & Iswantir. (2021). The correlation of students' perception about online
learning and students' grade point at IAIN bukittinggi. J*ournal of Physics. Conference*

Series, 1779(1). https://doi.org/10.1088/1742-6596/1779/1/012034

Sher, V., Bemis, K. G., Liccardi, I., & Chen, M. (2017). An empirical study on the reliability of perceiving correlation indices using scatterplots. *Computer Graphics Forum, 36*(3), 61-72. https://doi.org/10.1111/cgf.13168

Shi, C., Yu, L., Wang, N., Cheng, B., & Cao, X. (2020). Effects of social media overload on academic performance: A stressor–strain–outcome perspective. *Asian Journal of Communication, 30*(2), 179-197.

Shovestul, B., Han, J., Germine, L., & Dodell-Feder, D. (2020). Risk factors for loneliness: The high relative importance of age versus other factors. *PloS One, 15*(2), e0229087-e0229087. https://doi.org/10.1371/journal.pone.0229087

Silva, P. G., Oliveira, C. A. L., Borges, M. M. F., Moreira, D. M., Alencar, P. N. B., Avelar, R. L., Bitu Sousa, R. M. R., & Sousa, F. B. (2021). Distance learning during social seclusion by COVID-19: Improving the quality of life of undergraduate dentistry students. *European Journal of Dental Education, 25*(1), 124-134. https://doi.org/10.1111/eje.12583

Somers, C. L., Hillman, S. B., Townsend, A., Baranowski, A., & Robtoy, E. (2020). Correspondence between self-reported and actual high school grades. *Educational Research Quarterly, 43*(3), 24-51.

Stoyanov, S. T., Heidari, E., Mehrvarz, M., & Marzooghi, R. (2021). The role of digital informal learning in the relationship between students' digital competence and academic engagement during the COVID-19 pandemic. *Journal of Computer Assisted Learning, 37*(4), 1154-1166. https://doi.org/10.1111/jcal.12553

Su, C., & Guo, Y. (2021). Factors impacting university students' online learning experiences

during the COVID-19 epidemic. *Journal of Computer Assisted Learning, 37*(6), 1578-1590. https://doi.org/10.1111/jcal.12555

Tellakat, M., Boyd, R. L., & Pennebaker, J. W. (2019). How do online learners study? the psychometrics of students' clicking patterns in online courses. *PloS One, 14*(3). https://doi.org/10.1371/journal.pone.0213863

Thijs, J., & Zee, M. (2019). Further evidence for social projection in the classroom: Predicting perceived ethnic norms. *Journal of Applied Developmental Psychology, 62*(1), 239-248. https://doi.org/10.1016/j.appdev.2019.03.006

Thomas, L., Orme, E., & Kerrigan, F. (2020). Student loneliness: The role of social media through life transitions. *Computers and Education, 146*. https://doi.org/10.1016/j.compedu.2019.103754

Thompson, C. G., Kim, R. S., Aloe, A. M., & Becker, B. J. (2017). Extracting the variance inflation factor and other multicollinearity diagnostics from typical regression results. *Basic and Applied Social Psychology, 39*(2), 81-90. https://doi.org/10.1080/01973533.2016.1277529

Tomasik, M. J., Helbling, L. A., & Moser, U. (2021). Educational gains of in-person vs. distance learning in primary and secondary schools: A natural experiment during the COVID-19 pandemic school closures in Switzerland. *International Journal of Psychology, 55* (Special Issue, Art. 12728), 11-55: Special Issue, Art. 12728-11. https://doi.org/10.1002/ijop.12728

Tomaszek, K., & Muchacka-Cymerman, A. (2022). Student burnout and PTSD symptoms: The role of existential anxiety and academic fears on students during the COVID 19 pandemic. *Depression Research and Treatment, 2022*, 6979310-

9. https://doi.org/10.1155/2022/6979310

Van Den Beemt, A., Thurlings, M., & Willems, M. (2020). Towards an understanding of social media use in the classroom: A literature review. *Technology, Pedagogy and Education, 29*(1), 35-55. https://doi.org/10.1080/1475939X.2019.1695657

Warner, R. M. (2013). *Applied statistics: From bivariate through multivariate techniques (2nd ed.).* Sage Publications, Inc.

Weiss, R. S. (1973). *Loneliness: The experience of emotional and social isolation.* The MIT Press.

Wongpakaran, N., Wongpakaran, T., Pinyopornpanish, M., Simcharoen, S., Suradom, C., Varnado, P., & Kuntawong, P. (2020). Development and validation of a 6-item Revised UCLA Loneliness Scale (RULS-6) using Rasch analysis. *British Journal of Health Psychology, 25*(2), 233–256. https://doi.org/10.1111/bjhp.12404

Yan, S. (2021). COVID-19 and technology use by teenagers: A case study. Human Behavior and *Emerging Technologies, 3*(1), 185-193. https://doi.org/10.1002/hbe2.236

Zahodne, L. (2021). Associations between loneliness, reading ability and episodic memory in Non-Hispanic Black and White older adults. *Archives of Clinical Neuropsychology, 11*(1), 1-9.

APPENDIX A

The UCLA Loneliness Scale instrument is listed below with scoring instructions:

Scale:

Statement	Never	Rarely	Sometimes	Often
*1. How often do you feel that you are "in tune" with the people around you?	1	2	3	4
2. How often do you feel that you lack companionship?	1	2	3	4
3. How often do you feel that there is no one you can turn to?	1	2	3	4
4 How often do you feel alone?	1	2	3	4
*5. How often do you feel part of a group of friends?	1	2	3	4
*6. How often do you feel that you have a lot in common with the people around you?	1	2	3	4
7. How often do you feel that you are no longer close to anyone?	1	2	3	4
8. How often do you feel that your interests and ideas are not shared by those around you?	1	2	3	4
*9. How often do you feel outgoing and friendly?	1	2	3	4
*10. How often do you feel close to people?	1	2	3	4
11. How often do you feel left out?	1	2	3	4
12. How often do you feel that your relationships with others are not meaningful?	1	2	3	4
13. How often do you feel that no one really knows you we11?	1	2	3	4
14. How often do you feel isolated from others?	1	2	3	4
*15. How often do you fee1 you can find companionship when you want it?	1	2	3	4
*16. How often do you feel that there are people who really understand you?	1	2	3	4
17, How often do you feel shy?	1	2	3	4
18. How often do you feel that people are around you but not with you?	1	2	3	4
*19. How often do you feel that there are people you can talk to?	1	2	3	4
*20. How often do you feel that there are people you can turn to?	1	2	3	4

INSTRUCTIONS: Indicate how often each of the statements below is descriptive of you.

Scoring:

The items with an asterisk are reverse scored. Keep scoring on a continuous basis.

APPENDIX B

Request for permission to use UCLA Loneliness Scale from Dr. Daniel Russell, who has the Revision 3 survey copyrighted per his publication from 1996.

From: Wolford, Jeffrey
Sent: Tuesday, September 6, 2022 11:23 AM
To: Russell, Daniel W [HD FS]
Subject: UCLA Loneliness Scale Rev 3 permission to use

Dr. Russell,

My name is Jeff Wolford and I am a doctoral candidate at Liberty University in the School of Education. I am writing my dissertation focusing on student loneliness and predictors of academic success in twelfth grade students. I hope to use the UCLA Loneliness Scale and noticed that on the webpage for Dr. Peplau (https://peplau.psych.ucla.edu/loneliness/), the scale is available to use for student research without needing explicit permission. However, I do see that a revised scale – version 3 – has been noted as being copyrighted by you. I am asking permission to use the 20 point scaled instrument found in your paper:

Russell, D. W. (1996). UCLA Loneliness Scale (Version 3): Reliability, validity, and factor structure. Journal of Personality Assessment, 66(1), 20-40.

Thank you for your kind consideration in this matter.

Jeff Wolford
Liberty University
School of Education
Doctoral Candidate

APPENDIX C

Permission received to use the UCLA Loneliness Scale Rev 3 from Dr. Daniel Russell at Iowa State University.

From: Russell, Daniel W [HD FS]
Sent: Tuesday, September 6, 2022 2:12 PM
To: Wolford, Jeffrey
Subject: [External] RE: UCLA Loneliness Scale Rev 3 permission to use

---

[EXTERNAL EMAIL: Do not click any links or open attachments unless you know the sender and trust the content.]

You have my permission to use the UCLA Loneliness Scale in your research project.

Daniel W. Russell, PhD
Professor, Department of Human
  Development & Family Studies
Iowa State University

APPENDIX D

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

April 20, 2023

Jeffrey Wolford
Jeffrey Savage

Re: IRB Approval - IRB-FY22-23-1142 PREDICTING LONELINESS FROM ACADEMIC PERFORMANCE OF PUBLIC AND PRIVATE HIGH SCHOOL STUDENTS: A LINEAR REGRESSION ANALYSIS

Dear Jeffrey Wolford, Jeffrey Savage,

We are pleased to inform you that your study has been approved by the Liberty University Institutional Review Board (IRB). This approval is extended to you for one year from the following date: April 20, 2023. If you need to make changes to the methodology as it pertains to human subjects, you must submit a modification to the IRB. Modifications can be completed through your Cayuse IRB account.

Your study falls under the expedited review category (45 CFR 46.110), which is applicable to specific, minimal risk studies and minor changes to approved studies for the following reason(s):

7. Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies.

Your stamped consent form(s) and final versions of your study documents can be found under the Attachments tab within the Submission Details section of your study on Cayuse IRB. Your stamped consent form(s) should be copied and used to gain the consent of your research participants. If you plan to provide your consent information electronically, the contents of the attached consent document(s) should be made available without alteration.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,

G. Michele Baker, PhD, CIP
Administrative Chair
Research Ethics Office

APPENDIX E

Student Assent

Title of the Project: Predicting Loneliness from Academic Performance of Public and Private High School Students: A Linear Regression Analysis
Principal Investigator: Jeffrey Wolford, Doctoral Candidate, School of Education, Liberty University

Invitation to Be Part of a Research Study

You are invited to participate in a research study. To participate, you must be a high school student in twelfth grade. Taking part in this research project is voluntary.

Please take time to read this entire form and ask questions before deciding whether to take part in this research.

What is the study about, and why are we doing it?

The purpose of the study is to determine if academic indicators can predict student loneliness.

What will participants be asked to do in this study?

If you agree to be in this study, I will ask you to do the following:
1. Take an online Google survey. This should only take 5 to 10 minutes.

How could participants or others benefit from this study?

Participants should not expect to receive a direct benefit from participating in this study.

Benefits to society include a better predictor of loneliness and a faster way to help those who are struggling before their stresses become tragic for themselves and/or others.

What risks might participants experience from being in this study?

The expected risks from participating in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

How will personal information be protected?

The records of this study will be kept private. Research records will be stored securely, and only the researcher will have access to the records.
- Participant responses will be anonymous.
- Data will be stored on a password-locked computer. After three years, all electronic records will be deleted, and all hardcopy records will be shredded.

How will participants be compensated for being part of the study?

Participants have the potential to be compensated for participating in this study. One Amazon gift card in the amount of $50 will be given randomly to one student from each high school. The researcher will provide the school with the gift card to distribute to the randomly selected individual.

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether to participate will not affect your current or future relations with Liberty University or your current high school. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

What should be done if a participant wishes to withdraw from the study?

If you choose to withdraw from the study, please exit the survey and close your internet browser. Your responses will not be recorded or included in the study.

Whom do you contact if you have questions or concerns about the study?

The researcher conducting this study is Jeffrey Wolford. You may ask any questions you have

███

Whom do you contact if you have questions about rights as a research participant?

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the IRB. Our physical address is

███

Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted in an ethical manner as defined and required by federal regulations. The topics covered and viewpoints expressed or alluded to by student and faculty researchers are those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.

Your Consent

Before agreeing to be part of the research, please be sure that you understand what the study is about. You can print a copy of the document for your records. If you have any questions about the study later, you can contact the researcher using the information provided above.

Parental Consent

Title of the Project: Predicting Loneliness from Academic Performance of Public and Private High School Students: A Linear Regression Analysis
Principal Investigator: Jeffrey Wolford, Doctoral Candidate, School of Education, Liberty University

Invitation to Be Part of a Research Study

Your child/student is invited to participate in a research study. To participate, he or she must be in twelfth grade. Taking part in this research project is voluntary.

Please take time to read this entire form and ask questions before deciding whether to allow your child/student to take part in this research project.

What is the study about and why are we doing it?

The purpose of the study is to determine if academic indicators can predict student loneliness.

What will participants be asked to do in this study?

If you agree to allow your child/student to be in this study, I will ask her or him to do the following:
1. Take an online Google survey. This should only take 5 to 10 minutes.

How could participants or others benefit from this study?

Participants should not expect to receive a direct benefit from participating in this study.

Benefits to society include a better predictor of loneliness and a faster way to help those who are struggling before their stresses become tragic for themselves and/or others.

What risks might participants experience from being in this study?

The expected risks from participating in this study are minimal, which means they are equal to the risks your child/student would encounter in everyday life.

How will personal information be protected?

The records of this study will be kept private. Research records will be stored securely, and only the researcher will have access to the records.
- Participant responses will be anonymous.
- Data will be stored on a password-locked computer. After three years, all electronic records will be deleted, and all hardcopy records will be shredded.

How will participants be compensated for being part of the study?

Participants have the potential to be compensated for participating in this study. One Amazon gift card in the amount of $50 will be given randomly to one student from each high school. The researcher will provide the school with the gift card to distribute to the randomly selected individual.
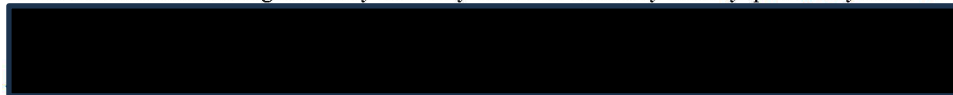
Is study participation voluntary?

Participation in this study is voluntary. Your decision whether to allow your child/student to participate will not affect your or his or her current or future relations with Liberty University or their current high school. If you decide to allow your child/student to participate, they are free to not answer any question or withdraw at any time without affecting those relationships.

What should be done if a participant wishes to withdraw from the study?

If you choose to withdraw your child/student from the study or your child/student chooses to withdraw, please have him or her exit the survey and close her or his internet browser. Your child's/student's responses will not be recorded or included in the study.

Whom do you contact if you have questions or concerns about the study?

The researcher conducting this study is Jeffrey Wolford. You may ask any questions you have

███

Whom do you contact if you have questions about rights as a research participant?

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the IRB. Our physical address is

███

Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted in an ethical manner as defined and required by federal regulations. The topics covered and viewpoints expressed or alluded to by student and faculty researchers are those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.

Your Consent

By signing this document, you are agreeing to allow your child/student to be in this study. Make sure you understand what the study is about before you sign. You will be given a copy of this document for your records. The researcher will keep a copy with the study records. If you have any questions about the study after you sign this document, you can contact the study team using the information provided above.

I have read and understood the above information. I have asked questions and have received answers. I consent to allow my child/student to participate in the study.

_____
Printed Child's/Student's Name

_____
Parent/Guardian's Signature   Date

Parental Consent

Title of the Project: Predicting Loneliness from Academic Performance of Public and Private High School Students: A Linear Regression Analysis
Principal Investigator: Jeffrey Wolford, Doctoral Candidate, School of Education, Liberty University

Invitation to Be Part of a Research Study

Your child/student is invited to participate in a research study. To participate, he or she must be in twelfth grade. Taking part in this research project is voluntary.

Please take time to read this entire form and ask questions before deciding whether to allow your child/student to take part in this research project.

What is the study about, and why are we doing it?

The purpose of the study is to determine if academic indicators can predict student loneliness.

What will participants be asked to do in this study?

If you agree to allow your child/student to be in this study, I will ask her or him to do the following:
1. Take an online Google survey. This should only take 5 to 10 minutes.

How could participants or others benefit from this study?

Participants should not expect to receive a direct benefit from participating in this study.

Benefits to society include a better predictor of loneliness and a faster way to help those who are struggling before their stresses become tragic for themselves and/or others.

What risks might participants experience from being in this study?

The expected risks from participating in this study are minimal, which means they are equal to the risks your child/student would encounter in everyday life.

How will personal information be protected?

The records of this study will be kept private. Research records will be stored securely, and only the researcher will have access to the records.
- Participant responses will be anonymous.
- Data will be stored on a password-locked computer. After three years, all electronic records will be deleted, and all hardcopy records will be shredded.

How will participants be compensated for being part of the study?

Participants have the potential to be compensated for participating in this study. One Amazon gift card in the amount of $50 will be given randomly to one student from each high school. The researcher will provide the school with the gift card to distribute to the randomly selected individual.

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether to allow your child/student to participate will not affect your or his or her current or future relations with Liberty University or their current high school. If you decide to allow your child/student to participate, they are free to not answer any question or withdraw at any time without affecting those relationships.

What should be done if a participant wishes to withdraw from the study?

If you choose to withdraw your child/student from the study or your child/student chooses to withdraw, please have him or her exit the survey and close her or his internet browser. Your child's/student's responses will not be recorded or included in the study.

Whom do you contact if you have questions or concerns about the study?

The researcher conducting this study is Jeffrey Wolford. You may ask any questions you have

Whom do you contact if you have questions about rights as a research participant?

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the IRB. Our physical address is

Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted in an ethical manner as defined and required by federal regulations. The topics covered and viewpoints expressed or alluded to by student and faculty researchers are those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.

Your Consent

Before agreeing to allow your child/student to be part of this research, please be sure that you understand what the study is about. You can print a copy of the document for your records. If you have any questions about the study later, you can contact the researcher using the information provided above.