Walden University

ScholarWorks

2021

Social Media Multitasking, Academic Performance, and the Fear of Missing Out

Lynn Esol Varela
Walden University

Walden University

College of Social and Behavioral Sciences

This is to certify that the doctoral dissertation by

Lynn Varela

has been found to be complete and satisfactory in all respects,
and that any and all revisions required by
the review committee have been made.

Review Committee
Dr. Melanie Shores, Committee Chairperson, Psychology Faculty
Dr. Natalie Costa, Committee Member, Psychology Faculty
Dr. Sandra Street, University Reviewer, Psychology Faculty

Chief Academic Officer and Provost
Sue Subocz, Ph.D.

Walden University
2021

Abstract

Social Media Multitasking, Academic Performance, and the Fear of Missing Out

by

Lynn Varela

MS, Palm Beach Atlantic, 2011

BS, Universidad del Sagrado Corazon, 1998

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Educational Psychology

Walden University

August 2021

Abstract

In college, social media use that is not directly associated with classroom activities (i.e., nonacademic social media use) can serve as distractions that undermine academic performance. The purpose of this quantitative investigation was to examine the potential relationships between nonacademic social media multitasking, academic performance (measured as self-reported, overall grade point average), and fear of missing out. Though some research indicates that social media use is associated with poor academic outcomes, the mechanism of this relationship is less understood. The variables that were examined included nonacademic social media multitasking (independent variable), academic performance (dependent variable), and fear of missing out (independent variable). The framework for the study was based on Baumeister and Leary's belonging hypothesis and van dur Schuur et al.'s scattered attention hypothesis. The sample consisted of 99 U.S. undergraduate college students enrolled at public, 4-year universities who were recruited through SurveyMonkey. Data were collected via online survey, which consisted of the Fear of Missing Out Scale, items from Ozer's study on social networking and academic performance, and a demographic questionnaire. Data analysis consisted of simple linear regressions and a hierarchical regression model. Analysis revealed no significant relationship between nonacademic social media multitasking and academic performance. There was, however, a significant predictive relationship between fear of missing out and nonacademic social media multitasking. While nonacademic social media multitasking should not be encouraged in class, social media has potential educational benefits, when properly harnessed leading to positive social change.

Social Media Multitasking, Academic Performance, and the Fear of Missing Out

by

Lynn Varela

MS, Palm Beach Atlantic, 2011

BS, Universidad del Sagrado Corazon, 1998

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Educational Psychology

Walden University

August 2021

Dedication

I dedicate this dissertation to my children for always being my motivators and the reason I always try to be a better me in every aspect of life. I want to also dedicate this work to my aunt Doctora Dora Nevarez who inspired me to follow my dream of being a doctor and showing me that you can be proud of your intellect while being humble. Finally, I would like to dedicate this work to my best friend and sister Alicia Latty for believing in me even when I stopped believing in myself.

Table of Contents

iii

List of Tables

List of Figures

Chapter 1: Introduction to the Study

Social media permeates many facets of life; for many, it has become routine to check social media feeds, share posts, and interact with others (Zheng & Lee, 2016). Though social media can benefit people in terms of sharing information and building social capital (Imran et al., 2019; Kim et al., 2016), it can also result in maladaptive use with negative consequences. Excessive social media engagement is related to depression (Lin et al., 2016), anxiety, loneliness, low self-esteem (Bhagat, 2015), and poor social adaptation (Bodroža & Jovanović, 2016). Social media can also affect students' academic outcomes. In school, social media use that is not directly associated with classroom activities, known as nonacademic social media use (Ravizza et al., 2014), can undermine academic performance. Nonacademic social media use may occur as social media multitasking and is associated with poor academic performance on standardized tests (Ravizza et al., 2014) and low self-reported grade point average (GPA; Lau, 2017).

The fear of missing out can perpetuate heavy social media use, contributing to reduced academic performance (Rozgonjuk et al., 2019). However, it is unclear whether fear of missing out is correlated with nonacademic social media multitasking or whether it moderated the relationship between social media multitasking and academic performance. Accordingly, the current quantitative investigation involved an examination of the potential relationships between nonacademic social media multitasking, academic performance (measured as self-reported, overall GPA), and fear of missing out. Findings from this research have potential social change implications for policies regarding social media use in schools and ultimately improvements in student academic performance.

The aim of this chapter is to orient the reader to the current investigation. It begins with a discussion of the background of the problem, followed by the problem and purpose statements. The research questions, theoretical framework, and nature of the study are discussed next. Key terms, assumptions, delimitations, and limitations are also detailed. The chapter ends with a statement of the study's significance and a concise summary.

Background

Social media refers to online platforms that allow users to create public profiles, curate a list of online friends or followers, and interact with others (Kircaburrun et al., 2018). Social media can help individuals develop social capital (Roberts & David, 2020), garner feelings of support (Domahidi, 2018), reduce loneliness (Seo et al., 2016), and pursue professional opportunities (Utz, 2016). However, though social media has many benefits, maladaptive use or abuse can create problems for users. For example, excessive social media use is associated with depression (Lin et al., 2016), anxiety, loneliness, and low self-esteem (Bhagat, 2015).

Social media also has the potential to serve as an education tool (Edwards et al., 2015), but it can also create distractions that undermine learning. When social media use is nonacademic and occurs concurrently with academic work (i.e., nonacademic social media multitasking), the effects can be harmful. Social media multitasking involves simultaneously engaging in several activities, at least one of which is social media (Konova & Chiang, 2015). In a classroom setting, nonacademic social media multitasking could involve taking lecture notes while checking social media feeds. Social

media multitasking is particularly prevalent among youth and young adults between the ages of 13 and 24 (Voorveld & van der Goot, 2013). Fear of missing out can propagate social media multitasking, as students fear disengagement with social media while working on academic activities may cause them to miss out on important social events or information. A growing body of literature suggests that social media multitasking may be primarily associated with the fear of missing out (Beyens et al., 2016; Duman & Ozkara, 2019).

Although researchers have studied the effects of social media use and multitasking behaviors (Chen & Yan, 2016; Hwang et al., 2014; Kirschner & De Bruyckere, 2017; Kononova & Chiang, 2015), little is known about the effects of nonacademic social media multitasking. Accordingly, additional investigation was needed to understand the relationships between these constructs. The current study aimed to address this gap in the literature by examining the potential relationships between nonacademic social media multitasking, academic performance (measured as self-reported, overall GPA), and fear of missing out. The current research was needed to better understand the ways nonacademic social media multitasking and fear of missing out may affect academic performance.

Problem Statement

Social media has become a ubiquitous aspect of everyday life in U.S. society (Dempsey et al., 2019). There are many benefits of social media, such as the development of social capital (Kim et al., 2016), knowledge sharing (Imran et al., 2019), and social support (Cole et al., 2017). When use is distracting, however, social media can have a

number of negative effects on users, including the development of distress (Muench et al., 2015), depression (Marino et al., 2018), alcohol abuse (Hormes, 2016), anxiety (Casale & Fioravanti, 2015; Seabrook et al., 2016), and poor learning (Rozgonjuk et al., 2019).

In educational settings, social media use that is not directly associated with classroom activities and can distract students from learning is referred to as nonacademic social media use (Ravizza et al., 2014). Nonacademic social media use is associated with poor academic performance on standardized tests (Ravizza et al., 2014) and low self-reported GPA (Lau, 2017). The negative effect of social media multitasking on academic performance may be the result of cognitive overload. According to the cognitive theory of multimedia learning (Mayer & Moreno, 2003), the human information processing system has two channels (visual and auditory), is limited in capacity, and is used to process incoming information (Mayer, 2010). Nonacademic social media multitasking overloads the limited capacity of the visual and auditory channels, creating deficits in learning and performance (Lau, 2017).

Another factor to consider in the potential relationship between nonacademic social media multitasking and poor academic performance is the fear of missing out, which may perpetuate high levels of social media use (Bright & Logan, 2018). Fear of missing out describes an apprehension that others are having rewarding experiences that one is missing out on, when absent (Rozgonjuk et al., 2019). Fear of missing out can have a number of negative effects such as anxiety, depression (Krasnoa et al., 2015), and smartphone addiction (Chotpitayasunondh & Douglas, 2016), but it is unknown whether

fear of missing out is correlated with nonacademic social media multitasking, or if it moderates the relationship between social media multitasking and academic performance.

Purpose of the Study

The purpose of this quantitative investigation was to examine the potential relationships between nonacademic social media multitasking, academic performance (measured as self-reported, overall GPA), and fear of missing out. The examined variables included nonacademic social media multitasking (independent variable), academic performance (dependent variable), and fear of missing out (independent variable). Although some research indicated social media use was associated with poor academic outcomes (Rozgonjuk et al., 2019), the mechanism of this relationship was less understood. If social media use is non-academic and distracting, as in the case of nonacademic social media multitasking, the negative effects on academic performance may be the result of reduced cognitive processing, as described in the cognitive theory of multimedia learning (Mayer & Moreno, 2003). In addition, it is possible that fear of missing out may prompt nonacademic social media multitasking, as students fear they will miss out on important information if they abstain from social media while in class. In this way, the fear of missing out may promote nonacademic social media multitasking, thereby overloading cognitive processing abilities and impeding academic performance.

Research Questions and Hypotheses

Research Question 1: To what degree is nonacademic social media multitasking (as assessed by Ozer's items for measuring social media multitasking) related to

academic performance (as assessed by self-reported GPA) among U.S. undergraduate students?

$H_0 1$: Nonacademic social media multitasking is not a significant predictor of academic performance.

$H_1 1$: Nonacademic social media multitasking is a significant predictor of academic performance.

Research Question 2: To what degree is fear of missing out (as assessed by the Fear of Missing Out Scale) related to nonacademic social media multitasking (as assessed by Ozer's items for measuring social media multitasking), among U.S. undergraduate students?

$H_0 2$: Fear of missing out is not a significant predictor of nonacademic social media multitasking.

$H_1 2$: Fear of missing out is a significant predictor of nonacademic social media multitasking.

Research Question 3: To what degree does fear of missing out moderate the relationship between nonacademic social media multitasking and academic performance?

$H_0 3$: Fear of missing out does not significantly moderate the relationship between nonacademic social media multitasking and academic performance.

$H_1 3$: Fear of missing out does significantly moderate the relationship between nonacademic social media multitasking and academic performance.

Theoretical Framework

The framework for the current study was based on Baumeister and Leary's (1995) belonging hypothesis and van dur Schuur et al.'s (2015) scattered attention hypothesis. The belonging hypothesis was useful for understanding how the need to belong prompts a fear of missing out, which may influence social media use (Beyens et al., 2016). The scattered attention hypothesis was helpful for understanding how social media multitasking, prompted by the need to belong, predicted academic performance. Together, the belonging hypothesis and scattered attention hypothesis were useful in understanding fear of missing out and its relationships with social media multitasking and academic performance. An illustration of the theoretical model is provided in Figure 1.

Figure 1

Theoretical Model
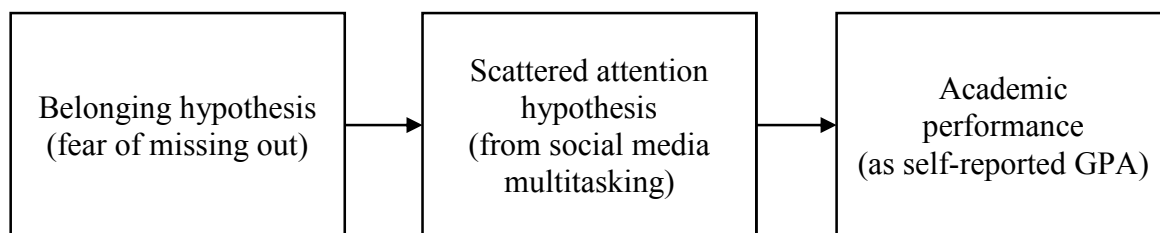
Belonging Hypothesis

Baumeister and Leary (1995) proposed that the need to belong was a fundamental driver of human behavior. People have an innate drive to form and maintain lasting, meaningful relationships, which transcends cultures has biological roots that foster reproduction, competition for resources, and survival of the human species. From an evolutionary perspective, social exclusion was life threatening (Roberts & David, 2019).

In this way, the need to belong is a biological instinct to foster survival. To develop and maintain valuable interpersonal relationships, humans must engage in frequent and pleasant interactions with others, and the interactions must occur within a context of concern for another's welfare (Baumeister & Leary, 1995). A lack of belonging, which can occur when frequent interactions are not present, can create a sense of deprivation.

The need to belong is a powerful and pervasive human motivation that influences individuals' behaviors and emotions (Wang et al., 2017). In modern societies, behaviors reflective of the need to belong may involve the use of modern communication technologies, such as social media and personal digital devices (Beyens et al., 2016). Because the role of social media and smart devices is to foster communication, it may follow that the need to belong inspires engagement with these technologies (Roberts & David, 2019). Further, the need to belong may prompt a fear of missing out, which fosters social engagement with others through social media (Abel et al., 2016; Beyens et al., 2016). Accordingly, the need to belong may help explain fear of missing out and social media multitasking among students.

The belonging hypothesis has been employed to understand social media use and fear of missing out in a number of contexts. For example, Yin et al. (2019) examined the relationships between social media addiction, fear of missing out, the need to belong, and envy. Results indicated that social media addiction was positively associated with fear of missing out, and that envy mediated this relationship. Wang, Zhao, et al. (2017) used the framework to explore smartphone addiction prompted by the need to belong, among a sample of Chinese adolescents. More recently, Wang, Xie, et al. (2018) studied the need

to belong in relation to authentic self-preservation and found fear of missing out was a significant moderator in this relationship. Roberts and David (2019) also used the belonging hypothesis to examine social media use, social connection, and fear of missing out. The researchers found that fear of missing out was positively correlated with the intensity of social media use and that it affects well-being through its effects on social connection and social media intensity.

Scattered Attention Hypothesis

In addition to the belonging hypothesis (Baumeister & Leary, 1995), the scattered attention hypothesis (van dur Schuur et al., 2015) was used in the framework for the current study, as this hypothesis may help explain relationships between social media multitasking and academic performance. Approaching cognitive function from a theoretical angle, the scattered attention hypothesis states that the brain utilizes and allocates cognitive resources to complete tasks, as necessary. Because attention is a limited resource, factors that distract one's focus could undermine the performance of primary tasks (May & Elder, 2018).

According to the scattered attention hypothesis, social media multitasking can create disruptions in cognitive control, encouraging individuals to gravitate toward preferred tasks rather than resist distractions and focus on required tasks. Because attention is a limited resource (van dur Schuur et al., 2015), the simultaneous engagement in multiple tasks can result in distractions and errors that reduce performance on primary tasks. In the context of social media multitasking and academic performance, the scattered attention hypothesis would suggest that social media multitasking can allocate

an individual's limited attention resources to secondary tasks (social media), thus reducing performance on primary, academic tasks.

Researchers have used the scattered attention hypothesis to understand the cognitive effects of multitasking behaviors. For example, van der Schuur et al. (2019) used the scattered attention hypothesis to examine the relationship between media multitasking and academic achievement among adolescents. Although no significant relationships were detected between media multitasking and academic achievement, the researchers did detect an association between multitasking and academic attention issues. Ophir et al. (2009) also used the hypothesis to study the correlation between media multitasking and poor academic outcomes, arguing that media multitasking creates cognitive control deficits that undermine academic performance. Finally, May and Elder (2018) conducted a meta-analysis of research on multitasking behaviors and academic performance and found that media multitasking interfered with working memory and attention, undermining self-regulation, efficiency, test performance, reading comprehension, and GPA.

Nature of the Study

The nature of this research was quantitative with a nonexperimental design. Because the aim was to explore relationships between quantifiable variables, a quantitative method was selected. A qualitative investigation would not support the research questions, nor the data collection strategy (online survey). This study was nonexperimental because the sample was not randomized, nor were there control or intervention groups.

The target population for this study included all U.S. undergraduate students who were currently attending public, 4-year institutions in the United States. The sample consisted of at least 77 U.S. undergraduate college students. To be eligible for this study, individuals had to be currently enrolled in a 4-year, post-secondary U.S. institute, be at least a sophomore, and be at least 18 years old. Data were collected via online survey, which was distributed through SurveyMonkey. The survey was used to measure the three study variables (fear of missing out, nonacademic social media multitasking, and academic performance). The online survey consisted of the Fear of Missing Out Scale (Przybylski et al., 2013), items from Ozer's (2014) study on social networking and academic performance, and a demographic questionnaire that gathered descriptive statistics, including respondents' GPA. The first two research questions were assessed via simple linear regressions. To address Research Question 3, Baron and Kenny's (1986) method for moderation was planned to test whether fear of missing out moderated the relationship between nonacademic social media multitasking and academic performance.

Definitions

Academic performance: Academic performance describes outcomes in educational settings, such as test scores, course grades, or GPA (Womack & McNamara, 2017). In the current study, academic performance was operationalized as participants' current self-reported GPA. Self-reported GPA is one of the most commonly used measures of academic performance (York et al., 2015).

Fear of missing out: Fear of missing out describes an apprehension that others are having rewarding experiences that one is missing out on when absent (Rozgonjuk et al.,

2019). Fear of missing was assessed in this study using the Fear of Missing Out Scale (Przybylski et al., 2013; Appendix A).

Media multitasking: Media multitasking describes simultaneously participating in multiple activities—at least one of which involves media use (Kononova & Chiang, 2015).

Nonacademic social media multitasking: In a classroom setting, nonacademic social media multitasking could involve simultaneously taking lecture notes while checking social media feeds.

Social media: Social media are "web-based services that allow individuals to (a) construct a public or semi-public profile within a bounded system, (b) articulate a list of other users with whom they share a connection, and (c) view and traverse their list of connections and those made by others within the system" (Kircaburrun et al., 2018, p. 526).

Assumptions

The current study was based on a few assumptions, which refer to elements that researchers must assume as true in order to perform an investigation (Simon & Goes, 2013). First, it was assumed that only eligible individuals would receive the study invitation and have the opportunity to participate in this research. SurveyMonkey only distributed the study invitation and survey link to registered users who met the stated inclusion criteria. It was also assumed that only eligible individuals would complete the survey because no incentives were offered for participation, and ineligible individuals would have little motivation to complete a survey for which they were not eligible. I

assumed that all participants possessed the cognitive and literacy skills required to read, understand, and complete the online survey. Because all participants were college students, it was safe to assume they all possessed these basic skills.

Scope and Delimitations

The scope of the study was bound by certain delimiting factors. Delimitations are study aspects selected by researchers that narrow the scope of an investigation (Simon & Goes, 2013). Delimitations of the current investigation included the population, which only included students who were currently enrolled in a 4-year, post-secondary U.S. institute, were at least a sophomore, and were at least 18 years old. The theoretical framework and selected method and design were also delimiting factors. Finally, the instruments selected to assess the study variables were delimitations.

Limitations

The main limitation of this study was the use of self-reported GPA to measure academic performance. Although a number of metrics may be used to assess academic performance, self-reported GPA is most convenient for a student survey. Further, other metrics such as test scores may not be standardized across all students, making it difficult to accurately compare performance across a sample. However, GPA is a standardized metric for all college students, reported along the same 4-point scale. Further, most students are aware of their cumulative GPA. Another limitation was factors other than nonacademic social media multitasking may influence academic performance. These factors could include individual characteristics such as socioeconomic status or race; the current research was limited in that it did not account for other factors that could

influence academic performance. But the aim of this research was not to prove causation; the aim was to assess for the presence of correlations.

Findings were also limited to undergraduate students enrolled at traditional, brick-and-mortar institutions. Graduate students or those enrolled in online program may have different experiences that would produce different results. Finally, I had little control over who completed the survey. Although I used screening questions to help ensure all respondents were eligible, I had no way of confirming eligibility. However, because I did not offer incentives for participation, I did not anticipate ineligible individuals would be motivated to complete the survey.

Significance

Findings from this study may shed light on the ways social media multitasking can affect student academic performance. Though nonacademic social media multitasking is associated with poor academic outcomes (Lau, 2017; Ravizza et al., 2014), the mechanism behind this relationship is less clear. This study also revealed whether fear of missing out was correlated with nonacademic social media multitasking. In addition to filling important gaps in the existing research regarding the relationships between social media multitasking, fear of missing out, and academic performance, findings from this study may also be useful to educational practitioners seeking to improve academic outcomes, such as GPA and college graduation, among postsecondary students.

Findings from this research also have potential social change implications. As a society, education and academic success are critical to a well-informed and successful

public (Mackey, 2019). An educated society is also essential for maintaining a competitive foothold in an increasingly globalized society (Wilgus, 2019). In recent decades, policymakers and educational leaders have become increasingly concerned with the declining academic performance of U.S. students (Jain, 2019). Although technology has provided teachers and learners with powerful educational tools, social media multitasking may impede academic performance via cognitive overload. Findings from this study revealed ways social media multitasking and fear of missing out may affect academic performance (assessed as students' self-reported GPA). Findings could inform the development policies regarding social media use in schools. Ultimately, this research could result in positive social change via improvements in student academic performance.

Summary

It was unknown whether the fear of missing out was correlated with nonacademic social media multitasking or whether it moderated the relationship between social media multitasking and academic performance. Accordingly, the current quantitative investigation examined the potential relationships between nonacademic social media multitasking, academic performance (measured as self-reported, overall GPA), and fear of missing out. Data for this study were collected via online survey, distributed by SurveyMonkey to eligible college students. Findings shed new light on the ways social media multitasking can affect student academic performance.

This chapter provided an introduction to the current investigation. A comprehensive review of recent, related research is provided in Chapter 2.

Methodological details are outlined in Chapter 3, and study results are provided in

Chapter 4, followed by a discussion of findings in Chapter 5.

Chapter 2: Literature Review

Nonacademic social media use such as social media multitasking is associated with poor academic performance on standardized tests (Ravizza et al., 2014) and low self-reported GPA (Lau, 2017). Another factor that can affect academic performance is the fear of missing out. Because fear of missing out can perpetuate high levels of social media use, it is an important factor to consider in the relationship between nonacademic social media multitasking and poor academic performance (Bright & Logan, 2018). However, it is unclear whether fear of missing out is correlated with or moderates the relationship between nonacademic social media multitasking and academic performance. Accordingly, the purpose of this quantitative investigation was to examine the potential relationships between nonacademic social media multitasking, academic performance (measured as self-reported, overall GPA), and fear of missing out.

This chapter provides a review, analysis, and synthesis of findings from previous researchers on the topics of social media, multitasking, fear of missing out, and academic performance. The chapter begins with a discussion of the strategy used to locate the journal articles, books, and other scholarly sources discussed in this review of the literature. Next, the theoretical framework is expanded on to illustrate the alignment of belonging hypothesis and scattered attention hypothesis to the current study. Next, a review of the related body of literature is presented, beginning with a discussion of the history of social media and its potential benefits and harms. Research on social media multitasking, the fear of missing out, and academic outcomes are also discussed. The chapter closes with a brief summary and conclusion.

Search Strategy

A number of online databases were used to locate the research discussed in this chapter, including Academic OneFile, JSTOR, Academic Search Premier, Gale InfoTrac, Digital Commons, Education Source, ProQuest, SAGE, Taylor & Francis Online, Project MUSE, Wiley, and Google Scholar. When possible, included research was limited to that which was published within the last 5 years. Older sources were selectively included when they were seminal or particularly relevant. Several combinations of the following search terms were used: *social media, social networking, SNS, Facebook, Twitter, social networking sites, academic outcomes, college, fear of missing out, social media overload, multitasking, media, social media multitasking,* and *cognitive overload*.

Theoretical Framework

The theoretical framework for the current study was based on Baumeister and Leary's (1995) belonging hypothesis as well as van dur Schuur et al.'s (2015) scattered attention hypothesis. Together, the belonging hypothesis and scattered attention hypothesis were useful in understanding fear of missing out and its relationships with social media multitasking and academic performance. Each of these hypotheses is discussed in relation to the current investigation in the following sections.

Belonging Hypothesis

Baumeister and Leary (1995) proposed that the need to belong is a fundamental driver of human behavior. According to the researchers, "Human beings have a pervasive drive to form and maintain at least a minimum quantity of lasting, positive, and significant interpersonal relationships" (p. 497). The need to belong is an innate

motivation that prompts much of individuals' interpersonal behaviors (Baumeister & Leary, 1995). In order to develop and maintain valuable interpersonal relationships, humans must engage in frequent and pleasant interactions with others, and the interactions must occur within a context of concern for another's welfare (Baumeister & Leary, 1995). A lack of belonging, which can occur when frequent interactions are not present, can create a sense of deprivation.

The need to belong may help explain fear of missing out and social media multitasking among students. Modern communication technologies, such as social media and personal digital devices (Beyens et al., 2016), can exacerbate the need to belong. The need to belong may prompt a fear of missing out, which fosters social engagement with others over social media (Abel et al., 2016; Beyens et al., 2016). Fear of missing out has been positively correlated with social media intensity and negatively correlated with social connection (Roberts & David, 2019). Essentially, fear of missing out affected subjective well-being in both positive and negative ways, depending on the intensity of social media use and users' social connections (Roberts & David, 2019). Further, fear of missing out can mediate the relationship between authentic self-presentation and the need to belong (Wang, Xie, et al., 2018). The current study expanded on the belonging hypothesis by using it to examine the potential moderating effect of fear of missing out in the relationship between nonacademic social media multitasking and academic outcomes.

Scattered Attention Hypothesis

The scattered attention hypothesis was also used in the framework for the current study, as this hypothesis helped explain relationships between social media multitasking

and academic performance. According to the scattered attention hypothesis, social media multitasking can disrupt focus on required tasks because attention is limited, which can lead to errors and reduced performance on tasks (van dur Schuur et al., 2015). In the context of this study, social media multitasking may reduce academic performance.

Previous research based on the scattered attention hypothesis has shown that social media can have negative effects on users. Research has indicated that multitasking with academic media results in attention problems (van dur Schuur et al., 2015). Multitasking with academic media can scatter users' attention and undermine focus on academic tasks. Further, media multitasking interferes with working memory, which has a negative effect on academic outcomes (Mary & Elder, 2018; Ophir et al., 2009). In addition to undermining academic performance, social media has been associated with psychological distress (May, 2017).

Literature Review Related to the Key Variables and Concepts

Social Media: A Historical View

Humans a typically desire a sense of belonging and membership in social groups (Abel et al., 2016). Historically, bonding social interactions occurred through face-to-face interactions; however, modern technologies have drastically changed the way humans interact, socialize, and build relationships. Much of today's communication and socialization take place via social media, also known as social networking sites. Social media sites allow people to connect with others and present themselves through a profile (Kircaburrun et al., 2018, p. 526). The most popular social media sites in the world include Facebook, Twitter, Instagram, Snapchat, and YouTube (Alexa, n.d.). Although

individuals may be motivated to use social media by a number of factors, the primary

reason for engaging with the platforms is to establish and maintain relationships, both

online and offline (Kuss & Griffiths, 2017). The *social* aspect of social media is apparent

in the different ways various platforms can be used. For example, Instagram can be used

for self-expression and social interaction (Lee et al., 2015); Facebook can satisfy users'

need to belong (Kircaburrun et al., 2018); and Snapchat is ideal for quick communication

that integrates users' immediate environments (Piwet & Joinson, 2016).

A discussion on the effects of social media can begin with a review of the origins

of these popular social networks. Researchers often credit the Bulletin Board System

(BBS) of the 1980s as the beginning of social media (Bialy, 2017). The BBS was a

rudimentary online meeting room that allowed users to leave messages for one another

without knowing with whom they were communicating. A growing interest in online

interaction was sparked by the BBS, which eventually led to the development of other

emerging social platforms, such as classmates.com and sixdegrees.com in the 1990s

(Bialy, 2017).

In the early 2000s, online platforms evolved further to become the social media

platforms so many users are now familiar with, two decades later. LinkedIn was founded

in 2003 (Kaur, 2016), followed by the development of Facebook by Mark Zuckerburg

and his classmates in 2004 (Scott et al., 2018). As of 2020, Facebook remained the most

popular online platform, used by 2.7 billion individuals each month (Statista, 2020b).

Facebook allows users to become "friends" online, giving them opportunities to view and

"like" one another's posts. Twitter emerged in 2006, unique in its use of hashtags and

short, 140-character messages that users could "tweet" to their online followers (Blank &

Lutz, 2016). With the growing popularity of social media, several other social media

platforms emerged in the early 2000s, including Myspace, Google+, YouTube,

Instagram, and Snapchat (Bialy, 2017). By the end of 2019, over 2.5 billion people used

social media platforms worldwide (Statista, 2020a).

  Over the years, social media has evolved to become a tool for more than just

online connection and social media interaction. Today's users also engage social media to

obtain information, such as news and current events (Oeldorf-Hirsch, 2017). Social media

platforms allow users to absorb and repost articles, share their opinions, and engage in

debates. Social media thus plays a prominent role in the flow of information across

societies (Bialy, 2017). Social media has become such a prolific information source that

mainstream media networks often use the platforms to share information and learn about

new stories through users. Social media has also changed the face of journalism, allowing

regular people to become citizen journalists, sharing stories of their own and offering

alternatives to mainstream media (Saka, 2018). However, with the protection of

anonymity and the absence of gatekeepers, risks for misinformation run high on social

media platforms (Bialy, 2017).

  The growing popularity of social media should not be underestimated. Between

2010 and 2016, the number of social media users in the world increased from .97 billion

to 2.34 billion (Statista, 2020a). Other estimates include that two-thirds of internet users

and one-third of all people in the world use social media (Kempy, 2017). Social media

dominates many people's lives, and nearly one-quarter of Americans' days are spent on

social media (Abel et al., 2016). Apart from connection and information-sharing, social media has also emerged as a tool for mobilizing support, waging information operations, disseminating narratives, and even coordinating military operations (Bialy, 2017). Although there are many beneficial uses of social media, its potential for harm has also increased, in the form of social cyberattacks. Common types of social cyberattacks waged on social media include crowd manipulation, hysteria propagation, escalation of rumors, violence, panic, confusion, and chaotic mass behaviors (Goolsby, n.d.).

Benefits of Social Media

Though much of the research on the effects of social media focuses on the potential harms of problematic levels of engagement, many researchers report a number of benefits associated with social media use. For example, social media has the potential to help users build relationships and bonds while developing social capital (Roberts & David, 2020). Social media engagement can also increase users' perceptions of social resources and support (Domahidi, 2018) while reducing feelings of loneliness (Seo et al., 2016). Social media also has a number of potential benefits from a professional perspective. For example, individuals can use the career oriented social media site, LinkedIn, to create connections or build social capital to boost their professional endeavors (Utz, 2016). The number of connections users had on professional social networking sites is predictive of informational benefits, such as receiving work-related information and opportunities for career advancement (Utz & Breuer, 2016).

Marketers and organizations have also tapped into the power of social media, using the platforms to create targeted ads and campaigns based on user preferences

(Chiang et al., 2019). Small businesses can use social networking sites to advertise, build communities, grow brands, leverage influence, and turn fans into customers (He et al., 2017). Social media sites such as Facebook allow businesses to directly communicate and interact with customers and potential customers in ways not previously possible (Morales et al., 2017).

In an educational context, many potential benefits of social media exist. For example, the use of social media increases content sharing and the exchange of ideas (Edwards et al., 2015). In classroom settings, social media can also help increase engagement (Edwards et al., 2015). Through the collaboration fostered by social media, these platforms have the potential to improve learning (Dumpit & Fernandez, 2017). Finally, social media has reconceptualized the boundaries of formal and informal education, creating opportunities for distance learning and educational attainment previously impossible for many individuals (Greenhow & Lewin, 2016).

Potential Harms of Social Media

Controlled use of social media has many benefits; however, maladaptive or addictive use can have a number of harmful effects on users. For example, compulsively checking social media feed can have harmful psychological consequences that undermine the well-being of users (Brooks, 2015; Fox & Moreland, 2015; Oberst et al., 2017). Research indicates that excessive social media engagement is related to depression (Lin et al., 2016), anxiety, loneliness, and low self-esteem (Bhagat, 2015). Researchers have also reported on the association between social media engagement and poor social adaptation (Bodroža & Jovanović, 2016).

The directions of the relationships between maladaptive social media engagement and negative affect, such as depression, is less clear. For example, it is unclear whether depressed individuals are more likely to demonstrate maladaptive social media behaviors or if maladaptive social media behaviors cause depression (Lin et al., 2016). Similarly, lonely individuals may be more likely to engage with social media to develop a sense of connectedness, or the isolation caused by maladaptive social media use may lead to loneliness. Lonely individuals may seek out online relationships to compensate for challenges in their in-person relationships (Andersson et al., 2016).

Researchers developed a seven-block model of social media to illustrate the ways individuals engage with social media and how they relate to one another (Kietzmann et al., 2011). The seven blocks include sharing, presence, conversations, identity, relationships, groups, and reputation. Sharing describes the degree to which individuals exchange and disseminate content on social media. Presence describes the degree to which individuals can determine the accessibility of others. Conversations describes the degree to which individuals communicate with other social media users. Identity describes the degree to which individuals reveal information about themselves. Relationships describe the degree to which individuals connect with one another through social media. Groups describe the degree to which social media users form communities. Finally, reputation describes the degree to which users know the standing of other social media users. Using this seven-block model of social media, researchers have described the dark side of social media as follows:

- Sharing: Users may share inappropriate content with one another.

- Presence: Users may monitor one another's whereabouts through location tracking technologies.

- Conversations: The conversations between users may include misinformation or aggressive engagement.

- Identity: Users may exploit their online selves.

- Relationships: Users may threaten, abuse, or intimidate others with whom they have online relationships.

- Groups: Users may establish group biases.

- Reputation: Users may shame and defame one another. (Bacccarella et al., 2018)

Addressing these darker facets of social media requires an awareness of the potential harm of social platforms. In addition, more research is needed to examine the negative outcomes that can result from social media engagement and develop strategies to overcome those harms. Further, it is important to address the negative effects of social media multitasking and related attentional deficits, especially in terms to academic outcomes.

Media Multitasking

Media multitasking can result from environmental disruptions or self-interruptions when individuals prioritize interaction with media over other tasks (le Roux et al., 2017). Typically, multitasking requires individuals to rapidly switch between tasks, creating continuous disruptions and shifts in attention (Chen & Yan, 2016). Students are constantly bombarded by a stream of information and communication through their

phones, computers, and other smart devices; as a result, media multitasking has become the norm for members of the net generation (le Roux et al., 2017).

As Demirilek and Talan (2017) explained, the constant and pervasive information stream created through social media and smart devices has resulted in a "multitasking generation" (p. 1). Today's students overwhelmingly engage in media multitasking. In a study on media multitasking, Hwang et al. (2014) found that 90% of college students multitasked with media. While few students may develop the ability to efficiently multitask, long-term rapid switching behaviors from media multitasking typically leads to reduced learning and poor performance on academic tasks (Kirschner & De Bruyckere, 2017). Kirschner and De Bruyckere (2017) explained that media multitasking may create the illusion of effective multitasking and technical savvy, but for most users, media multitasking undermines performance across many domains. Findings from the existing research largely indicate that non-academic media multitasking with technology and social media has a negative effect on academic performance. Such findings support the scattered attention hypothesis, as attempting to pay attention to class materials while engaging with technologies can undermine learning by drawing learners' attention away from class materials (May & Elder, 2018).

In-class media multitasking is increasingly problematic on modern school campuses. Smart devices and widespread access to wireless networks allow students to engage in multitasking activities, such as texting and browsing social media, during class (Demirilek & Talan, 2017). As May and Elder (2018) explained, "The ubiquity of media multitasking among today's students raises concerns about its consequences and

outcomes in relation to student learning and cognition" (p. 2). Researchers have found

multitasking activities can create distractions, memory reductions, lack of attention and

engagement, and declines in performance and productivity (Demirilek & Talan, 2017).

According to Harrison and Risler (2015), the most common in-class multitasking

activities that students engage in are texting and browsing social media.

Social media multitasking can negatively affect academic performance (Lau,

2017), as frequent media multitasking can create habitual, scattered levels of attention

(van der Schuur et al., 2019). The negative school-related outcomes of social media

multitasking occur in the areas of academic performance, study behaviors, and perceived

learning (van der Schuur et al., 2015). Researchers have examined the effects of social

media multitasking on various facets of academic performance. For example, Demirilek

and Talan (2017) studied the relationship between off-task social media multitasking

during class and grade performance among post-secondary students. Results confirmed

that when students engaged in social media multitasking during lectures, their grade

performance declined.

Lau (2017) also found that social media multitasking had a negative effect on the

academic performance of postsecondary students. The researcher surveyed 348

undergraduate students to assess nonacademic social media use, academic social media

use, social media multitasking, and academic performance. Analysis revealed social

media multitasking significantly and negatively predicted academic performance. More

recently, Uzun and Kilis (2019) examined the relationships between media use,

multitasking, self-regulation, and academic performance. Analysis of a survey completed

by 631 college students revealed multitasking and media use were both negatively associated with academic outcomes; self-regulation appeared to have no effect on academic outcomes.

Findings reported by Lau (2017) Demirilek and Talan (2017), and Uzun and Kilis (2019) echo those from previous researchers, who also reported in-class multitasking was correlated with lower GPA (Al-Menayes, 2015; Bellur et al., 2015; Walsh et al., 2013). Al-Menayes (2015) studied the ways social media use, engagement, and addiction affected academic performance and found time spent using social media was negatively related to academic performance. Accordingly, addictive social media behaviors were also associated with poor academic outcomes (Al-Menayes, 2015). Similarly, Bellur et al. (2015) conducted a survey of college students and found in-class multitasking was negatively predictive of GPA. The most common form of in-class multitasking reported by Bellur et al. was texting. Walsh et al.'s (2013) study on media use and academic outcomes among female, first-year college students revealed high rates of media use (nearly 12 hours per day, on average), which was negatively associated with GPA.

Kuznekoff and Titsworth (2015) examined the effects of in-class multitasking on academic performance among three groups of students: one that did not multitask, a second group that performed low-distraction multitasking, and a third group that performed high distraction multitasking. The scholars found participants in the non-multitasking groups took more detailed notes and earned higher grades than students in the low- and high-distraction multitasking groups. An interesting finding from this study was that students in the low-distraction group who sent text messages related to the

lecture demonstrated 70% better information recall than students in the high-distraction

group, which did not sent texts related to the lecture. This finding suggests that the effects

of multitasking may depend on the purpose of multitasking activities (Kuznekoff &

Titworth, 2015).

Downs et al. (2015) also studied the effects of academic multitasking using a

variety of conditions. In this study, the researchers assigned students to one of six

classroom settings: (a) one that was distracted by Facebook, (b) one that took notes with

pen and paper, (c) a control group that used no media, (d) a group with mixed

distractions, (e) a group that took notes using a laptop, and (f) one that experienced

distracted combination. The researchers found that participants in the distracted

conditions (a, d, and f) performed worse on an academic assessment than those in the

control, pen and paper note-taking, and laptop note-taking groups.

While computers and other smart devices such as tablets have the potential to

prompt non-academic multitasking in classroom settings, smartphones are the most

common devices carried by students, and may create the most significant problems.

Brooks (2015) studied nonacademic multitasking with smart phones and found students

who used social media on these devices had lower academic performance. Indeed, media,

technology type, and a number of other factors, including academic subject matter, may

influence the ways in-class social media multitasking affects academic performance. Le

Roux and Parry (2017) examined differences in the effects of in-class media use on

academic performance, by subject matter. The researchers found that arts and social

science students were negatively affected by in-class media use, while students in

engineering, economics, medical, and health sciences classes did not experience these negative academic outcomes from in-class media engagement. In contrast, Gaudreau et al. (2014) found no significant subject area differences in the effect of media multitasking on students' academic performance.

Importantly, not all researchers report that multitasking with smart devices and social media results in declines to academic performance. For example, Hartnell-Young and Vetere (2008) found that the use of smart phones during class was associated with increased creativity. Junco (2012) reported that social media multitasking was associated with increased rates of homework completion, while Corbeil and Valdes-Corbeil (2007) found such multitasking was associated with increases in collaborative learning. Importantly, in the aforementioned studies, smart devices were leveraged as tools to support learning. When explicitly used as support tools, smart devices are associated with improved communication and social acceptance (Valkenburg et al., 2006), self-esteem (Yu et al., 2010), and student involvement (Heiberger & Harper, 2008).

Finally, Van der Schuur et al. (2015) conducted a systematic review of 43 studies on the way media multitasking affected academic performance. Of the studies examined, 17 reported a negative effect and four studies demonstrated no significant effect of media multitasking. In the remaining studies, the direction of the relationship between media multitasking and academic outcomes could not be determined (Van der Schuur et al., 2015). Other researchers have also reported media multitasking had no effects on academic outcomes (Elder, 2013; Lee et al., 2012). These contrasting findings indicate future research is needed to better understand the relationships between media

multitasking and academic outcomes, including factors that may serve as moderators or mediators, as well as the effects of characteristics of individual users (le Roux et al., 2017).

Fear of Missing Out

In-class social media multitasking may be prompted by several needs, such as the desire for information or boredom with class materials. However, a growing body of literature suggests social media multitasking may be primarily associated with the fear of missing out. Although the fear or missing out is not a new concept, it has received growing attention from scholars in light of the rise of social media (Abel et al., 2016). Fear of missing out describes an apprehension that others are having rewarding experiences that one is missing out on, when absent (Rozgonjuk et al., 2019). Fear of missing out can have a number of negative effects such as anxiety, depression (Krasnoa et al., 2015; Oberst et al., 2017), and smartphone addiction (Chotpitayasunondh & Douglas, 2016). Other negative consequences of the fear of missing out include poor motivation in school (Alt, 2018), declines in life satisfaction (Dossey, 2014), and alcohol consumption (Riordan et al., 2018).

Fear of missing out is also associated with problematic use of social networking sites (Alt, 2015; Beyens et al., 2016). As Whelan et al. (2017) explained, "In a vicious cycle, the possibility to be constantly connected with others may further fuel FoMO, driving people towards greater use of social media" (p. 3). Problematic social networking site use is likely the result of a deficit in need satisfaction; accordingly, fear of missing

out mediates the relationship between poor needs satisfaction and problematic social networking site behaviors (Przybylski et al., 2013).

A number of researchers have reported on the correlation between fear of missing out and social media use. For example, Beyens et al. (2016) studied the relationship between fear of missing out, the need for popularity, and Facebook use among a sample of 402 adolescents. Analysis revealed the need for popularity was positively associated with Facebook use, and fear of missing out moderated this association. Duman and Ozkara (2019) examined the mediating role of fear of missing out in the relationship between social identity and online game addiction, as well as the moderating role of the need to belong in the relationship between social identity and online game addiction. Analysis revealed that the relationship between social identity and addictive gaming behavior was fully mediated by players' fear of missing out (Duman & Ozkara, 2019).

Social Media Use and Academic Outcomes

Several researchers have examined the links between social media use and academic outcomes and found that excessive or problematic use is associated with poorer academic outcomes (Felisoni & Godoi, 2018; Kates et al., 2018; Rozgonjuk & That, 2017; Wammes et al., 2019). As Rozgonjuk et al. (2019) explained, factors that link the use of technology and social media to poor academic outcomes need to be understood to identify students at-risk for negative effects of use, and to develop ways to mitigate such risks. Some of these factors may be social in nature, as students face increasing pressures to fit in and stay abreast of events and information within their social circles. Because social information proliferates through social media, fears of missing out on information,

when not constantly engaging with social media, may foster excessive and distracting social media use. Distracting social media use, in turn, may undermine academic performance.

Fear of Missing Out and Academic Outcomes

Fear of missing out has also been examined in relation to academic outcomes, and most recent investigations examine academic outcomes associated with technology use that is prompted by the fear of missing out. A number of researchers have investigated the relationships between fear of missing out and academic performance (Lemay et al., 2019; Qutishat & Sharour, 2019; Rozgonjuk et al., 2019). For example, Rozgonjuk et al. (2019) examined the relationships between instant notifications on users' smart phones, fear of missing out, and surface learning. Instant notifications are also known as *push notifications* or *pop-ups*, are designed to alert users about updated content or information. Surface learning describes an instrumental approach to learning that is often incentivized by external factors and associated with minimal effort made studying or trying to synthesize new information (Dolmans et al., 2016). Rozgonjuk et al. surveyed 316 undergraduate students in the United States and found students with greater fear of missing out were more likely to interact with instant notifications and become distracted from current tasks by the notifications they received on their phones. Further, a positive relationship was noted between fear of missing out and surface learning, suggesting people with greater fear of missing out may place more of their attention on social interactions and experiences than on their studies. The researchers concluded that

notifications can disrupt studying, especially for those with higher levels of fear of missing out (p. 6).

Not all investigations reveal fear of missing out negatively influences academic performance. Lemay et al. (2019) employed self-determination theory to examine the relationship between fear of missing out, loneliness, self-determination, and academic performance. Survey data from 102 university students revealed fear of missing out was positively related to academic performance, while autonomy was negatively associated with academic performance. In a similar investigation, Qutishat and Sharour (2019) investigated associations between fear of missing out and academic outcomes. The researchers surveyed university students from Oman and found no statistically significant relationship between the two variables. The positive effect of fear of missing out on academic performance reported by Lemay et al., and the lack of relationship reported by Qutishat and Sharour (2019) contradict findings from Rozgonjuk et al.'s (2019) study. The inconsistency in findings regarding the effect of fear of missing out on academic performance suggests additional research is needed to better understand the relationships between these constructs.

Nonacademic Social Media Multitasking

The negative effects of social media use on academic outcomes is likely the result of multitasking behaviors that distract students' attention from their academic endeavors. Factors that distract students' attention can interrupt learning and academic achievement because the ability to focus one's attention on academic tasks is essential to processing information and excelling in academic settings (van der Schuur et al., 2019).

Nonacademic social media multitasking describes social media use that is not directly associated with classroom activities and can distract from learning (Ravizza et al., 2014). These types of multitasking behaviors are also described in the cognitive science literature as *task switching* (Junco, 2015). Today's students of all levels, especially those in college, multitask more than any previous generation (Junco, 2015). Social media multitasking is particularly prevalent among youth and young adults between the ages of 13 and 24 (Voorveld & van der Goot, 2013).

The relationship between social media multitasking and academic outcomes is important to understand in light of school initiatives that require students to own laptop computers, as well as the pervasive access and influence of technology (Junco, 2015). When students have laptops in class, they may be more likely to engage in off-task or multitasking behaviors. With connected laptops and other smart devices in hand, students can easily connect to social media, exchange instant messages, surf the net, and engage in other off-task activities during lectures (Demirbilek & Talan, 2017).

Nonacademic social media use is associated with poor academic performance on standardized tests (Ravizza et al., 2014) and low self-reported GPA (Lau, 2017). In most of the studies on the effects of nonacademic social media multitasking, academic outcomes are assessed as GPA or test scores (le Roux et al., 2017). Nonacademic social media use may occur as social media multitasking. According to Konova and Chiang (2015), social media multitasking involves simultaneously engaging in several activities, at least one of which is social media. In a classroom setting, an example of nonacademic social media multitasking could involve simultaneously taking lecture notes while

checking social media feeds. The reasons for the negative effects of multitasking behaviors on academic outcomes have been examined. Early cognitive science researchers found that *cognitive bottlenecking* can occur when the simultaneous performance of two tasks increases the time needed to perform the second task (Welford, 1967). As Junco (2015) explained, "trying to attend to more than one task at a time 'clogs' up the bottleneck by overloading the capacity of the human information processing system" (p. 20).

A number of researchers have examined the effects of social media multitasking behaviors on various academic outcomes. For example, Junco (2015) studied the relationships between time spent using Facebook, time spent multitasking on Facebook, and GPA. Data were collected via 1,774 surveys completed by U.S. undergraduate students. The researcher found that students significantly multitasked Facebook use and academic work. Sophomores demonstrated the most social media multitasking with Facebook, at 70 minutes per day. Seniors performed the least amount of social media multitasking, but still spent 49 minutes per day switching between Facebook use and scholarly work. An important finding from Junco's study was that the effects of Facebook use and multitasking activities varied by class rank. For example, time spent on Facebook was negatively associated with GPA among freshmen, but not students from other ranks. Among freshmen, sophomores, and juniors, multitasking with Facebook was a negative predictor of GPA; however, the negative association was not present for seniors.

Demirbilek and Talan (2017) also explored the ways nonacademic multitasking with Facebook affected academic outcomes of college students. In this study, nonacademic multitasking included the following non-lecture-related uses: multitasking with phones, sending text messages, reading Facebook profiles, browsing news, and looking at shared multimedia. Academic outcomes from the Facebook multitasking group were compared to those of a control group that only took pen-and-paper notes during lectures. The researchers found that grade performance declined when students engaged in nonacademic multitasking via Facebook or texting. The researchers suggested that the reason for the negative effect of multitasking behaviors may be due to limited capacity for cognitive processing.

Cognitive Overload

Despite research recognizing the benefits of social media (Chiang et al., 2019; Domahidi, 2018; Edwards et al., 2015; Roberts & David, 2020; Seo et al., 2016; Utz, 2016), such benefits can disappear when social media use exceeds an optimal level; Whelan et al. (2020) referred to this phenomenon as *social media overload*. Two dimensions of social media overload exist, including information overload and communication overload (Whelan et al., 2017). Information overload occurs when the available information to be processed exceeds the cognitive processing abilities of an individual, while communication overload occurs when interruptions from communication demands, such as responding to text messages or emails, exceed an individuals' communication capacity (Whelan et al., 2017).

Other types of overload can also occur from social media use, including social overload, connection overload, information overload, and communication overload (Whelan et al., 2020). Social overload occurs when a social media user perceives they are receiving too much support through social platforms, while connection overload describes the demands placed on an individual to receive, maintain, and update information on social media. Information overload happens when the information received on a social platform exceeds an individuals' processing capabilities. Finally, communication overload happens when communicative demands of social media exceed the processing capabilities of users. Together, these types of social media-induced overload can contribute to the phenomenon known as *cognitive overload.*

The negative academic effects of social media use and multitasking are often understood through cognitive load theory (Lau, 2017). As Byyny (2016) explained, "Social norms have introduced a presumed requirement to participate, and collaborate, in every message we receive" (p. 2). The growing prevalence and use of social media have exposed users to more information than ever before, often requiring cognitive processing that exceeds their mental capacities (Whelan et al., 2017). The development of new information and communication technologies has resulted in an enormous amount of online content in competition for users' attention (Kononova & Chiang, 2015). While the potential for technology continues to expand, the cognitive capabilities of humans are limited (Byyny, 2016). The increase in available information and communication does not result in increased processing speed of the human brain; rather, efforts to maintain pace with social expectations of participation, communication, and digesting information

requires an increasing proportion of individuals' time, attention, and cognitive

capabilities (Byyny, 2016). As Byyny explained,

> We are continuously distracted from important priorities – thinking, learning,
>
> reflecting, decision-making. The presentation of information has become an
>
> insidious influence in the loss of our intellectual independence. We are
>
> bombarded with jibber-jabber, rumor, and opinions that are often biased with
>
> inaccurate or false information. (p. 3)

Increased demands on individuals' attention and cognitive abilities, often inherent

to social media use, can result in cognitive overload (Whelan et al., 2017). Cognitive load

describes the cognitive demands placed on a learner's information processing system,

based on the type, design, and nature of the material (Edwards et al., 2015). As Byyny

(2016) explained, cognitive overload describes the amount of mental effort utilized by

human's working memory at any time. Limitations to cognitive processing and working

memory undermine individuals' abilities to process new information (Demirbilek &

Talan, 2017). Switching between tasks, as required for nonacademic social media

multitasking, requires a change of attention and redirection of processing energy

(Demirbilek & Talan, 2017).

Cognitive load theory (Sweller, 1994) posits that the performance of one task can

be undermined when another task is simultaneously performed because of limitations to

cognitive processing abilities. That is, task performance declines when multiple tasks are

performed at once. Sweller's (1994) cognitive load theory proposes that an individual's

total cognitive processing abilities is the sum of intrinsic, extraneous, and germane loads.

In cognitive load theory, intrinsic load represents the mental demand required to process learning materials (Edwards et al., 2015). Germane load is the demand placed by transferring processed learning materials into schema for storage in long-term memory (Paas et al., 2004). Extraneous load represents "unnecessary materials or activities that are unrelated to or distracting from the learning tasks; this includes multitasks and distractions" (Edwards et al., 2015, p. 3028). Extraneous loads can include instructional aspects that do not directly contribute to learning.

According to Paas et al. (2004), learning is negatively affected when the demand imposed by extraneous load interferes or distracts from the construction of schemas; thus, for learning to be effective, extraneous loads must be kept low. Extraneous loads, such as nonacademic social media multitasking, have the potential to override the processing of learning materials when competition for cognitive resources occurs. This potential effect of extraneous loads becomes even more evident when extraneous demands are more engaging, motivating, and require more attention (Edwards et al., 2015).

Academic Effects

Cognitive overload has been associated with negative learning outcomes in a variety of contexts. For example, Jiang et al. (2016) found that individuals' ability to comprehend information was negatively affected by browsing micro-blogging posts through the Chinese social media platform, Weibo; mediation analysis revealed that cognitive overload mediated this relationship. While the posts on microblogging sites like Twitter are limited to 140 characters, participants face a virtually unlimited number of

messages. The quantity of messages can contribute to cognitive overload, as can the complexity and vagueness inherent to microblogging posts (Jiang et al., 2016).

Whelan et al. (2020) also studied the mechanics of overload caused by social media. The researchers surveyed a sample of 186 college students to understand how cognitive overload caused by social media impacted academic performance. Data were collected via survey, which measured fear of missing out, information overload, communication overload, deficient self-regulation, and academic performance. Results indicated fear of missing out created overload, which undermined users' abilities to self-regulate. Faulty self-regulation, in turn, resulted in reduced academic performance. Findings from Whelan et al.'s study contributed valuably to the existing body of research because they provide a more detailed explanation of the causal pathway between social media overload and academic performance.

Nonacademic Effects

The detrimental effects of cognitive overload, which encompasses social overload, information overload, and communication overload, extend far beyond the classroom. According to Whelan et al. (2017), almost 30% of workers' time is spent dealing with interruptions, including those caused by social media. The associated losses in productivity equate to annual losses of $650 billion. Cognitive overload is also associated with increased stress (Matthews et al., 2019), poor decision-making (Sos et al., 2019), mental health problems (Collins, 2020), depression (Arcand et al., 2020), and declines in performance (Biondi et al., 2020). Other negative effects of cognitive overload on workers include deterioration in communication skills, increased rate of

errors, and difficulties completing tasks that were previously achievable (Iskander, 2019).

Among athletes, cognitive burnout is associated with reduced physical performance

(Kalenscher, 2019). Acculturative stress can contribute to cognitive overload among U.S.

immigrants (Pena, 2019). Difficult courses can create cognitive among students,

especially those just beginning their postsecondary education (Benko et al., 2019).

Cognitive Overload and Fear of Missing Out

Cognitive overload may be exacerbated by the fear of missing out. Whelan et al.

(2017) examined the relationship between three aspects of cognitive control,

communication overload, and information overload. The three aspects of cognitive

control examined by the researchers included the fear of missing out, internet cognitive

failure, and poor self-regulation. Internet cognitive failure occurs when an individual

loses focus, becomes absent-minded, and makes errors while completing internet-related

tasks that they would normally be able to perform, error-free (Whelan et al., 2017).

Deficient self-regulation occurs when individuals lose self-control required to moderate

their consumption of media (Whelan et al., 2017).

Whelan et al. (2017) collected survey data from 129 U.S. and Irish college

students and found that all three aspects of cognitive control were associated with

communication overload. Specifically, the researchers reported fear of missing out

caused individuals to actively use many channels of communication, which provided

them relief in believing that if something happened, they would know about it. However,

limitations to the amount of communication an individual can effectively process can

result in communication overload. While internet cognitive failure and poor self-

regulation were positively associated with information overload, the fear of missing out was not. The researchers posited that the reason for this lack of association may be that individuals experiencing fear of missing out are more likely to turn to communicative channels such as email, texting, and social media to ease their discomfort, than they are to seek out information.

Social Media and the Fear of Missing Out

Research indicates that the fear of missing out can prompt social media use. Modern smart devices provide users with constant access to social media, allowing them to constantly observe updates from those in their networks. In this way, social media can drive the fear of missing out and prompt users to engage with their smart devices so they do not miss any updates from individuals in their networks (Rozgonjuk et al., 2019). For example, Wolniewicz et al. (2018) found that fear of missing out was associated with both social and problematic smartphone use, illustrating how individuals high in fear of missing out may use their connected devices to access social networks. Several other researchers have reported the strong, positive association between problematic smartphone use and fear of missing out (Alt & Boniel-Nissim, 2018; Wolniewicz et al., 2018). Makki et al. (2018) found that use of the social media platform, Snapchat, was associated with users' desire to experience a sense of connection, affiliation, and acceptance.

Social media use that is prompted by the fear of missing out can also include unhealthy, addictive behaviors (Alt, 2017). Negative affect, such as isolation, depression, and loneliness, can prompt social media engagement; this relationship can be partially

explained by the fear of missing out. Reer et al. (2019) surveyed a representative sample of German internet users to explore how loneliness, anxiety, and depression related to social media engagement, and how social comparison behaviors and fear of missing out moderated those relationships. The researchers found individuals who experienced loneliness, depression, and anxiety were more likely to engage in social media. The relationship between these markers of well-being and social media engagement were moderated by the fear of missing out and social comparison behaviors. That is, decreases in well-being were associated with increases in fear of missing out and social comparison behaviors, which then prompted increases in social media engagement.

Reer et al.'s (2019) findings reveal that fear of missing out can prompt individuals to use social media, and those with lower levels of well-being are more likely to use social media to soothe the fear of missing out. Oberst et al. (2017) explained that fear of missing out may explain tendencies for those with chronic deficits in need satisfaction to perpetually seek out opportunities to engage with social media and keep abreast of updates, even when that engagement occurs during inappropriate times. Other researchers have reported the association between fear of missing out and social media engagement is influenced by users' affective states. Among a sample of 386 undergraduate students, Baker et al. (2016) found that fear of missing out was positively associated with social media use, and higher levels of fear of missing out were associated with depression, a lack of mindfulness, and physical symptoms. When the researchers included fear of missing out in the model, time spent on social media was longer associated with

depression and lack of mindfulness, suggesting that fear of missing out is a stronger predictor of social media engagement than individuals' mental states.

In a similar investigation on fear of missing out, wellbeing, and social media engagement, Alt (2018) found the relationship between maladjustment to college and social media engagement was mediated by fear of missing out, leading the researchers to conclude that fear of missing out could help explain social media use during class, especially among students struggling to adjust to college. Oberst et al. (2017) also explored the mediation of fear of missing out in a study on the negative effects of problematic social media use. The researchers found that fear of missing out mediated the relationship between psychopathological symptoms and negative consequences of heavy social media use. Interestingly, the mechanisms of these mediations varied by gender; depression triggered problematic social media use in girls, while anxiety was more likely to prompt boys to engage in heavy social media use. Roberts and David (2018) also examined fear of missing out, social media engagement, and well-being. Among a sample of 458 college students, the researchers found that fear of missing out influenced subjective well-being in direct and indirect ways, through social media intensity and need for social connection. Dhir et al. (2018) reported compulsive social media use mediated the association between social media fatigue and fear of missing out.

While low levels of well-being can prompt fear of missing out and social media engagement, well-being can also be undermined by social media engagement and fear of missing out. That is, poor states can contribute to fear of missing out and social media use, and fear of missing out and social media use can contribute to poor states. This is an

important point to note because it reveals the downward spiral that individuals can experience when they use social media to quell fear of missing out. For example, Scott and Woods (2018) explored fear of missing out, social media use, and sleep habits and outcomes among adolescent internet users. The researchers found that nighttime engagement with social media was associated with later bedtimes and shorter sleep duration. Fear of missing out predicted shorter sleep duration in two ways. First, late night social media use resulted in later bedtimes, and increased levels of cognitive arousal at night delayed the onset of sleep, resulting in fewer hours of rest.

Conclusion

Findings from this literature review confirm the ways social media use can undermine academic achievement. A number of researchers have reported negative relationships between social media use and academic outcomes, and the negative effects of multitasking on academic outcomes have also been explored. Extensive findings on the relationship between social media use and fear of missing out, in a variety of contexts and among a wide variation in samples, underscore the importance of examining fear of missing out in studies on social media use (Alt, 2017). Missing from the existing body of literature is an examination of the way fear of missing out may moderate the relationship between nonacademic social media multitasking and academic outcomes.

Researchers have examined the effects of social media use, as well as multitasking, but less is known about social media multitasking. Further, conflicting findings regarding the effects of fear of missing out, social media use, and multitasking on academic outcomes indicate additional investigation is needed to better understand

relationships between these constructs. The current study aimed to answer that call for investigation by examining the potential relationships between nonacademic social media multitasking, academic performance (measured as self-reported, overall GPA), and fear of missing out. Findings shed light on the ways nonacademic social media multitasking and fear of missing out can affect academic performance. This chapter provided essential background and context for the current investigation. The following chapter contains details of the methodology, including the method, design, sampling strategy, data collection procedures, and data analysis plan.

Chapter 3: Research Method

Though some research indicates that social media use is associated with poor academic outcomes (Rozgonjuk et al., 2019), the mechanism of this relationship is less understood. The purpose of this quantitative investigation was to examine the potential relationships between nonacademic social media multitasking, academic performance (measured as self-reported, overall GPA), and fear of missing out. This chapter includes details of the study's method and design. It begins with a discussion of the design and rationale, followed by a discussion of my positionality, as the researcher. The population, sample, and sampling strategy are discussed next. Procedures for recruitment, participation, and data collection are then detailed. Instrumentation is outline and variables are operationalized. The data analysis plan is described, followed by threats to validity and how such threats will be mitigated. The chapter closes with the study's ethical procedures and a summary.

Research Design and Rationale

The nature of this research was a quantitative, nonexperimental design. A quantitative method was selected because the aim was to explore relationships between variables (Queirós et al., 2017), and the design was nonexperimental because the sample was not randomized, nor were there control or intervention groups (Seeram, 2019). For research question 1, the independent variable was nonacademic social media multitasking, measured using Lau's (2017) instrument on social media multitasking; the dependent variable, academic performance, was measured using self-reported GPA. For Research Question 2, the independent variable corresponded to fear of missing out, which

was measured using the Fear of Missing Out scale; the dependent variable corresponded to nonacademic social media multitasking, which was measured using Lau's (2017) instrument on social media multitasking. For Research Question 3, the independent variable corresponded to nonacademic social media multitasking; the dependent variable corresponded to academic performance; and the moderator corresponded to fear of missing out. Although significant time restraints were not associated with this design or data collection strategy, it is important to mention financial constraints associated with the use of SurveyMonkey. Because each completed survey was paid for, I only gathered the number of completed surveys determined by the power analysis.

Methodology

Population

A target population describes the population for which inferences will be made; the study population is a subset of the target population that is obtained through sampling (Howe & Robinson, 2018). Information gathered from the study sample is used to make inferences about the target population (Howe & Robinson, 2018). In the current study, the target population included all U.S. undergraduate students who were currently attending public, 4-year institutions in the United States. According to the National Center for Education Statistics (2020), 9% of undergraduate students enrolled at public, 4-year universities were exclusively enrolled in distance courses; the other 91% took classes exclusively on campus or participated in both online and in-person courses. The original intention of this project was to sample only students attending in-person classes in public, brick-and-mortar schools; however, due to the Covid-19 pandemic, many in-

person classes switched to online formats. For this reason, the target population of the

research included all undergraduate students attending 4-year institutions, regardless of

class format. The most recent data from the National Center for Education Statistics

revealed the total undergraduate enrollment at public 4-year institutions was

approximately 13 million students.

Sample and Sampling Strategy

The sample for this study consisted of U.S. undergraduate college students

enrolled at public, 4-year universities. To be eligible for this study, individuals had to be

currently enrolled in a 4-year, postsecondary U.S. institute, be at least a sophomore, and

be at least 18 years old. Participants were recruited via SurveyMonkey based on these

criteria. SurveyMonkey has a database of registered users who can be recruited based on

criteria provided by researchers. These criteria were sent to SurveyMonkey, and the

company distributed the study invitation to eligible individuals. A convenience sampling

strategy was used, which is a nonprobability sampling strategy in which participants are

selected based on practical criteria such as accessibility or their willingness to participate

(Etikan et al., 2016). In this way, the sample was not random and may not be

representative of the population of U.S. students attending 4-year schools. This is a

limitation associated with convenience sampling (Etikan et al., 2016).

Sample Size

The sample size was determined based on a power analysis performed using

G*Power 3.1.9 software (Faul et al., 2014). The primary inferential analysis consisted of

regression analyses. The following criteria were entered: a conventional power of 0.80, a

significance level of $\alpha = 0.05$, and a medium effect size, $f^2 = 0.15$. The hierarchical regression for Research Question 3 included three total predictors. For a regression analysis with these parameters, the minimum sample for this research was 77 participants.

Recruitment, Participation, and Data Collection

Study participants were recruited through SurveyMonkey, which is a web-based survey company that assists researchers with recruitment and data collection. SurveyMonkey was used for this study because it provided timely data collection using a sample of individuals from all over the country. In addition, I selected the inclusion criteria so only eligible individuals received a study invitation, helping to ensure findings were relatively reflective of the study population, despite the lack of representativeness. The sample was limited to individuals ages 18 years and older to avoid the ethical challenges associated with sampling minors. In addition, only students who had been in college for at least 1 full year were included to ensure all participants possessed postsecondary experience needed to gauge fear of missing out and nonacademic social media multitasking behaviors among college students. Students under the age of 18 and those who were not currently enrolled in a public, 4-year postsecondary institution were not eligible to participate.

Data were collected via online survey, which was distributed through SurveyMonkey. The online survey consisted of the Fear of Missing Out Scale (Przybylski et al., 2013), items from Lau's (2017) study on social networking and academic performance, and a demographic questionnaire that gathered descriptive

statistics, including respondents' GPA. I selected online surveys over traditional, paper-and-pencil surveys for two main reasons. First, in light of the Covid-19 pandemic, online surveys were safer and preferred. Online surveys do not possess risks of disease transfer, which could occur with traditional paper surveys that respondents are required to physically handle and fill out. Second, online surveys help ensure anonymity and are often more reliable than traditional surveys (Tuten, 2010). Traditional surveys tend to be more costly to administer than online surveys (King et al., 2014), and obtaining the mailing addresses of prospective participants would be more difficult than distributing the survey online (Saleh & Bista, 2017).

I uploaded the online survey to SurveyMonkey and provide the company with the list of inclusion criteria as well as the required sample size. SurveyMonkey then sent study invitations to eligible individuals. The study invitation outlined the study's purpose, inclusion criteria, and participation requirements. Interested individuals were prompted to click a link embedded within the email invitation, which took them to the study survey via a new window. The first page of the survey was the informed consent form, which once again detailed the study's purpose, inclusion criteria, and participation requirements. In addition, the informed consent form assured respondents of anonymity, explained participation was completely voluntary, and provided my contact information for any questions they may have had. To access the study survey, respondents were required to click a button at the bottom of the consent form, indicating their understanding of the consent and agreement to participate. Individuals who did not provide consent were redirected to a screen thanking them for their consideration and then exited from the

survey. Individuals who provided consent were taken to the first page of the survey.

Upon completion of the survey, participants were sent to a screen thanking them for their

time and participation, and then they were exited from the survey. The data collection

period lasted less than 1 week. After the required sample of 77 completed surveys were

gathered, the survey was closed and downloaded to analyze the raw data.

Instrumentation and Operationalization of Constructs

Data for this study were collected via online survey, which was distributed via

SurveyMonkey. The survey was used to measure the three study variables, including fear

of missing out, nonacademic social media multitasking, and academic performance. The

measurement of each of these variables is described in the following sections.

Fear of Missing Out

Fear of missing out describes an apprehension that others are having rewarding

experiences that one is missing out on, when absent (Rozgonjuk et al., 2019). Fear of

missing was assessed using the Fear of Missing Out Scale (Przybylski et al., 2013;

Appendix A). This scale consists of 10 items designed to measure apprehension

associated with missing out on potentially rewarding experiences. Each item is a

statement that is responded to along a five-point scale ranging from *not at all true of me*

to *extremely true of me*. The instrument is scored by averaging responses to all 10 items,

producing a score ranging from 1 to 5. This variable was treated as interval. A sample

item is: "I fear my friends have more rewarding experiences than me." The Fear of

Missing Out Scale has strong internal consistency. Rozgonjuk et al. (2019) reported a

Cronbach's alpha of .89. Other researchers have reported Cronbach's alphas of .80

(Wang et al., 2018) and .84 (Beyens et al., 2016; Duman & Ozkara, 2019). This scale is open access and is free to use for academic purposes.

The Fear of Missing Out Scale (Przybylski et al., 2013) has been extensively used in research on the fear of missing out construct. For example, Beyens et al. (2016) used the instrument to examine the relationships between fear of missing out, Facebook use, stress, and social needs among adolescents. Rozgonjuk et al. (2019) employed the measure to assess associations between fear of missing out, smartphone notifications, and learning among college students. Among a sample of adolescents, Oberst et al. (2017) studied the way fear of missing out mediated the relationship between social networking behaviors and negative affect, such as anxiety and depression. The Fear of Missing Out Scale was selected for the current study because of its strength and widespread use by previous researchers.

Social Media Multitasking

Media multitasking describes simultaneously participating in multiple activities – at least one of which involves media use (Konova & Chiang, 2015). Nonacademic social media multitasking was assessed using three items used in Lau's (2017) study on social media multitasking and academic performance (Appendix B). Permission was obtained from the author to use these three items in the current study. Those three items were "I multitask with my social media account while studying," "I do not check my social media account if I am doing my work for school" (reverse coded), and "I remain online with my social media site(s) while doing homework." The items were rated along a five-point Likert-like scale ranging from *strongly disagree* to *strongly agree.* The instrument is

scored by averaging responses to all 3 items, producing a score ranging from 1 to 5. This variable was treated as interval. Lau (2017) adapted these items from the instrument in Ozer's (2014) study on Facebook addiction, social media multitasking, and academic performance. Although the effects of social media multitasking on academic performance have been examined by other researchers, little was known about the specific effects of *nonacademic* social media multitasking. This scale was selected because it had been previously used in the little available research on nonacademic social media multitasking (Lau, 2017; Ozer, 2014), and has demonstrated reliability, as reported by Lau and Ozer (2014). Lau reported the scaled to be unidimensional, with acceptable reliability of .719.

Academic Performance

Academic performance describes outcomes in educational settings, such as test scores, course grades, or GPA (Womack & McNamara, 2017). Academic performance was measured as students' self-reported GPA. GPA data were collected in the demographic questionnaire (Appendix C). Self-reported GPA is one of the most commonly used measures of academic performance (York et al., 2015). This variable was treated as interval.

Data Analysis Plan

Study data were downloaded from SurveyMonkey and then uploaded into SPSS version 27.0 for Windows. Data were screened for missing cases and incomplete surveys were removed. Frequencies and percentages were used to explore the trends in the demographic variables. Means and standard deviations were used to explore the trends in the three variables of interest: fear of missing out, nonacademic social media

multitasking, and academic performance. Cronbach's alpha test of internal consistency

and reliability was examined for the fear of missing out and nonacademic social media

multitasking scales. The strength of the alpha values will be interpreted through

suggestions by George and Mallery (2016), in which $\alpha \geq .9$ Excellent, $\alpha \geq .8$ Good, $\alpha \geq .7$

Acceptable, $\alpha \geq .6$ Questionable, $\alpha \geq .5$ Poor, and $\alpha < .5$ Unacceptable.

To address Research Question 1—To what degree is nonacademic social media

multitasking (as assessed by Ozer's items for measuring social media multitasking)

related to academic performance (as assessed by self-reported GPA) among U.S.

undergraduate students?—an ordinal logistic regression was conducted to examine the

predictive relationship between nonacademic social media multitasking and academic

performance among U.S. undergraduate students. An ordinal logistic regression is

appropriate when testing the predictive relationship between an independent variable and

an ordinal dependent variable (Tabachnick & Fidell, 2013). The independent variable

corresponded to nonacademic social media multitasking, which was measured using

Lau's (2017) instrument on social media multitasking. The dependent variable, academic

performance, was measured using self-reported GPA.

There are not strict parametric assumptions to verify for an ordinal logistic

regression. The primary assumption is that the dependent variable is an ordinal

measurement, which was supported due to academic achievement being a multiple-

choice response. The second assumption is that there are one or more predictor variables

that are continuous, ordinal, or categorical. There was one continuous predictor variable

in the regression model. The χ^2 test and Wald test were used to assess the predictive

ability between nonacademic social media multitasking on academic performance. The χ^2 test assessed the predictive effect of the collective regression model. The Wald test assessed the predictive effect of the independent variable specifically. Due to one predictor being examined, the *p*-values matched between the χ^2 test and Wald test. The coefficient of determination, Nagelkerke R^2, explained the amount of variance in academic performance that could be explained by nonacademic social media multitasking.

To address Research Question 2—To what degree is fear of missing out (as assessed by the Fear of Missing Out Scale) related to nonacademic social media multitasking (as assessed by Ozer's items for measuring social media multitasking), among U.S. undergraduate students?—a simple linear regression was conducted to examine the predictive relationship between fear of missing out and nonacademic social media multitasking among U.S. undergraduate students. The independent variable corresponded to fear of missing out, which was measured using the Fear of Missing Out scale. The dependent variable corresponded to nonacademic social media multitasking, which was measured using Lau's (2017) instrument on social media multitasking

Prior to analysis, the assumptions of a simple linear regression were tested, including linearity, normality, and homoscedasticity. All three assumptions were assessed with scatterplots. Linearity was assessed with a scatterplot between nonacademic social media multitasking and fear of missing out. The assumption of linearity would be met if the data followed a distinct trend (Howell, 2013). Normality as tested with a P-P scatterplot. The assumption of normality would be met if the data in the scatterplot

followed the normality trend line (Field, 2013). Homoscedasticity was tested with a residuals scatterplot. The assumption of homoscedasticity was met if the data did not follow a clear pattern (Pallant, 2013).

Following an examination of the assumptions, the findings of the linear regression were examined. The F test and t-test were used to assess the predictive ability between fear of missing out and nonacademic social media multitasking. The coefficient of determination, R^2, explained the amount of variance in nonacademic social media multitasking scores that could be explained by fear of missing out scores. If the F test and t-test were significant, the unstandardized beta coefficient (β) would explain how nonacademic social media multitasking changed based on a one-unit increase in fear of missing out scores.

To address Research Question 3—To what degree does fear of missing out moderate the relationship between nonacademic social media multitasking and academic performance?—Baron and Kenny's (1986) method for moderation was used to test whether fear of missing out moderated the relationship between nonacademic social media multitasking and academic performance. Moderators alter the direction or strength of a relationship between an independent variable and a dependent variable (Baron & Kenny, 1986). A stepwise ordinal logistic regression model was used to test the moderating effect. The independent variable corresponded to nonacademic social media multitasking. The dependent variable corresponded to academic performance. The moderator corresponded to fear of missing out. An interaction term was created between

nonacademic social media multitasking and fear of missing out. The same assumptions were verified in research question one.

Using a hierarchical regression, the independent variables were entered in two steps. In the first step of the regression model, the independent variable (nonacademic social media multitasking) and the moderator (fear of missing out) were entered into the model. In the second step, the interaction term nonacademic social media multitasking*fear of missing out was added to the model. A significant interaction term suggested moderation was supported. Results of the analysis are presented in Chapter 4 of this dissertation. Findings were also posted on social media, to make available to the public.

Threats to Validity

Threats to external validity are factors that affect an outcome and can hinder the generalization of the findings. Through use of a convenience sampling approach, selection bias can potentially cause limit the generalizability of the findings. In addition, statistical conclusions can be limited based on the findings of the parametric assumptions of linearity, normality, homoscedasticity, and absence of multicollinearity. I was cautious in the interpretation of the findings and did not automatically generalize the findings to the overarching population.

Threats to internal validity correspond to limitations that exist within the scope of the current research. The selection of a quantitative methodology limited my ability to explore underlying thoughts and perceptions of the participants. Qualitative methods allow for a more in-depth examination of the experiences of participants. I traded the

richness of qualitative data for a level of statistical significance that relationships exist between the variables of interest. There was also the potential threat that confounding variables altered the statistical relationships established in the analysis. It was not possible to control or account for every potential confounding variable in the research.

Ethical Procedures

To ensure the ethical treatment and protection of all study participants, a number of ethical procedures were implemented. First, prior to participant recruitment and data collection, permission was obtained from Walden University's Institutional Review Board (approval number 03-05-21-0641743). Because the study survey was online and anonymous, there was no risk to the identities of any respondents. Deidentification of study data was not necessary because no identifying information was collected. In order to ensure autonomy and respect for all participants, informed consent procedures were followed. Prior to accessing the online survey, respondents were required to provide informed consent by reading the first page of the survey form and checking a box that says "I agree to participate in this study." After indicating consent, individuals were forwarded to the first question of the online survey. Individuals who did not agree to the informed consent from were exited from the survey and forwarded to a screen expressing gratitude for their consideration.

There were no significant risks associated with participation, beyond minimal stress that may result from personal reflection. No incentives were offered for participation and no individuals with whom I had personal or professional relationships were knowingly recruited. Although study data were completely anonymous, raw data

were carefully protected. After an adequate sample was obtained, I closed the survey and download the raw data from SurveyMonkey. Data were stored on my personal, password-protected computer. Analysis was also conducted on my personal computer. I will securely store data for a period of 5 years, post study, as required by Walden University. After the 5-year period has passed, I will destroy all raw data.

Summary

The purpose of this quantitative investigation was to examine the potential relationships between nonacademic social media multitasking, academic performance (measured as self-reported, overall GPA), and fear of missing out. Data were collected via online survey, distributed via SurveyMonkey. The survey was used to measure the three study variables, including fear of missing out, nonacademic social media multitasking, and academic performance. A minimum sample of 77 participants was recruited. To be eligible, individuals had to be currently enrolled in a 4-year, post-secondary U.S. institution, be at least sophomores, and be at least 18 years old. The first two research questions were assessed via simple linear regressions. To address research question three, Baron and Kenny's (1986) method for moderation was used to test whether fear of missing out moderated the relationship between nonacademic social media multitasking and academic performance. This chapter provided details of the current study's research methods. Results from the analysis are presented in Chapter 4. A discussion of findings appears in Chapter 5.

Chapter 4: Results

The purpose of this quantitative investigation was to examine the potential relationships between nonacademic social media multitasking, academic performance (measured as self-reported, overall GPA), and fear of missing out. The study was guided by three research questions related to the degree that nonacademic social media multitasking affects academic performance and the degree that fear of missing out is related to nonacademic social media multitasking and moderates this relationship. In this chapter, the findings of the data analysis are presented. The chapter begins with a description of the data collection process and sample. Results are presented by research question. Frequencies and percentages were used for the nominal-level variables. Means and standard deviations were examined for the continuous-level data. To address the research questions, a series of regression analyses were conducted. Statistical significance was evaluated at the generally accepted level, $\alpha = .05$.

Data Collection

Data were collected via online survey, which was distributed through SurveyMonkey. The online survey consisted of the Fear of Missing Out Scale (Przybylski et al., 2013), items from Lau's (2017) study on social networking and academic performance, and a demographic questionnaire that gathered descriptive statistics, including respondents' GPA. I partnered with SurveyMonkey for participant recruitment and data collection, employing the company to distribute the survey invitation to individuals who met the following inclusion criteria: (a) were enrolled in a 4-year, post-secondary U.S. institute, (b) were at least a sophomore, and (c) were at least

18 years old. A power analysis using G*Power 3.1.9 software revealed a minimum

sample of 77 participants was needed. After the survey was launched, data collection was

complete in less than 24 hours. The final sample consisted of 99 individuals. Because this

was a nonprobability convenience sample, findings cannot be generalized to the entire

U.S. population of undergraduate students.

Results

A total of 115 participants were invited to complete the survey questionnaire. Six

participants did not consent to respond to the questionnaire. In addition, 10 participants

consented but did not respond to a majority of the questionnaire. These participants were

subsequently removed. Potential outliers in the data were examined by converting the

fear of missing out and nonacademic social media multitasking data to z scores. No

outliers were found in the dataset. The final sample consisted of 99 participants and a

response rate of 86%.

The sample included 52 males, 46 females, and one individual who identified

their gender as "Other." In terms of racial identity, the majority ($n = 54$, 54.55%) of the

sample consisted of Caucasian students, followed by African American students ($n = 29$,

29.29%). In terms of academic performance, the GPA of most participants ranged

between 3.00–3.99 ($n = 61$, 61.62%). Approximately one-fifth ($n = 20$, 20.20%) of the

participants reported GPAs of 4.00 or above. Collectively, over 80% of the respondents

had GPAs of at least 3.00, suggesting an overall high level of academic performance

among respondents. Frequencies and percentages are presented in Table 1.

Table 1

Frequency Table for Nominal Variables

Variable	*n*	%
Sex		
Male	52	52.53
Female	46	46.46
Other	1	1.01
Race		
White or Caucasian	54	54.55
Black or African American	29	29.29
Hispanic or Latino	6	6.06
Asian or Asian American	8	8.08
Native Hawaiian or Other Pacific Islander	1	1.01
Biracial	1	1.01
GPA		
1.00–1.99	3	3.03
2.00–2.99	15	15.15
3.00–3.99	61	61.62
4.00 and over	20	20.20

*Note.* Due to rounding errors, percentages may not equal 100%.

Composite scores were developed for fear of missing out and nonacademic social media multitasking by computing an average of the respective items comprising the scales. Cronbach's alpha test of internal consistency and reliability were examined for the two scales. The strength of the alpha values was assessed through use of the guidelines suggested by George and Mallery (2016), in which $\alpha \geq .9$ excellent, $\alpha \geq .8$ good, $\alpha \geq .7$ acceptable, $\alpha \geq .6$ questionable, $\alpha \geq .5$ poor, and $\alpha < .5$ unacceptable. Fear of missing out ($\alpha = .91$) reached the acceptable threshold for internal consistency. Nonacademic social media multitasking ($\alpha = .36$) had low reliability, which may be attributed to the low number of items comprising the scale. The scoring instructions were followed, and one item was reverse scored, which did not improve the reliability coefficient. Therefore,

findings of the descriptive and inferential analysis for nonacademic social media

multitasking will be interpreted with a level of caution.

Fear of missing out scores ranged from 1.00 to 5.00, with $M = 2.77$ and $SD =$

0.99. Nonacademic social media multitasking scores ranged from 1.00 to 5.00, with $M =$

3.18 and $SD = 0.85$. Figures 2 and 3 present histograms of the data. Both fear of missing

out and nonacademic social media multitasking appeared to follow an approximate bell-
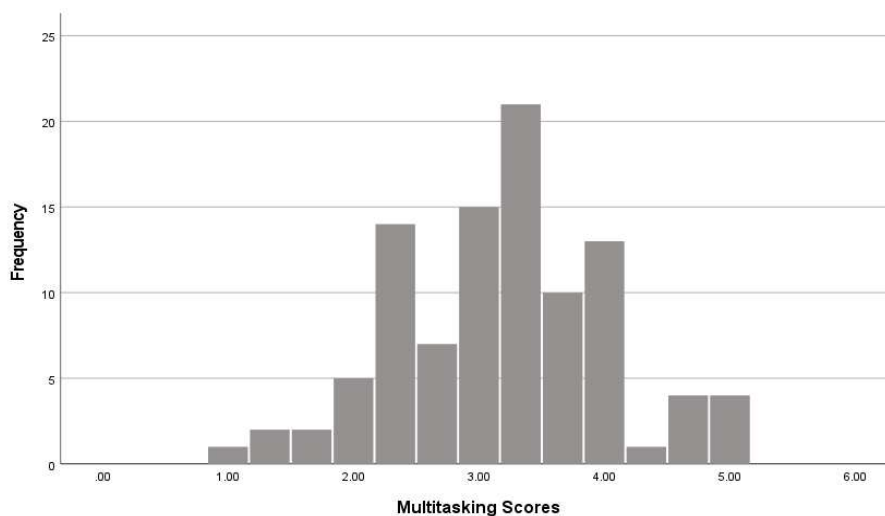
shaped distribution.

Figure 2

Histogram for Fear of Missing Out Scores
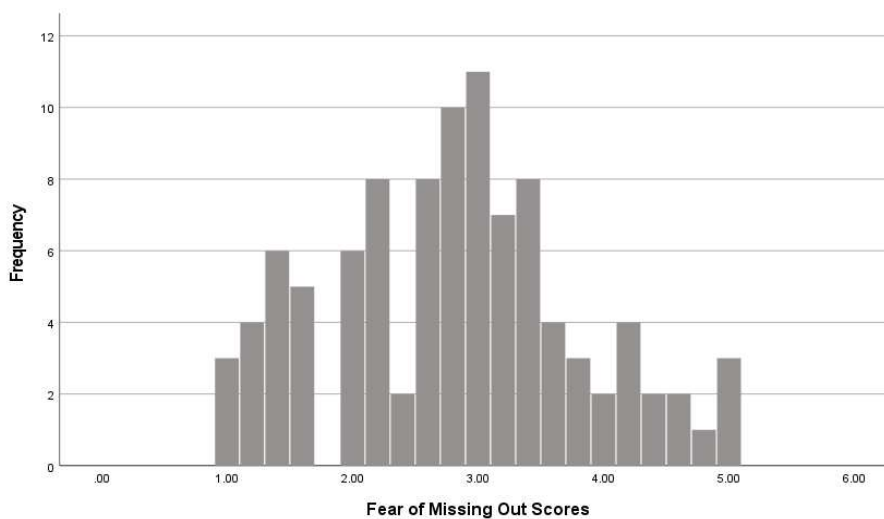
Figure 3

Histogram for Nonacademic Social Media Multitasking Scores

Research Question 1

Research Question 1: To what degree is nonacademic social media multitasking (as assessed by Ozer's items for measuring social media multitasking) related to academic performance (as assessed by self-reported GPA) among U.S. undergraduate students? To address Research Question 1, an ordinal logistic regression was conducted to examine the relationship between multitasking and academic performance. The predictor variable corresponded to social media multitasking and the criterion variable corresponded to academic performance (GPA). An ordinal logistic regression does not have strict parametric assumptions in comparison to a linear regression. The primary assumption is that the outcome variable is an ordinal measurement, which is supported due to academic achievement being a multiple-choice response. The second assumption is that there are one or more predictor variables that are continuous, ordinal, or categorical. There was one continuous predictor variable in the regression model. The χ^2

test and Wald test were used to assess the predictive ability between nonacademic social media multitasking on academic performance. The χ^2 test assessed the predictive effect of the collective regression model. The Wald test assessed the predictive effect of the independent variable specifically. Due to one predictor being examined, the *p*-values matched between the χ^2 test and Wald test. The coefficient of determination, Nagelkerke R^2, explained the amount of variance in academic performance that could be explained by nonacademic social media multitasking.

The results of the model were not statistically significant, $\chi^2(1) = 0.47$, $p = .493$, indicating there was not a significant predictive relationship between nonacademic social media multitasking and academic performance. The Nagelkerke *R*-squared was .005, indicating that approximately 0.5% of the variance in academic performance could be explained by nonacademic social media multitasking. Due to non-significance of the overall model, the individual predictor of nonacademic social media multitasking was not examined further. The null hypothesis (H_{01}) was not rejected for research question one. Table 2 summarizes the results of the ordinal regression model.

Table 2

Ordinal Logistic Regression Results between Nonacademic Social Media Multitasking and Academic Performance (GPA)

Predictor	*B*	*SE*	Wald	*p*
Nonacademic social media multitasking	0.16	0.24	0.47	.496

*Note.* Overall model fit: $\chi^2(1) = 0.47$, $p = .493$

Research Question 2

To what degree is fear of missing out (as assessed by the Fear of Missing Out

Scale) related to nonacademic social media multitasking (as assessed by Ozer's items for

measuring social media multitasking), among U.S. undergraduate students?

To address research question two, a linear regression was conducted to examine the

relationship between fear of missing out and nonacademic social media multitasking. The

predictor variable corresponded to fear of missing out and the criterion variable

corresponded to nonacademic social media multitasking. Prior to analysis, the

assumptions of a linear regression were tested. Linearity was visually examined with a

scatterplot between fear of missing out scores and nonacademic social media

multitasking scores. The scatterplot depicted a slight positive trend, indicating the

assumption was supported (see Figure 4). Normality was visually assessed with a normal

P-P scatterplot. The data in the scatterplot closely followed the normality trend line,

suggesting the assumption of normality was verified (see Figure 5). The assumption of

homoscedasticity was visually tested with a residuals scatterplot. There was not a

recurring pattern in the residuals scatterplot, indicating the assumption for

homoscedasticity was supported (see Figure 6).

Figure 4

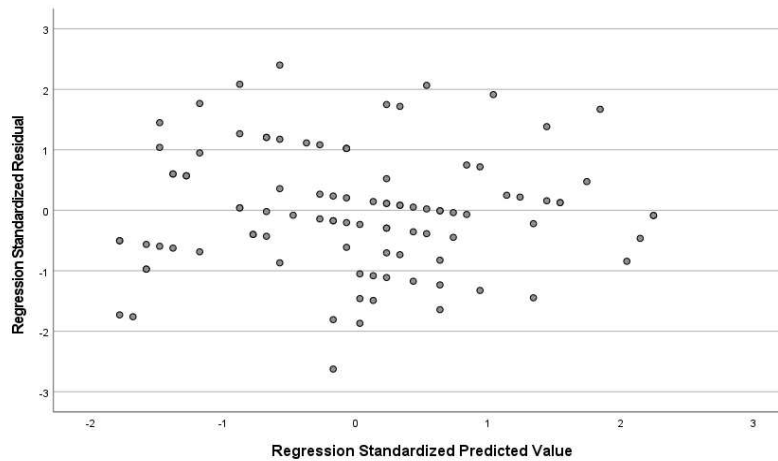*Scatterplot Between Fear of Missing out and Nonacademic Social Media Multitasking*
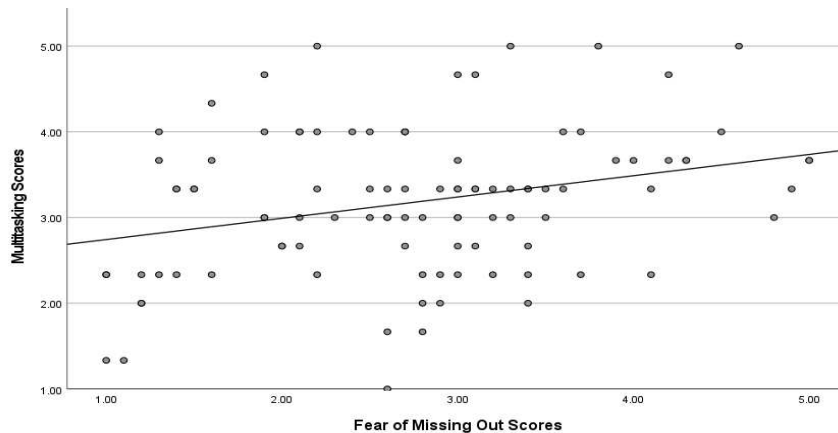
Figure 5

Normal P-P Scatterplot for Regression Model with Fear of Missing Out Predicting Nonacademic Social Media Multitasking
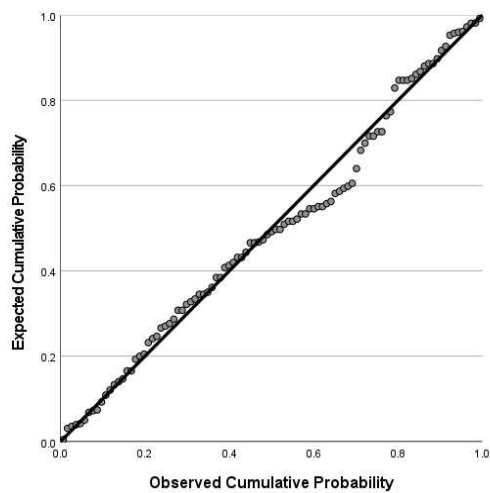
Figure 6

Residuals Scatterplot for Regression Model with Fear of Missing Out Predicting Nonacademic Social Media Multitasking

The results of the regression model were statistically significant, $F(1, 97) = 8.96$, $p = .004$, indicating a significant predictive relationship between fear of missing out and nonacademic social media multitasking. The coefficient of determination, R-squared, indicated approximately 8.5% of the variance in nonacademic social media multitasking could be explained by fear of missing out scores. With every one-unit increase in fear of missing out scores ($B = 0.25$, $t = 2.99$, $p = .004$), nonacademic social media multitasking scores increased by approximately 0.25 units. The null hypothesis (H_{02}) was rejected for research question two. Table 3 summarizes the results of the ordinal regression model.

Table 3

Linear Regression Results for Fear of Missing Out and Nonacademic Social Media Multitasking

Predictor	B	SE	β	t	p
Fear of missing out	0.25	0.08	.29	2.99	.004

Note. Overall model fit: $F(1, 97) = 8.96$, $p = .004$

Research Question 3

To what degree does fear of missing out moderate the relationship between nonacademic social media multitasking and academic performance?

To address research question three, an ordinal logistic regression was conducted in two steps to identify whether fear of missing out moderated the relationship between nonacademic social media multitasking and academic performance. In step one, the predictor (nonacademic social media multitasking) and moderator (fear of missing out) were entered into the model. In step two, the interaction term was added to the model – multitasking*fear of missing out. The criterion variable corresponded to academic performance (GPA). The same assumptions were supported as research question one.

The results of the first step of the model were not statistically significant, $\chi^2(2) = 1.57$, $p = .457$, indicating that collectively, there was not a significant predictive relationship between nonacademic social media multitasking, fear of missing out, and academic performance. The Nagelkerke R-squared was .018, indicating that approximately 1.8% of the variance in academic performance could be explained by nonacademic social media multitasking and fear of missing out.

The results of the second step of the model were not statistically significant, $\chi^2(3) = 2.80$, $p = .423$, indicating that collectively, there was not a significant predictive relationship between nonacademic social media multitasking, fear of missing out, multitasking*fear of missing out, and academic performance. The Nagelkerke R-squared was .032, indicating that approximately 3.2% of the variance in academic performance could be explained by nonacademic social media multitasking and fear of missing out.

Due to the interaction term not indicating significance, there was not sufficient evidence

for moderation. The null hypothesis (H_{03}) was not rejected for research question three.

Table 4 summarizes the results of the ordinal regression model.

Table 4

Two-Step Ordinal Logistic Regression Results between Nonacademic Social Media
Multitasking, Fear of Missing Out, and Academic Performance (GPA)

Predictor	B	SE	Wald	p
Step 1:				
Nonacademic Social Media Multitasking	0.24	0.25	0.93	.336
Fear of Missing Out	-0.23	0.21	1.14	.285
Step 2:				
Nonacademic Social Media Multitasking	-0.44	0.67	0.44	.505
Fear of Missing Out	-1.08	0.80	1.82	.178
Multitasking*Fear of Missing Out	0.26	0.24	1.21	.271

Note. Overall model fit: Step 1 - $\chi^2(2) = 1.57$, $p = .457$; Step 2 - $\chi^2(3) = 2.80$, $p = .423$

Summary

The purpose of this quantitative investigation was to examine the potential

relationships between nonacademic social media multitasking, academic performance

(measured as self-reported, overall GPA), and fear of missing out. In this chapter, the

findings of the data analysis were presented. Frequencies and percentages were used to

summarize the nominal-level variables. Cronbach alpha was examined for the scales.

Means and standard deviations were examined for the continuous-level data. To address

the research questions, a series of regression analyses were conducted. Analysis revealed

there was not a significant relationship between nonacademic social media multitasking

and academic performance. There was, however, a significant predictive relationship

between fear of missing out and nonacademic social media multitasking. These findings

revealed nonacademic social media multitasking may not be related to students'

academic performance; however, multitasking was significantly associated with fear of

missing out. As respondents' fear of missing out increased, so too did their social media

multitasking behaviors. Analysis for research question three revealed there was not

sufficient evidence that fear of missing out moderated the relationship between

nonacademic social media multitasking and academic performance. The null hypothesis

for research question two was rejected. The null hypotheses for research questions one

and three were not rejected. Statistical significance was evaluated at the generally

accepted level, $\alpha = .05$. A discussion of study results, implications, and associated

recommendations is provided in the following chapter.

Chapter 5: Discussion, Conclusions, and Recommendations

In educational settings, nonacademic social media use is associated with poor academic performance on standardized tests (Ravizza et al., 2014) and low self-reported GPA (Lau, 2017). Fear of missing out is an important factor to consider in the potential relationship between nonacademic social media multitasking and poor academic performance, as it can perpetuate high levels of social media use (Bright & Logan, 2018). The purpose of this quantitative investigation was to examine the potential relationships between nonacademic social media multitasking, academic performance (measured as self-reported GPA), and fear of missing out. The study followed a nonexperimental design and included a sample of 99 U.S. undergraduate students. A series of regression analyses were conducted to address the research questions. Results revealed no significant relationship between nonacademic social media multitasking and academic performance. There was, however, a significant predictive relationship between fear of missing out and nonacademic social media multitasking. As respondents' fear of missing out increased, so too did their social media multitasking behaviors. Analysis for Research Question 3 revealed insufficient evidence that fear of missing out moderated the relationship between nonacademic social media multitasking and academic performance.

This chapter includes a discussion of study findings, beginning with an interpretation of results in context of previous research. Next, study limitations and recommendations for future research are presented. Practical and theoretical implications are also discussed. The chapter closes with my concluding thoughts.

Interpretation of Findings

Research Question 1

An ordinal logistic regression was conducted to assess the first research question. Results were not statistically significant, indicating no significant predictive relationship between nonacademic social media multitasking and academic performance. This finding was challenges previous research that indicated significant relationships between nonacademic social media use and poor academic outcomes (Felisoni & Godoi, 2018; Kates et al., 2018; Rozgonjuk & That, 2017; Wammes et al., 2019). As van der Schuur et al. (2019) explained, factors that distract students' attention (such as nonacademic social media multitasking) can interrupt learning and academic achievement because the ability to focus one's attention on academic tasks is essential to processing information and excelling in academic settings. Previous researchers have linked nonacademic social media multitasking with poor academic performance on standardized tests (Ravizza et al., 2014) and low self-reported GPA (Lau, 2017). Academic performance can decline when students engaged in nonacademic multitasking via Facebook or texting (Demirbilek & Talan, 2017).

It is important to explore possible explanations for the surprising results from the current study. First, it is possible that participants did not respond truthfully, whether intentionally or unintentionally. Inaccurate self-reports of GPA or nonacademic social media use could have undermined the reliability of findings. It is also possible that the sample was disproportionately comprised of high-achieving students with more cognitive processing abilities than average students. Based on self-report GPA data, 81% of the

sample had GPAs of 3.0 or higher, with over 20% reporting GPAs over 4.0. Assuming self-reported GPAs were accurate, the study sample consisted mostly of students who performed above average. It could be that more studious individuals find ways to balance social media multitasking behaviors with studying and academic responsibilities so academic outcomes do not suffer from social media use. It could also be that high-achieving students are capable of handling greater cognitive loads, so social media multitasking does not have a negative impact on their performance. Finally, it is possible that students who grew up with technology have become increasingly adept at social media multitasking, so it does not influence their academic outcomes.

Research Question 2

A liner regression was conducted to examine the relationship between fear of missing out and nonacademic social media multitasking. Results indicated a significant predictive relationship between fear of missing out and nonacademic social media multitasking. That is, the greater participants' fear of missing out, the greater their social media multitasking behaviors. This finding aligns with those reported in a number of previous investigations, which indicated fear of missing out was associated with increased or problematic social media use. For example, Makki et al. (2018) found increased Snapchat use was associated with fear of missing out. Reer et al. (2019) found increased fear of missing out and social comparison behaviors predicted increased social media engagement. Oberst et al. (2017) explained individuals who experienced deficits in needs satisfaction often engaged with social media to soothe fear of missing out. Although the current study did not examine well-being, previous research revealed that

poor well-being can prompt fear of missing out and subsequent social media engagement, sparking an ongoing cycle that is detrimental to users' well-being (Alt, 2018; Baker et al., 2016; Dhir et al., 2018).

Research Question 3

An ordinal regression was conducted to determine if fear of missing out moderated the relationship between nonacademic social media multitasking and academic performance. Results revealed variances in academic performance could not be significantly predicted by nonacademic social media multitasking of fear of missing out. Because of the lack of significance in the interaction terms, evidence for moderation was not sufficient. These findings revealed that social media multitasking and fear of missing out did not have expected negative association with academic performance, though many previous researchers have reported that social media multitasking often undermines academic outcomes (Felisoni & Godoi, 2018; Kates et al., 2018; Rozgonjuk & That, 2017; Wammes et al., 2019). Similarly, previous researchers have reported on the negative relationship between fear of missing out and academic outcomes. For example, Rozgonjuk et al. (2019) found fear of missing out prompted nonacademic social media multitasking, which could then undermine academic outcomes.

Though findings for Research Question 3 were unexpected, they are not wholly contradicted by results from previous studies. Other researchers have similarly reported fear of missing out was not associated with declines in academic performance. For example, Lemay et al. (2019) found that fear of missing out was positively related to academic performance. Qutishat and Sharour (2019) also found no statistically significant

relationship between fear of missing out and academic outcomes. From previous research, it appears fear of missing out is more likely to have a negative effect on academic outcomes if those fears prompt behaviors that distract from studies, such as social media or smartphone use. The positive association between fear of missing out and academic outcomes reported by Lemay et al. could relate to academic socialization or expectations. For example, if a student is surrounded by other students who excel in academics and enjoy the rewards of strong academic outcomes (such as scholarships, recognition, etc.), a fear of missing out on similar rewards and experiences could prompt students to study harder and perform better in school. Alternatively, among students with a strong sense of self or orientation toward individualism, fear of missing out may simply be a less influential factor in their lives.

Limitations of the Study

This study was subject to a few important limitations. First, the study was limited by the use of self-report data, particularly for the measure of academic performance. GPA is often used to assess academic performance in research; it is a standardized metric for all college students which is reported along the same four-point scale (Guo et al., 2015; Yeager et al., 2016). Though self-report data, such as GPA, are widely used and accepted in the academic literature, self-report data are prone to bias (Rosen et al., 2017). A large meta-analysis of discrepancies between students' self-reported GPA and their official GPA records revealed significant discrepancies, with students' tending to self-report GPAs that were higher than their official records indicated (Kuncel et al., 2005). Low-performing students are more likely to self-report inaccurate academic performance data

(Teye & Peaslee, 2015). As Schwartz and Beaver (2015) explained, the inaccuracy of self-reported GPA and the prevalent use of this metric "poses a serious threat for researchers examining factors related to academic achievement" (p. 1127).

While many researchers have reported a discrepancy between self-reported and actual GPA, others have found self-reports to be a valid proxy for official GPA (Marley & Platau, 2017; Ratelle & Duchesne, 2014). Further, it is even possible that students underreport GPA. For example, Caskie et al. (2014) found low-performing male students were likely to underreport GPA. Given the conflicting research reports of the accuracy of self-report GPA data, the use of this metric in the current study must be acknowledged as a limitation.

The instrumentation used to assess study variables may present another limitation. Specifically, the instrument used to assess nonacademic social media multitasking demonstrated low reliability, despite acceptable reliability reported by a previous researcher (Lau, 2017). Cronbach's alpha is a measure of an instrument's internal consistency (Tavakol & Dennick, 2011). The social media multitasking measure was very short, consisting of just three items. Shorter instruments are more likely to have weak reliability, as Cronbach alphas are affected by the length and dimensionality of an instrument (Tavakol & Dennick, 2011).

Upon recognizing the weak reliability of this instrument in the current research (α = .36), each of the three items were examined for low correlation values. Removal of the second item would have resulted in significantly higher reliability (α = .738); however, that would have shortened an instrument that was already very brief. I chose to retain all

three items of the instrument, as designed, rather than rely on two items to assess an important study variable. It seems likely that the low alpha was due to inconsistencies in responses that may have occurred from quick responses or the failure to carefully read and respond to each item. Unfortunately, this is an unavoidable limitation of any data collected through online anonymous surveys. I had no way of knowing if responses were thought out or rushed through.

Another limitation was that factors other than nonacademic social media multitasking could have influenced academic performance. For example, socioeconomic status may have affected academic performance, but this factor was not accounted for. Finally, I had no control over who actually completed the study survey. I used screening questions and did not offer incentives for participation, so it was unlikely that ineligible individuals would desire to complete the survey. My lack of control over the sample is another inevitable limitation of anonymous online surveys conducted in partnership with SurveyMonkey.

Recommendations

Findings from the current study offer a number of opportunities for future research. Although the sample for this research was adequate in size, it was not random or representative of the larger population of U.S. college students. Accordingly, future researchers could replicate the study with a larger sample that was randomly chosen in order to provide findings that could be generalized to the larger population. As previously mentioned, the low reliability of the nonacademic social media multitasking instrument was a significant limitation of the current study. It is likely that the short length of the

instrument contributed to the low Cronbach's alpha for the measure. A thorough review of existing validated instruments revealed no other available measure, which is why this short instrument was selected for the current study. However, a longer inventory is likely to produce more reliable findings. Thus, future researchers could develop and pilot a more thorough measure of nonacademic social media multitasking and then replicate the study with the new instrument.

The current study employed SurveyMonkey to assist with participant recruitment. This recruitment strategy was a limitation because the pool of potential participants consisted only of individuals who were registered users with SurveyMonkey. Future researchers may replicate this study with a different recruitment strategy, such as social media posts or flyers at college campuses. Such strategies may create a more varied sample of college students. Although self-reported GPA is a commonly accepted measure of academic achievement, it has the potential to be both subjective and inaccurate. Self-reported GPA is often used because it is difficult to obtain official GPA data for participants. However, it is possible that different results could emerge if official GPA were used, rather than self-reported grades. Researchers with access to student GPA records could consider assessing the relationships between nonacademic social media use and academic achievement using more objective data, such as data from official transcripts.

The current investigation was limited in that it did not account for a number of factors that could influence the relationships between nonacademic social media multitasking, fear of missing out, and academic achievement. Accordingly, future

researchers could assess for the presence of moderators in the relationships between these variables. Possible moderators include race, gender, socioeconomic status, age, employment status, and academic institution type (i.e., community college, private college, public university). Similarly, it is possible that the effects of nonacademic social media multitasking may differ by generation. Students who grew up using social media may be affected by nonacademic use in different ways from older students who are less adapted to social media.

Because multitasking behaviors are limited by individuals' cognitive processing abilities, researchers may consider the role intellect plays in the influences of distractive behaviors such as nonacademic social media multitasking. More intelligent individuals may have higher cognitive processing abilities that help circumvent the negative effects of distractive behaviors on academic outcomes. Essentially, researchers could examine the degree to which intelligence moderates the effects of nonacademic social media multitasking on academic outcomes. Finally, future researchers could study the impact of specific forms of nonacademic social media multitasking on academic outcomes. For example, researchers may consider how effects differ according to the social media platform used, or the electronic devices through which social media are accessed (i.e., smartphone, laptop, tablet, etc.). Such investigation could reveal other factors that influence the effects of social media multitasking on academic outcomes.

Implications

Findings from this study have a number of practical, theoretical, and social change implications. From a practical perspective, findings provide insights that may be

of value to educators. While nonacademic social media multitasking should not be encouraged in class, educators who are leery of technology use in classrooms may be encouraged by findings from the current study. Specifically, the use of social media has potential educational benefits, when properly harnessed. For example, Edwards et al. (2015) reported social media fostered increased collaboration and classroom engagement. Dumpit and Fernandez (2017) found that collaboration through social media helped improve learning. Social media has also redefined the scope of formal and informal education, creating opportunities for distance learning that was not previously attainable for many (Greenhow & Lewin, 2016).

This study also has theoretical implications. The framework for this study was based on Baumeister and Leary's (1995) belonging hypothesis and van dur Schuur et al.'s (2015) scattered attention hypothesis. The belonging hypothesis is useful for understanding how the need to belong prompts a fear of missing out and subsequent behaviors (Beyens et al., 2016). Results from the current study revealed a significant predictive relationship between fear of missing out and nonacademic social media multitasking; participants with greater fear of missing out were more likely to engage in nonacademic social media multitasking. Because the need to belong correlates with fear of missing out (Wang et al., 2018), this finding contributes to the belonging hypothesis by revealing how the inherent human need of belonging may prompt social behaviors in modern society.

The scattered attention hypothesis states that the brain utilizes and allocates cognitive resources to complete tasks, as necessary (van dur Schuur et al., 2015). Because

attention is a limited resource, factors that distract one's focus could undermine the performance of primary tasks (May & Elder, 2018). Through the lens of the scattered attention hypothesis, it was assumed that nonacademic social media multitasking would undermine academic performance. However, results from the current investigation indicated this was not the case. Thus, nonacademic social media multitasking may not be a factor that significantly detracts attention from primary tasks among the current generation of college students. Students may be less affected by social media because they have adapted to the constant distractions of social media through electronic devices.

In terms of social change, implications relate to the importance of a well-informed and educated public (Mackey, 2019). Policymakers and educational leaders have become increasingly concerned with declines in the academic performance of U.S. students (Jain, 2019). Because findings from the current study did not reveal social media multitasking was detrimental to academic performance, educational leaders and researchers may work to identify other factors that impede academic outcomes, and focus efforts on reducing those barriers for students. For example, attention may be better placed on addressing racial inequities and access to technology, in efforts to improve the academic performance of U.S. students.

Conclusion

The constant and pervasive information stream created through social media and smart devices has resulted in a generation of multitaskers (Demirilek & Talan, 2017). Today's students overwhelmingly engage in social media multitasking. One study revealed 90% of college students multitasked with media (Hwang et al., 2014). Although

technology and social media have a number of potential benefits, in-class social media multitasking is increasingly problematic on modern school campuses. Smart devices and widespread access to wireless networks allow students to engage in nonacademic social media multitasking behaviors during class (Demirilek & Talan, 2017). Although previous researchers studied the effects of social media use and multitasking behaviors (Chen & Yan, 2016; Hwang et al., 2014; Kirschner & De Bruyckere, 2017; Kononova & Chiang, 2015), little was known about the effects of nonacademic social media multitasking. In addition, it was unknown whether fear of missing out was correlated with nonacademic social media multitasking, or whether it moderated the relationship between social media multitasking and academic performance.

Accordingly, the current study involved an examination of the potential relationships between nonacademic social media multitasking, academic performance (measured as self-reported, overall GPA), and fear of missing out. Three key findings emerged from this investigation. First, analysis revealed no significant relationship between nonacademic social media multitasking and academic performance. Second, a significant predictive relationship between fear of missing out and nonacademic social media multitasking was evident. Finally, there was insufficient evidence that fear of missing out moderated the relationship between nonacademic social media multitasking and academic performance.

Results for research questions 1 and 3 were somewhat unexpected, and could have been the result of some inherent subjectivity and poor instrument reliability, as previously discussed. The relationship between fear of missing out and nonacademic

social media multitasking aligned with findings reported by previous investigators (Makki et al., 2018; Oberst et al., 2017; Reer et al., 2019). Educators should consider an important practical implication of these results. While nonacademic social media multitasking should not be encouraged in class, educators who are leery of technology use in classrooms may be encouraged by study findings. Specifically, the use of social media has potential educational benefits, when properly harnessed. It is also possible that some students may be more distracted by social media, creating negative outcomes that others do not experience.

Love it or hate it, social media is here to stay. Rather than recoil from its potential drawbacks, educators should consider ways to integrate this pervasive new social element into education. At the same time, it is critical to create boundaries that limit in-class distractions caused by social media.

References

Abel, J. P., Buff, C. L., & Burr, S. A. (2016). Social media and the fear of missing out: Scale development and assessment. *Journal of Business & Economics Research, 14*(1), 33–44. https://doi.org/10.19030/jber.v14i1.9554

Alexa. (n.d.). *The top 500 sites on the web*. Retrieved December, 2017, from https://www.alexa.com/topsites

Al-Menayes, J. J. (2015). Social media use, engagement and addiction as predictors of academic performance. *International Journal of Psychological Studies, 7*(4), 86. https://doi.org/10.5539/ijps.v7n4p86

Alt, D. (2015). College students' academic motivation, media engagement and fear of missing out. *Computers in Human Behavior, 49*, 111–119. https://doi.org/10.1016/j.chb.2015.02.057

Alt, D. (2016). Students' wellbeing, fear of missing out, and social media engagement for leisure in higher education learning environments. *Current Psychology, 37*(1), 128–138. https://doi.org/10.1007/s12144-016-9496-1

Alt, D. (2017). Students' social media engagement and fear of missing out (FoMO) in a diverse classroom. *Journal of Computing in Higher Education, 29*(2), 388–410. https://doi.org/10.1007/s12528-017-9149-x

Alt, D., & Boniel-Nissim, M. (2018). Parent–adolescent communication and problematic internet use: The mediating role of Fear of Missing Out (FoMO). *Journal of Family Issues, 39*(13), 3391–3409. https://doi.org/10.1177/0192513x18783493

Anderson, E. L., Steen, E., & Stavropoulos, V. (2016). Internet use and problematic

internet use: A systematic review of longitudinal research trends in adolescence and emergent adulthood. *International Journal of Adolescence and Youth, 22*(4), 430–454. https://doi.org/10.1080/02673843.2016.1227716

Arcand, M., Juster, R.-P., Lupien, S. J., & Marin, M.-F. (2020). Gender roles in relation to symptoms of anxiety and depression among students and workers. *Anxiety, Stress, & Coping*, 1–14. https://doi.org/10.1080/10615806.2020.1774560

Baker, Z. G., Krieger, H., & LeRoy, A. S. (2016). Fear of missing out: Relationships with depression, mindfulness, and physical symptoms. *Translational Issues in Psychological Science, 2*(3), 275–282. https://doi.org/10.1037/tps0000075

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173–1182. https://doi.org/10.1037/0022-3514.51.6.1173

Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*(3), 497–529. https://doi.org/10.1037/0033-2909.117.3.497

Bellur, S., Nowak, K. L., & Hull, K. S. (2015). Make it our time: In class multitaskers have lower academic performance. *Computers in Human Behavior, 53*, 63–70. https://doi.org/10.1016/j.chb.2015.06.027

Benko, M. H., Vogelsang, K. M., Johnson, K. C., & Babij, A. R. (2019). Strategies to prevent cognitive overload: A team-based approach to improving student success and persistence in a gateway introductory chemistry course. *Enhancing Retention*

in Introductory Chemistry Courses: Teaching Practices and Assessments, 187–
200. https://doi.org/10.1021/bk-2019-1330.ch012

Beyens, I., Frison, E., & Eggermont, S. (2016). "I don't want to miss a thing":
Adolescents' fear of missing out and its relationship to adolescents' social needs,
Facebook use, and Facebook related stress. *Computers in Human Behavior, 64*,
1–8. https://doi.org/10.1016/j.chb.2016.05.083

Bhagat, S. (2015). Is Facebook a planet of lonely individuals? A review of literature. *The
International Journal of Indian Psychology, 3*(1), 5–9.
https://doi.org/10.25215/0301.038

Bialy, B. (2017). Social media- From social exchange to battlefield. *The Cyber Defense
Review, 2*(2), 69–90. https://cyberdefensereview.army.mil/

Biondi, F. N., Cacanindin, A., Douglas, C., & Cort, J. (2020). Overloaded and at work:
Investigating the effect of cognitive workload on assembly task performance.
Human Factors: The Journal of the Human Factors and Ergonomics Society.
https://doi.org/10.1177/0018720820929928

Blank, G., & Lutz, C. (2016). The social structuration of six major social media platforms
in the United Kingdom. *Proceedings of the 7th 2016 International Conference on
Social Media & Society – SMSociety, 16.*
https://doi.org/10.1145/2930971.2930979

Bodroža, B., & Jovanović, T. (2016). Validation of the new scale for measuring
behaviors of Facebook users: Psycho-social aspects of Facebook use (PSAFU).
Computers in Human Behavior, 54, 425–435.

https://doi.org/10.1016/j.chb.2015.07.032

Bright, L. F., & Logan, K. (2018). Is my fear of missing out (FOMO) causing fatigue?

Advertising, social media fatigue, and the implications for consumers and brands.

Internet Research, 28(5), 1213–1227. https://doi.org/10.1108/intr-03-2017-0112

Brooks, S. (2015). Does personal social media usage affect efficiency and well-being?

Computers in Human Behavior, 46, 26–37.

https://doi.org/10.1016/j.chb.2014.12.053

Byyny, R. L. (2016). Information and cognitive overload: How much is too much? *The*

Pharos, 2-7. https://www.alphaomegaalpha.org/the_pharos.html

Casale, S., & Fioravanti, G. (2015). Satisfying needs through social networking sites: A

pathway towards problematic Internet use for socially anxious people? *Addictive*

Behaviors Reports, 1, 34–39. https://doi.org/10.1016/j.abrep.2015.03.008

Caskie, G. I. L., Sutton, M. C., & Eckhardt, A. G. (2014). Accuracy of self-reported

college GPA: Gender-moderated differences by achievement level and academic

self-efficacy. *Journal of College Student Development, 55*(4), 385–390.

https://doi.org/10.1353/csd.2014.0038

Chiang, I., Wong, R., & Huang, C. (2019). Exploring the benefits of social media

marketing for brands and communities. *International Journal of Electronic*

Commerce Studies, 10(2), 113-140. http://ijecs.academic-publication.org/

Chen, Q., & Yan, Z. (2016). Does multitasking with mobile phones affect learning? A

review. *Computers in Human Behavior, 54*, 34–42.

https://doi.org/10.1016/j.chb.2015.07.047

Chotpitayasunondh, V., & Douglas, K. M. (2016). How "phubbing" becomes the norm: The antecedents and consequences of snubbing via smartphone. *Computers in Human Behavior, 63*, 9–18. https://doi.org/10.1016/j.chb.2016.05.018

Cole, D. A., Nick, E. A., Zelkowitz, R. L., Roeder, K. M., & Spinelli, T. (2017). Online social support for young people: Does it recapitulate in-person social support; can it help? *Computers in Human Behavior, 68*, 456–464. https://doi.org/10.1016/j.chb.2016.11.058

Collins, R. (2020). Clinician cognitive overload and its implications for nurse leaders. *Nurse Leader, 18*(1), 44–47. https://doi.org/10.1016/j.mnl.2019.11.007

Corbeil, J. R., & Valdes-Corbeil, M. E. (2007) Are you ready for mobile learning? *Educause Quarterly, 30*(2), 51–58. https://er.educause.edu/about/eq-archives

Demirbilek, M., & Talan, T. (2017). The effect of social media multitasking on classroom performance. *Active Learning in Higher Education, 19*(2), 117–129. https://doi.org/10.1177/1469787417721382

Dempsey, A. E., O'Brien, K. D., Tiamiyu, M. F., & Elhai, J. D. (2019). Fear of missing out (FoMO) and rumination mediate relations between social anxiety and problematic Facebook use. *Addictive Behaviors Reports, 9*, 100150. https://doi.org/10.1016/j.abrep.2018.100150

Dhir, A., Yossatorn, Y., Kaur, P., & Chen, S. (2018). Online social media fatigue and psychological wellbeing—A study of compulsive use, fear of missing out, fatigue, anxiety and depression. *International Journal of Information Management, 40*, 141–152. https://doi.org/10.1016/j.ijinfomgt.2018.01.012

Dolmans, D., Loyens, S. M. M., Marcq, H., & Gijbels, D. (2016). Deep and surface learning in problem-based learning: A review of the literature. *Advances in Health Sciences Education, 21*(5), 1087–1112. https://doi.org/10.1007/s10459-015-9645-6.

Domahidi, E. (2018). The associations between online media use and users' perceived social resources: A meta-analysis. *Journal of Computer-Mediated Communication, 23*, 181–200. https://doi.org/10.1093/jcmc/zmy007

Dossey, L. (2014). FOMO, digital dementia, and our dangerous experiment. *EXPLORE, 10*(2), 69–73. https://doi.org/10.1016/j.explore.2013.12.008

Downs, E., Tran, A., McMenemy, R., & Abegaze, N. (2015). Exam performance and attitudes toward multitasking in six, multimedia–multitasking classroom environments. *Computers & Education, 86*, 250–259. https://doi.org/10.1016/j.compedu.2015.08.008

Duman, H., & Ozkara, B. Y. (2019). The impact of social identity on online game addiction: The mediating role of the fear of missing out (FoMO) and the moderating role of the need to belong. *Current Psychology*. https://doi.org/10.1007/s12144-019-00392-w

Dumpit, D. Z., & Fernandez, C. J. (2017). Analysis of the use of social media in higher education institutions (HEIs) using the technology acceptance model. *International Journal of Educational Technology in Higher Education, 14*(1). https://doi.org/10.1186/s41239-017-0045-2

Edwards, B., Aris, B., & Shukor, N. (2015). Cognitive load implications of social media

in teaching and learning. *Journal of Multidisciplinary Science and Technology, 2*(11), 3026-3030. https://publons.com/journal/74063/journal-of-multidisciplinary-engineering-science-a

Elhai, J. D., Levine, J. C., Alghraibeh, A. M., Alafnan, A. A., Aldraiweesh, A. A., & Hall, B. J. (2018). Fear of missing out: Testing relationships with negative affectivity, online social engagement, and problematic smartphone use. *Computers in Human Behavior, 89*, 289–298. https://doi.org/10.1016/j.chb.2018.08.020

Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of Convenience Sampling and Purposive Sampling. *American Journal of Theoretical and Applied Statistics, 5*(1), 1. https://doi.org/10.11648/j.ajtas.20160501.11

Faul, F., Erdfelder, E., Buchner, A., & Lang, A. G. (2014). *G*Power Version 3.1.9 [computer software]. Uiversität Kiel, Germany*. http://www.gpower.hhu.de/en/html

Felisoni, D. D., & Godoi, A. S. (2018). Cell phone usage and academic performance: An experiment. *Computers & Education, 117*, 175–187. https://doi.org/10.1016/j.compedu.2017.10.006.

Field, A. (2013). *Discovering Statistics Using SPSS, 4th ed.* Sage Publications.

Fox, J., & Moreland, J. J. (2015). The dark side of social networking sites: An exploration of the relational and psychological stressors associated with Facebook use and affordances. *Computers in Human Behavior, 45*, 168–176. https://doi.org/10.1016/j.chb.2014.11.083

Gaudreau, P., Miranda, D., & Gareau, A. (2014). Canadian university students in wireless

    classrooms: What do they do on their laptops and does it really matter?

    Computers & Education, 70, 245–255.

    https://doi.org/10.1016/j.compedu.2013.08.019

George, D. & Mallery, P. (2016). *SPSS for Windows step by step: a simple guide and*

    reference, 11.0 update (14th ed.). Allyn and Bacon.

Goolsby, R. (n.d.). *On cybersecurity, crowdsourcing, and social cyber-attack.*

    http://www.stratcomcoe.org/rebecca-goolsby-cybersecurity-crowdsourcing-and-

    social-cyber-attack

Greenhow, C., & Lewin, C. (2015). Social media and education: Reconceptualizing the

    boundaries of formal and informal learning. *Learning, Media and Technology,*

    41(1), 6–30. https://doi.org/10.1080/17439884.2015.1064954

Guo, J., Marsh, H. W., Morin, A. J. S., Parker, P. D., & Kaur, G. (2015). Directionality of

    the associations of high school expectancy-value, aspirations, and attainment.

    American Educational Research Journal, 52(2), 371–402.

    https://doi.org/10.3102/0002831214565786

Harrison, L. M., & Risler, L. (2015). The role consumerism plays in student learning.

    Active Learning in Higher Education, 16(1), 67–76.

    https://doi.org/10.1177/1469787415573356

Hartnell☐Young, E., & Vetere, F. (2008). A means of personalising learning:

    Incorporating old and new literacies in the curriculum with mobile phones. *The*

    Curriculum Journal, 19(4), 283–292.

https://doi.org/10.1080/09585170802509872

He, W., Wang, F.-K., Chen, Y., & Zha, S. (2017). An exploratory investigation of social

media adoption by small businesses. *Information Technology and Management,*

18(2), 149–160. https://doi.org/10.1007/s10799-015-0243-3

Heiberger, G., & Harper, R. (2008) Have you Facebooked Astin lately? Using technology

to increase student involvement. In R. Junco and D. M. Timm (Eds.), Using

emerging technologies to enhance student engagement: New directions for

student services, pp. 19-35. Jossey-Bass Education.

Hormes, J. M. (2016). Under the influence of Facebook? Excess use of social networking

sites and drinking motives, consequences, and attitudes in college students.

Journal of Behavioral Addictions, 5(1), 122–129.

https://doi.org/10.1556/2006.5.2016.007

Howe, C. J., & Robinson, W. R. (2018). Survival-related selection bias in studies of

racial health disparities. *Epidemiology, 29*(4), 521–524.

https://doi.org/10.1097/ede.0000000000000849

Howell, D. C. (2013). *Statistical methods for psychology* (8th ed.). Wadsworth Cengage

Learning.

Hwang, Y., Kim, H., & Jeong, S.-H. (2014). Why do media users multitask? Motives for

general, medium-specific, and content-specific types of multitasking. *Computers*

in Human Behavior, 36, 542–548. https://doi.org/10.1016/j.chb.2014.04.040

Iskander, M. (2018). Burnout, cognitive overload, and metacognition in medicine.

Medical Science Educator, 29(1), 325–328. https://doi.org/10.1007/s40670-018-

00654-5

Jain, D. (2019). Cause behind declining academic performance: Stress among students. *Journal of Emerging Technologies and Innovative Research, 6*(6), 114-119. http://www.jetir.org/

Jiang, T., Hou, Y., & Wang, Q. (2016). Does micro-blogging make us "shallow"? Sharing information online interferes with information comprehension. *Computers in Human Behavior, 59*, 210–214. https://doi.org/10.1016/j.chb.2016.02.008

Junco, R. (2012). Too much face and not enough books: The relationship between multiple indices of Facebook use and academic performance. *Computers in Human Behavior, 28*(1), 187–198. https://doi.org/10.1016/j.chb.2011.08.026

Junco, R. (2015). Student class standing, Facebook use, and academic performance. *Journal of Applied Developmental Psychology, 36*, 18–29. https://doi.org/10.1016/j.appdev.2014.11.001

Kalenscher, T. (2019). Cognitive neuroscience: No gain, much pain. *Current Biology, 29*(19), R918–R920. https://doi.org/10.1016/j.cub.2019.08.006

Kashif Imran, M., Fatima, T., Aslam, U., & Muhammad Javed Iqbal, S. (2019). Exploring the benefits of social media towards knowledge sharing among doctors. *Pakistan Journal of Psychological Research, 34*(2), 331–352. https://doi.org/10.33824/pjpr.2019.34.2.18

Kates, A. W., Wu, H., & Coryn, C. L. S. (2018). The effects of mobile phone use on academic performance: A meta-analysis. *Computers & Education, 127*, 107–112.

https://doi.org/10.1016/j.compedu.2018.08.012.

Kaur, S. (2016). Social media marketing. *Asian Journal of Multidimensional Research (AJMR), 5*(4), 6-12.

https://www.indianjournals.com/ijor.aspx?target=ijor:ajmr&type=home

Kemp, S. (2017). *Digital in 2017: Global overview*.

http://wearesocial.com/uk/blog/2017/01/digital-in-2017-global-overview.

Kim, Y., Wang, Y., & Oh, J. (2016). Digital media use and social engagement: How social media and smartphone use influence social activities of college students. *Cyberpsychology, Behavior, and Social Networking, 19*(4), 264–269. https://doi.org/10.1089/cyber.2015.0408

King, D. B., O'Rourke, N., & DeLongis, A. (2014). Social media recruitment and online data collection: A beginner's guide and best practices for assessing low-prevalence and hard-to-reach populations. *Canadian Psychology, 55*(4), 240–249. https://doi.org/10.1037/a0038087

Kircaburun, K., Alhabash, S., Tosuntaş, Ş. B., & Griffiths, M. D. (2018). Uses and gratifications of problematic social media use among university students: A simultaneous examination of the Big Five of personality traits, social media platforms, and social media use motives. *International Journal of Mental Health and Addiction, 18*(3), 525–547. https://doi.org/10.1007/s11469-018-9940-6

Kirschner, P. A., & De Bruyckere, P. (2017). The myths of the digital native and the multitasker. *Teaching and Teacher Education, 67*, 135–142. https://doi.org/10.1016/j.tate.2017.06.001

Kononova, A., & Chiang, Y.-H. (2015). Why do we multitask with media? Predictors of

    media multitasking among Internet users in the United States and Taiwan.

    Computers in Human Behavior, 50, 31–41.

    https://doi.org/10.1016/j.chb.2015.03.052

Krasnova, H., Widjaja, T., Buxmann, P., Wenninger, H., & Benbasat, I. (2015). Research

    note—Why following friends can hurt you: An exploratory investigation of the

    effects of envy on social networking sites among college-age users. *Information*

    Systems Research, 26(3), 585–605. https://doi.org/10.1287/isre.2015.0588

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.

    https://doi.org/10.3102/00346543075001063

Kuss, D., & Griffiths, M. (2017). Social networking sites and addiction: Ten lessons

    learned. *International Journal of Environmental Research and Public Health,*

    14(3), 311. https://doi.org/10.3390/ijerph14030311

Kuznekoff, J. H., Munz, S., & Titsworth, S. (2015). Mobile phones in the classroom:

    Examining the effects of texting, Twitter, and message content on student

    learning. *Communication Education, 64*(3), 344–365.

    https://doi.org/10.1080/03634523.2015.1038727

Lau, W. W. F. (2017). Effects of social media usage and social media multitasking on the

    academic performance of university students. *Computers in Human Behavior, 68*,

    286–291. https://doi.org/10.1016/j.chb.2016.11.043

Le Roux, D. B., & Parry, D. A. (2017). In-lecture media use and academic performance: Does subject area matter? *Computers in Human Behavior, 77*, 86–94. https://doi.org/10.1016/j.chb.2017.08.030

Lee, A. R., Son, S.-M., & Kim, K. K. (2016). Information and communication technology overload and social networking service fatigue: A stress perspective. *Computers in Human Behavior, 55*, 51–61. https://doi.org/10.1016/j.chb.2015.08.011

Lemay, D. J., Doleck, T., & Bazelais, P. (2019). Self-determination, loneliness, fear of missing out, and academic performance. *Knowledge Management & E-Learning: An International Journal*, 485–496. https://doi.org/10.34105/j.kmel.2019.11.025

Lin, L. yi, Sidani, J. E., Shensa, A., Radovic, A., Miller, E., Colditz, J. B., … Primack, B. A. (2016). Association between social media use and depression among U.S. young adults. *Depression and Anxiety, 33*(4), 323–331. https://doi.org/10.1002/da.22466

Mackey, L. K. (2019). The value of education in today's American society: A glimpse into the current way America supports the educational system. *Student Research Journal, 8*(1). https://doi.org/10.25073/0866-773x/264

Makki, T. W., DeCook, J. R., Kadylak, T., & Lee, O. J. (2017). The social value of Snapchat: An exploration of affiliation motivation, the Technology Acceptance Model, and relational maintenance in Snapchat use. *International Journal of Human–Computer Interaction, 34*(5), 410–420. https://doi.org/10.1080/10447318.2017.1357903

Marino, C., Gini, G., Vieno, A., & Spada, M. M. (2018). The associations between problematic Facebook use, psychological distress and well-being among adolescents and young adults: A systematic review and meta-analysis. *Journal of Affective Disorders, 226*, 274–281. https://doi.org/10.1016/j.jad.2017.10.007

Marley, R., & Platau, S. (2017). Empirical evidence on the validity of using accounting research subjects' self-reported GPA as a proxy measure of actual GPA. *International Journal of Critical Accounting, 9*(3), 193. https://doi.org/10.1504/ijca.2017.10009649

Matthews, G., Wohleber, R. W., & Lin, J. (2019). Stress, skilled performance, and expertise. *The Oxford Handbook of Expertise*, 489–524. https://doi.org/10.1093/oxfordhb/9780198795872.013.22

May, K. (2017). *Media multitasking in relation to cognition and socioemotional well-being: A literature review.* (Master's thesis). https://ir.library.msstate.edu/handle/11668/14461

May, K. E., & Elder, A. D. (2018). Efficient, helpful, or distracting? A literature review of media multitasking in relation to academic performance. *International Journal of Educational Technology in Higher Education, 15*(1). https://doi.org/10.1186/s41239-018-0096-z

Mayer, R. E. (2010). Applying the science of learning to medical education. *Medical Education, 44*(6), 543–549. https://doi.org/10.1111/j.1365-2923.2010.03624.x

Mayer, R. E., & Moreno, R. (2003). Nine ways to reduce cognitive load in multimedia learning. *Educational Psychologist, 38*(1), 43–52.

https://doi.org/10.1207/s15326985ep3801_6

Morales, K., Sosa-Fey, J., & Farias, J. (2017). Social media: Are the benefits worth the risks for business? *International Journal of Business & Public Administration, 14*(1), 87-97. http://www.iabpad.com/journals/international-journal-of-business-and-public-administration-2/

Muench, F., Hayes, M., Kuerbis, A., & Shao, S. (2015). The independent relationship between trouble controlling Facebook use, time spent on the site and distress. *Journal of Behavioral Addictions, 4*(3), 163–169. https://doi.org/10.1556/2006.4.2015.013

National Center for Education Statistics. (2020). *Undergraduate enrollment.* https://nces.ed.gov/programs/coe/indicator_cha.asp

Oberst, U., Wegmann, E., Stodt, B., Brand, M., & Chamarro, A. (2017). Negative consequences from heavy social networking in adolescents: The mediating role of fear of missing out. *Journal of Adolescence, 55*, 51–60. https://doi.org/10.1016/j.adolescence.2016.12.008

Oeldorf-Hirsch, A. (2017). The role of engagement in learning from active and incidental news exposure on social media. *Mass Communication and Society, 21*(2), 225–247. https://doi.org/10.1080/15205436.2017.1384022

Ophir, E., Nass, C., & Wagner, A. D. (2009). Cognitive control in media multitaskers. *Proceedings of the National Academy of Sciences, 106*(37), 15583–15587. https://doi.org/10.1073/pnas.0903620106

Ozer, I. (2014). *Multitasking and academic performance among university students in the*

United States, Europe, and Turkey: A multigroup structural equation modeling

approach. (Doctoral dissertation).

Paas, F., Renkl, A., & Sweller, J. (2004). Cognitive load theory: Instructional

implications of the interaction between information structures and cognitive

architecture. *Instructional Science, 32*(1/2), 1–8.

https://doi.org/10.1023/b:truc.0000021806.17516.d0

Pallant, J. (2013). *SPSS Survival Manual* (5th ed.). McGraw-Hill.

Pena, A. (2019). *Acculturative stress and trauma in Cuban immigrants within the first*

year of arrival to the United States. (Doctoral dissertation). ProQuest

Dissertations and Theses (UMI No. 13426721).

Piwek, L., & Joinson, A. (2016). "What do they snapchat about?" Patterns of use in time-

limited instant messaging service. *Computers in Human Behavior, 54*, 358–367.

https://doi.org/10.1016/j.chb.2015.08.026

Przybylski, A. K., Murayama, K., DeHaan, C. R., & Gladwell, V. (2013). Motivational,

emotional, and behavioral correlates of fear of missing out. *Computers in Human*

Behavior, 29(4), 1841–1848. https://doi.org/10.1016/j.chb.2013.02.014

Queirós, A., Faria, D., & Almeida, F. (2017). Strengths and limitations of qualitative and

quantitative research methods. *European Journal of Education Studies, 3*(9), 369-

386. https://doi.org/10.5281/zenodo.887089

Qutishat, M., & Sharour, L. A. (2019). Relationship between fear of missing out and

academic performance among Omani university students: A descriptive

correlation study. *Oman Medical Journal, 34*(5), 404–411.

https://doi.org/10.5001/omj.2019.75

Ratelle, C. F., & Duchesne, S. (2014). Trajectories of psychological need satisfaction

from early to late adolescence as a predictor of adjustment in school.

Contemporary Educational Psychology, 39(4), 388–400.

https://doi.org/10.1016/j.cedpsych.2014.09.003

Ravizza, S. M., Hambrick, D. Z., & Fenn, K. M. (2014). Non-academic internet use in

the classroom is negatively related to classroom learning regardless of intellectual

ability. *Computers & Education, 78*, 109–114.

https://doi.org/10.1016/j.compedu.2014.05.007

Reer, F., Tang, W. Y., & Quandt, T. (2019). Psychosocial well-being and social media

engagement: The mediating roles of social comparison orientation and fear of

missing out. *New Media & Society, 21*(7), 1486–1505.

https://doi.org/10.1177/1461444818823719

Riordan, B. C., Cody, L., Flett, J. A. M., Conner, T. S., Hunter, J., & Scarf, D. (2018).

The development of a single item FOMO (Fear of Missing Out) scale. *Current

Psychology, 39*(4), 1215–1220. https://doi.org/10.1007/s12144-018-9824-8

Roberts, J. A., & David, M. E. (2019). The social media party: Fear of Missing Out

(FOMO), social media intensity, connection, and well-being. *International

Journal of Human–Computer Interaction, 36*(4), 386–392.

https://doi.org/10.1080/10447318.2019.1646517

Rosen, J. A., Porter, S. R., & Rogers, J. (2017). Understanding student self-reports of

academic performance and course-taking behavior. *AERA Open, 3*(2).

https://doi.org/10.1177/2332858417711427

Rozgonjuk, D., Elhai, J. D., Ryan, T., & Scott, G. G. (2019). Fear of missing out is associated with disrupted activities from receiving smartphone notifications and surface learning in college students. *Computers & Education, 140.* https://doi.org/10.1016/j.compedu.2019.05.016

Rozgonjuk, D., & Täht, K. (2017). To what extent does Internet use affect academic performance? Using evidence from the large-scale PISA study. *Annual Review of Cybertherapy and Telemedicine, 15*, 39–44. http://www.arctt.info/

Saka, E. (2018). The role of social media-based citizen journalism practices in the formation of contemporary protest movements. *Rethinking Ideology in the Age of Global Discontent: Bridging Divides, Global and Transnational Politics.* Routledge.

Saleh, A., & Bista, K. (2017). Examining factors impacting online survey response rates in educational research: Perceptions of graduate students. *Journal of Multidisciplinary Evaluation, 13*(29), 63-74. https://journals.sfu.ca/jmde/index.php/jmde_1

Schwartz, J. A., & Beaver, K. M. (2015). Making (Up) the grade? Estimating the genetic and environmental influences of discrepancies between self-reported grades and official GPA scores. *Journal of Youth and Adolescence, 44*(5), 1125–1138. https://doi.org/10.1007/s10964-014-0185-9

Scott, G. G., Boyle, E. A., Czerniawska, K., & Courtney, A. (2018). Posting photos on Facebook: The impact of narcissism, social anxiety, loneliness, and shyness.

Personality and Individual Differences, 133, 67–72.

https://doi.org/10.1016/j.paid.2016.12.039

Scott, H., & Woods, H. C. (2018). Fear of missing out and sleep: Cognitive behavioral

factors in adolescents' nighttime social media use. *Journal of Adolescence, 68*,

61-65. https://doi.org/10.1016/j.adolescence.2018.07.009

Seabrook, E. M., Kern, M. L., & Rickard, N. S. (2016). Social networking sites,

depression, and anxiety: A systematic review. *JMIR Mental Health, 3*(4), e50.

https://doi.org/10.2196/mental.5842

Seeram, E. (2019). An overview of correlational research. *Radiologic Technology, 91*(2),

176-179. http://www.radiologictechnology.org/

Seo, M., Kim, J., & Yang, H. (2016). Frequent interaction and fast feedback predict

perceived social support: Using crawled and self-reported data of Facebook users.

Journal of Computer-Mediated Communication, 21, 282–297.

https://doi.org/10.1111/jcc4.12160

Simon, M. K., & Goes, J. (2013). *Assumptions, limitations, delimitations, and scope of

the study*. Dissertation Success, LLC.

Sos, N., Thompson, C., & Ziebell, A. (2019). Investigating cognitive overload in the

undergraduate chemistry laboratory through the lens of decision-making. *In

Proceedings of The Australian Conference on Science and Mathematics

Education,* pp. 101.

Statista. (2020a). *Number of social network users worldwide from 2017 to 2025.*

https://www.statista.com/statistics/278414/number-of-worldwide-social-network-

users/

Statista. (2020b). *Number of monthly active Facebook users worldwide as of 1ˢᵗ quarter of 2020.* https://www.statista.com/statistics/264810/number-of-monthly-active-facebook-users-worldwide/

Stevens, J. P. (2009). *Applied multivariate statistics for the social sciences* (5th ed.). Routledge Academic.

Sweller, J. (1994). Cognitive load theory, learning difficulty, and instructional design. *Learning and Instruction, 4*(4), 295–312. https://doi.org/10.1016/0959-4752(94)90003-5

Tabachnick, B. G., & Fidell, L. S. (2013). *Using Multivariate Statistics, 6ᵗʰ ed.* Allyn and Bacon.

Tavakol, M., & Dennick, R. (2011). Making sense of Cronbach's alpha. *International Journal of Medical Eucation, 2*, 53-55. https://doi.org/10.5116/ijme.4dfb.8dfd

Teye, A. C., & Peaslee, L. (2015). Measuring educational outcomes for at-risk children and youth: Issues with the validity of self-reported data. *Child & Youth Care Forum, 44*(6), 853–873. https://doi.org/10.1007/s10566-015-9310-5

Tuten, T. L. (2010). Conducting online surveys. In S. D. Gosling & J. A. Johnson (Eds.), *Advanced methods for conducting online behavioral research* (pp. 179-192). American Psychological Association.

Utz, S. (2016). Is LinkedIn making you more successful? The informational benefits derived from public social media. *New Media & Society, 18*, 2685–2702. https://doi.org/10.1177/1461444815604143

Utz, S., & Breuer, J. (2016). Informational benefits from social media use for professional purposes: Results from a longitudinal study. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace, 10*(4), article 3. https://doi.org/10.5817/CP2016-4-3

Uzun, A. M., & Kilis, S. (2019). Does persistent involvement in media and technology lead to lower academic performance? Evaluating media and technology use in relation to multitasking, self-regulation and academic performance. *Computers in Human Behavior, 90*, 196–203. https://doi.org/10.1016/j.chb.2018.08.045

Valkenburg, P. M., Peter, J., & Schouten, A. P. (2006). Friend networking sites and their relationship to adolescents' well-being and social self-esteem. *CyberPsychology & Behavior, 9*(5), 584-590. https://doi.org/10.1089/cpb.2006.9.584

Van der Schuur, W. A., Baumgartner, S. E., Sumter, S. R., & Valkenburg, P. M. (2015). The consequences of media multitasking for youth: A review. *Computers in Human Behavior, 53*, 204–215. https://doi.org/10.1016/j.chb.2015.06.035

Voorveld, H. A. M., & van der Goot, M. (2013). Age differences in media multitasking: A diary study. *Journal of Broadcasting & Electronic Media, 57*(3), 392–408. https://doi.org/10.1080/08838151.2013.816709

Walsh, J. L., Fielder, R. L., Carey, K. B., & Carey, M. P. (2013). Female college students' media use and academic outcomes: Results from a longitudinal cohort study. *Emerging Adulthood, 1*, 219–232. https://us.sagepub.com/en-us/nam/journal/emerging-adulthood

Wammes, J. D., Ralph, B. C. W., Mills, C., Bosch, N., Duncan, T. L., & Smilek, D. (2019). Disengagement during lectures: Media multitasking and mind wandering in university classrooms. *Computers & Education, 132*, 76–89. https://doi.org/10.1016/j.compedu.2018.12.007.

Wang, P., Xie, X., Wang, X., Wang, X., Zhao, F., Chu, X., Nie, J., & Lei, L. (2018). The need to belong and adolescent authentic self-presentation on SNSs: A moderated mediation model involving FoMO and perceived social support. *Personality and Individual Differences, 128*, 133–138. https://doi.org/10.1016/j.paid.2018.02.035

Wang, P., Zhao, M., Wang, X., Xie, X., Wang, Y., & Lei, L. (2017). Peer relationship and adolescent smartphone addiction: The mediating role of self-esteem and the moderating role of the need to belong. *Journal of Behavioral Addictions, 6*(4), 708–717. https://doi.org/10.1556/2006.6.2017.079

Welford, A. T. (1967). Single-channel operation in the brain. *Acta Psychologica, 27*, 5–22. https://doi.org/10.1016/0001-6918(67)90040-6

Whelan, E., Islam, N., & Brooks, S. (2017). *Cognitive control and social media overload.* Twenty-third Americas Conference on Information Systems.

Whelan, E., Islam, A. K. M. N., & Brooks, S. (2020). Applying the SOBC paradigm to explain how social media overload affects academic performance. *Computers & Education, 143*, 103692. https://doi.org/10.1016/j.compedu.2019.103692

Wilgus, G. (2019). From a nation at risk to no child left behind to race to the top: The US response to global competition. *Investment in Early Childhood Education in a Globalized World*, 107–158. https://doi.org/10.1057/978-1-137-60041-7_4

Wolniewicz, C. A., Tiamiyu, M. F., Weeks, J. W., & Elhai, J. D. (2018). Problematic

smartphone use and relations with negative affect, fear of missing out, and fear of

negative and positive evaluation. *Psychiatry Research, 262*, 618–623.

https://doi.org/10.1016/j.psychres.2017.09.058

Womack, J. M., & McNamara, C. L. (2017). Cell phone use and its effects on

undergraduate academic performance. *The Kennesaw Journal of Undergraduate

Research, 5*(1), 1-9. https://doi.org/10.32727/25.2019.17

Yeager, D. S., Romero, C., Paunesku, D., Hulleman, C. S., Schneider, B., Hinojosa, C.,

Lee, H. Y., O'Brien, J., Flint, K., Roberts, A., Trott, J., Greene, D., Walton, G.

M., & Dweck, C. S. (2016). Using design thinking to improve psychological

interventions: The case of the growth mindset during the transition to high school.

Journal of Educational Psychology, 108(3), 374–391.

https://doi.org/10.1037/edu0000098

Yin, L., Wang, P., Nie, J., Guo, J., Feng, J., & Lei, L. (2019). Social networking sites

addiction and FoMO: The mediating role of envy and the moderating role of need

to belong. *Current Psychology*. https://doi.org/10.1007/s12144-019-00344-4

York, T. T., Gibson, C., & Rankin, S. (2015). Defining and measuring academic success.

Practical Assessment, Research, & Evaluation, 20(5), 1-20. pareonline.net

Yu, A. Y., Tian, S. W., Vogel, D., & Chi-Wai Kwok, R. (2010). Can learning be virtually

boosted? An investigation of online social networking impacts. *Computers &

Education, 55*(4), 1494–1503. https://doi.org/10.1016/j.compedu.2010.06.015

Zheng, X., & Lee, M. K. O. (2016). Excessive use of mobile social networking sites:

Negative consequences on individuals. *Computers in Human Behavior, 65*, 65–

76. https://doi.org/10.1016/j.chb.2016.08.011

Appendix A: Fear of Missing Out Scale

(scale of 1 to 5, ranging from *not at all true of me* to *extremely true of me*)

1. I fear others have more rewarding experiences than me.

2. I fear my friends have more rewarding experiences than me.

3. I get worried when I find out my friends are having fun without me.

4. I get anxious when I don't know what my friends are up to.

5. It is important that I understand my friends ''in jokes''.

6. Sometimes, I wonder if I spend too much time keeping up with what is going on.

7. It bothers me when I miss an opportunity to meet up with friends.

8. When I have a good time it is important for me to share the details online (e.g. updating status).

9. When I miss out on a planned get-together it bothers me.

10. When I go on vacation, I continue to keep tabs on what my friends are doing.

Appendix B: Nonacademic Social Media Multitasking Scale

1. I multitask with my social media account while studying

   Strongly disagree

   Disagree

   Neither agree nor disagree

   Agree

   Strongly agree

2. I do not check my social media account if I am doing my work for school.

   Strongly disagree

   Disagree

   Neither agree nor disagree

   Agree

   Strongly agree

3. I remain online with my social media site(s) while doing homework.

   Strongly disagree

   Disagree

   Neither agree nor disagree

   Agree

   Strongly agree

Appendix C: Demographic Questionnaire

1. How old are you?
   18
   19
   20
   21
   22
   23 or older

2. What is your biological sex?
   Female
   Male

3. What race do you identify as?
   African American
   Caucasian
   Hispanic
   Asian
   Pacific Islander
   Biracial
   Other

4. What was your GPA for the last term/semester/quarter you completed?
   _____