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# Examining the Relationships between Social Media Use Constructs and Mental and Sleep Health in Hispanic University Emerging Adults

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EXAMINING THE RELATIONSHIPS BETWEEN SOCIAL MEDIA USE CONSTRUCTS  
AND MENTAL AND SLEEP HEALTH IN HISPANIC UNIVERSITY EMERGING ADULTS

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## **Dedication**

To my parents, Elsa Silex Garcia and Miguel Angel Garcia. And to my sister and brothers, Allyson Mariah Palombo, Angel David Garcia, & Christopher Lee Palombo. To my animal companions as well, Ginger and Lemon. Thank you for your everlasting and unwavering love and support.

EXAMINING THE RELATIONSHIPS BETWEEN SOCIAL MEDIA USE CONSTRUCTS  
AND MENTAL AND SLEEP HEALTH IN HISPANIC UNIVERSITY EMERGING ADULTS

by

MIGUEL ANDRES GARCIA, B.A

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## **Abstract**

The number of social media users and platforms have increased dramatically in recent years. Several different social media use constructs have developed from past research to assess social media engagement, including overall social media use, nighttime in-bed social media use, social media addiction, social media self-control failure, and emotional investment in social media. Such constructs are distinct from each other and may adversely impact mental and sleep health, especially during emerging adulthood. This study investigated the relationships between such social media use constructs and mental and sleep health in Hispanic university emerging adults through a framework of Uses and Gratifications Theory. Three hundred and fifty-eight Hispanic university emerging adults completed a cross-sectional online survey assessing sociodemographics, overall social media use frequency, nighttime in-bed social media use, social media addiction, social media self-control failure, emotional investment in social media, depression, anxiety, stress, and sleep quality. It was hypothesized that the above social media use constructs of interest would be positively associated with depression, anxiety, stress, and poor sleep quality after controlling for participant age and sex. Four multiple linear regression models were performed to test hypotheses. Hypotheses were partially supported such that social media addiction was positively associated with depression, anxiety, stress, and poor sleep quality, and social media self-control failure was positively associated with anxiety, stress, and poor sleep quality. These findings indicate that Hispanic university emerging adults may use social media problematically to cope with pre-existing poor mental and sleep health or that poor mental and sleep health stem from using social media problematically. Assessing problematic forms of social media use seems vital in clinical settings. Future studies may wish to investigate these observed relationships longitudinally to establish temporality.

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## **Chapter 1: Introduction**

### **Prevalence and Definitions**

Since the development of SixDegrees.com as the first social networking website in 1997 in which users created profiles and connected with others online (Boyd & Ellison, 2008), the number of social media users and platforms have increased dramatically. From 2017 to 2022, worldwide social media users increased from 2.73 billion to 4.59 billion and are expected to reach 5.85 billion by 2027 (Statista, 2022a). With over 100 social media platforms today, the most popular social media platforms as ranked by the number of monthly active users include Facebook, YouTube, WhatsApp, and Instagram with approximately 2.91, 2.56, 2.00, and 1.47 billion users, respectively (Statista, 2022b). Findings were similar from a survey by the Pew Research Center (2021) that assessed the number of social media users in the United States and found that 81% and 69% of the United States population reported ever using YouTube and Facebook, respectively. Along with this increase in social media users, past literature has noted that greater social media use is associated with several adverse health consequences including poorer sleep health (Bhat et al., 2018), poorer mental health (Vannucci et al., 2017), increased self-harm (Barthorpe et al., 2020), greater eating disorder symptoms/concerns (Santarossa & Woodruff, 2017), and poorer academic performance (Leyrer-Jackson & Wilson, 2018).

Broadly, social media use can be defined as communicating with others on the internet by sharing and viewing information, ideas, personal messages, photos, and videos. One's social media use may become excessive and problematic at which point it may be termed as social media addiction (Andreassen, 2015; Griffiths et al., 2014). Behavioral addictions (Grant et al., 2010) consist of six core components: salience, mood modification, tolerance, withdrawal, conflict, and relapse (Griffiths, 2005). Specific to social media addiction, salience involves

constantly thinking about social media and how time can be freed up for social media. Mood modification comprises using social media to reduce negative affect and feel “high.” Tolerance encompasses spending increasing amounts of time on social media to attain the same level of pleasure or “high.” Withdrawal involves the unpleasant states (e.g., stress, irritability) that occur when social media cannot be accessed. Conflict includes prioritizing social media over other important activities and people (e.g., studies/job, family). Relapse involves ignoring others’ advice to reduce social media use and failing at attempts to reduce social media use (Andreassen, 2015; Griffiths et al., 2014).

Social media addiction is not recognized as a disorder in the Diagnostic and Statistical Manual of Mental Disorders fifth edition (DSM-5), yet internet gaming disorder is recognized as a condition for further study in the DSM-5 (American Psychiatric Association [APA], 2013). Although social media addiction and internet gaming disorder may be specific forms of internet addiction (Su et al., 2020), studies have reasoned that social media addiction may be distinct from internet gaming disorder and internet addiction given definition and gender differences. Specifically, internet addiction typically covers a broad range of online activities while specific internet addictions (e.g., social media addiction, internet gaming disorder) target distinct online activities (Davis, 2001; Montag et al., 2014). Researchers have even criticized the construct of internet addiction as too general, and suggest that specific forms of internet addiction be investigated instead (Starcevic & Aboujaoude, 2017). Moreover, women are more likely to exhibit social media addiction, while men are more likely to exhibit internet gaming disorder and internet addiction (Spilková et al., 2017; Su et al., 2019; Su et al., 2020). Given these findings, it is important to assess social media addiction as a distinct construct.

Despite past research observing that Facebook addiction is negatively associated with dispositional self-control (Błachnio & Przepiorka, 2016), research on self-control failure specific to social media is limited. Social media self-control failure is when an individual fails to control their social media use even when their social media use conflicts with or delays other important goals and obligations (e.g., studying; Du et al., 2018). Du et al. (2018) argued that problematic social media use can be viewed on a continuum, with social media self-control failure on the lower less-problematic end and social media addiction on the upper more-problematic end. One study revealed that social media self-control failure is positively associated with checking social media constantly, experiencing the ubiquity of social media, and being easily disturbed by social media notifications (Du et al., 2019). Due to the scarce literature on social media self-control failure and studies arguing that social media self-control failure is much more prevalent than social media addiction among social media users (Du et al., 2018; Hofmann et al., 2012), it is worth investigating if social media self-control failure relates with potential deleterious consequences (e.g., depression, poor sleep quality).

As studies continue to measure social media use in terms of frequency and duration (e.g., Lerma et al., 2021), it may also be important to assess additional social media constructs such as an individual's emotional investment in social media. Emotional investment in social media involves the emotional connection one has with social media in which one feels upset, disappointed, and disconnected with others when one cannot access social media (Jenkins-Guarnieri et al., 2013; Woods & Scott, 2016). Considering that reviews suggest a more in-depth measurement of social media (Bekalu et al., 2019; Scott & Woods, 2019) beyond frequency and duration, measuring emotional investment in social media, especially as it relates to mental health (Alsunni & Latif, 2021), is warranted.

## **Mental Health**

A plethora of research has investigated how social media use and addiction relate to depression (Andreassen et al., 2016; Coyne et al., 2020; Sherlock & Wagstaff, 2019; Wright et al., 2013), anxiety (Andreassen et al., 2016; Brailovskaia et al., 2021; Vannucci et al., 2017), and stress (Brailovskaia et al., 2021; Denq et al., 2018; Mathis et al., 2021) from which several systematic and meta-analytic reviews have been conducted (Ahmed & Vaghefi, 2021; Cunningham et al., 2021; Karim et al., 2020; Keles et al., 2020; Vahedi & Zannella, 2021; Valkenburg, 2022; Valkenburg et al., 2022; Wolfers & Utz, 2022, Yin et al., 2019). Depression can be characterized as experiencing a loss of interest or pleasure and feeling “empty” or hopeless, whereas anxiety includes the apprehension of a perceived future threat and excessive worry (APA, 2013; Lambert et al., 2022). Stress involves a constant state of tension with a low threshold for frustration usually resulting from a situation or event that one perceives as a stressor (e.g., final examinations in college; Lovibond & Lovibond, 1995; Sanderson, 2019). Given the severity of mental health problems and the distress these problems may cause individuals, investigating how poor mental health associates with social media use is crucial.

Mixed findings have resulted from studies investigating the relationships between social media use and depression and anxiety. Several studies have observed a positive association (Lin et al., 2016; Sherlock & Wagstaff, 2019; Twenge et al., 2018; Woods & Scott, 2016; Vannucci et al., 2017) while others have noted no association (Alsunni & Latif, 2021; Coyne et al., 2020; Franco & Carrier, 2020). In one longitudinal study (Heffer et al., 2019), researchers investigated the associations between social media use and depressive symptoms over two years in adolescents ( $M_{age} = 12.22$ ) and over six years in young adults ( $M_{age} = 19.06$ ). Results revealed no significant associations between social media use and depression among young adults and

adolescent boys, yet revealed that greater depression significantly predicted greater social media use frequency among adolescent girls. Moreover, in a systematic review of 70 articles by Seabrook et al. (2016) that assessed the relationships between different social media use constructs (e.g., frequency, network size, etc.) and depression and anxiety, 30 studies investigated the relationships between social media use frequency and depression and anxiety. Eight studies observed a positive association and sixteen studies observed no association between social media use frequency and depression. Similarly, three studies observed a positive association and seven studies observed no association between social media use frequency and anxiety. Despite these mixed findings noted by Seabrook et al. (2016), two meta-analytic reviews observed a positive overall effect size for the relationship between overall social media use and depression ( $r = .165$ , Vahedi & Zannella, 2021) and between time spent on social media and depression ( $r = 0.11$ , Cunningham et al., 2021). Given these mixed findings, studies are warranted to continue investigating these relationships.

Findings on the association between social media addiction and depression and anxiety have been more consistent with the majority of studies observing a positive association (Andreassen et al., 2016; Hong et al., 2014; Hussain & Griffiths, 2018; Koc & Gulyagci, 2013; Mamun & Griffiths, 2019; Shannon et al., 2022; Wong et al., 2020). For example, in one meta-analysis (Shannon et al., 2022), results revealed a small-to-medium effect size for the relationship between problematic social media use and depression ( $r = 0.273$ ) and a medium effect size for the relationship between problematic social media use and anxiety ( $r = 0.348$ ) in adolescents and young adults. Despite these consistent findings, studies should continue to explore these relationships in underassessed populations as only one study has investigated how social media addiction is associated with depression and anxiety in Hispanic groups (Mathis et



al., 2021). In addition, because social media addiction is positively correlated with social media self-control failure ( $r = 0.56$ ; Du et al., 2018), studies are also needed to investigate how social media self-control failure is associated with depression and anxiety as social media self-control failure is widespread among social media users (Du et al., 2018) and no study has investigated these relationships.

Relative to social media use and addiction with depression and anxiety, the relationships between emotional investment in social media and depression and anxiety have been far less addressed (Alsunni & Latif, 2021; Lowe-Calverley et al., 2019; Woods & Scott, 2016). For instance, Alsunni and Latif (2021) investigated the relationships between overall social media use, nighttime-specific social media use, emotional investment in social media, depression, and anxiety in university students. Interestingly, results revealed that both overall and nighttime social media use were not associated with depression or anxiety. However, emotional investment in social media use was positively associated with depression and anxiety. Authors reasoned that the association between social media use and negative affect may be contingent on one's emotional connection to social media. These findings may indicate that measuring emotional investment in social media is also of importance as opposed to solely measuring duration and frequency of social media use (Alsunni & Latif, 2021). In sum, research is mixed between social media use, depression, and anxiety as well as limited between social media self-control failure, emotional investment in social media, depression, and anxiety, thus requiring further research.

Compared to depression and anxiety, research investigating the relationships between stress and social media use constructs have received less attention. Similar to depression and anxiety though, the relationships between stress and social media use have also yielded mixed findings (Wolfers & Utz, 2022) with some studies observing a positive association (Franco &

Carrier, 2020) and others observing no association (Denq et al., 2018). Also similar to depression and anxiety are the consistent findings for the relationship between stress and social media addiction in which multiple studies have observed a positive association (Brailovskaia et al., 2021; Hou et al., 2019; Mathis et al., 2021; Shannon et al., 2022; Wong et al., 2020). For example, in the same meta-analysis discussed above (Shannon et al., 2022), results indicated a medium effect size ( $r = 0.313$ ) for the relationship between problematic social media use and stress. In one study, however, even though Hou et al. (2019) observed a positive correlation between problematic social media use and stress in Chinese college students, researchers also observed that stress was not directly related to problematic social media use in a mediation analysis. Instead, depression and anxiety mediated the relationship between stress and problematic social media use. Given these intricate findings and that social media addiction is related to social media self-control failure and social media self-control failure is widespread (Du et al., 2018), explorations of these relationships deserve further investigation as no study as investigated the relationship between social media self-control failure and stress.

As for emotional investment in social media, studies have not yet investigated the relationship between emotional investment in social media and stress. One study (Lowe-Calverly et al., 2019) investigated how Instagram investment was associated with stress in which a positive association was observed. However, this study was platform-specific and did not measure across social media. Due to the increasing number of social media applications in recent years (Statista, 2022b), measuring social media more broadly seems necessary. In light of these limitations and that studies have observed a positive association between emotional investment in social media and depression and anxiety (Alsunni & Latif, 2021; Woods & Scott, 2016), it is worth investigating if emotional investment in social media and stress are related. Together, these

mixed and limited findings between social media use constructs and stress warrant more examinations of these relationships.

## **Sleep Health**

Mental health is closely linked with sleep health as several studies have observed a positive association between poor mental health (e.g., depression, anxiety, stress) and poor sleep health (e.g., increased sleep disturbances, short sleep duration, poor sleep quality; Massetti et al., 2017; Vernon et al., 2017; Wickham et al., 2020; Woods & Scott, 2016). Even in the DSM-5, possible symptoms for depressive and anxiety disorders include insomnia and sleep disturbances (APA, 2013). Poor sleep health such as short sleep duration (i.e., sleeping for less than approximately six hours a night; Grandner et al., 2010) is associated with a myriad of consequences including: lapses in sustaining attention, impaired decision making, loss of motivation, emotional dysregulation, mood changes, stress, metabolic obesity, increased risk for hypertension, and increased mortality risk (Banks & Dinges, 2007; Grandner et al., 2010; Owens, 2014).

One possible influence on poor sleep health is the use of electronic devices before bedtime (Bhat et al., 2018). In short, light suppresses the nocturnal secretion of melatonin (Lewy et al., 1980), an important hormone that helps manage the timing of one's circadian rhythm and sleep-wake cycle. In one study (Chang et al., 2015), researchers randomly assigned participants to either read a printed book or light-emitting electronic book at night for four hours before bedtime for five consecutive nights. Results indicated that participants who read the light-emitting electronic book experienced reduced evening sleepiness, increased sleep latency, reduced melatonin secretion, circadian rhythm delays, and decreased next-morning alertness compared to participants who read the printed book. With these results and the continued

proliferation of electronic social media use (Statista, 2022a), social media use may be associated with poor sleep health.

Indeed, numerous studies and reviews have suggested that greater social media use is associated with poorer sleep health (Alonzo et al., 2021; Bhat et al., 2018; Exelmans & Scott, 2019; Garrett et al., 2016; Graham et al., 2021; Lemola et al., 2015; Levenson et al., 2016; Levenson et al., 2017; Orzech et al., 2016; Scott & Woods, 2019; Tavernier & Willoughby, 2014; Woods & Scott, 2016) and that poor sleep health mediates the relationship between social media use and poor mental health (Graham et al., 2021; Lemola et al., 2015; Vernon et al., 2017). However, far fewer studies have compared the difference in how overall versus nighttime-specific social media use (i.e., using social media before bedtime) are associated with poor sleep health (Exelmans & Scott, 2019; Levenson et al., 2017; Woods & Scott, 2016). Investigating this difference may be important in order to further illuminate how the timing of social media use is associated with poor sleep health. One study observed that only nighttime social media use (and not overall social media use) was associated with poor sleep quality in young adults (Exelmans & Scott, 2019), whereas another study observed that both overall and nighttime social media use were associated with poor sleep quality in adolescents (Woods & Scott, 2016). Given these mixed and limited findings, studies are warranted to continue exploring the difference in how overall and nighttime social media use may be associated with sleep health, especially among different age groups.

Research has also demonstrated a consistent positive association between poor sleep health and social media addiction (Koc & Gulyagci, 2013; Mamun & Griffiths, 2019; Sümen & Evgin, 2021; Vernon et al., 2017; Wolniczak et al., 2013; Wong et al., 2020), similar to the consistent positive association between poor mental health and social media addiction discussed

above. Moreover, the relationship between sleep health and social media addiction has been investigated in several contexts including with Turkish and Bangladeshi university students (Koc & Gulyagci, 2013; Mamun & Griffiths, 2019) as well as university students in Hong Kong and Peru (Wolniczak et al., 2013; Wong et al., 2020). However, no study has investigated how sleep health is associated with social media addiction in Hispanic university students.

Similar to mental health, limited studies have investigated the relationship between social media self-control failure and sleep health (e.g., Masood et al., 2021). However, previous studies have noted that social media self-control failure is positively associated with checking social media constantly (Du et al., 2019), and another study observed that checking social media constantly moderated the relationship between nighttime social media use and sleep quality (Exelmans & Scott, 2019). Specifically, there was only a relationship between nighttime social media use and poor sleep quality for those who constantly checked their social media at night (Exelmans & Scott, 2019). From these findings, it is important to continue assessing if social media self-control failure is associated with poor sleep health.

Only one study has investigated how sleep health is associated with emotional investment in social media (Woods & Scott, 2016) in which findings revealed a positive association between emotional investment in social media and poor sleep quality in adolescents. Authors reasoned that adolescents more emotionally connected to social media may be more likely to experience a fear of missing out on new social media content while they attempt to fall and stay asleep (Woods & Scott, 2016). No study has investigated how emotional investment in social media may be associated with sleep health in emerging adults. In sum, more research is necessary to delineate between overall social media use, nighttime social media use, and sleep health as well

as extend findings between social media self-control failure, emotional investment in social media, and sleep health, particularly in emerging adults.

### **Emerging Adulthood**

Much of the research discussed above has investigated how social media use, addiction, and emotional investment are associated with mental and sleep health in adolescent samples (Lemola et al., 2015; Seo et al., 2017; Sümen & Evgin, 2021; Vernon et al., 2017; Woods & Scott, 2016), yet these associations have been researched less in emerging adult samples (Rasmussen et al., 2020; Vannucci et al., 2017; Wong et al., 2020). Additionally, results may differ between the two samples. For example, while one study (Woods & Scott, 2016) observed that overall and nighttime social media use were positively associated with depression and anxiety in adolescents, another study (Alsunni & Latif, 2021) observed that overall and nighttime social media use were not associated with depression and anxiety in university students, who are typically within the range of emerging adulthood.

Emerging adulthood is the period of development between adolescence and adulthood, approximately between the ages of 18 and 25 years, that includes five distinct features from other developmental periods: identity exploration, instability, self-focus, feeling in-between, and possibilities/optimism (Arnett, 2000, 2007, 2015). Additional features of emerging adulthood include increases in risky behaviors and experiencing major life transitions (e.g., leaving home, attending college; Arnett, 2000; Schulenberg et al., 2004; Rasmussen et al., 2020). Notably though is that emerging adulthood can also be a time for mental health problems (Arnett, 2007; Newcomb-Anjo et al., 2017). For example, emerging adults reported the greatest prevalence of mental illness (30.6%) and the lowest rate of receiving mental health services (42.1%) than any

other adult group in the United States during 2020 (National Institute of Mental Health [NIMH], 2022).

One potential risk factor for these mental health problems in emerging adults may be social media use (Rasmussen et al., 2020; Vannucci et al., 2017). According to one survey conducted in the United States (Pew Research Center, 2021), 84% of adults ages 18 to 29 reported ever using any social media sites, and Andreassen et al. (2017) observed that younger adults are more vulnerable to social media addiction than older adults. Past studies reason that social media may serve as an important context for emerging adults such that emerging adults may use social media to explore possible identities and manage social connections (Arnett, 2015; Moreno & Whitehill, 2014; Villanti et al., 2017). Thus, emerging adults may be considered a vulnerable group given their increased use of social media during a time of identity formation and instability in relationships, work, and education (Shannon et al., 2022) as well as their increased rates of mental illness (NIMH, 2022). Thus, assessing the relationships between social media use constructs and mental and sleep health in emerging adults is needed.

## **Hispanics**

In addition to emerging adulthood, the relationships between social media use, addiction, self-control failure, and emotional investment and mental and sleep health in Hispanic groups have been minimally studied. Only two studies have investigated how social media use and addiction are associated with mental health in Hispanics. Specifically, one study observed that social media use was positively associated with stress, but not with anxiety or depression (Franco & Carrier, 2020), while another study observed that anxiety was positively associated with weekly social media use and stress was positively associated with social media addiction (Mathis et al., 2021). Similar to emerging adults, Hispanics are also at risk of developing a mental illness,

as the NIMH (2022) reported that among ethnic/racial minorities, the past year prevalence of any mental illness was greatest among Hispanics (18.4%). Moreover, from 2000 to 2020, Hispanic undergraduate enrollment increased by 148%, the greatest increase of any minority group (U.S. Department of Education, 2021). Additionally, Hispanics are the largest ethnocultural minority group with 62.5 million Hispanic individuals living in the United States in 2021, making up 19% of the United States population (Krogstad et al., 2022). By 2060, the United States Hispanic population is projected to reach 111.2 million individuals, accounting for 28% of the United States population (U.S. Census Bureau, 2018).

Beyond the growth of the United States Hispanic population, sleep disparities exist within Hispanic groups (Roncoroni et al., 2022) such that Hispanics experience shorter sleep duration and poorer sleep quality than their non-Hispanic white counterparts (Chen et al., 2015; Piccolo et al., 2013). More specifically, Chen et al. (2015) observed that Hispanics had a 1.80 greater odds of sleeping fewer than six hours per night and a 1.28 greater odds of sleeping between six and seven hours per night compared to non-Hispanic whites. Furthermore, Piccolo et al. (2013) observed that Hispanics reported a higher prevalence of poor sleep quality as measured by restless sleep than non-Hispanic whites (43% versus 34%, respectively). A systematic review on sleep health in the United States Hispanic population (Roncoroni et al., 2022) observed that Hispanics sleep less and more poorly than recommended for their health. Risk factors that may influence these sleep disturbances in Hispanics include acculturation, discrimination, socioeconomic status, obesity, and stress (Roncoroni et al., 2022). A possible additional factor that may influence sleep health in Hispanics is social media use.

Recent studies have investigated social media use patterns in Hispanic college students (Gainza Perez et al., 2021; Gutierrez & Cooper, 2016; Lerma et al., 2021; Mathis et al., 2021) in



which one study (Lerma et al., 2021) observed that Hispanic college students reported using social media an average of 20 hours per week. Compared to other ethnocultural groups, Hispanic college students were not observed to use social media more than other non-Hispanic college students (Ceballos et al., 2018). In contrast though, one survey (Statista, 2022c) reported that in 2019, daily social media use was greatest among users residing in the Latin American region at approximately 3 hours and 30 minutes per day. Despite these mixed findings, studies have observed that social media use frequency has increased among Hispanic college students living on the United States – Mexico border in recent years, from an average of 46 hours per month in 2016 (Gutierrez & Cooper, 2016) to an average of 80 hours per month in 2021 (Lerma et al., 2021). Given this rise in and frequent use of social media among Hispanic college students living on the United States – Mexico border, the limited studies on Hispanics social media use and mental and sleep health, and that one systematic review (Alonzo et al., 2021) suggested future studies to investigate the relationships between social media use, mental health, and sleep health in other technologically literate populations, investigations among Hispanic university emerging adults are critical.

### **Uses and Gratifications Theory**

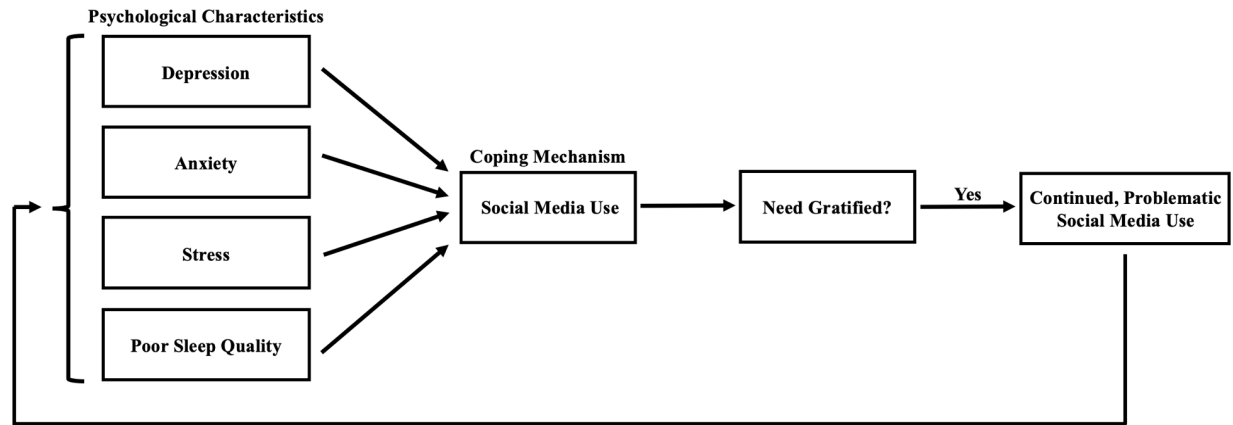
One theory for understanding the possible relationships between social media use constructs and mental and sleep health is Uses and Gratifications Theory (UGT; Katz et al., 1973; Rubin, 1993). UGT is a psychological communication theory that includes five major assumptions: 1) media use is goal-directed or motivated; 2) individuals use media to satisfy their needs and desires; 3) one's sociodemographic and psychological characteristics influence one's media use; 4) media and interpersonal communication are related for satisfying needs; and 5) people are more influential than media (Katz et al., 1973, Rubin, 1993). In short, UGT posits that

individuals seek gratifications from media and technology based on their own needs, goals, or motivations (Huang et al., 2014; Sun & Zhang, 2021) with needs and motivations being influenced by one's sociodemographic and psychological characteristics (Elhai et al., 2019). If these needs are gratified, users are likely to repeat such media experiences (Huang et al., 2014).

Past studies have applied UGT to smartphone addiction and mental health (Elhai et al., 2017) as well as social media addiction and social media motives (Ferris et al., 2021; Kircaburun et al., 2020). For the present study, social media use, addiction, self-control failure, and emotional investment may be related with poor mental and sleep health such that individuals may have a need or desire to calm or cope with their pre-existing poor mental and/or sleep health conditions, thus resorting to social media. If these needs of calming one's poor mental and/or sleep health are gratified by using social media, one may become emotionally invested in social media, fail to control their social media use, and become addicted to social media. Indeed, past studies have suggested that media may be used as a sleep aid (Exelmans & Van den Bulck, 2016), and burnout from academic stress may lead to problematic Facebook use (Walberg et al., 2016). One longitudinal study observed not that social media use led to sleep problems, but that sleep problems led to social media use in university emerging adults (Tavernier & Willoughby, 2014). Similarly, another longitudinal study observed not that social media use led to depression, but that depression led to more frequent social media use in adolescent girls (Heffer et al., 2019). Thus, pairing UGT with observed directionality from longitudinal studies suggests that individuals use social media to treat poor mental and sleep health.

However, social media use, addiction, self-control failure, and emotional investment may also lead to poor mental and sleep health as well. For example, longitudinal studies have found that social media addiction serves as a risk factor for insomnia and depression in adolescents

(Lin et al., 2021; Raudsepp, 2019). Considering these findings, a bidirectional relationship between social media use constructs and mental and sleep health may be at play. Of note, Elhai et al. (2019) developed a theoretical model postulating that the relationship between anxiety, smartphone use frequency, and problematic smartphone use is likely bidirectional. Specifically, anxiety may lead to transdiagnostic-related anxiety constructs (e.g., fear of missing out) which then leads to increased smartphone use frequency ultimately leading to problematic smartphone use. Problematic smartphone use may then lead back to increased anxiety (Elhai et al., 2019). Considering this theoretical model presented by Elhai et al. (2019) and the longitudinal findings between social media use and addiction with poor mental and sleep health, the relationships between social media use constructs and mental and sleep health may also be bidirectional. Therefore, the present study utilizes a similar theoretical framework of UGT within a feedback loop to explain the possible relationships between social media use constructs and mental and sleep health. As demonstrated in Figure 1, the presence of psychological characteristics such as depression, anxiety, stress, and/or poor sleep quality influences one's need to use social media as a coping mechanism. If using social media reduces one's levels of depression, anxiety, stress, and/or poor sleep quality, then one's need is gratified. When one's need is gratified, continued and problematic social media use will likely follow. Continued and problematic social media use will then lead back to increased levels of depression, anxiety, stress, and/or poor sleep quality.



**Figure 1: Theoretical Framework of Uses and Gratifications Theory within a Feedback Loop**

### **Present Study – Aims and Hypotheses**

The present study investigated how overall social media use frequency, nighttime in-bed social media use, social media addiction, social media self-control failure, and emotional investment in social media relate to depression, anxiety, stress, and sleep quality in Hispanic university emerging adults through a theoretical framework of UGT within a feedback loop. Hypotheses were fourfold: 1) Depression will be positively associated with overall social media use frequency, nighttime in-bed social media use, social media addiction, social media self-control failure, and emotional investment in social media; 2) Anxiety will be positively associated with overall social media use frequency, nighttime in-bed social media use, social media addiction, social media self-control failure, and emotional investment in social media; 3) Stress will be positively associated with overall social media use frequency, nighttime in-bed social media use, social media addiction, social media self-control failure, and emotional investment in social media; 4) Poor sleep quality will be positively associated with overall social media use frequency, nighttime in-bed social media use, social media addiction, social media self-control failure, and emotional investment in social media.

## Chapter 2: Method

### Participants

A power analysis was performed to determine necessary sample size by using G\*Power, a statistical power analysis tool. In G\*Power, the test family was set to F-tests and the statistical test was set to linear multiple regression fixed model,  $R^2$  deviation from zero. Power was set to 0.80,  $\alpha = 0.05$ , and effect size to  $f^2 = 0.042$ . The effect size was determined from an adjusted squared multiple correlation between weekly social media use and poor mental health constructs (e.g., depression, anxiety) that was derived from a study investigating the relationships between social media use and sociodemographic and psychological constructs among Hispanic college students (adjusted  $R^2 = 0.04$ ; Mathis et al., 2021). Moreover, a second squared multiple correlation between social media use constructs (e.g., nighttime specific social media use, emotional investment in social media) and poor sleep quality was also assessed from previous literature ( $R^2 = 0.13$ , Woods & Scott, 2016). However, because the latter correlation was larger, the former correlation was used for the power analysis to detect the smallest possible effect size. The number of predictors was set to seven as calculated from the number of control and independent variables. From this power analysis, a minimum of 349 participants were required for the present study.

Four hundred and twenty-nine university students were ultimately recruited for the present cross-sectional study. However, 52 participants were excluded because they did not meet the inclusion criteria. The inclusion criteria for the present study included being between 18 and 25 years of age, self-identifying as Hispanic/Latinx, and having used social media at least once within the past week. An additional 16 participants were excluded for not passing at least three out of four attention checks. Lastly, three participants were excluded for taking more than 24

hours to complete the online study. After removing these three participants, the next longest time a participant took in completing the online study was 7.75 hours. Removing the participants described above resulted in a final analyzable sample size of 358 Hispanic university emerging adults ( $M_{age} = 20.11$ ,  $SD = 1.79$ ; 81.8% female).

## **Materials**

### ***Sociodemographic Survey***

This 27-item demographic survey assesses typical demographic information (e.g., age, sex) and information related to the COVID-19 pandemic (e.g., What best describes the impact that the COVID-19 pandemic has had on your mental health?; Appendix A).

### ***Social Media Use Frequency (SMUF)***

This 5-item scale measures social media use frequency by assessing frequency of daily, weekly, and monthly social media use as well as frequency of social media use divided across major social media platforms (Facebook, Instagram, Twitter, Snapchat, TikTok, YouTube, Reddit). For the present study, overall social media use frequency was assessed using weekly social media use. Similar assessments of social media use frequency have been used in past research (Gainza Perez et al., 2021; Lerma et al., 2021; Appendix B).

### ***Adapted In-Bed Electronic Social Media Use (A-IBESMU)***

This 7-item scale measures nightly electronic social media use by assessing near bedtime and in-bed electronic social media use (Bhat et al., 2018). Items one and two assess the number of nights per week that social media is used in the hour before going to bed and while in bed, respectively. Item three assesses the amount of time per night that is spent on social media while in-bed and was adapted for the present study in which the item was changed from a closed-ended 5-point Likert scale item ranging from 1 (*Less than half an hour*) to 5 (*More than 3 hours*) to a

non-Likert scale open-ended item. Scores from items two and three are then multiplied with the product score representing volume of weekly in-bed electronic social media use that was termed nighttime in-bed social media use in the present study. For example, if a participant reported using social media at night in-bed five days a week for one hour and thirty minutes per night while in-bed, then 5 was multiplied by 1.5 to obtain 7.5 hours of volume of weekly in-bed electronic social media use. Items four and five assess if the participant has a bed-partner and the bed-partner's in-bed social media use, respectively. Items six and seven assess the number of hours slept on weeknights and weekend nights, respectively (Appendix C).

### ***Bergen Social Media Addiction Scale (BSMAS)***

This 6-item scale measures social media addiction by assessing the six core symptoms of addiction: salience, conflict, mood modification, withdrawal, tolerance, and relapse (Andreassen et al., 2017; Griffiths, 2005). Items are rated on a 5-point Likert scale ranging from 1 (*Very Rarely*) to 5 (*Very Often*). Items are summed to create a total score ranging from 6 to 30 with higher scores indicating greater social media addiction. A conservative monothetic scoring approach (scoring 3 or above on all 6 items) was used to identify participants with social media addiction. The BSMAS has demonstrated adequate to high internal reliability in previous studies ( $\alpha = 0.88$ , Andreassen et al., 2017;  $\alpha = 0.83$ , Gainza Perez et al., 2021). The BSMAS is a modified version of the validated Bergen Facebook Addiction Scale which has demonstrated adequate 3-week test-retest reliability ( $r = 0.82$ ) and adequate convergent validity with the Addictive Tendencies Scale ( $r = 0.69$ ; Andreassen et al., 2012; Appendix D). Internal reliability for the BSMAS in the present study was adequate ( $\alpha = .79$ ).

### ***Social Media Self-Control Failure Scale (SMSCF)***

This 3-item scale measures one's failure to control their social media use (Du et al., 2018). Items are rated on a 5-point Likert scale ranging from 1 (*Almost Never*) to 5 (*Very Often*). Items are summed and a mean score is computed with higher scores indicating greater failure of social media self-control. The SMSCF-scale has demonstrated high internal reliability at two time points ( $\alpha = 0.87$  &  $0.88$ , respectively; Du et al., 2018) and adequate 4-week test-retest reliability ( $r = 0.68$ ). However, the construct validity of the SMSCF-scale with the BSMAS was moderate ( $r = 0.56$ ), indicating that SMSCF is distinct from social media addiction (Du et al., 2018; Appendix E). Internal reliability for the SMSCF-scale in present study was high ( $\alpha = .91$ ).

### ***Social Media Use Integration Scale (SMUIS)***

This 10-item two-factor scale measures one's emotional investment in social media and integration of social media into daily routines (Jenkins-Guarnieri et al., 2013). The two factors are: 1) Social Integration and Emotional Connection (SIEC) and 2) Integration into Social Routines. For the present study, only the first factor was used and "Facebook" was replaced with "social media." Items are rated on a 6-point Likert scale ranging from 1 (*Strongly Disagree*) to 6 (*Strongly Agree*). Items are summed and a mean score is computed with higher scores indicating greater emotional investment in social media. The SIEC-factor has demonstrated high internal reliability ( $\alpha = 0.89$ ), adequate 3-week test-retest reliability ( $r = 0.80$ ), and adequate convergent validity with the Facebook Use Intensity Scale ( $r = 0.69$ ; Jenkins-Guarnieri et al., 2013; Appendix F). Internal reliability for the SIEC-factor in the present study was high ( $\alpha = .84$ ).

### ***Depression, Anxiety, and Stress Scale – 21 (DASS-21)***

This 21-item three-factor scale measures levels of 1) depression, 2) anxiety, and 3) stress (Lovibond & Lovibond, 1995). Items are rated on a 4-point Likert-like scale ranging from 0 (*Did*



*not apply to me at all*) to 3 (*Applied to me very much or most of the time*). Items within each factor are summed and multiplied by two with higher scores indicating greater levels of depression, anxiety, and/or stress. The DASS-21 has demonstrated adequate to high internal reliability for the three factors ( $\alpha = 0.91$ ,  $\alpha = 0.84$ , &  $\alpha = 0.90$ , respectively; Lovibond & Lovibond, 1995). The DASS-21 depression and anxiety factors have demonstrated adequate convergent validity with the Beck Depression Inventory and Beck Anxiety Inventory ( $r = 0.74$  &  $r = 0.81$ , respectively; Lovibond & Lovibond, 1995; Appendix G). Internal reliabilities for the depression, anxiety, and stress factors in the present study were adequate to high ( $\alpha = .90$ ,  $\alpha = .83$ , &  $\alpha = .81$ , respectively).

### ***Pittsburgh Sleep Quality Index (PSQI)***

This 24-item seven-component scale measures levels of one's 1) subjective sleep quality, 2) sleep latency, 3) sleep duration, 4) habitual sleep efficiency, 5) sleep disturbances, 6) use of sleeping medication, and 7) daytime dysfunction (Buysse et al., 1989). Within the 24-items, 19 are self-rated, and five are rated by the bed partner or roommate if one is available. For the present study, only the self-rated questions were used as these are the only questions that are included in the scoring. Items are grouped into seven component scores with each component given a score ranging from 0 (*No Difficulty*) to 3 (*Severe Difficulty*). The seven component scores are then summed to provide a 'global sleep quality' score ranging from 0 to 21 with higher scores indicating poorer sleep quality and a score greater than 5 distinguishing poor sleepers from good sleepers. The PSQI has demonstrated adequate internal reliability ( $\alpha = 0.83$ ) and high test-retest reliability ( $r = 0.85$ ). However, the PSQI did not demonstrate convergent validity with polysomnography (Buysse et al., 1989). Despite low validity, the PSQI is widely used as one review (Alonzo et al., 2021) reported 17 of 42 studies using the PSQI to measure sleep quality

(Appendix H). Internal reliability for the PSQI in the present study was slightly less than acceptable ( $\alpha = .57$ ).

### ***End-of-Survey Questionnaire***

This 3-item questionnaire measures how comfortable participants are in answering questions about their mental health, sleep health, and social media use. Items are rated on a 5-point Likert scale ranging from 1 (*Uncomfortable*) to 5 (*Very Comfortable*). Items are summed and a mean score is computed with higher scores indicating greater comfortability in answering questions about mental health, sleep health, and social media use (Appendix I).

### **Procedure**

Prior to study implementation, approval was obtained from the University Institutional Review Board. Data were collected between January 20, 2023 and March 13, 2023. Participants were recruited via SONA-system, a secure web-based recruitment website. Participants first read and electronically signed a consent form using the Qualtrics platform. Once consent was obtained, participants who chose to participate in the study completed a series of questionnaires not connected to the consent form. Measures were responded to in Qualtrics and the order of measures was randomized to protect against order effects. Participants received course credit for their participation, were debriefed regarding the study, and were offered mental health resources such as the University Counseling Center.

### **Approach to Analyses**

Descriptive analyses were performed to yield participant characteristics. Bivariate analyses were performed to assess the correlations between age, biological sex, overall social media use frequency, nighttime in-bed social media use, social media addiction, social media self-control failure, emotional investment in social media, depression, anxiety, stress, and sleep

quality. Multiple linear regressions were conducted to test hypotheses. Specifically, four multiple linear regression models were performed in which depression, anxiety, stress, and sleep quality served as the dependent variables. Five independent variables of interest were included in each model: overall social media use frequency, nighttime in-bed social media use, social media addiction, social media self-control failure, and emotional investment in social media. All models controlled for participant age and biological sex because past studies have observed links between these variables and the present study's variables of interest (e.g., Andreassen et al., 2017; Graves et al., 2021). Squared semi-partial correlations were performed to assess how much each independent variable of interest uniquely contributed to the variance in the dependent variable above and beyond all other independent variables.

To assess that variables were normally distributed, cutoff scores of  $|Sk| < 2$  and  $|Ku| < 7$  were used (Kim, 2013). Using these guidelines, all variables met the assumption of normality with the exception of overall social media use frequency and nighttime in-bed social media use. Despite exhibiting non-normality, these two variables were treated as is given that past studies using similar variables did not modify such variables (e.g., Gainza Perez et al., 2021; Lerma et al., 2021). Furthermore, the time spent on a behavior (e.g., using social media) may be considered as quasi-count data (Green et al., 2021) and these type of data are often non-normal with true outliers. There were no issues of multicollinearity in either of the four multiple linear regression models as the variance inflation factor was less than 10 and the tolerance value was greater than 0.100 for each independent variable.

### Chapter 3: Results

Participants had an average age of 20.11 years ( $SD = 1.79$ ) and 81.8% of the sample were women (see table 1). Participants reported using social media an average of 4.58 hours ( $SD = 2.87$ ) per day, an average of 27.36 hours ( $SD = 21.94$ ) per week, and an average of 119.30 hours ( $SD = 130.69$ ) per month (assuming 30 days per month). Of the total number of hours participants reported spending on social media per day, participants reported on average using Facebook 6.57% of the time, Instagram 31.35% of the time, Twitter 5.53% of the time, Snapchat 6.13% of the time, TikTok 33.90% of the time, YouTube 13.02% of the time, Reddit 1.23% of the time, and other platforms (e.g., Pinterest, Discord, WhatsApp) 1.84% of the time. Participants used English on social media an average of 73.58% of the time, Spanish 26.24% of the time, and other languages (e.g., French, Korean) .18% of the time. For nighttime in-bed social media use, participants reported on average spending 14.20 hours ( $SD = 14.69$ ) on social media at night in-bed per week. Approximately 15.1% of the sample met the conservative threshold for social media addiction.

Using the DASS-21 thresholds provided by Lovibond and Lovibond (1995), participants reported on average mild-to-moderate levels of depression ( $M = 13.57$ ,  $SD = 11.00$ ), moderate levels of anxiety ( $M = 11.03$ ,  $SD = 9.42$ ), and normal-to-mild levels of stress ( $M = 14.91$ ,  $SD = 9.05$ ). Using the PSQI threshold that a global sleep quality score of greater than 5 distinguishes poor sleepers from good sleepers (Buysse et al., 1989), 76.7% of the sample were considered poor sleepers. Participants reported moderate-to-high levels of comfortability in responding to questions about their social media use ( $M = 4.06$ ,  $SD = 1.09$ ), mental health ( $M = 3.77$ ,  $SD = 1.209$ ), and sleep health ( $M = 4.23$ ,  $SD = .998$ ).

**Table 1: Participant Characteristics and Descriptive Statistics**

Participants ( $n = 358$ )				
Characteristic	Frequency	$n$		
Biological Sex				
Women	81.8%	293		
Men	18.2%	65		
Social media addiction				
Above monothetic addiction score	15.1%	53		
PSQI				
Poor sleepers	76.7%	267		
Measures	<i>Mean</i>	<i>Median</i>	<i>SD</i>	Range
Age	20.11	20.00	1.79	18–25
Daily social media use (hours)	4.58	4.00	2.87	0–20.50
Weekly social media use (hours)	27.36	22.00	21.94	1.40–160.83
Monthly social media use (hours)	119.30	85.00	130.69	0–720.08
Nighttime in-bed social media use (hours)	14.20	10.50	14.69	0–140.58
Social media addiction	17.45	18.00	5.20	6–30
Social media self-control failure	3.61	3.67	0.91	1–5
Emotional investment in social media	2.73	2.67	1.13	1–5.67
DASS-21				
Depression	13.57	12.00	11.00	0–42
Anxiety	11.03	8.00	9.42	0–42
Stress	14.91	14.00	9.05	0–42
PSQI				
Subjective sleep quality	1.25	1.00	0.61	0–3
Sleep latency	1.42	2.00	1.00	0–3
Sleep duration	1.20	1.00	0.88	0–3
Habitual sleep efficiency	0.67	0.00	0.98	0–3
Sleep disturbances	1.22	1.00	0.54	0–3
Use of sleeping medication	0.51	0.00	0.95	0–3
Daytime dysfunction	1.44	1.00	0.82	0–3
Global sleep quality score	7.73	7.00	3.13	1–17

*Note.* Any sample size deviations are a result of missing data; DASS-21: Depression, Anxiety, and Stress Scale – 21; PSQI: Pittsburgh Sleep Quality Index; Higher scores on PSQI components indicate poorer sleep patterns

### Bivariate Correlations of Interest

Overall social media use frequency was positively correlated with depression ( $r = .111$ ) and anxiety ( $r = .131$ ). Nighttime in-bed social media use was positively correlated with anxiety ( $r = .113$ ) and poor sleep quality ( $r = .135$ ). Social media addiction was positively correlated with depression ( $r = .374$ ), anxiety ( $r = .368$ ), stress ( $r = .456$ ), and poor sleep quality ( $r = .334$ ).

Similarly, social media self-control failure was positively correlated with depression ( $r = .295$ ), anxiety ( $r = .313$ ), stress ( $r = .394$ ), and poor sleep quality ( $r = .293$ ). Emotional investment in social media was also positively correlated with depression ( $r = .262$ ), anxiety ( $r = .174$ ), stress ( $r = .220$ ), and poor sleep quality ( $r = .198$ ; see table 2).

**Table 2: Correlation Matrix of Study Variables**

Variable	1.	2.	3.	4.	5.	6.	7	8.	9.	10.	11.
1. Sex	1										
2. Age	<b>-.121</b>	1									
3. Overall social media use frequency	<b>.146</b>	-.068	1								
4. Nighttime in-bed social media use	.088	-.099	<b>.328</b>	1							
5. Social media addiction	<b>.158</b>	<b>-.129</b>	<b>.122</b>	<b>.131</b>	1						
6. Social media self-control failure	<b>.134</b>	<b>-.131</b>	<b>.164</b>	<b>.139</b>	<b>.565</b>	1					
7. Emotional investment in social media	<b>.132</b>	-.086	<b>.128</b>	.098	<b>.472</b>	<b>.354</b>	1				
8. Depression	.065	-.039	<b>.111</b>	.071	<b>.374</b>	<b>.295</b>	<b>.262</b>	1			
9. Anxiety	<b>.130</b>	-.035	<b>.131</b>	<b>.113</b>	<b>.368</b>	<b>.313</b>	<b>.174</b>	<b>.628</b>	1		
10. Stress	<b>.156</b>	-.039	.066	.078	<b>.456</b>	<b>.394</b>	<b>.220</b>	<b>.701</b>	<b>.755</b>	1	
11. Sleep quality	.088	-.032	.082	<b>.135</b>	<b>.334</b>	<b>.293</b>	<b>.198</b>	<b>.430</b>	<b>.440</b>	<b>.478</b>	1

*Note.* **Bold text indicates significance at  $p < .05$** ; Men were coded as 1 and women as 2.

## Multiple Linear Regression Models

The model assessing depression was statistically significant, ( $F(7,332) = 8.536, R^2 = .153, p < .001$ ). Participants who reported greater levels of social media addiction reported greater levels of depression ( $\beta = .265, p < .001$ ), and social media addiction uniquely accounted for 4.1% of the variance in depression above and beyond all other entered independent variables (see table 3).

**Table 3: Multiple Linear Regression of Social Media Use Constructs Predicting Depression**

Variable	95% CI for $B$					
	$B$	$SE$	$\beta$	$sr^2$	Lower	Upper
Sex	-.004	1.488	.000	.000	-2.930	2.923
Age	.025	.315	.004	.000	-.595	.644
Overall social media use frequency	.025	.027	.051	.003	-.027	.078
Nighttime in-bed social media use	-.006	.040	-.009	.000	-.086	.073
<b>Social media addiction</b>	<b>.561</b>	<b>.139</b>	<b>.265</b>	<b>.041</b>	<b>.287</b>	<b>.835</b>
Social media self-control failure	1.284	.745	.107	.008	-.181	2.749
Emotional investment in social media	.767	.563	.079	.005	-.341	1.875
$R^2$	<b>.153</b>					
Adjusted $R^2$	<b>.135</b>					

*Note.* The overall model was significant: ( $F(7,332) = 8.536, R^2 = .153, p < .001$ ); **Bold text indicates significance at  $p < .05$** ; Men were coded as 1 and women as 2.

The model assessing anxiety was statistically significant, ( $F(7,326) = 8.718, R^2 = .158, p < .001$ ). Participants who reported greater levels of social media addiction reported greater levels of anxiety ( $\beta = .278, p < .001$ ), and social media addiction uniquely accounted for 4.6% of the variance in anxiety above and beyond all other entered independent variables. Participants who reported greater levels of social media self-control failure reported greater levels of anxiety ( $\beta = .137, p = .029$ ), and social media self-control failure uniquely accounted for 1.2% of the variance in anxiety above and beyond all other entered independent variables (see table 4).

**Table 4: Multiple Linear Regression of Social Media Use Constructs Predicting Anxiety**

Variable	95% CI for $B$					
	$B$	$SE$	$\beta$	$sr^2$	Lower	Upper
Sex	1.923	1.285	.078	.006	-.606	4.451
Age	.101	.269	.019	.000	-.428	.630



Overall social media use frequency	.024	.023	.056	.003	-.021	.069
Nighttime in-bed social media use	.020	.035	.031	.001	-.049	.089
<b>Social media addiction</b>	<b>.506</b>	<b>.120</b>	<b>.278</b>	<b>.046</b>	<b>.271</b>	<b>.742</b>
<b>Social media self-control failure</b>	<b>1.416</b>	<b>.646</b>	<b>.137</b>	<b>.012</b>	<b>.145</b>	<b>2.687</b>
Emotional investment in social media	-.303	.484	-.036	.001	-1.255	.650
$R^2$	<b>.158</b>					
Adjusted $R^2$	<b>.140</b>					

Note. The overall model was significant: ( $F(7,326) = 8.718, R^2 = .158, p < .001$ ); **Bold text indicates significance at  $p < .05$** ; Men were coded as 1 and women as 2.

The model assessing stress was statistically significant, ( $F(7,332) = 14.904, R^2 = .239, p < .001$ ). Women reported greater levels of stress ( $\beta = .105, p = .034$ ). Participants who reported greater levels of social media addiction reported greater levels of stress ( $\beta = .339, p < .001$ ), and social media addiction uniquely accounted for 6.9% of the variance in stress above and beyond all other entered independent variables. Participants who reported greater levels of social media self-control failure reported greater levels of stress ( $\beta = .200, p < .001$ ), and social media self-control failure uniquely accounted for 2.7% of the variance in stress above and beyond all other entered independent variables (see table 5).

**Table 5: Multiple Linear Regression of Social Media Use Constructs Predicting Stress**

Variable	95% CI for $B$					
	$B$	$SE$	$\beta$	$sr^2$	Lower	Upper
<b>Sex</b>	<b>2.464</b>	<b>1.155</b>	<b>.105</b>	<b>.010</b>	<b>.191</b>	<b>4.737</b>
Age	.138	.242	.028	.001	-.339	.614
Overall social media use frequency	-.007	.021	-.017	.000	-.048	.034
Nighttime in-bed social media use	-.004	.031	-.006	.000	-.065	.058
<b>Social media addiction</b>	<b>.592</b>	<b>.108</b>	<b>.339</b>	<b>.069</b>	<b>.380</b>	<b>.805</b>
<b>Social media self-control failure</b>	<b>1.982</b>	<b>.578</b>	<b>.200</b>	<b>.027</b>	<b>.846</b>	<b>3.116</b>
Emotional investment in social media	-.216	.436	-.027	.001	-1.073	.641
$R^2$	<b>.239</b>					
Adjusted $R^2$	<b>.223</b>					

Note. The overall model was significant: ( $F(7,332) = 14.904, R^2 = .239, p < .001$ ); **Bold text indicates significance at  $p < .05$** ; Men were coded as 1 and women as 2.

The model assessing sleep quality was statistically significant, ( $F(7,329) = 6.853, R^2 = .127, p < .001$ ). Participants who reported greater levels of social media addiction reported

poorer sleep quality ( $\beta = .230, p < .001$ ), and social media addiction uniquely accounted for 3.1% of the variance in sleep quality above and beyond all other entered independent variables. Participants who reported greater levels of social media self-control failure reported poorer sleep quality ( $\beta = .139, p = .029$ ), and social media self-control failure uniquely accounted for 1.3% of the variance in sleep quality above and beyond all other entered independent variables (see table 6).

**Table 6: Multiple Linear Regression of Social Media Use Constructs Predicting Sleep Quality**

Variable	95% CI for $B$					
	$B$	$SE$	$\beta$	$sr^2$	Lower	Upper
Sex	.279	.432	.034	.001	-.570	1.129
Age	.047	.090	.028	.001	-.130	.224
Overall social media use frequency	-.003	.008	-.017	.000	-.019	.014
Nighttime in-bed social media use	.013	.012	.064	.003	-.009	.036
<b>Social media addiction</b>	<b>.136</b>	<b>.040</b>	<b>.230</b>	<b>.031</b>	<b>.057</b>	<b>.214</b>
<b>Social media self-control failure</b>	<b>.468</b>	<b>.213</b>	<b>.139</b>	<b>.013</b>	<b>.049</b>	<b>.886</b>
Emotional investment in social media	.059	.164	.022	.000	-.259	.377
$R^2$	<b>.127</b>					
Adjusted $R^2$	<b>.109</b>					

*Note.* The overall model was significant: ( $F(7,329) = 6.853, R^2 = .127, p < .001$ ); **Bold text indicates significance at  $p < .05$** ; Men were coded as 1 and women as 2.

## **Chapter 4: Discussion**

The aim of the present study was to investigate how overall social media use frequency, nighttime in-bed social media use, social media addiction, social media self-control failure, and emotional investment in social media relate with depression, anxiety, stress, and sleep quality in a sample of Hispanic university emerging adults through a theoretical framework of UGT within a feedback loop. All hypotheses were partially supported such that social media addiction was positively associated with depression, anxiety, stress, and poor sleep quality and social media self-control failure was positively associated with anxiety, stress, and poor sleep quality in multiple linear regression analyses.

In the present sample, participants reported using social media an average of 27.36 hours per week, indicating a 35.78% increase in weekly social media use from the number of hours observed in the study by Lerma et al. (2021) that was conducted in a similar sample – Hispanic university students. However, this increase in social media use may be slightly underestimated given that the university where data were collected banned TikTok on the university's Wi-Fi networks (Fischer, 2023) approximately a week before data collection began. Despite this ban, the amount of time spent on social media observed in the present study suggests that Hispanic university emerging adults living on the United States – Mexico border are using social media at high rates and are technologically literate. Approximately 15.1% of the present sample met the conservative threshold for social media addiction (Andreassen et al., 2012), a percentage comparable to other studies conducted among Hispanic university students (Gainza Perez et al., 2021; Lerma et al., 2021). Additionally, 76.7% of the sample were considered poor sleepers according to the PSQI (Buysse et al., 1989), which may support the findings that Hispanic groups are at risk for poor sleep quality (Roncoroni et al., 2022). Regarding sociodemographic

findings, women reported greater levels of stress than men which replicates past research (Graves et al., 2021) and suggests that women may be more likely to perceive events as stressors in college settings such as passing final exams.

## **Mental Health**

### ***Depression and Anxiety***

Although overall social media use frequency was positively correlated with depression and anxiety, no association was observed between overall social media use frequency and depression and anxiety in regression analyses, thus contributing to the mixed findings regarding this relationship (Alsunni & Latif, 2021; Franco & Carrier, 2020; Twenge et al., 2018; Woods & Scott, 2016). Franco and Carrier (2020) also observed a null association between depression and anxiety with social media use after holding other media constructs constant (e.g., media sharing) in a Hispanic sample. However, Franco and Carrier (2020) observed that acculturation moderated the relationship between social media use and depression and anxiety (these moderations were marginally significant,  $p < .10$ ) such that there was a positive association between social media use and depression and anxiety for Hispanics reporting higher levels of acculturation indicating that being less connected to one's cultural group may in turn lead to unhealthy social media use. (Franco & Carrier, 2020). Conversely though, another study found a positive association between social media use and anxiety in a national sample of emerging adults (Vannucci et al., 2017) and reasoned that increased awareness of anxiety-inducing events seen on social media (e.g., mass shootings) may lead to greater levels of anxiety. Therefore, future studies may wish to investigate these relationships between Hispanic emerging adults and non-Hispanic emerging adults to assess if sociocultural constructs affect the magnitude of such relationships.

A second notable point is that a relationship between social media use frequency and depression and anxiety is typically observed in adolescent samples (Woods & Scott, 2016) and less frequently observed in adult samples (Alsunni & Latif, 2021). This also seems consistent with the relationship between nighttime in-bed social media use and anxiety and depression, in which the current study also observed a null association between these variables in regression analyses indicating that the timing of social media use (nighttime use versus overall use) may not affect emerging adults' mental health, yet may affect adolescents' mental health. Indeed, adolescence is a time period of major development (e.g., biologically through puberty and sleep changes; Carskadon, 2002; Sisk & Romeo, 2020) which may make adolescents more vulnerable to external influences such as nighttime in-bed social media use than emerging adults. Future longitudinal studies may investigate how overall and nighttime in-bed social media use are associated with depression and anxiety during adolescence and while transitioning into emerging adulthood.

Consistent with past literature (Mamun & Griffiths, 2019; Shannon et al., 2022; Wong et al., 2020) and hypotheses, social media addiction was positively associated with both depression and anxiety and explained the most unique variance in depression and anxiety. This finding was particularly expected due to the components that create social media addiction, specifically mood modification and withdrawal. This finding suggests that Hispanic emerging adults may use social media addictively to reduce poor mental health and increase pleasurable feelings, yet poor mental health may result from not being able to access social media. Indeed, the present study's theoretical framework of UGT (Katz et al., 1973; Rubin, 1993) within a feedback loop supports this finding such that emerging adults may have a need to cope with their pre-existing poor mental health conditions by using social media. If using social media gratifies one's need to cope

with depression and/or anxiety, then continued and addictive social media use may follow. However, using social media addictively may in turn increase poor mental health. Considering that the current study was cross-sectional, investigating temporality of these observed relationships using a theoretical framework of UGT within a feedback loop may be fruitful for future studies. Moreover, future studies are warranted to investigate how the individual components of social media addiction relate to depression and anxiety for the development of targeted interventions, especially as emerging adults are at increased risk for mental illness (NIMH, 2022).

Findings also revealed a positive association between social media self-control failure and anxiety, yet not depression. Social media self-control failure is when one cannot control their social media use even when their use at that time conflicts with or delays important goals (Du et al., 2018) such as studying for a final exam. Two explanations for the present finding are noteworthy. First, social media self-control failure may be more attune with anxiety as using social media to delay important goals (e.g., studying for an exam) may increase one's feelings of worry and thus anxiety, while not so much affecting one's depressed mood, such as experiencing a loss of pleasure. Second and consistent with UGT (Katz et al., 1973; Rubin, 1993), high levels of anxiety may influence one's need to use social media as a coping mechanism and if using social media diminishes one's anxiety, then one's need is gratified leading to continued social media use and potentially social media self-control failure. Together, these findings indicate that specific social media behaviors may have differential effects on different psychopathology, underscoring the need to assess nuanced social media constructs as they relate with specific psychopathology for well-informed and targeted interventions for Hispanic university emerging adults. Despite the explanation UGT provides for this observed relationship between anxiety and

social media self-control failure, future longitudinal studies are necessary to determine temporality.

Inconsistent with hypotheses, emotional investment in social media was not uniquely associated with depression or anxiety, after holding participant age and sex and additional social media use constructs constant. This was unexpected as previous studies have observed a positive association between emotional investment in social media and depression and anxiety in adolescents (Woods & Scott, 2016) and university students (Alsunni & Latif, 2021). These null findings may be attributable to the statistical control of social media addiction. Although there were no issues of multicollinearity in either of the four multiple linear regression models, emotional investment in social media may be obscured by the withdrawal symptom of social media addiction given the high similarity between the two constructs. Specifically, emotional investment in social media is when one feels upset and disappointed when one cannot access social media (Jenkins-Guarnieri et al., 2013; Woods & Scott, 2016) and social media withdrawal refers to the unpleasant states (e.g., stress, irritability) that occur when social media cannot be accessed (Andreassen, 2015; Griffiths et al., 2014). Future studies may wish to compare the differences and similarities between emotional investment in social media and social media addiction.

### ***Stress***

Similar to depression and anxiety findings, stress was not associated with overall social media use frequency nor nighttime in-bed social media use in regression analyses. This finding also adds to the mixed literature between negative affect and social media use (Denq et al., 2018; Franco & Carrier, 2020). For the present study, it may be that Hispanic sociocultural constructs, such as familism which involves tender and supportive relations among family members

(Campos et al., 2014), protect against negative affect and poor mental health. Indeed, one study found that of people with a Hispanic, European, or Asian background, those with a Hispanic background reported the highest levels of familism (Campos et al., 2014); another study observed that greater levels of familism were associated with lower levels of negative affect (Corona et al., 2017). Future studies may wish to investigate how familism and other sociocultural constructs impact the relationship between social media use and negative affect between Hispanic groups and non-Hispanic groups.

Consistent with past literature (Brailovskaia et al., 2021; Shannon et al., 2022; Wong et al., 2020) and hypotheses, social media addiction was positively associated with stress. Explanations here may be similar to those regarding depression and anxiety discussed above. Specifically, components two and three of UGT (Katz et al., 1973; Rubin, 1993) would postulate that high levels of stress influence one's need to use social media as a coping mechanism. If this need of coping with high levels of stress is gratified by using social media, continued and addictive social media use will likely occur. However, using social media addictively may in turn lead back to high levels of stress. This finding supports the theoretical framework of UGT (Katz et al., 1973; Rubin, 1993) within a feedback loop, which potentially provides further insight that the relationship between social media addiction and negative affect may be cyclical and bidirectional. Despite the theoretical framework of UGT within a feedback loop, prospective studies are necessary to investigate whether this observed relationship is unidirectional or bidirectional.

Additionally, increased social media self-control failure was associated with increased levels of stress. Two explanations may help elucidate this finding. First and consistent with UGT (Katz et al., 1973; Rubin, 1993), high levels of stress may influence one's need to use social



media as a coping mechanism and if using social media reduces one's stress, then one's need is gratified leading to continued social media use and potentially social media self-control failure. Second, because the present sample was comprised of university students, this finding may also suggest that emerging adult university students use social media problematically and in turn procrastinate their academic tasks which results in increased levels of stress from late or incomplete coursework. Indeed, one study noted that constantly checking Facebook predicted using Facebook to procrastinate which in turn predicted increased academic stress (Meier et al., 2016). However, Du et al. (2018) argued that procrastination is distinct from social media self-control failure such that the former includes postponing difficult, distressing tasks (e.g., writing a final term paper) and the latter involves delaying a range of tasks (e.g., doing laundry). Therefore, along with suggestions from Du et al. (2018), future studies may wish to compare procrastination and social media self-control failure and how each are associated with negative affect.

Inconsistent with hypotheses, emotional investment in social media was not associated with stress in regression analyses after controlling for participant age and sex and other social media use constructs. This was the first study to investigate this relationship, yet Lowe-Calverley et al. (2019) found that stress and Instagram investment were positively associated with each other. Past studies have reasoned that different social media platforms are used for different purposes. For example, Facebook is typically used for leisure and forming and maintaining relationships (Ryan et al., 2014), while Twitter is used for broad entertainment (e.g., celebrity updates; Hargittai & Litt, 2011), and Instagram is primarily used for posting photos and browsing others' photos (Lee et al., 2015). It may be that depending on the type of purpose of each platform, one's levels of stress are impacted. The current study investigated broad general social

media use, so future studies are recommended to investigate how emotional investment in different major social media platforms are associated with depression, anxiety, and stress. Indeed, the present study observed that participants reported spending large amounts of time on Instagram and TikTok per day which highlights the need to distinguish between social media platforms.

### **Sleep Health**

Findings between social media use constructs and sleep health revealed two of the hypothesized associations in the present study. Unexpectedly, overall social media use frequency and nighttime in-bed social media use were not associated with poor sleep quality in regression analyses, a finding that differs from the majority of the literature (Bhat et al., 2018; Graham et al., 2021; Tavernier & Willoughby, 2014; Woods & Scott, 2016). However, nighttime in-bed social media use was positively correlated with poor sleep quality in univariate analyses. Despite this correlation, two explanations may help illuminate the present study's null findings observed in regression analyses. First, many of the studies that observe a relationship between social media use and poor sleep quality are conducted in adolescent samples (Lemola et al., 2015; Seo et al., 2017; Vernon et al., 2017; Woods & Scott, 2016). Adolescents experience major sleep changes, such as natural and biological shifts in their circadian rhythms and sleep-wake cycles (Carskadon, 2002). These changes may make adolescents' sleep patterns more vulnerable to social media use and in particular nighttime in-bed social media use, unlike emerging adults. Second, the PSQI (Buysse et al., 1989) which was used to measure sleep quality in the present study revealed low internal reliability, thus all sleep quality findings in the present study should be interpreted with caution. One study that assessed the factorial validity of the PSQI in adolescents and young adults observed a lower reliability (de la Vega et al., 2015;  $\alpha = .72$ ) than

the original reliability reported by Buysse et al. (1989;  $\alpha = .83$ ), suggesting that the reliability of the PSQI may shift among different populations. Future studies should use sleep quality measures already validated in Hispanic populations and/or further validate the PSQI in Hispanic populations.

In line with past research (Mamun & Griffiths, 2019; Masood et al., 2021; Sümen & Evgin, 2021; Wong et al., 2020) and hypotheses, social media addiction and social media self-control failure were both positively associated with poorer sleep quality in Hispanic university emerging adults. Three reasonings may help explicate these hypothesized findings. First and consistent with a theoretical framework of UGT (Katz et al., 1973; Rubin, 1993) within a feedback loop, Hispanic emerging adults with pre-existing sleep problems may have a need to use social media as a coping mechanism. If using social media gratifies one's need to cope with sleep problems, then continued and problematic social media use will likely follow. However, using social media problematically may introduce even more sleep problems, thus creating a vicious cycle between poor sleep health and problematic social media use. Despite the utility of UGT within a feedback loop, future studies that employ longitudinal designs are necessary to establish temporality between problematic social media use and poor sleep health. Second and similar with how previous studies have reasoned (e.g., Levenson et al., 2016), using social media addictively and losing control over social media use may directly replace sleep in which one may stay up throughout the night using social media resulting in poor sleep health. Third, light from electronic devices being used to access social media may adversely impact one's sleep-wake cycle and levels of melatonin (Lewy et al., 1980), therefore leading to poor sleep health. Given these observed relationships, clinical interventions may be justified to assess Hispanic university

emerging adults' social media use patterns and intervene before these patterns become problematic.

Last, emotional investment in social media was not uniquely associated with poor sleep quality after controlling for participant age and sex and other social media use constructs in regression analyses which was inconsistent with hypotheses. Investigating this relationship was more exploratory in the present study as only one study has investigated this relationship in adolescents in which a positive association between emotional investment in social media and poor sleep quality was observed (Woods & Scott, 2016). Explanations here may be similar to those discussed above such that adolescents' sleep patterns may be more vulnerable to external influences than emerging adults' sleep patterns. Alternatively, poor sleep quality in Hispanic individuals may be more attributable to other more salient factors such as discrimination, acculturation, and stress (Roncoroni et al., 2022) and not emotional investment in social media. Due to the rising number of social media users in the world (Statista, 2022a), studies may wish to continue investigating how emotional investment in social media is associated with sleep quality in different populations.

### **Limitations and Strengths**

Several limitations and strengths exist in the present study. Three limitations are notable. First, the PSQI demonstrated low reliability, thus results concerning sleep quality should be interpreted with caution. Second, data were collected using a convenience sample that included mostly women and included only Hispanic university emerging adults, thus limiting generalizability to other non-university Hispanic emerging adults and emerging adults from other ethnocultural groups. Third, the current study employed a cross-sectional design which does not

allow for the temporal, causal assessment of observed relationships, necessitating prospective studies.

Despite the above limitations, three strengths are notable as well. First, the present study expands on the scarce literature examining the relationships between social media use constructs and mental health in Hispanic groups (Franco & Carrier, 2020; Mathis et al., 2021) and was the first to investigate how different social media use constructs relate with sleep health in Hispanic university emerging adults. Thus, the homogeneity of the sample is also a strength. Second, this study was one of the first to assess how social media self-control failure relates with mental and sleep health, and results indicate that social media self-control failure may be especially important to target in Hispanic university emerging adults. Third, the present study examined the variables of interest through a framework of UGT within a feedback loop, therefore providing theoretical support behind the observed relationships in the present study.

### **Clinical Implications and Future Directions**

In sum, the findings of the present study indicate that greater levels of social media addiction and social media self-control failure are associated with poorer mental and sleep health in Hispanic university emerging adults. Given these findings along with past findings indicating that social media addiction serves as a risk factor for poor sleep health and depression in adolescents (Lin et al., 2021; Raudsepp, 2019), clinical implications certainly warrant discussion considering the increased rate that emerging adults are using social media (Pew Research Center, 2021), the sleep disparities Hispanic groups experience (Roncoroni et al., 2022), and the increased risk that Hispanic groups and emerging adults are at for mental illness (NIMH, 2022). Motivational enhancement in which emerging adults weigh the advantages and disadvantages of using social media, particularly before bedtime, may help decrease problematic social media use

patterns. Cognitive-behavioral therapy may help emerging adults reflect on social media behaviors that adversely impact their mental and sleep health. Importantly, therapists may educate clients about the benefits of discontinuing social media use, even if the discontinuation is temporary. Indeed, one experimental intervention found that taking a one-week break from social media increased psychological well-being and decreased levels of depression and anxiety (Lambert et al., 2022). However, this discontinuation of social media use may be sudden for individuals using social media problematically. Thus, interventions may initially focus on decreasing usage throughout the day by using daily dairy journals that capture when one's thoughts of using social media are most pervasive and when one fails to control their social media use to target situations and/or behaviors that precipitate problematic social media use.

Future prospective and longitudinal studies are warranted to investigate the observed relationships in the present study to determine temporality and causality. Furthermore, future studies are encouraged to include other Hispanics, non-Hispanics, and non-university emerging adult samples. Moreover, studies should assess how sociocultural constructs such as acculturation and familism affect the relationships between social media use constructs and mental and sleep health. Studies should continue to investigate how nuanced social media constructs, such as social media self-control failure, emotional investment in social media, and different social media motives relate with mental and sleep health. Other methodologies such as ecological momentary assessments in which participants complete daily logs of their social media use patterns can be used to better capture these associations in real-time.

## **Conclusion**

The present study investigated how overall social media use frequency, nighttime in-bed social media use, social media addiction, social media self-control failure, and emotional

investment in social media relate with depression, anxiety, stress, and sleep quality in a sample of Hispanic university emerging adults through a theoretical framework of UGT within a feedback loop. Multiple linear regressions were performed to test the above relationships and the present study observed that greater levels of social media addiction and social media self-control failure were associated with poorer mental health and poorer sleep health. Future research is necessary to investigate the temporality of these relationships and include other populations. Clinically, assessing social media self-control failure and social media addiction behaviors and how each relate with mental and sleep health in Hispanic university emerging adults seems vital.

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## Appendices

### Appendix A: Sociodemographic Survey

- 1) What is your biological sex?
  - ☐ Male
  - ☐ Female
  - ☐ Intersex
- 2) What is your gender?
  - ☐ Man/Transgender Man
  - ☐ Woman/Transgender Woman
  - ☐ Gender Fluid
  - ☐ Non-Binary
  - ☐ Other (please specify):
- 3) What is your age? \_\_\_\_
- 4) What is your ethnicity?
  - ☐ Hispanic/Latinx
  - ☐ Not Hispanic/Latinx
- 5) What is your race?
  - ☐ Asian or Pacific Islander
  - ☐ White/Caucasian
  - ☐ Black/African American
  - ☐ American Indian/Native American or Alaska Native
  - ☐ Native Hawaiian
  - ☐ Other (please specify):
- 6) What is your household income?
  - ☐ Less than \$10,000
  - ☐ \$10,000 - \$19,999
  - ☐ \$20,000 - \$29,999
  - ☐ \$30,000 - \$39,999
  - ☐ \$40,000 - \$49,999
  - ☐ \$50,000 - \$59,999
  - ☐ \$60,000 - \$69,999
  - ☐ \$70,000 - \$79,999
  - ☐ \$80,000 - \$89,999
  - ☐ \$90,000 - \$99,999

- ☐ \$100,000 - \$149,999
- ☐ More than \$150,000

7) How many people live in your current household? \_\_\_\_

8) My household consists of (Select all that apply):

- ☐ Great grandparents
- ☐ Grandparents
- ☐ Mother or father
- ☐ Siblings
- ☐ Mother or father in-law
- ☐ Brother or sister in-laws
- ☐ Daughter or son
- ☐ Cousins
- ☐ Niece or nephew
- ☐ Grandchildren
- ☐ God children
- ☐ Uncles or aunts
- ☐ Son or daughter in-laws
- ☐ Guardian
- ☐ Step-parents
- ☐ Step Siblings

9) Do you speak more than one language?

- ☐ Yes
- ☐ No

10) What was the first language you spoke?

- ☐ English
- ☐ Spanish
- ☐ Other (Please specify)

11) Do you still live at home or with your parent(s) or legal guardian(s)?

- ☐ Yes
- ☐ No

12) What is the highest level of education obtained by your father?

- ☐ Less than high school
- ☐ High School Diploma
- ☐ Some College
- ☐ 2 Year College
- ☐ 4 Year College

- Graduate School
- Professional School

13) What is the highest level of education obtained by your mother?

- Less than high school
- High School
- Some College
- 2 Year College
- 4 Year College
- Graduate School
- Professional School

14) What is the primary language spoken at home?

- English
- Spanish
- Other, please specify

15) What language do you typically use on social media? (Total must sum to 100%).

\_\_\_\_\_ English  
 \_\_\_\_\_ Spanish  
 \_\_\_\_\_ Other (please specify)?

16) What is your sexual orientation?

- Heterosexual
- Bisexual
- Gay
- Lesbian
- Asexual
- Pansexual

17) What describes your current romantic relationship?

- Single
- Dating
- In a Committed relationship
- Engaged
- Married
- Open-Relationship
- Other, please specify:

18) How long have you been in this relationship for? (In Months) \_\_\_\_

19) Have you ever received Mental Health Services?

- ☐ Yes
- ☐ No

19b) If yes, what conditions were you treated for?

- ☐ Substance Abuse
- ☐ Depression
- ☐ Anxiety
- ☐ Post-Traumatic Stress Disorder
- ☐ Schizophrenia
- ☐ Other, please specify:

20) Are you currently employed?

- ☐ Employed full time
- ☐ Employed part time
- ☐ Unemployed looking for work
- ☐ Unemployed not looking for work

21) What is your current GPA (on a 4.0 scale) \_\_\_\_

22) What country do you live in?

- ☐ United States
- ☐ Mexico

23) Where were you born?

- |  |   |
|--|---|
| <input type="radio"/> United States      | <input type="radio"/> Guatemala             |
| <input type="radio"/> Argentina          | <input type="radio"/> Honduras              |
| <input type="radio"/> Bolivia            | <input type="radio"/> Mexico                |
| <input type="radio"/> Brazil             | <input type="radio"/> Nicaragua             |
| <input type="radio"/> Chile              | <input type="radio"/> Panama                |
| <input type="radio"/> Colombia           | <input type="radio"/> Paraguay              |
| <input type="radio"/> Costa Rica         | <input type="radio"/> Peru                  |
| <input type="radio"/> Cuba               | <input type="radio"/> Puerto Rico           |
| <input type="radio"/> Dominican Republic | <input type="radio"/> Uruguay               |
| <input type="radio"/> Ecuador            | <input type="radio"/> Venezuela             |
| <input type="radio"/> El Salvador        | <input type="radio"/> Other (specify) _____ |

24) What country/place/nationality do you identify with the most? (Check all that apply)

- |                                     |                                 |
|-------------------------------------|---------------------------------|
| <input type="radio"/> United States | <input type="radio"/> Guatemala |
| <input type="radio"/> Argentina     | <input type="radio"/> Honduras  |
| <input type="radio"/> Bolivia       | <input type="radio"/> Mexico    |
| <input type="radio"/> Brazil        | <input type="radio"/> Nicaragua |
| <input type="radio"/> Chile         | <input type="radio"/> Panama    |

- Colombia
- Costa Rica
- Cuba
- Dominican Republic
- Ecuador
- El Salvador
- Paraguay
- Peru
- Puerto Rico
- Uruguay
- Venezuela
- Other (specify) \_\_\_\_\_

25) What best describes the impact that the COVID-19 pandemic has had on your social media use?

- Extremely positive
- Moderately positive
- Slightly positive
- Neither positive nor negative
- Slightly negative
- Moderately negative
- Extremely negative

26) What best describes the impact that the COVID-19 pandemic has had on your mental health?

- Extremely positive
- Moderately positive
- Slightly positive
- Neither positive nor negative
- Slightly negative
- Moderately negative
- Extremely negative

27) What best describes the impact that the COVID-19 pandemic has had on your sleep health?

- Extremely positive
- Moderately positive
- Slightly positive
- Neither positive nor negative
- Slightly negative
- Moderately negative
- Extremely negative



## Appendix B: Social Media Use Frequency (SMUF)

1) How often did you use social media (e.g., Facebook, Twitter, Instagram, snapchat, etc.) during the last month?

- ☐ I did not at all.
- ☐ About once a month.
- ☐ Two to three times a month.
- ☐ Once or twice a week.
- ☐ Three to four times a week.
- ☐ Nearly every day.
- ☐ Once a day or more.

2) Typically in a day, how many hours do you spend on social media sites?

\_\_\_ Hours \_\_\_ Minutes

3) Typically in a week, how many hours do you spend on social media sites?

\_\_\_ Hours \_\_\_ Minutes

4) Typically in a month, how many hours do you spend on social media sites?

\_\_\_ Hours \_\_\_ Minutes

5) Thinking of how many hours you typically spend on social media in a day (total must sum to 100), what percentage of those hours would you say you spend on:

5a) Facebook daily?

5b) Instagram daily?

5c) Twitter daily?

5d) Snapchat daily?

5f) Tik Tok daily?

5g) YouTube daily?

5h) Reddit daily?

5g) Other (please specify)?

5h) I do not use social media (enter 100 here)?

### **Appendix C: Adapted In-Bed Electronic Social Media Use (A-IBESMU)**

1) How many nights a week on average did you use your mobile phone for electronic social media use (Twitter/Facebook, etc) in the hour before you went to bed?

\_\_\_ nights

2) How many nights a week on average did you use your mobile phone for electronic social media use (Twitter/Facebook, etc) while in bed?

\_\_\_ nights

3) How much time per night on average did you spend on your mobile phone for electronic social media use (Twitter/Facebook, etc) while in bed?

\_\_\_ Hours \_\_\_ Minutes

4) Do you have a regular bed-partner who spent at least 4 nights a week in bed with you?

- ☐ Yes
- ☐ No

5) If so, how many nights per week did the bed-partner indulge in in-bed electronic social media use? \_\_\_ nights

6) What is the average number of hours you sleep on weeknights?

- (1) less than 4
- (2) 4-5
- (3) 5-6
- (4) 6-7
- (5) 7-8
- (6) 8-9
- (7) 9-10
- (8) more than 10

7) What is the average number of hours you sleep on weekend nights?

- (1) less than 4
- (2) 4-5
- (3) 5-6
- (4) 6-7
- (5) 7-8
- (6) 8-9
- (7) 9-10
- (8) more than 10

## **Appendix D: Bergen Social Media Addiction Scale (BSMAS)**

Each item is scored on a 5-point scale (1: Very rarely, 2: Rarely, 3: Sometimes, 4: Often, 5: Very often). A score of three or greater on all six items indicates social media addiction.

- 1) How often during the last year have you spent a lot of time thinking about social media or planned use of social media?
- 2) How often during the last year have you felt an urge to use social media more and more?
- 3) How often during the last year have you used social media in order to forget about personal problems?
- 4) How often during the last year have you tried to cut down on the use of social media without success?
- 5) How often during the last year have you become restless or troubled if you have been prohibited from using social media?
- 6) How often during the last year have you used social media so much that it has had a negative impact on your job/studies?

## **Appendix E: Social Media Self Control Failure (SMSCF)**

Each item is rated on a 5-point scale (1 = almost never, 2 = rarely, 3 = sometimes, 4 = often, 5 = very often).

- 1) How often do you give in to a desire to use social media even though your social media use at that particular moment conflicts with other goals (for example: doing things for school/study/work or other tasks)?
- 2) How often do you give in to a desire to use social media even though your social media use at that particular moment makes you use your time less efficiently?
- 3) How often do you give in to a desire to use social media even though your social media use at that particular moment makes you delay other things you want or need to do?

## **Appendix F: Social Media Use Integration Scale (SMUIS)**

Each item is rated on a 6-point Likert-type scale ranging from 1 (Strongly Disagree) to 6 (Strongly Agree).

Factor 1 – Social Integration and Emotional Connection:

- 1) I feel disconnected from friends when I have not logged into social media
- 2) I would like it if everyone used social media to communicate
- 3) I would be disappointed if I could not use social media at all
- 4) I get upset when I can't log on to social media
- 5) I prefer to communicate with others mainly through social media
- 6) Social media plays an important role in my social relationships

## **Appendix G: Depression, Anxiety, & Stress Scale – 21 (DASS-21)**

Please read each statement and select a number 0, 1, 2 or 3 which indicate how much the statement applied to you over the past week. There are no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all

1 Applied to me to some degree, or some of the time

2 Applied to me to a considerable degree, or a good part of time

3 Applied to me very much, or most of the time

- 1) I found it hard to wind down.
- 2) I was aware of the dryness of my mouth.
- 3) I couldn't seem to experience any positive feeling at all.
- 4) I experienced breathing difficulty (e.g., excessively rapid breathing, breathlessness in the absence of physical exertion).
- 5) I found it difficult to work up the initiative to do things.
- 6) I tended to over-react to situations.
- 7) I experienced trembling (e.g., in the hands).
- 8) I felt that I was using a lot of nervous energy.
- 9) I was worried about situations in which I might panic and make a fool of myself.
- 10) I felt that I had nothing to look forward to.
- 11) I found myself getting agitated.
- 12) I found it difficult to relax.
- 13) I felt down-hearted and blue.
- 14) I was intolerant of anything that kept me from getting on with what I was doing.
- 15) I felt I was close to panic.
- 16) I was unable to become enthusiastic about anything.
- 17) I felt that I wasn't worth much as a person.
- 18) I felt that I was rather touchy.
- 19) I was aware of the action of my heart in the absence of exertion (e.g., sense of heart rate increase, heart missing a beat).
- 20) I felt scared without any good reason.
- 21) I felt that life was meaningless.

## Appendix H: Pittsburgh Sleep Quality Index (PSQI)

The following questions relate to your usual sleep habits during the past month only. Your answers should indicate the most accurate reply for the majority of days and nights in the past month. Please answer all questions.

1) During the past month, when have you usually gone to bed at night?

USUAL BED TIME \_\_\_\_\_

2) During the past month, how long (in minutes) has it usually take you to fall asleep each night?

NUMBER OF MINUTES \_\_\_\_\_

3) During the past month, when have you usually gotten up in the morning?

USUAL GETTING UP TIME \_\_\_\_\_

4) During the past month, how many hours of *actual sleep* did you get at night? (This may be different than the number of hours you spend in bed.)

HOURS OF SLEEP PER NIGHT \_\_\_\_\_

For each of the remaining questions, check the one best response. Please answer *all* questions.

5) During the past month, how often have you had trouble sleeping because you...

5a) Cannot get to sleep within 30 minutes

- ☐ Not during the past month
- ☐ Less than once a week
- ☐ Once or twice a week
- ☐ Three or more times a week

5b) Wake up in the middle of the night or early morning

- ☐ Not during the past month
- ☐ Less than once a week
- ☐ Once or twice a week
- ☐ Three or more times a week

5c) Have to get up to use the bathroom

- ☐ Not during the past month
- ☐ Less than once a week
- ☐ Once or twice a week
- ☐ Three or more times a week

5d) Cannot breathe comfortably

- ☐ Not during the past month
- ☐ Less than once a week
- ☐ Once or twice a week

- Three or more times a week

5e) Cough or snore loudly

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

5f) Feel too cold

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

5g) Feel too hot

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

5h) Had bad dreams

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

5i) Have pain

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

5j) Other reason(s), please describe \_\_\_\_\_

How often during the past month have you had trouble sleeping because of this?

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

6) During the past month, how would you rate your sleep quality overall?

- Very good
- Fairly good
- Fairly bad
- Very bad

7) During the past month, how often have you taken medicine (prescribed or “over the counter”)



to help you sleep?

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

8) During the past month, how often have you had trouble staying awake while driving, eating meals, or engaging in social activity?

- Not during the past month
- Less than once a week
- Once or twice a week
- Three or more times a week

9) During the past month, how much of a problem has it been for you to keep up enough enthusiasm to get things done?

- No problem at all
- Only a very slight problem
- Somewhat of a problem
- A very big problem

10) Do you have a bed partner or roommate?

- No bed partner or roommate
- Partner/roommate in other room
- Partner in same room, but not same bed
- Partner in same bed

## **Appendix I: End-of-Survey Questionnaire**

Each item is rated on a 5-point scale (1 = Uncomfortable, 2 = Slightly Uncomfortable, 3 = Neutral, 4 = Somewhat comfortable, 5 = Very comfortable).

- 1) How comfortable did you feel responding to questions about your mental health?
- 2) How comfortable did you feel responding to questions about your sleep health?
- 3) How comfortable did you feel responding to questions about your social media use?

## Vita

Miguel Andres Garcia was born and raised in El Paso, Texas to Elsa Silex Garcia and Miguel Angel Garcia. He has two older siblings: Allyson Mariah Palombo and Angel David Garcia. Miguel graduated summa cum laude from the University of Texas at El Paso with his Bachelor of Arts degree in Psychology and minor in Sociology. While completing his undergraduate degree, he also completed an honors thesis under the mentorship of Dr. Lawrence D. Cohn. In the Fall of 2021, he enrolled in the Doctoral program in Health Psychology at the University of Texas at El Paso under the mentorship of Dr. Theodore V. Cooper in the Prevention and Treatment in Clinical Health Laboratory. His first-year graduate project investigated how phubbing and being phubbed are associated with psychosocial constructs and personality traits in Hispanic emerging adult college students, and this project was subsequently published in *Current Psychology* with him serving as first author. Presently, he has four manuscripts under review at *Psychology of Popular Media, Behaviour & Information Technology, Cultural Diversity and Ethnic Minority Psychology*, and the *Journal of Ethnicity in Substance Abuse*, with him serving as first author on two of these four manuscripts. He has also presented at the national conferences of the Society for Behavioral Medicine and the Association for Behavioral and Cognitive Sciences. Once Miguel graduates with his doctoral degree, he plans to pursue post-doctoral training or become a program analyst/evaluator for the federal government.

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*This Master's Thesis was typed by Miguel Andres Garcia.*