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Screen Time, Sleep, and Mental Health: An Investigation of Electronics Use and Sleep Habits

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Screen Time, Sleep, and Mental Health: An Investigation of Electronics Use and Sleep Habits

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ABSTRACT

Internet addiction (IA) is classified as a compulsive-impulsive behavior disorder involving excessive use of the internet, withdrawal, tolerance, and negative repercussions (Block, 2007). Internet usage is becoming more widespread across all industrialized people, and younger people are using the internet more and more as it becomes more ubiquitous (Rideout, Foehr, & Roberts, 2010). The purpose of the current study is to investigate internet usage habits, sleep disturbance, and IA as it appeared in a national United States sample, and a sample seeking clinical psychological help in the Southwestern United States. The results of the current study suggested that IA predicted sleep disturbance, and sleep disturbance had a moderating interaction when IA was used to predict mental health outcomes. Implications for clinicians and the future of psychological treatment are discussed.

Keywords: Internet addiction, Young internet addiction test, weekend usage, clinical, sleep.

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CHAPTER I

INTRODUCTION

Internet addiction is a growing phenomenon that has received increasing attention in recent years. Internet addiction (IA) has been classified as a compulsive-impulsive behavior disorder involving excessive use of the internet, withdrawal, tolerance, and negative repercussions (Block, 2007). The exact types of use tend to differ, but addictive behaviors commonly include excessive gaming, sexual preoccupations, social media, and excessive messaging (Block, 2008). Like other addictive disorders, IA is resistant to treatment, has high relapse rates, has high rates of comorbid psychiatric disorders (such as major depressive disorder, social anxiety disorder, and attention deficit hyperactivity disorder all found alongside IA), and makes those disorders less responsive to therapy (Block, 2007a; Block, 2007b; Andreassen et al., 2016; Müller, Beutel, &Wölfling, 2014). Research that leads to effective intervention is certainly warranted, particularly for children and adolescents, who are vulnerable to disordered screen use (Blackwell, Leaman, Tramposch, Osborne, & Liss, 2017).

In a nation-wide survey on the media consumption habits of 2,002 3rd-12th grade students, ages 8 to 18 years old, was conducted in the United States (Rideout, Foehr, & Roberts, 2010). The researchers found that, on an average day, youth spend more than 7½ hours (7 hours 38 minutes) using media. The same survey found that approximately

29% of that time was spent multitasking, or consuming multiple forms of media at once, for a total average media exposure time of 10 hours 45 minutes. The consumption of printed media made up only about 38 minutes of total time spent, and these figures do not take into account time spent talking or texting on cell phones, or account electronic use for school or educational purposes. Given the ubiquitous nature of technology use among children and adolescents, it begs the question of what effects all the screens are having on developing brains.

Magnetic Resonance Imaging (MRI) studies have indicated that many of the neurological changes associated with drug addiction and recovery are seen in IA (Ko et al., 2009; Thalemann, Wölfling, &Grüsser, 2007; Ko, Liu, Yen, Chen, Yen, & Chen, 2011). Gray matter abnormalities, specifically reduced gray matter density, were observed in adolescents with IA in one MRI study; lower gray matter density was observed in the left anterior cingulate cortex, left posterior cingulate cortex, left insula, and left lingual gyrus (Zhou, Lin, Du, Zhao, Xu, & Lei, 2011). These findings have psychological implications that warrant clinical attention, and these will be discussed.

Excessive screen time has been found to correlate with psychological problems and reduced sleep (Müller, Beutel, &Wölfling, 2014; Hale & Guan, 2015). In a clinical study, individuals with IA displayed higher levels of psychopathology than those without IA; the most common symptoms reported comorbid with IA were depressed and dissociative symptoms (Müller, Beutel, &Wölfling, 2014). It should be noted that IA, along with other excessive, repetitive behavioral addictions are not included in the DSM-

5 because there is insufficient peer-reviewed evidence to establish the diagnostic criteria (American Psychiatric Association, 2013). There is a possible relationship between screen time and psychopathology through disrupted sleep. Screen time is hypothesized to be a cause for insufficient and low quality of sleep; this is thought to be due to time displacement, psychological and physical arousal due to media content, and disrupted melatonin production (Cain &Gradisar, 2010; Owens & Jones, 2011; Anderson & Bushman, 2001; Higuchi, Motohashi, Liu, & Maeda, 2005). Given the negative impact of reduced sleep on emotional regulation and mood, it is important for clinicians to closely examine the screen time and media consumption habits of their patients, adolescent patients in particular (Baum, Desai, Field, Miller, Rausch, & Deebe, 2014; Strasburger et al., 2013).

In summary, screens are ubiquitous in the lives of individuals in the United States. Adolescents have been found to be among the most excessive over-users of screen time. While there may be limited to no impact of moderate electronic use on the developing brain, children and teens are not using electronic devices with moderation. Given the findings of excessive screen time's impact on sleep and mental health, it is important to examine this growing concern from a clinical perspective. The study will examine the internet use, sleep quality, and reported psychological disorder in a rural mental health clinic in the Southwestern United States and nationally via internet-based research.

CHAPTER II

IMPACT OF EXCESSIVE SCREEN TIME

Neurobiology of Internet Addiction

Internet Addiction (IA) has been defined as the excessive and poorly controlled addictive urge and behavior regarding use of the computer and internet to the extent of functional impairment and distress (Shaw & Black, 2008). This urge can take the form of a variety of online activities and specific behaviors. One such addictive behavior is specified as online gaming addiction. In a study using functional magnetic resonance imaging (fMRI), 10 online gaming addicted participants and 10 control participants without said addiction were compared to determine the neural substrates of the disorder (Ko et al., 2009). In said study, participants were primed to experience the subjective urge to participate in online gaming by being presented with pictures of a game that they played. Corresponding with the reported subjective urge, addicted participants showed increased activation of the right orbitofrontal cortex, right nucleus accumbens, bilateral anterior cingulate and medial frontal cortex, right dorsolateral prefrontal cortex, and right caudate nucleus when compared to non-addicted controls. These brain regions have been implicated in other disorders including substance abuse, depression, and obsessive compulsive disorder (Tekin & Cummings, 2002). This pattern of activation suggests that there are measurable, physical changes that occur in the brain based on compulsive gaming.

Authors examined MRI data using voxel-based morphometry between adolescents diagnosed with IA and healthy controls with no psychiatric history (Zhou, Lin, Du, Zhao, Xu, & Lei, 2011). Participants were classified with IA based on their responses to the Diagnostic Questionnaire for Internet Addiction, which was modified to the Chinese language (Beard & Wolf, 2001). On the eight item questionnaire, participants who responded in the affirmative for at least five items fit the criteria for IA. When the IA and control groups were compared, lower gray matter densities were found in the IA group in the following areas: the left anterior cingulate cortex, left posterior cingulate cortex, left insula, and left lingulate gyrus. These areas are conceptually linked through their responsibility in modulating emotional behavior (Zhou et al., 2011). This corresponds to other findings that adolescents and adults with IA have more emotional problems (Min & Du, 2005; Zhu, Du, & Jiang, 2006; Whang, Lee, & Chang, 2003; Andreassen et al., 2016). However, these data do not indicate a causal relationship in either direction. It is unknown whether pre-existing emotional problems are a cause for IA, if the reverse is true, or if neither is a true cause for the other.

Further research into this phenomenon found similar results. Researchers studied online gaming addiction through MRI brain scanning of individuals with IA as compared with healthy controls (Weng, Qian, Fu, Lin, Han, Niu, & Wang, 2013). Participants were grouped based on their responses to the Young's Diagnostic Questionnaire for IA; those who responded in the positive to five of the eight items and to at least one more were considered IA individual. Those who did not respond in this way were categorized as

healthy controls. The data were analyzed using voxel-based morphometry analysis and tract-based spatial statistics to compare gray and white matter volumes between subjects. Their results indicated that the game-addicted group showed significant gray matter atrophy in the right orbitofrontal cortex, bilateral insula, and right supplemental motor area. TBSS analysis showed significantly reduced fractional anisotropy (FA) in the right genu of corpus callosum, bilateral frontal lobe white matter, and right external capsule. Their findings were consistent with prior research that implicated the prefrontal cortex with substance abuse and behavior addiction (Han, Bolo, Daniels, Arenella, Lyoo, & Renshaw, 2011; Filbey et al., 2008; Maas et al., 1998). It should be noted that there is a weakness in the literature regarding the variety of behavior involved in internet addiction and observed brain changes. Thus far, studies examining the structural and functional changes of the brain in IA individuals have focused on online gaming addiction. There is an apparent lack of available information on brain differences for IA individuals who overuse online media in other ways. Given the potential for behavioral and cognitive dysfunction based on this observed atrophy, the lack of available information on brain changes in IA individuals with other behaviors is a critical and unaddressed problem.

Taken together, the results from these studies indicate that IA is a compulsive-impulsive spectrum disorder involving the excessive use of electronic devices, usually online, that corresponds to physiological changes associated with addiction and emotional dysregulation. Whenever there are observed changes in an individual's brain, there is sufficient justification to examine that individual's behavior. The findings of the

literature suggest that psychological distress will be elevated in individuals who spend excessive amounts of time with screens.

Psychology of Internet Addiction

Addiction prediction. In a one year, longitudinal study of IA in Hong Kong, Leung (2014) designed a study to identify the predictors of internet addiction. Structured interviews were conducted to determine the gratifications sought by children and adolescents, and internet addiction based on the Young Internet Addiction Scale (Young, 1998) was examined at time 1 and time 2, one year later. IA symptoms included withdrawal and negative life consequences, while gratifications sought included status-gaining through social media, expressing opinions, identity experimentation, information-seeking, passing time, and entertainment. A significant positive relationship was found between the gratification of social media at time one and time two after one year. Further, according to the results of the hierarchical regression model used by the researchers, entertainment gratifications followed by status-gaining were the best predictors of addiction, where the weakest impacts were from information seeking, identity experimentation, and passing time.

Researchers have also examined personality traits and other factors likely to impact addiction to internet use. In one study, participants completed survey items pertaining to extraversion, neuroticism, attachment styles, and fear of missing out as those factors related to social media addiction (Blackwell, Leaman, Tramposch, Osborne, &Liss, 2017). In a hierarchical regression analysis, younger age, neuroticism, and fear of

missing out significantly predicted social media use. However, only fear of missing out significantly predicted social media addiction. Other traits have also been examined.

A total of 23,532 participants completed a web-based survey with the objective of examining the associations between social media addiction, narcissism, and self-esteem (Andreassen, Pallesen, & Griffiths, 2017). The participants completed the Bergen Social Media Addiction Scale (BSMAS), the Narcissistic Personality Inventory-16, and the Rosenberg Self-Esteem Scale. Their results suggested that lower age, female gender, being a student, lower levels of education and income, lower self-esteem, and narcissism were all associated with greater degrees of social media addiction. The authors suggest that the results were consistent with the notion of addictive social media use reflecting narcissistic personality traits and the need to inhibit a negative self-evaluation.

Differences in social media or gaming preference. The factors that accompanied addictive video game playing behavior were somewhat different from the factors found to be related to social media addiction. To examine the differences between social media and online gaming addictive use, authors conducted a cross-sectional survey of 23,533 participants (mean age 35.8 years, ranging from 16 to 88 years) that studied demographic variables such as age and gender, and psychiatric concerns such as attention-deficit/hyperactivity disorder (ADHD), obsessive-compulsive disorder (OCD), anxiety, and depression (Andreassen et al., 2016). The objective of the study was to examine how these factors could explain variance in the addictive use of social media and video games. The results indicated that there were significant, positive

correlations between disorder symptoms and addictive technology use. The results also suggested that younger age was associated with a greater degree of addictive tech use. Being male was significant associated with addictive video game use, while being female was related to addictive social media use. Data were analyzed using a hierarchical multiple regression model. ADHD, OCD, anxiety, and depression accounted for 15% of the variance in social media addiction and 7% in video games after controlling for demographic variables. The demographic variables accounted for between 11 – 12% of the variance. In a separate study, another predictive factor of pathological game use was suggested to be loneliness (Lemmens, Valkenburg, & Peter, 2011). Researchers conducted a two-wave panel study among 851 Dutch adolescents and analyzed the data using autoregressive structural equation models, and correlations between waves one and two. The results suggested that loneliness both predicted and was a consequence of addictive video game use.

In summary, data from the literature suggest that psychiatric symptoms, narcissism, young age, loneliness, entertainment seeking, and status seeking all contributed to the likelihood of internet addiction. Fear of missing out served as a predictor for addictive social media use. The platforms of addictive technology use focused on by the current literature are social media and video games. Being male was associated with more video game use, while being female was associated with more social media use. Given the findings for psychiatric symptoms and disorders in close

association with addictive technology use, it is important to examine the psychiatric comorbidities with IA.

Psychiatric comorbidity. Addiction-spectrum disorders and other psychiatric disorders are highly comorbid; one US study from the National Institute of Mental Health Epidemiologic Catchment Area Program demonstrated that among individuals with an alcohol use disorder, 37% had a comorbid mental disorder (Regier et al., 1990). The same study found a 53% comorbidity rate between mental disorders and drug use. Studies examining the comorbidity of IA and other psychiatric disorders are finding similar results. A lack of self-regulatory activities was found to be associated with problematic video game use in one longitudinal study of 2790 online gamers (Seay & Kraut, 2007).

Given the link between self-regulation difficulties and ADHD (McClelland et al., 2018), the findings suggesting ADHD as the most common co-morbidity with gaming-intensive IA are logical (Bozkurt, Coskun, Ayaydin, Adak, & Zoroglu, 2013). Researchers investigated a clinical sample of 10-18 year-old patients referred for problematic internet use and emotional/behavioral problems. The tools used for the investigation were the Turkish version of the Schedule for Affective Disorders and the Young's Internet Addiction Scale. A sample of 60 participants revealed that the most common comorbidities were ADHD (n = 53; 83.3%), social phobia (n = 21; 35.0%) and major depressive disorder (n = 18; 30.0%). These findings were consistent with a review

of literature surmising IA was comorbid with ADHD, substance use, depression, aggression, and social anxiety (Ko, Yen, Yen, Chen, & Chen, 2012).

When excessive time is spent playing video games, the content of those games becomes important to examine. There is a large body of evidence linking violent video game playing to increases in aggressive cognitions, feelings, and behaviors (Anderson & Bushman, 2001; Anderson, 2004; Anderson, Gentile, & Buckley, 2007; Gentile & Stone, 2005). As conceptualized by Gentile and Gentile (2008), this increase in aggression is because violent video games make use of highly effective teaching practices. They are often tailored to the skill level of the individual playing (difficulty levels), they build upon what is already taught using practice with highly reinforcing feedback, and they promote mastery by adding to difficulty and complexity as skills increase. This makes video games highly effective at teaching the game, and in the case of violent video games it makes the game highly effective at teaching that violence will solve your problems. Due to the highly stimulating and immediately reinforcing nature of video games, it makes them a natural draw for children and adolescents, particularly those with ADHD.

Among 287 adolescents, ages 11-18, which were diagnosed with ADHD, 15.7% were classified as having IA (Yen, Chou, Liu, Yang, & Hu, 2014). Participants were assessed using the Chen Internet Addiction Scale, the Taiwanese version of the Multidimensional Anxiety Scale for Children, the Center for Epidemiological Studies Depression Scale, and the Rosenberg Self-Esteem Scale. The data were analyzed using multiple regression analyses. The findings indicated that higher physical symptoms and

lower harm avoidance scores on the MASC-T, higher somatic discomfort on the CES-D, and lower self-esteem scores on the RSES were significantly associated with more severe IA symptoms. More severe physical anxiety, or somatic, symptoms were associated with more severe IA symptoms. In other studies, anxieties were found to be focused more around the social realms.

A study of 174 Taiwanese college-age online gamers identified that the quality of interpersonal relationships decreased, social competence decreased, and social anxiety increased as the amount of time spent playing online games increased (Lo, Wang, & Fang, 2005). Given the social consequences of gaming-based internet addiction, it is no surprise that loneliness is also associated with excessive gaming (Seay & Kraut, 2007; Lemmens, Valkenburg, & Peter, 2011). To investigate the psychosocial causes and consequences of pathological gaming, researchers conducted a two-wave study, six months apart, using 851 Dutch adolescents, ages 11-17 years old (Lemmens, Valkenburg, & Peter, 2011). Diminished social competence, increased loneliness, and lower self-esteem predicted an increase in pathological gaming six months later. Loneliness had a reciprocal relation with pathological gaming, implicating it as both a cause and a consequence of that behavior. While boys were, as in other studies, more likely to be involved in pathological gaming than girls, loneliness did not differentiate by gender as either a consequence or cause.

While implications for pathological video game use are clearly defined in the literature, the findings were different in the realm of social media. Social media use is

potentially addictive (Hormes, Kearns, & Timko, 2014). Researchers investigated the addictive nature of social media by targeting 253 undergraduate students in a cross-sectional survey study. They examined disordered online social networking use, internet addiction, deficits in emotional regulation, and alcohol use problems. Their measures included the DSM-IV-TR diagnostic criteria for alcohol dependence, the Penn Alcohol Craving Scale and the Cut-down, Annoyed, Guilt, Eye-opener (CAGE) screen, along with the Young Internet Addiction Test, Alcohol Use Disorders Identification Test, Acceptance and Action Questionnaire-II, White Bear Suppression Inventory, and Difficulties in Emotion Regulation Scale. Of those surveyed, 9.7% showed responses indicating disordered social networking use; among those, there were significant positive associations with scores on the Young Internet Addiction Test ($P < 0.001$), greater difficulties with emotion regulation ($P = 0.003$) and problem drinking ($P = 0.03$).

Researchers investigated the suggested links between use of the popular social media platform Facebook and depression in college students (Tandoc, Ferrucci, & Duffy, 2015). Their findings suggested that Facebook use, even heavy use, was not depressing in and of itself. This was consistent with other findings that clinical depression and social networking site use were not significantly related (Jelenchick, Eickhoff, & Moreno, 2013). However, heavy users were more likely to use Facebook for reasons of surveillance, such as browsing a friend's timeline, reading the newsfeed, viewing friends' photos, and reading friends' status updates. The researchers' findings indicated that this use of the social media site resulted in increased reported envy, and increased envy was

associated with more symptoms of depression (Tandoc, Ferrucci, & Duffy, 2015). The researchers suggest that surveillance use of Facebook lead to more comparisons of oneself to others, which in turn led to envy and depression. These findings on comparisons with others help point to mindfulness as another factor impacted by social media use.

Sriwilai and Charoensukmongkol (2016), investigated the impact of social media addiction on mindfulness and coping strategies. Their Thailand-based study of 211 participants indicated that participants who were highly addicted to social media tended to have lower mindfulness, and tended to use emotion-focused coping strategies to deal with stress. These factors being reduced were also associated with higher emotional exhaustion.

In summary, addiction-spectrum disorders, including internet addiction, are highly comorbid with other psychiatric disorders and symptoms. Attention deficit hyperactivity disorder was found to be the disorder most frequently comorbid with IA – in regard to excessive video game playing. Anxiety symptoms, particularly social anxiety and somatic symptoms, were associated with IA. The playing of violent video games was associated with increases in aggression. Accompanying this, social competency, quality of interpersonal relationships, and loneliness were associated with excessive gaming. Loneliness in particular was found to be both a cause and a consequence of IA related to gaming. Excessive use of social media sites was found to be related to problem drinking, difficulties with emotional regulation, and envious

comparisons with others which in turn resulted in depression. This was somewhat related to the finding that excessive social networking site use was related to reduced mindfulness and emotionally-focused coping styles, which were linked to emotional exhaustion.

Health Outcomes in Internet Addiction

Spending an excessive amount of time doing sedentary activities, such as anything involving screen time, is suggested to have a negative impact on physical health (Stamatakis, Hamer, &Dunstant, 2011). A population-based study of 4,512 participants was conducted to help determine the link between screen-based entertainment time, cardiovascular events, and all-cause mortality over a four year period. There were 215 cardiovascular events and 325 any-cause deaths recorded in this study. Their findings suggested that recreational sitting (screen time) is related to raised mortality and cardiovascular event risk regardless of physical activity participation. Compared with those who spent <2 hours per day on screen time, all-cause mortality risk increased 48% with ≥4 hours per day of screen time, and cardiovascular risk increased 125% with ≥2 hours per day of screen time. Inflammatory and metabolic risk factors such as C-reactive protein, body mass index, and high-density lipoprotein cholesterol explained approximately 25% of this association. These findings should be taken together with data suggesting a link between excessive screen time and lack of sleep.

Researchers have systematically examined the scientific literature on the association between screen time and sleep outcomes among school-aged children and

adolescents (Hale & Guan, 2015). In 90% of the reviewed studies, screen time was adversely associated with sleep outcomes including shortened sleep duration and delayed sleep time. While some of the results varied by type of screen exposure, age, gender, and whether it was a weekend or weekday, the findings suggest that screen use before bedtime was more associated with poor sleep outcomes, and that active screen use (computer) was more detrimental to sleep than passive use (tv viewing). Having screen access in the bedroom was generally associated with poor sleep outcomes, as was multiple media use (e.g. using the phone while watching tv, etc). The authors discuss limitations found in the studies examined, and these included lack of causal association, measurement error, and limited data on use of multiple screens at once. Though significant associations between sleep and screen time were not found in all studies, there is sufficient evidence to warrant a close examination of sleep in individuals who are addicted to internet use. Given these connected concepts, it may be possible that sleep quality moderates the relationship between IA and psychological distress.

Sleep Restriction and Emotional Health

To experimentally establish the effects of sleep restriction on mood in healthy adolescents, researchers completed a 3-week long sleep manipulation study (Baum, Desai, Field, Miller, Rausch, & Deebe, 2014). Adolescents ages 14 - 17 with no history of psychiatric or medical concerns that may affect sleep completed one baseline week of 10 hours of sleep, and two weeks of restricted sleep at 6.5 hours. It has been suggested that this level of sleep restriction is feasible across five nights and induces measurable

sleepiness in adolescents (Beebe et al., 2008; Fallone, Arcebo, Seifer, &Carskadon, 2005). The participants' sleep was monitored with an actigraph and self-reporting, and the Profile of Mood States was used to measure mood (Baum, Desai, Field, Miller, Rausch, &Deebe, 2014). The results indicated that, after a few days of shortened sleep, they reported feeling less alert, less efficient, more helpless, forgetful, and exhausted. They reported feelings of tension, anger, and anxiety. Irritability had increased, as well as emotional dysregulation. It should be noted that while depressed mood was not observed, the authors suggested that the increase in irritability corresponded to an increase in depression with an irritable presentation.

Similar findings on depression and lack of sleep in adolescents have been suggested through a larger community-based two-wave cohort study (Roberts & Doung, 2014). A total of 4,175 adolescents ages 11 - 17 were surveyed DSM-IV criteria for major depression and sleep deprivation. At baseline, sleep deprivation predicted depression at follow-up when controlling for depression at baseline. In a reciprocal relationship, depression at baseline predicted sleep deprivation at the follow-up.

In summary, ≥4 hours per day of screen time has been shown to be associated with all-cause mortality risk increased 48%, and cardiovascular risk increased 125% with ≥2 hours per day of screen time. Screen time near bedtime also corresponds to poor sleep outcomes, with active screen use (computer, smart phone, tablet, etc) being more detrimental than TV viewing, and screens present in the bedroom affecting sleep more than using screens in separate rooms. Insufficient sleep of poor quality has been shown

to relate to depressed and irritable mood, anger, anxiety, and emotional dysregulation. These associations with excessive tech use highlight the disordered nature of internet addiction and its impact on physical and mental well being.

Study Rationale and Hypotheses

Screen time, particularly online screen time, is quickly becoming the United States' number one pastime. Given the large amount of time spent in front of screens, internet addiction is an important area of research for clinicians. IA is a compulsive-impulsive spectrum disorder involving the excessive use of electronic devices which carries with it all the psychological and physiological hallmarks of an addictive behavior disorder. Psychiatric symptoms, such as those associated with ADHD, depression, and anxiety are comorbid with and predictive of IA. Narcissism, young age, loneliness, entertainment seeking, status seeking, and fear of missing out all contribute to predicting IA. Additionally, being male is associated with excessive video game use while being female is associated with excessive social media use. There is a pervasive difficulty with emotional dysregulation in IA, as well as evidence to suggest that the excessive screen time is impacting sleep. There is a long-standing relationship between sleep problems and psychiatric problems such as depressed and irritable mood, anger, anxiety, and emotional dysregulation. Finally, there is an increased risk of all-cause mortality and cardiovascular events when an individual spends excessive amounts of time sedentary in front of a screen. Taken together, excessive screen time – such as the amount of time

reported in recent polls – is associated with a number of negative health outcomes. These data provide sufficient justification for the investigation.

Purpose of the Study

The purpose of the study was to investigate the electronic use habits of a randomized national sample of participants in the United States, as well as a clinical population in the rural Southwestern United States, and how these habits relate to sleep and mental health outcomes. To this end, the study used a brief self-report questionnaire for the reporting of types of electronic use, the Young Internet Addiction Test (YIAT) to examine pathological internet use, the Pittsburg Sleep Quality Index (PSQI) for reporting on sleep, and de-identified data as recorded in psychotherapy notes was used to obtain diagnostic information (Widyanto & McMurran, 2004; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). Based on the existing research, the following hypotheses were given for the study:

Hypotheses

I. Internet Addiction as reported on the YIAT and age will predict poor quality sleep as reported on the PSQI.

II. There will be a significant positive relationship between IA on the YIAT and presence of a psychiatric diagnosis. This relationship will be significantly moderated by sleep disturbance as reported on the PSQI.

III. No significant differences will be found in the distributions of data when the localized clinical group and national group are compared on sleep disturbance, IA, and time spent online.

IV. As suggested by the literature, there will be no differences on IA between genders; however, male gender will be associated with more mean self-reported time spent on video games while female gender will be associated with more mean self-reported time spent on social media.

CHAPTER III

METHODS

Participants and Location

The data for this United States based study were collected in two locations: a rural mental health clinic in the Southwestern United States and through a national online survey using Amazon Mechanical Turk (mTurk). Participants in the national online data collection received small monetary compensation, and the researchers declare that there is no conflict of interest between the research and this platform.

The materials for the clinical investigation were offered to all individuals seeking treatment or assessment at the psychology clinic who consented to participate. This clinic treats individuals and families seeking psychological assessment and therapy services. All ages are treated, and individuals diagnosed with depressive disorders, anxiety disorders, trauma or acute stressor disorders, and neurodevelopmental disorders such as ADHD are most commonly seen.

The study was offered to individuals of ages eighteen and up. The sample's demographics are described further in the results. Please refer to appendix A for the informed consent page. Please refer to Appendix E for the debriefing statement. All data gathered were reported anonymously and in aggregate.

Variables and Materials

Dependent variable: sleep quality. Sleep quality, a dependent variable, was investigated using the Pittsburg Sleep Quality Index (PSQI, see appendix C; Buysse, Reynolds, Monk, Berman, & Kupfer, 1989). The PSQI demonstrates a high degree of internal consistency with an overall reliability coefficient (Cronbach's a) of 0.83. The validity of this instrument was measured by comparing the self-report data of adults with those obtained from physiological data. Those results indicated that there were no significant differences between physiological data and self-report, excluding a tendency for participants to over-report their sleep duration and efficiency.

Independent variable: internet addiction. Pathological internet use, or IA, is an independent variable and was assessed using the Young Internet Addiction Test (YIAT). The YIAT is a 20 item questionnaire designed to assess six factors of internet addiction (see appendix D); in a study that examined the psychometric properties of the YIAT, the following internal consistency (Cronbach's *a*) was found for the following factors: salience (0.82), excessive use (0.77), neglect of work (0.75), anticipation (0.61), lack of control (0.76), and neglect of social life (0.54; Widyanto & McMurran, 2004). For the current sample, Cronbach's $a = .95$.

Independent variables: demographics and internet use characteristics. Demographics for the participants were obtained from self-report and through client files in the clinic. For the national data collection, client files were not available and so any demographic information was collected through self-report. Demographic information

reported on the questionnaire included age, ethnicity, and gender, (see appendix B). Self-report on internet use characteristics were obtained through a brief questionnaire (see appendix B).

Dependent variable: psychiatric diagnosis. Regarding the national group, the presence or absence of a psychiatric diagnosis was provided through self-report. The exact diagnosis was not required. This was in part because many individuals do not know their specific diagnosis, if any, and there would be no guarantee of its accuracy through a self-report medium in any case. Participants answered true or false whether they know to be carrying some form of diagnosis, regardless of its nature. As clinical data collection for the study took place using a clinical population, all participants were carrying some form of psychiatric diagnosis. A diagnosis is required by insurance providers in order to be treated by the clinic. Diagnoses were obtained through clinical files.

Procedure

Clinical data collection. New and returning clients of the mental health service center were offered the opportunity to participate in the study, and consenting participants were administered the questionnaire packet. The packet included informed consent first, so that individuals who did not wish to participate were able to return the packet unsigned. Many individuals accepted a questionnaire packet and never returned it, while others took it home and returned it completed at a later date. A standardized administration with controlled conditions for participants completing the questionnaire

packet could not be used due to the logistical limitations of the clinic. Clients spend very little time in the waiting room at this clinic as therapy sessions typically start promptly on the hour. As a result, the study was offered to participants after their therapy session. After providing consent, participants completed the demographics and internet use questionnaire, the PSQI, and the YIAT. Client files were used to obtain the most recent diagnoses and employment status for participants.

National data collection. The data for the national group were collected through mTurk, an online service that allows participants to participate in surveys for small amounts of compensation. The materials that these individuals completed were the same as those completed by the clinical group, but they were also asked in simple true/false format whether they carry a psychiatric diagnosis. These participants received small monetary compensation as deemed appropriate by the guidelines of the service. This study has received no external sources of funding.

Research Design and Statistical Analysis

The study was a nonexperimental design, not an experimental design as none of the variables examined were manipulated in any way. The purpose of the study was to examine the relationships between variables in an effort to describe the samples and potentially inform the course of treatment for IA. To analyze H1, a multiple regression analysis was used to investigate the predictive value of IA as reported on the YIAT, and age on the outcome variable sleep disturbance as reported on the PSQI.

In order to analyze H2, a moderation analysis was used to determine whether sleep quality moderates the relationship between internet addiction and presence of a psychiatric diagnosis.

For the analysis of H3, one-way Analysis of Variance (ANOVA) was used to determine whether there are statistically significant differences in any of the examined variables between the national, non-clinical group and the localized clinical group. Sleep disturbance, IA, and self-reported time spent online were compared across groups.

To analyze H4, an independent samples *t* test was used to analyze the differences in sleep disturbance, IA, and self-reported time spent in different online activities between males and females. This included hours spent in different activities (e.g. streaming video, TV watching, game playing, social media use, and work use, etc.). Please refer to Appendix B for the specific items that were examined.

CHAPTER IV

RESULTS

A Description of the Sample

The total number of participants was N = 126. There were 99 participants in the national group and 27 in the clinical group. The total national group was M_{age} = 35.49 years old (SD = 12.15); with a minimum age of 18 and a maximum age of 73. The sample had an average of *M* = 15.45 years of education (SD = 5.1). The sample reported to be 46.5% female (n = 46), 52.5% male (n = 52), and one participant reported to be transgender. Please see Table 1 for the ethnicity of the national and clinical groups.

Table 1

Ethnicity of the Sample

	National group		Clinical group	
Ethnicity	Frequency	Percent (%)	Frequency	Percent (%)
African	2	2	0	0
Caucasian	70	70.7	20	74.1
East Asian	6	6.1	1	3.7
Latino	3	3	1	3.7
Mixed	2	2	3	11.1
Other	4	4	2	7.4
South Asian	12	12.1	0	0

The total clinical group was M_{age} = 49.52 years old (SD = 20.9); with a minimum age of 18 and a maximum age of 79. The sample was 63% female (n = 17), 37% male (n = 10).

Predicting Internet Addiction and Sleep Disturbance

H1 analysis. A multiple regression analysis was conducted to determine the predictive value of IA and age on the DV of sleep disturbance. Please refer to Table 2 for the model predicting sleep disturbance. The total sample data were used to fulfill this analysis. The data reject the null hypothesis for H1 in the given sample. Age and IA significantly predicted poor quality sleep when examined as a model. The sample multiple correlation coefficient was .31, indicating that 31% of the variance in sleep disturbance can be accounted for by the model. As demonstrated in Table 2, IA significantly contributed to the model's predictive power on sleep disturbance.

Table 2

Regression Analysis for Variables Predicting Sleep Disturbance (N = 126)

Variable	*B*	*SE B*	*β*
IA Total	.22	.31	*.57
Age	.14	.05	.03
R^2		.31	
F		*28.07	

*p < .001.

H2 analysis. A moderation analysis was conducted to determine whether sleep disturbance significantly moderated the predictive relationship of internet addiction on psychiatric diagnosis. Based on the available model, the data reject fail to reject the null hypothesis for H2. However, this is not because the effect was non-significant, but rather because the direction of the relationship was opposite to what was hypothesized based on the literature. IA significantly predicted the presence of a psychiatric diagnosis with sleep disturbance as a moderator; in this sample it was a negative relationship. Lower degrees of internet addiction were related to higher probability of having a diagnosis. The data indicate that 18% of the variance is explained by the interaction model. Please refer to Table 3 and Figure 1 for further information.

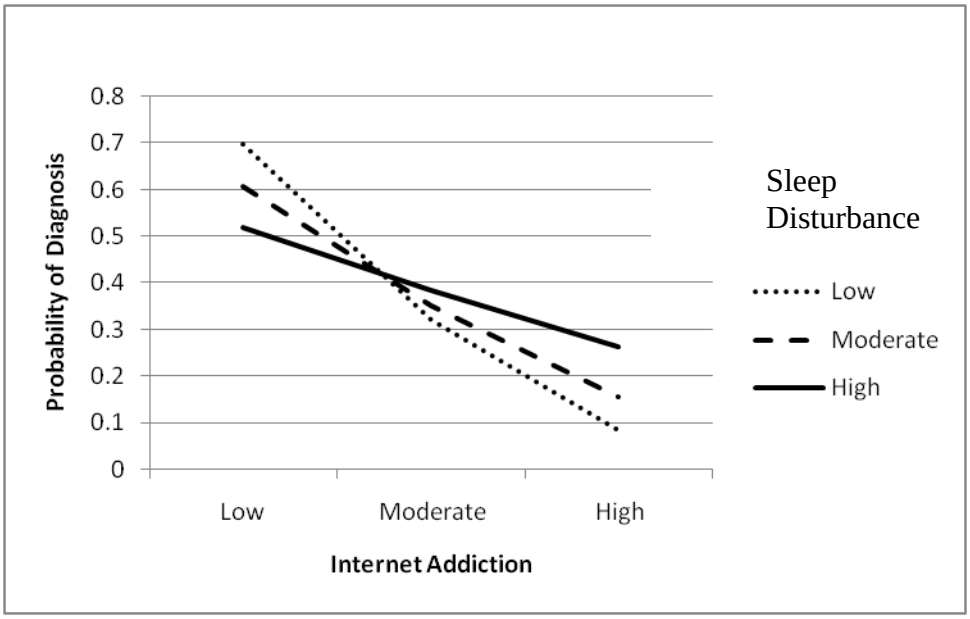
Table 3

Summary of Moderation Analysis for Internet Addiction Predicting Diagnosis with Sleep Disturbance as a Moderator (N = 126)

Variable	*B*	*SE B*	*p*
Internet Addiction	-0.13	.01	<.001
Sleep Disturbance	-0.12	.03	.02
IA x Sleep Disturbance	0.00	.00	.002
-2LL Likelihood Ratio		146.99	
R^2		.18	

Figure 1

Sleep Moderation Analysis (N = 126)



Sample Differences

H3 analysis. A One Way ANOVA was conducted to determine differences in sleep disturbance, IA, and internet usage between the clinical group (n = 27), the national group that self-reported some form of psychiatric diagnosis (n = 26), and the national group that reported no diagnosis (n = 73). The data fail to reject the null hypothesis for H3; there were significant differences between the samples in IA and Sleep Disturbance with large effect sizes. The clinical group reported significantly lower IA and sleep disturbance, followed by the national group with no diagnosis and finally the sample with diagnoses. There were no significant differences in total internet usage. Please refer to tables 4 - 8 for further information.

Table 4

Analysis of Variance (ANOVA) for Internet Addiction Comparing the National group With Diagnoses, Without Diagnoses, and the Clinical group With Diagnoses (N = 126)

	Sum of Squares	df	Mean Square	F	η^2
Between Groups	23145.37	2	11572.69	36.20**	0.37**
Within Groups	39318.99	123	319.67		
Total	62464.36	125			

**p < .001

Table 5

Tukey HSD Post-Hoc Comparison for Internet Addiction

Comparisons	Mean Difference	Std. Error	95% CI	
			Lower Bound	Upper Bound
Clinical vs. National No Diag.	-31.33**	4.03	-40.88	-21.77
Clinical vs. National With Diag.	-36.45**	4.91	-48.1	-24.79
National No Diag. vs. With Diag.	-5.12	4.08	-14.81	4.57

**p < .001. Note. Diag. = Diagnosis.

Table 6

Analysis of Variance (ANOVA) for Sleep Disturbance Between the National group With Diagnoses, Without Diagnoses, and the Clinical group With Diagnoses (N = 126)

	Sum of Squares	df	Mean Square	F	η^2
Between Groups	2471.31	2	1235.65	21.42**	0.26**
Within Groups	7096.85	123	57.70		
Total	9568.16	125			

**p < .001

Table 7

Tukey HSD Post-Hoc Comparison for Sleep Disturbance

Comparisons	Mean Difference	Std. Error	95% CI	
			Lower Bound	Upper Bound
Clinical vs. National No Diag.	-8.89**	1.71	-12.95	-4.83
Clinical vs. National With Diag.	-13.14**	2.09	-18.10	-8.19
National No Diag. vs. With Diag.	-4.25*	1.74	-8.37	-.14

* $p < .05$, **$p < .001$. Note. Diag. = Diagnosis.

Table 8

Analysis of Variance (ANOVA) for Total Time Online Between the National group With Diagnoses, Without Diagnoses, and the Clinical group With Diagnoses (N = 126)

	Sum of Squares	df	Mean Square	F	η^2
Between Groups	85.97	2	42.99	0.91	--
Within Groups	5797.46	123	47.13		
Total	5883.43	125			

*p = .05

Usage Habits by Gender

These data reject the null hypothesis for H4 as significant gender differences were observed regarding IA, internet use for work purposes, and time spent playing video games. Effect sizes were noted to be small (IA and video game time) to moderate (work use). Please refer to table 9.

Table 9

Internet Usage Habits by Gender (N = 125; Female = 63, Male = 62)

	Females		Males			
Variable	M	SD	M	SD	*t*-test	Cohen's *d*
Sleep Disturbance	25.67	6.78	25.44	10.46	.15	--
Diagnosis	1.38	0.49	1.45	0.50	-0.80	--
Internet Addiction*	38.95	18.82	49.45	24.59	-2.68*	0.48*
Total Time Online	27.71	6.57	29.23	7.17	-1.23	--
Work Use Total*	4.13	1.61	4.98	1.68	-2.91*	0.52*
Social Media	3.83	1.56	3.79	1.74	0.12	--
Video Games*	2.92	1.58	3.69	1.83	-2.53*	0.45*
Phone Games	2.87	1.40	2.95	1.49	-0.31	--

*p < .05

CHAPTER V

DISCUSSION

Exploration of the Results

The purpose of the study was to investigate the internet use habits of a national group of participants in the United States, as well as in a clinical population in the rural Southwestern United States, and how these habits relate to sleep and mental health outcomes. The study proposed a number of hypotheses: Hypothesis number one (H1) for the current study was that internet addiction (IA) and younger age would predict poor quality sleep. H2 was that there would be a significant relationship between IA and having a psychiatric diagnosis, of any kind, per self-report. This relationship was expected to be moderated by sleep disturbance. H3 stated that no significant differences would be found in sleep disturbance, IA, and internet usage habits between the clinical group, the national group that reported having a psychiatric diagnosis, and the national group without a diagnosis. Finally, H4 was that male gender would be associated with more time spent on video games while female gender would be associated with more time spent on social media.

H1 Findings. The current study found support for H1, and rejected the null hypothesis. Internet addiction and age as a model significantly predicted sleep disturbance in the sample. The IA factor had the most significant impact on sleep disturbance per the findings of the current model. Based on the findings of this study, IA

significantly contributes to a model accounting for approximately 31% of sleep disturbance. The implications for this are clear; where there are sleep issues, health care providers should educate patients on the impact of pathological internet use on patient sleep. This, along with education on sleep hygiene and medical intervention as needed, should be a mainstay for the treatment of patients reporting sleep issues in the modern age.

H2 Findings. The findings for H2 had interesting implications. The current study found support for the moderation interaction of sleep on the relationship between IA and diagnosis. There was a significant interaction effect of sleep disturbance on the relationship between IA and psychiatric diagnosis. The model accounted for 18% of variance in the probability of having a diagnosis. However with that said, in the current study the relationship was the inverse of what was hypothesized based on the available literature. It was hypothesized that more IA would predict a greater probability of having a diagnosis with sleep as a moderating factor. What was found was that lower degrees of IA in fact predicted a higher probability of having a diagnosis.

The analysis for H2 was attempted with the clinical group excluded. When run this way, with N = 99 from the national group only, the results fell short of statistical significance. However, the trend of the data suggested that more IA would result in more probability of diagnosis with sleep as a moderator. With the clinical group included, as seen above in Figure 1, the relationship became that the higher the IA, the lower the probability of having a diagnosis. It appears that this is due to the large differences

between IA and sleep disturbance in the clinical and national groups. This is described in further detail below, where the results of differences between groups are discussed. It is important to note here that these observed relationships do not indicate causation. While it is suggested that pathological internet use predicts sleep disturbance and diagnosis, nowhere is it suggested that IA causes these other problems. IA might simply be higher in individuals who already have sleep disturbance because it is an option for late-night insomniacs to pass the time. Further research in this area will be required in order to make that determination.

H3 Findings. This study failed to reject the null hypothesis for H3. Significant differences were noted between the national group with a diagnosis, national without a diagnosis, and the clinical group taken from the rural mental health clinic in the Southwestern United States. The findings suggested that the national group with a psychiatric diagnosis had the greatest degree of sleep disturbance. Following that, the national group with no reported diagnosis had the second most sleep disturbance. Finally, the clinical group – all of whom carried a psychiatric diagnosis by default – reported the lowest degree of sleep disturbance on average. Effect sizes were noted to be large regarding sleep disturbance. These large differences appear to have influenced the results of the moderation analysis conducted for H2 as described above.

The potential reasons for these differences fall under the realm of speculation. It is possible that the clinical group was somewhat more prone to under-reporting in some cases, or that the national group over-reported. It is also possible that cultural

differences, such as living in an urban environment as opposed to the all-rural environment of the clinical group, accounted for the differences in sleep disturbance between the groups. Alternatively, it is important to note that the clinical group was in treatment for psychological concerns. For the clinical group, treatment may consist of medications and psychotherapy that help improve the quantity and quality of sleep. Part of this treatment for many individuals included education on sleep hygiene, relaxation training, and other therapies that may improve the quality and quantity of sleep. However, data on which therapies and medications were used with which participants, and how this may have affected the PSQI results, were beyond the scope of the current study.

In further investigation of H3, the clinical group had a lower degree of IA than the national group. In the national group, IA was the same whether someone had a diagnosis or not, there were no statistically significant differences. Effect sizes were noted to be large. It is also important to note that there were no significant differences in the reported usage statistics between either of the national or clinical groups. Despite the higher addiction ratings in the national group, both groups spent approximately the same amount of time online.

There are a number of potential explanations for these findings which fall under the realm of speculation. Again it is possible that the clinical group may have been under-reporting symptoms, or that the national sample was over-reporting. Though the clinical group reported with the anonymity guaranteed by psychological research, the

national group reported online with a greater sense of perceived privacy. It is also possible that cultural differences partially account for the differences in IA between the groups. In this case, cultural differences may be defined as the environment in which one lives (urban, suburban, rural, etc), socio-economic status, beliefs about internet usage, and the availability and accessibility of alternate activities to stand in for internet use. Socio-economic status would mean the gross income of a household and the household's standard of living, which was not accounted for in the current study.

Further, it is important to consider that the clinical group was receiving treatment for their psychological distress at the time of the study, while it is unknown whether the national group was receiving any treatment or help for distress they may have had. In any case, it is interesting to note that rates of IA were higher in the national sampling despite the lack of differences in time spent online. This evidences the importance of cultural differences when studying IA. Researchers should keep in mind demographic information, such as whether one lives in a rural or urban area, and the sampling method, such as online or pen-and-paper, when looking at IA and not simply assume "one size fits all."

H4 Findings. The current study found partial support for H4. Males were found to spend significantly more time playing video games than females in the sample, with a small effect size. Interestingly, an unexpected finding arose in that males reported significantly more time on computer work than females with a moderate effect size. It should be noted that there were no significant differences in social media time by gender

in the sample. This is inconsistent with previous findings in the literature, and may reflect cultural differences between prior studies and the current study. It could also reflect an idiosyncrasy within the sample itself. Finally, males were noted to report greater addiction to the internet on the YIAT, with a small effect size. Given the differences in game-playing, it is possible that the addictive qualities of online video games contributed to greater addiction to the internet in the case of males (Ko et al., 2009). No gender differences were noted in sleep disturbance.

In summary. IA predicted sleep disturbance. IA also predicted the probability of a diagnosis, with sleep disturbance as a factor that moderates the relationship; however the relationship between IA and diagnosis was the inverse of what was expected given large cultural differences in the current sample. These differences were that IA was lower in the clinical group than in the national group. Regarding sleep disturbance the clinical group had the best sleep, followed by the national group without a diagnosis and finally the national group that did have some form of diagnosis. There were no differences in usage between groups, but males did play more video games and work online more than females, while social media use was the same. The way in which these findings relate to the existing literature will be discussed below.

Integrating the Results with Existing Literature

The results of the current study further support the previous findings about the impact of excessive screen use on sleep. IA significantly predicted sleep disturbance in the current sample just as excessive screen time has previously been related to sleep

disturbance (Hale & Guan, 2015). The literature described shortened sleep duration and delayed sleep onset occurring when there is excessive late-night screen use, and these are factors examined by the PSQI in the current study. Further, there does appear to be an interaction between sleep and IA on having a psychiatric diagnosis. This is consistent with the prior finding that disrupted sleep is related to worsening mental health, a common clinical problem (Baum, Desai, Field, Miller, Rausch, & Deebe, 2014). The logic behind this relationship is that addicted individuals will spend excessive amounts of time online in front of screens. Sometimes this happens late at night, and the light and stimulation they are exposed to results in poorer sleep. The poorer quality and quantity of sleep, in turn, worsens emotional regulation and emotional health (Baum, Desai, Field, Miller, Rausch, & Deebe, 2014). However, the current study adds to the research that cultural factors may have a larger impact on sleep quality than internet usage and these should be carefully accounted for and controlled in the research.

The current study did not find that individuals with psychiatric disorders in the national group had higher IA than those who did not. This does not support the previous findings which suggested there are high rates of psychiatric comorbidity with IA (McClelland et al., 2018; Bozkurt, Coskun, Ayaydin, Adak, & Zoroglu, 2013; Ko, Yen, Yen, Chen, & Chen, 2012). The sampling method in this study did not result in differences in IA between disordered individuals and not, at least among the national group. While the findings of this study do not by any means invalidate the previous

research, nor do they suggest that there are not high rates of comorbidity between IA and other disorders.

In the current sample, large differences between the clinical and national groups in IA and sleep resulted in the opposite of the anticipated relationship in IA and diagnosis. The clinical group was drawn from a rural area, which could account for differences in reported sleep patterns. Ozminkowski, Wang, and Walsh (2007) suggested that health care spending on insomnia and days missed from work due to insomnia are greater in urban areas, while the clinical group in the current sample was entirely rural. The existing IA literature has not yet explored the impact of whether living in a rural or urban setting impacts addiction to the internet, but the current study highlights a need for research on that topic.

Previous researcher found that being male was associated with greater video game use while being female was associated with greater social media use (Andreassen et al., 2016). The current study found support for half of that, and given the large N in this previous study it is likely that support for social media use being greater in females would have been more likely to be found as the N for the current study increased. This suggests that greater male video game use may be a more powerful effect than greater female social media use.

The observed differences between males and females in video game time and degrees of IA have some interesting implications for the research. To a small degree, males played more video games and had more IA than females in the sample. Consider

previous neurological findings about IA specific to online gaming addiction. Lower gray matter densities were found in the IA group in the following areas: the left anterior cingulate cortex, left posterior cingulate cortex, left insula, and left lingulate gyrus; these are areas which are implicated in modulating emotional behavior (Zhou et al., 2011). Brain changes brought about in relation to online gaming addiction may be responsible for small but significant differences between males and females in IA in the current study. Examining those brain differences, if any, was beyond the scope of the current study. However, the implication for future research is that males may be slightly more susceptible to IA than females if they play online games. The findings in the current study that males both had greater IA and more online gaming support the YIAT for use in online gaming addiction (Weng, Qian, Fu, Lin, Han, Niu, & Wang, 2013).

Taken together, the findings of the current study expand on and support the existing literature in the field of psychology which examines the emerging phenomenon of addiction to the internet. The results suggest that cultural differences, such as cultural beliefs on electronics use, living in rural, urban, or suburban areas, geographic location, and the impact of living environment on sleep will be highly important to IA researchers in the future. These and other implications for future research will be discussed in the below section.

Future Research Directions

Future studies may investigate the loneliness aspect of IA more closely. This was a theme that appeared in the literature, but due to time and logistical limitations,

loneliness was excluded from the current study. The YIAT does briefly address social isolation (neglect of social life, see below), but none of the assessment tools used in the study examined loneliness. In addition, the findings in the current study require replication. It may be possible that there are other moderating factors influencing the relationship between IA and diagnosis, and between IA and sleep disturbance. Lonely individuals may turn to the internet to pass time, and potentially to socialize with others online when their in-person social lives are lacking.

Causation has also yet to be determined for these observed relationships in the data, and that is likely to be challenging due to the nature of IA. An experimental study in which individuals are required to spend fewer or greater numbers of hours online may potentially shed light on these findings, but there would be a number of issues associated with such a study. For example, a person's work may require them to spend a certain amount of time online. Alternatively, an already-addicted person may have significant difficulty reducing their online time for the sake of a research study. There would need to be some form of accountability beyond self-report in order to experimentally control the online time spent by anyone in a study that directly controlled time online. Further, temporarily altering the amount of time online may not impact IA at all as the confines of a study do not mirror the exact addictive action of organic use. The current study evidences this because the lower IA clinical group did not spend less time online than the higher IA national group. Cultural beliefs on electronics use, a lack of other available entertainment options, socioeconomic status, and available time to spend online may also

have a significant impact on IA. Given the observed relationship between IA and sleep, as established both in the current study and the existing literature, sleep habits will need to be examined more thoroughly as they relate to internet use.

Future research should closely investigate the sleep habits of individuals with IA, different psychiatric diagnoses, and healthy controls. As evidenced by the current study's results and previous results on differences between rural and urban sleep (Ozminkowski, Wang, & Walsh, 2007), demographic features such as where a person lives must be accounted for when studying sleep. Other factors such as the location of the computer (in or outside of the bedroom, for example), light pollution, ambient sound, and late-night internet usage should be examined closely in such a follow-up study. In addition, a study investigating sleep in depth as it relates to IA may consider taking into account the presence of different psychiatric disorders, such as different depressive, anxiety, or psychotic disorders, as differences therein may impact the results.

The current study did not investigate what may be considered "positive" or prosocial uses of the internet as opposed to "negative" uses of the internet. Many social media platforms are used to effect societal change or raise awareness of important issues, for example. It is currently unknown how these different types of internet use may influence addiction, and many questions remain for future researchers in investigating which uses of the internet are more addictive than others.

There are a number of possible contributing factors to the results that were not examined during this investigation. Widyanto and McMurran (2004) described the

following factors for the YIAT: salience, excessive use, neglect of work, anticipation, lack of control, and neglect of social life. The possibility that some of these factors are directly related to sleep disturbance and/or psychiatric diagnosis is worth investigation.

In the coming years, researchers may also focus on treatments for IA. Researchers may look at which therapeutic approaches prove to be effective for IA, and which are ineffective approaches. As there appears to be comorbidity between IA and psychological disturbance, and addictive disorders tend to make other comorbid disorders more treatment-resistant, effective and targeted treatments for IA will quickly become a necessity for health care providers as the western world's dependency on the internet deepens.

Limitations

The limitations of the study were that a convenience sample on mTurk was used and that the sample may not entirely represent a true national average. MTurk workers are a self-selecting population that chooses to participate through the Amazon service. This is also a population which, by default, works online. This could artificially inflate some of the results, particularly when the study asked about time spent online working. It is unknown whether the mTurk workers had other jobs in addition to their work online, and this could have impacted sleep in addition to the factors studied by the current research.

All measures were based on self-report, and when using self-report there is some unavoidable error because people are not always accurate reporters of their own

behaviors, particularly when the possibility of addictive behavior is considered. As previously mentioned, it is possible that some of the sample over or under-reported. This could be due to a desire to be seen in a socially favorable light, or to highlight one's current distress in an episode of acute turmoil. There could also be genuine ignorance and a lack of self-awareness that contributes to the current results.

As the cultural differences between the clinical and national sample were not anticipated, they were not controlled for prior to commencing the study. These cultural differences may include socio-economic status, living environment, race/ethnicity, and cultural beliefs on internet usage. It is a limitation in the current study that many of these factors were not examined through the questionnaires. Other differences such as the other activities a person is involved in, available time, and time spent socializing may have impacted the results. This affected the end results in an unexpected way, but highlights the importance of cultural differences when conducting psychological research and attempting replication. It should also be considered that the cultural differences in the current study are assumed, and it is a limitation that they were not specifically accounted for in the final results. It may be possible that the entirety of the difference noted in the current data analysis between the clinical and national groups exists because the clinical group is in treatment. However, given the prior research on sleep differences in rural areas this is unlikely.

It should also be considered as a limitation that the current study did not break down and individually investigate the individual factors of IA on the YIAT (salience,

excessive use, neglect of work, anticipation, lack of control, and neglect of social life) for their validity as IA symptoms in the given sample. Considering the cultural differences between the current sample and the sample used when the YIAT was created and validated, some or all of the factors may or may not have a significant predictive impact on the results. Which of the factors individually accounts for more or less total addiction is worth investigating for its clinical value, as these factors may be individually targeted in therapy in order to improve the functioning of IA patients. Treating addiction to the internet may also help improve other psychological problems in those affected by both.

Conclusion

Internet Addiction is a growing phenomenon that of great importance to the modern industrialized world. Its full scope and impact may not be realized for some time yet, but with the ubiquitous nature of the internet and society's growing dependence on it, pathological internet use must be observed cautiously for its clinical implications. Further, as an addictive impulsive-compulsive behavioral disorder, IA is difficult to treat. Finally, the nature of industrialized society means that an "addict" of the internet may not be able to divorce themselves entirely from it as might a person addicted to alcohol. Because of this, it is highly likely that clinicians will find themselves helping clients develop healthy internet usage habits with appropriate boundaries, and not simply encouraging them to quit "cold turkey."

References

American Psychiatric Association. (2013). Diagnostic and statistical manual of mental disorders (5th ed.). doi:10.1176/appi.books.9780890425596.744053

Anderson, C. A. (2004). An update on the effects of violent video games. Journal of Adolescence, 27, 113–122. doi: 1016/j.adolescence.2003.10.009

Anderson, C. A., Gentile, D. A., & Buckley, K. (2007). Violent video game effects on children and adolescents: Theory, research, and public policy. New York: Oxford University Press.

Anderson, C.A., & Bushman, B.J. (2001). Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: a meta-analytic review of the scientific literature. *Psychological Science*, *12*(5), 353-359. doi: 10.1111/1467-9280.00366

Andreassen, C. S., Billieux, J., Griffiths, M. D., Kuss, D. J., Demetrovics, Z., Mazzoni, E., & Pallesen, S. (2016). The relationship between addictive use of social media and video games and symptoms of psychiatric disorders: A large-scale cross-sectional study. *Psychology of Addictive Behaviors*, *30*(2), 252. doi: 10.1037/adb0000160

Andreassen, C. S., Pallesen, S., & Griffiths, M. D. (2017). The relationship between addictive use of social media, narcissism, and self-esteem: Findings from a large

national survey. *Addictive Behaviors, 64,* 287-293. doi: 10.1016/j.addbeh.2016.03.006

Baum, K. T., Desai, A., Field, J., Miller, L. E., Rausch, J., & Beebe, D. W. (2014). Sleep restriction worsens mood and emotion regulation in adolescents. *Journal of Child Psychology and Psychiatry, 55*(2), 180-190. doi: 10.1111/jcpp.12125

Beard, K.W., & Wolf, E.M. (2001). Modification in the proposed criteria for internet addiction. *Cyberpsychological Behavior, 4,* 377-383.

Beebe, D.W., Fallone, G., Godiwala, N., Flanigan, M., Martin, D., Schaffner, L., Amin, R. (2008). Feasibility and behavioral effects of an at-home multi-night sleep restriction protocol for adolescents. *Journal of Child Psychology and Psychiatry*, 49:915–923. Retrieved from PubMed.

Blackwell, D., Leaman, C., Tramposch, R., Osborne, C., & Liss, M. (2017). Extraversion, neuroticism, attachment style and fear of missing out as predictors of social media use and addiction. *Personality and Individual Differences, 116,* 69-72. doi: 10.1016/j.paid.2017.04.039.

Block, J. J. (2007a). Pathological computer use in the USA. *International symposium on the counseling and treatment of youth internet addiction.*

Block, J. J. (2007b). Lessons from Columbine: virtual and real age. *American Journal of Forensic Psychiatry, 28,* 5-33.

Block, J. J. (2008). Internet Addiction. *American Journal of Psychiatry, 165,* 306-307.

Bozkurt, H., Coskun, M., Ayaydin, H., Adak, I., & Zoroglu, S. S. (2013). Prevalence and patterns of psychiatric disorders in referred adolescents with Internet addiction. *Psychiatry and clinical neurosciences*, *67*(5), 352-359. doi: 10.1111/pcn.12065

Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry research*, *28*(2), 193-213. doi: 10.1016/0165-1781(89)90047-4

Cain, N., & Gradisar, M. (2010). Electronic media use and sleep in school-aged children and adolescents: A review. *Sleep Medicine, 11*(8), 735-742. Retrieved from PubMed.

Fallone, G., Acebo, C., Seifer, R., & Carskadon, M.A. (2005). Experimental restriction of sleep opportunity in children: Effects on teacher ratings. *Sleep,* 28(12):1561–1567. Retrieved from PubMed.

Filbey, F. M., Claus, E., Audette, A. R., Niculescu, M., Banich, M. T., Tanabe, J.,… & Hutchison, K. E. (2008). Exposure to the taste of alcohol elicits activation of the mesocorticolimbic neurocircuitry. *Neuropsychopharmacology*, *33*(6), 1391-1401. doi:10.1038/sj.npp.1301513

Gentile, D. A., & Gentile, J. R. (2008). Violent video games as exemplary teachers: A conceptual analysis. *Journal of Youth and Adolescence, 37*(2), 127-141. doi: 10.1007/s10964-007-9206-2

Gentile, D. A., & Stone, W. (2005). Violent video game effects on children and adolescents: A review of the literature. Minerva Pediatrica, 57, 337–358. Retrieved from eropepmc.org

Ha, J. H., Kim, S. Y., Bae, S. C., Bae, S., Kim, H., Sim, M... & Cho, S. C. (2007). Depression and Internet addiction in adolescents. *Psychopathology*, *40*(6), 424-430. doi: 10.1159/000107426

Hale, L., & Guan, S. (2015). Screen time and sleep among school-aged children and adolescents: a systematic literature review. *Sleep medicine reviews*, *21*, 50-58. doi: 10.1016/j.smrv.2014.07.007

Han, D. H., Bolo, N., Daniels, M. A., Arenella, L., Lyoo, I. K., & Renshaw, P. F. (2011). Brain activity and desire for Internet video game play. *Comprehensive psychiatry*, *52*(1), 88-95. doi: 10.1016/j.comppsych.2010.04.004

Higuchi, S., Motohashi, Y., Liu, Y., Maeda, A. (2005). Effects of playing a computer game using a bright display on presleep physiological variables, sleep latency, slow wave sleep and REM sleep. *Journal of Sleep Research, 14*(3), 267-273. Retrieved from PubMed.

Hormes, J. M., Kearns, B., & Timko, C. A. (2014). Craving Facebook? Behavioral addiction to online social networking and its association with emotion regulation deficits. *Addiction, 109*(12), 2079-2088. doi:10.1111/add.12713

Jelenchick, L. A., Eickhoff, J. C., & Moreno, M. A. (2013). "Facebook depression?" Social networking site use and depression in older adolescents. *Journal of Adolescent Health, 52*(1), 128-130. doi: 10.1016/j.jadohealth.2012.05.008

Ko C. H., Liu G.C., Hsiao S., Yen J.Y., Yang M. J.,… & Lin W.C. (2009). Brain activities associated with gaming urge of online gaming addiction. *Journal of Psychiatric Research, 43,* 739-47.

Ko C.H., Liu G.C., Yen J.Y., Chen C.Y., Yen C.F., Chen C.S. (2011). Brain correlates of craving for online gaming under cue exposure in subjects with Internet gaming addiction and in remitted subjects. *Addictive Biology*. doi: 10.1111/j.1369-1600.2011.00405.x

Ko, C. H., Yen, J. Y., Yen, C. F., Chen, C. S., & Chen, C. C. (2012). The association between Internet addiction and psychiatric disorder: a review of the literature. *European Psychiatry*, *27*(1), 1-8. doi: 10.1016/j.eurpsy.2010.04.011

Lemmens, J. S., Valkenburg, P. M., & Peter, J. (2011). Psychosocial causes and consequences of pathological gaming. *Computers in Human Behavior*, *27*(1), 144-152. doi: 10.1016/j.chb.2010.07.015

Leung, L. (2014). Predicting Internet risks: a longitudinal panel study of gratifications-sought, Internet addiction symptoms, and social media use among children and adolescents. *Health Psychology and Behavioral Medicine: an Open Access Journal*, *2*(1), 424-439. doi: 10.1080/21642850.2014.902316

Lo, S. K., Wang, C. C., & Fang, W. (2005). Physical interpersonal relationships and social anxiety among online game players. *Cyberpsychology & behavior*, *8*(1), 15-20. doi: 10.1089/cpb.2005.8.15

Maas, L. C., Lukas, S. E., Kaufman, M. J., Weiss, R. D., Daniels, S. L., Rogers, V. W.,... & Renshaw, P. F. (1998). Functional magnetic resonance imaging of human brain activation during cue-induced cocaine craving. *American Journal of Psychiatry*, *155*(1), 124-126. doi: 10.1176/ajp.155.1.124

Marino, M., Li, Y., Rueschman, M. N., Winkelman, J. W., Ellenbogen, J. M., Solet, J. M.,... & Buxton, O. M. (2013). Measuring sleep: accuracy, sensitivity, and specificity of wrist actigraphy compared to polysomnography. Sleep, 36(11), 1747-1755. doi: 10.5665/sleep.3142

McClelland, M., Geldhof, J., Morrison, F., Gestsdóttir, S., Cameron, C., Bowers, E.,... & Grammer, J. (2018). Self-regulation. In *Handbook of Life Course Health Development*(pp. 275-298). Springer, Cham. Retrieved from Springer Link.

Min, J., & Du, Y.S. (2005). The clinical application of screen for anxiety related emotional disorders. *Shanghai Archive of Psychiatry, 17,* 72-74.

Müller, K. W., Beutel, M. E., & Wölfling, K. (2014). A contribution to the clinical characterization of Internet addiction in a sample of treatment seekers: Validity of assessment, severity of psychopathology and type of co-morbidity. *Comprehensive Psychiatry*, *55*(4), 770-777. doi: 10.1016/j.comppsych.2014.01.010

Owens, J.A., Jones, C. (2011). Parental knowledge of healthy sleep in young children: results of a primary care clinic survey. *Journal of Developmental and Behavioral Pediatrics, 32*(6), 447-453. Retrieved from PubMed.

Ozminkowski, R. J., Wang, S., & Walsh, J. K. (2007). The direct and indirect costs of untreated insomnia in adults in the United States. *Sleep*, *30*(3), 263-273. doi: 10.1093/sleep/30.3.263

Petry, N. M., Rehbein, F., Gentile, D. A., Lemmens, J. S., Rumpf, H. J., Mößle, T.,... & Auriacombe, M. (2014). An international consensus for assessing internet gaming disorder using the new DSM-5 approach. *Addiction*, *109*(9), 1399-1406. doi: 10.1111/add.12457

Pontes, H. M., Kuss, D. J., & Griffiths, M. D. (2015). Clinical psychology of Internet addiction: A review of its conceptualization, prevalence, neuronal processes, and implications for treatment. *Neuroscience & Neuroeconomics*, *4*, 11-23. doi: 10.2147/NAN.S60982

Regier, D. A., Farmer, M. E., Rae, D. S., Locke, B. Z., Keith, S. J., Judd, L. L., & Goodwin, F. K. (1990). Comorbidity of mental disorders with alcohol and other drug abuse: results from the Epidemiologic Catchment Area (ECA) study. *JAMA*, *264*(19), 2511-2518. doi: 10.1001/jama.1990.03450190043026

Rideout, V. J., Foehr, U. G., & Roberts, D. F. (2010). GENERATION M^2, Media in the Lives of 8- to 18-Year-Olds. Kaiser Family Foundation.

Roberts, R. E., & Duong, H. T. (2014). The prospective association between sleep deprivation and depression among adolescents. *Sleep, 37*(2), 239-244. doi: 10.5665/sleep.3388

Seay, A. F., & Kraut, R. E. (2007, April). Project massive: Self-regulation and problematic use of online gaming. In *Proceedings of the SIGCHI conference on Human factors in computing systems* (pp. 829-838). ACM. doi: 10.1145/1240624.1240749

Shaw, M., Black, D.W. (2008). Internet addiction – definition, assessment, epidemiology and clinical management. *CNS Drugs,22*, 353-65.

Sriwilai, K., & Charoensukmongkol, P. (2016). Face it, don't Facebook it: Impacts of Social Media Addiction on Mindfulness, Coping Strategies and the Consequence on Emotional Exhaustion. *Stress and Health*, *32*(4), 427-434. doi:10.1002/smi.2637

Stamatakis, E., Hamer, M., & Dunstan, D. W. (2011). Screen-based entertainment time, all-cause mortality, and cardiovascular events: population-based study with ongoing mortality and hospital events follow-up. *Journal of the American College of Cardiology*, *57*(3), 292-299. doi: 10.1016/j.jacc.2010.05.065

Strasburger, V. C., Hogan, M. J., Mulligan, D. A., Ameenuddin, N., Christakis, D. A., Cross, C.,... & Moreno, M. A. (2013). Children, adolescents, and the media. *Pediatrics*, *132*(5), 958-961.

Tandoc, E. C., Ferrucci, P., & Duffy, M. (2015). Facebook use, envy, and depression among college students: Is facebookingdepressing?. *Computers in Human Behavior*, *43*, 139-146. doi: 10.1016/j.chb.2014.10.053

Tekin, S., & Cummings, J. L. (2002). Frontal–subcortical neuronal circuits and clinical neuropsychiatry: an update. *Journal of psychosomatic research*, *53*(2), 647-654. doi: 10.1016/j.jpsychires.2008.09.012

Thalemann R, Wölfling K, & Grüsser SM. (2007). Specific cue reactivity on computer game-related cues in excessive gamers. *Behavioral Neuroscience, 121*, 614-8.

Weng, C. B., Qian, R. B., Fu, X. M., Lin, B., Han, X. P., Niu, C. S., & Wang, Y. H. (2013). Gray matter and white matter abnormalities in online game addiction. *European Journal of Radiology*, *82*(8), 1308-1312. doi: 10.1016/j.ejrad.2013.01.031

Whang, L.S., Lee, S., & Chang, G. (2003). Internet over-users' psychological profiles: a behavior sampling analysis on internet addiction. *Cyberpsychological Behavior, 6*, 143-150.

Widyanto, L., & McMurran, M. (2004). The psychometric properties of the internet addiction test. *CyberPsychology & Behavior*, *7*(4), 443-450. doi: 10.1089/cpb.2004.7.443

Yen, C. F., Chou, W. J., Liu, T. L., Yang, P., & Hu, H. F. (2014). The association of Internet addiction symptoms with anxiety, depression and self-esteem among

adolescents with attention-deficit/hyperactivity disorder. *Comprehensive psychiatry*, *55*(7), 1601-1608. doi: 10.1016/j.comppsych.2014.05.025

Young, K. S. (1998). *Caught in the net: How to recognize the signs of internet addiction--and a winning strategy for recovery*. John Wiley & Sons.

Zhou, Y., Lin, F. C., Du, Y. S., Zhao, Z. M., Xu, J. R., & Lei, H. (2011). Gray matter abnormalities in Internet addiction: a voxel-based morphometry study. *European Journal of Radiology*, *79*(1), 92-95. doi: 10.1016/j.ejrad.2009.10.025

Zhu, Y.H., Du, Y.S., & Jiang, W.Q. (2006). Emotional correlation of internet addiction disorder among middle-school students in Shanghai. *Shanghai Archive of Psychiatry, 18,* 69-71.

APPENDIX A

Letter of Informed Consent

Dear Participant or Parent,

We would like to invite you to be a part of a research study we are conducting with the help of the clients at our clinic. The purpose of the research is to determine how internet use patterns relate to the symptoms of our clients. The information you provide will be used to help other clients, and the mental health of our little slice of East Texas. As this project is the dissertation of one of our interns, your participation will also help toward their graduation.

Your participation in this study is voluntary, confidential, and free of charge. All data will be reported as a group, which means no one will be able to identify your answers. Data in this study will be stored separate from your medical information, and will be locked and password-protected. Whether you choose to participate or not, it will not affect your standing or services at East Texas Psychological Services.

This study is minimal risk, although if you are distressed in any way by your participation, our therapy staff is here for you.

To participate, just fill in the following packet to the best of your truthful knowledge and turn it back in to the front desk. It should only take about 10 to 15 minutes to complete. If you do not wish to participate, kindly return the packet unsigned.

By signing below, you consent to participate in the research study. If you are the parent of a child under the age of 18, please sign below and see the separate assent form. You will receive a copy of this consent statement.

_____ _____

Participant or Parent Signature & Date
18 years or older

Child Participant's Name
17 years or younger

If you have any questions or concerns regarding this research study, please contact Robert Nicks at nicksrcn@gmail.com, his faculty sponsor Luis Aguerrevere at aguerrevle@sfasu.edu, or Dr. Chrissy Cross at crossc1@sfasu.edu Phone: (936) 468-2792.

If you have any questions about your rights as a participant in this research, or if you feel you have been placed at risk, please contact the Stephen F. Austin State University Office of Research and Sponsored Programs (OSRP) (936) 468-6606.

APPENDIX B
Demographics and Internet Use

Please complete the following questionnaire. Select only the one answer per item that is most correct for you. Answer as truthfully and accurately as possible. Keep in mind that it is possible to add up to more than 24 hours of time spent due to multitasking (using the phone while on the computer, etc.). Items may be read aloud to you on request.

Age: _____
Years of Education: ____

Gender: __ Female __ Male __ Transgender __ Other/Prefer not to say

Ethnicity: __African __Caribbean __Caucasian __East Asian __Latino/Hispanic __Middle Eastern __Mixed __South Asian __Other/Prefer not to say

In the past month on WEEKDAYS, how many hours per day did you spend…

	Less than One	One to Three	Three to Six	More than Six
…using a computer, tablet, phone, or other electronic device for school or work purposes?	○	○	○	○
… using an electronic device for any purpose NOT related to school or work?	○	○	○	○
… watching TV, NOT including any videos or streaming services viewed exclusively online (Youtube, Netflix, Hulu, etc.)?	○	○	○	○
… viewing any kind of video or streaming content on the internet (Youtube, Netflix, Hulu, Twitch TV, etc.) using any device capable of being online?	○	○	○	○

… using social media (Facebook, Snapchat, Instagram, etc.) using any kind of device?	○	○	○	○
… playing video games on any platform other than your phone?	○	○	○	○
… playing video games on your phone?	○	○	○	○

In the past month on WEEKENDS, how many hours per day did you spend…

	Less than One	One to Three	Three to Six	More than Six
…using a computer, tablet, phone, or other electronic device for school or work purposes?	○	○	○	○
… using an electronic device for any purpose NOT related to school or work?	○	○	○	○
… watching TV, NOT including any videos or streaming services viewed exclusively online (Youtube, Netflix, Hulu, etc.)?	○	○	○	○
… viewing any kind of video or streaming content on the internet (Youtube, Netflix, Hulu, Twitch TV, etc.) using any device capable of being online?	○	○	○	○
… using social media (Facebook, Snapchat, Instagram, etc.) using any kind of device?	○	○	○	○
… playing video games on any platform other than your phone?	○	○	○	○
… playing video games on your phone?	○	○	○	○

1. I often find myself using multiple electronics at once, such as using my phone while on the computer or while watching TV.
    a. True
    b. False
2. I frequently use my phone in bed before going to sleep.
    a. True
    b. False
    If true, what do you usually use your phone for in bed?

    _____

3. I often use the internet late at night, either within the hour before falling asleep or staying awake longer than I intended.
    a. True
    b. False
    If true, what do you usually use the internet for late at night?

    _____

4. I often stay up late playing video games.
    a. True
    b. False
5. If I play games, they are usually games that I play online in which I can talk (or type) to others.
    a. True
    b. False
6. When I use either my phone or computer, I often keep my face close to the screen.
    a. True
    b. False

APPENDIX C
Pittsburg Sleep Quality Index

During the past month,

1. When have you usually gone to bed? _____
2. How long (in minutes) has it taken you to fall asleep each night? _____
3. What time have you usually gotten up in the morning? _____
4. A. How many hours of actual sleep did you get at night? _____
   B. How many hours were you in bed? _____

5. During the past month, how often have you had trouble sleeping because you…	Not during the past month (0)	Less than once a week (1)	Once or twice a week (2)	Three or more times a week (3)
A. Cannot get to sleep within 30 minutes				
B. Wake up in the middle of the night or early morning				
C. Have to get up to use the bathroom				
D. Cannot breathe comfortably				
E. Cough or snore loudly				
F. Feel too cold				
G. Feel too hot				
H. Have bad dreams				
I. Have pain				
J. Other reasons, please describe, including how often:				
6. During the past month, how often have you taken medication (prescribed or "over the counter") to help you sleep?				
7. During the past month, how often have you had trouble staying awake while driving, eating meals,				

or engaging in social activity?				
8. During the past month, how much of a problem has it been for you to keep up enthusiasm to get things done?				
During the past month, how would you rate your sleep quality overall?	Very good (0)	Fairly good (1)	Fairly bad (2)	Very bad (3)

APPENDIX D

Young Internet Addiction Test

Please answer the following questions about your internet usage by using this scale. Please remember that internet usage may include any use of the internet, including phone usage.

0	Does not apply
1	Rarely
2	Occasionally
3	Frequently
4	Often
5	Always

	Question	Scale					
	How often do you…						
1	Find that you stay online longer than you intended?	1	2	3	4	5	0
2	Neglect household chores to spend more time online?	1	2	3	4	5	0
3	Prefer the excitement of the Internet to intimacy with your partner?	1	2	3	4	5	0
4	Form new relationships with fellow online users?	1	2	3	4	5	0
5	Others in your life complain to you about the amount of time you spend online?	1	2	3	4	5	0
6	Your grades or school work suffers because of the amount of time you spend online?	1	2	3	4	5	0
7	Check your email before something else that you need to do?	1	2	3	4	5	0
8	Your job performance or productivity suffer because of the internet?	1	2	3	4	5	0
9	Become defensive or secretive when anyone asks what you do online?	1	2	3	4	5	0
10	Block out disturbing thoughts about your life with soothing thoughts of the Internet?	1	2	3	4	5	0
11	Find yourself anticipating when you will go online again?	1	2	3	4	5	0
12	Fear that life without the internet would be boring, empty, and joyless?	1	2	3	4	5	0
13	Snap, yell, or act annoyed if someone bothers you while you are online?	1	2	3	4	5	0

14	Lose sleep due to late-night log-ins?	1	2	3	4	5	0
15	Feel preoccupied with the Internet when offline, or fantasize about being online?	1	2	3	4	5	0
16	Find yourself saying "just a few more minutes" or similar when online?	1	2	3	4	5	0
17	Try to cut down the amount of time you spend online and fail?	1	2	3	4	5	0
18	Try to hide how long you've been online?	1	2	3	4	5	0
19	Choose to spend more time online over going out with others?	1	2	3	4	5	0
20	Feel depressed, moody, or nervous when you are offline, which goes away once you are back online?	1	2	3	4	5	0

APPENDIX E
Debriefing Statement

Thank you for participating in the research study. This research will be used to help our community. Remember that you are a voluntary participant. If you wish, you can still tell us not to use your information in the study, and we will destroy it. Doing so will not affect your standing or services at East Texas Psychological Services.

If you became distressed or upset by participating in this study, please ask your therapist for help. That's what we're here for after all. If you have any questions or concerns regarding this research study, please contact the lead investigator, Robert Nicks, at nicksrcn@gmail.com or the faculty sponsor, Dr. Luis Aguerrevere, at aguerrevle@sfasu.edu.

If you have any questions about your rights as a participant in this research, or if you feel you have been placed at risk, please contact the Stephen F. Austin State University Office of Research and Sponsored Programs (OSRP):
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VITA

After completing high school at Buna High School in 2006, Robert went on to complete his Bachelors of Arts in Psychology with a minor in Biology at Stephen F. Austin State University in 2013. He was awarded a Masters of Arts from SFA in School Psychology in 2017, and currently seeks a Doctorate in School Psychology. Robert is currently employed as an intern at East Texas Psychological Services in Athens, TX.

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