Social, Behavioral, and Academic Ramifications of Video Game Playing in College

Keywords: college students, gaming addiction, GPA, boundary management, psychological well being

Young adults within the college-aged range (18-25) spend nearly seven hours a week on average playing video games (Limelight, 2019). Video game usage has been linked to positive mental health effects in both clinical and non-clinical studies as an alternative to psychiatric medication as well as reducing symptomology of psychological issues (Carras et al., 2018; Fish et al., 2018). Psychological well-being in college students may be a significant facet of school performance (Punia & Malaviya, 2015). General technology usage may also be a facet in determining psychological well-being (Barkely et al., 2014; Bjornsen et al., 2015; Lepp et al., 2014). To fully understand video gaming habits and how they may affect college students' academic performance, the psychological factors associated with well-being should be considered.

Video Game Usage

Young adults within the college-aged range (18-25) spend nearly seven hours a week on average playing video games (Limelight, 2019). As of 2019, nearly 46% of gamers are women (Gough, 2019). Most gamers define themselves as 'casual' gamers, and mobile devices such as smartphones or tablets are the most used means of playing video games. In the US, casual single-player games, such as Angry Birds or Candy Crush, are the most popular types of games, followed by casual multi-player games (e.g., Words With Friends) and First-Person Shooter (e.g., Call of Duty or Overwatch). Additionally, 56% of frequent gamers play multiplayer games, according to the Entertainment Software Association ([ESA], 2018). Other popular game genres include massive multiplayer online (MMO), simulations, real-time strategy (RTS), puzzles, action, stealth shooter, combat, sports, role-playing games (RPG), and educational games (Thought Catalog, 2015).

Because of the rising usage of video games, concerns about related psychological issues have been discussed. The *Diagnostic and Statistical Manual of Mental Disorders, 5th Edition* (*DSM-5*) recognized Internet Gaming Disorder, or IGD, as a condition warranting further research and included symptoms such as preoccupation with gaming, continuing to focus on gaming despite the presence of problems, and jeopardizing jobs or relationships due to continued gaming (American Psychiatric Association [APA], 2013). Continued research on IGD notes men are more at risk for developing IGD and IGD is frequently comorbid with other psychological issues such as depression, anxiety, aggression, and obsessive-compulsive symptoms (Zajac et al., 2017). Additionally, IGD may place an individual at risk for physical health problems, such as being overweight or obese, sleep disorders, or a heightened risk for seizures (Li et al., 2017). Higher levels of gameplay time were also associated with issues related to psychosocial adjustment and lower levels of life satisfaction (Przybylski & Mishkin, 2016).

Despite the potential issues that arise with poor gaming habits, video game usage has been associated with certain positive mental health outcomes. In recent years, video games have been used experimentally

to treat mental health issues. In one recent study, casual video game play (CVG) was assigned to patients who were prescribed selective serotonin reuptake inhibitor (SSRI) medication (Fish et al., 2018). The CVG group continued to take medication while utilizing CVG but was compared to a treatment control group that only prescribed two forms of medication. The results indicate that CVG was effective in treating symptoms associated with anxiety disorders and could be used as an alternative prescription to extensive medication (Fish et al., 2018). In another recent study, a video game-based intervention addressed internalizing problems for youths with behavioral problems within residential care facilities (Schuurmans et al., 2018). The study also explored the psychological effects of treatment on youths' mentors. Both youth groups in the study received ongoing psychotherapy or prescribed medication as recommended by clinicians; however, only the experimental group received the game intervention. At the end of the study, the group that participated in the video game intervention self-reported improvements in both anxiety and externalizing problems immediately after the study and at a 4-month follow-up. The study also indicated improvements in the mentors' anxiety levels at the immediate follow-up (Schuurmans et al., 2018).

Another form of clinical research on video games used game intervention to treat negative mental health outcomes and used in-game behavior to predict treatment outcomes. In a study conducted by Wols et al. (2018), a video game intervention was used to teach children coping methods for anxious behaviors as well as define children's behaviors as "engaged" or "avoidant/safety" based on in-game actions (Wols et al., 2018). The researchers noted that game-based interventions could be useful in tailoring engaging interventions for children, and the game itself could be useful in recognizing specific anxiety-related behaviors to be targeted in therapy (Wols et al., 2018).

Non-clinical trial research on video game usage and positive mental health outcomes have also shown notable results. Carras et al. (2018) interviewed military veteran gamers about their experiences and how gaming assisted with aspects such as coping or well-being. Most of the individuals in the sample reported post-traumatic stress disorder (PTSD) symptoms or some other form of trauma-related issues. While many of the veterans reported they used gaming as a means of distraction from their mental health issues, the interactivity and narrative focus of games can help veterans develop insight into their own thoughts and feelings, which is useful for clinicians in assessing suicidality. Video games offered veterans opportunities for leadership and social opportunities through multiplayer games; these virtual spaces helped veterans develop support systems that are a major element in recovery interventions (Carras et al., 2018).

A Dutch study examined the relationship between competitive video game usage and children's social development in conduct problems, peer relations, and prosocial behaviors (Lobel et al., 2019). The results did not indicate any significant changes in prosocial behaviors but found that children who played competitive games reported improvements in conduct problems and peer relations. The researchers note that competitive gaming in the home environment should be viewed within the context of self-improvement and comradery (Lobel et al., 2019).

A study conducted by Stiff and Kedra (2018) examined the effects of intergroup social video game play on reducing prejudice. Participants in the study either played the game alone or with an outgroup partner and were told their opponent was either human or computer-controlled; all participants rotated between the four conditions of the study. The results of the study indicated that participants who played collaboratively with outgroup members also reported higher levels of favorability towards the outgroup. Stiff and Kedra (2018) concluded the findings of their study could be a potential utility of video games in reducing prejudice between groups. Lastly, specific video games may be useful for improving cognitive functions in specific aspects such as top-down control and processing speed (Nuyens et al., 2019). Research was compiled from multiple studies and focused on specific cognitive aspects such as attention, task-switching, and time perception. Many studies examined by researchers noted cognitive flexibility relative to task-switching was higher in gamers compared to non-gamers and gamers exhibit a higher global attention level and processing speed. Lastly, the literature also indicates that gamers display higher sub-second time perception, but research in this aspect is still largely limited (Nuyens et al., 2019). In general, video games have the potential to improve different facets of psychological health.

Psychological Wellbeing and Academics

Psychological well-being describes multiple facets of functioning that relate back to overall psychological health. Psychologist Carolyn Ryff divided psychological well-being into six major categories: self-acceptance, autonomy, personal growth, positive relationships, environmental mastery, and purpose in life (Ryff, 2014). Self-acceptance describes a person's attitudes towards themselves and their ability to accept both good and bad qualities. Autonomy is a measure of self-determination, independence, and the ability to resist societal pressure to think for oneself. Personal growth is a person's feeling of continued development and openness to new experiences. Positive relationships describe a person's warm, satisfying, and trusting relationship with peers or family as well as the capacity to extend empathy to others. Environmental mastery measures a person's sense of mastery and competence in utilizing external activities and opportunities. Lastly, purpose in life gauges a person's direction in life and long- and short-term goals (Ryff, 2014).

College Students

Many studies have explored different aspects of psychological well-being in college students to identify specific internal or external factors that affect students' well-being. A study conducted by Ludban in 2015, based on Ryff's categories, measured the psychological well-being of a sample of college students to understand the positive and negative factors that influence their psychological health. The results of this study suggest gender, age, support, and financial welfare are the primary aspects that predict psychological well-being in college students. Receiving support from family or friends, especially in specific circumstances for non-traditional students, is a significant factor in lowering stress and maintaining emotional mastery (Ludban, 2015).

Researchers have also examined the relationship between psychological instability and the propensity for developing psychological issues such as depression in an undergraduate sample (Gable & Nezlek, 1998). Students reported on facets of their psychological health such as anxiety, self-esteem, and causal uncertainty. Results indicated students who reported lower levels of psychological well-being were at a higher risk for depression. Additionally, while the relationship between daily adjustment and depression risk is complex, day-to-day instability should be considered to fully understand the

trajectory of depression (Gable & Nezlek, 1998).

Specific lifestyle aspects of psychological well-being have also been examined (Ozpolat et al., 2012). The researchers utilized a lifestyle inventory to measure and categorize students' lifestyles into five sub-dimensions: control, perfectionism, pleasing, self-esteem, and expectations. Findings indicated students with low self-esteem and need-to-please lifestyles are at a greater risk of negative psychological wellbeing outcomes, compared to students who are expectation-oriented. Students who fit this lifestyle criteria may still maintain positive relationships with others but may do so at the cost of their own desires and well-being (Ozpolat et al., 2012). Additional findings indicated that students who engaged in task-oriented coping strategies also self-reported higher levels of psychological well-being (Punia & Malaviya, 2015).

Academic Performance

Studies examining the relationship between psychological well-being and college students' academic performance have been mixed. For example, the connection between the academic performance of first-year undergraduate students and their psychological well-being was examined (Topham & Moller, 2011). Results did not indicate an association between psychological well-being and academic performance at the end of the first year, but students with clinical levels of personal concerns may still be at risk for developing psychological health problems (Topham & Moller, 2011). A similar study conducted in 2015 by Punia and Malaviya also examined the relationship between college students' academic performance and psychological well-being. The results indicated that while most of the participants self-reported medium levels of well-being and average academic performance, those who reported medium or high levels of academic performance also reported higher levels of psychological well-being. In general, psychological well-being can affect both broad and specific areas of a college student's academic performance.

Although IGD symptoms may make it difficult for an individual to prioritize school responsibilities over gaming, research examining the effects of video game usage on academic performance has varied results. An early study from 2007 attempted to explore the correlation between academic performance and overall time spent on gaming. Anand's study utilized SAT scores and overall GPA as a gauge of academic

performance. The results of Anand's analysis showed that extensive gaming habits had a negative impact on both GPA and SAT scores. However, Anand emphasizes that SAT scores only represent a single instance of academic performance and extrapolating conclusions may be difficult (Anand, 2007). A 2014 study conducted by Drummond and Sauer examined collected data from adolescents to view the effect size of video game usage on academic achievement in science, mathematics, and reading. Across the data, differences in academic performance were negligible although the researcher noted that reading performance did show a noticeable decline but did not reach the cutoff level (Drummond & Sauer, 2014). A longitudinal German study from 2018 also examined the long-term effects of extensive gaming time on a sample of adolescents. Gnambs et al. (2018) specifically looked at the effects of the amount of time students spent playing computer games on their overall grade performance and competencies in math and reading. The study results indicated that students who played games most frequently would have a decline in grades in the proceeding years, but they did not show marked decreases in math and reading competencies (Gnambs et al., 2018).

A few studies found that moderate video game use may be beneficial for skills related to academic development. One study from 2013 explored the effects of strategic games (i.e., specifically strategy or RPGs) on students' self-reported problem-solving skills over time. Adachi and Willoughby (2013) found students who played strategy games predicted higher levels of problem-solving skills. The researchers also noted that higher problem-solving skills were associated with higher levels of academic achievement in students (Adachi & Willoughby, 2013). Another study by Przybylski and Mishkin (2016) examined the difference in effects of overall game time on adolescents' behavior, as well as comparing students who play cooperative games versus single-player games. Students in the sample who played for less than an hour a day had lower levels of conduct issues and hyperactivity, but students who played for more than three hours a day had higher levels of behavioral issues. Additionally, students who primarily played single-player games had lower levels of behavioral problems and higher levels of academic achievement; students who played cooperative or competitive games were more emotionally stable and reported better relationships with their peers (Przy-

bylski & Mishkin, 2016). Ventura et al.'s online study from 2013 compared the levels of persistence with tasks exhibited by gamers compared to non-gamers. During the study, persistence was measured using anagram or riddle tasks, which were correlated with a self-reported measure of persistence and examined alongside self-reported levels of gaming time. Individuals who reported higher levels of gaming time spent longer time persisting on tasks (Ventura et al., 2013).

Further research has examined the link between psychological well-being and aspects of school performance. For example, the exploration of the concept of belongingness at a university, and how it is affected by students' values, university norms, health, and academic outcomes have been examined (Suhlmann et al., 2018). Findings indicate that a sense of belongingness at a university contributes to overall psychological well-being and reduces dropout intention. Furthermore, a dignity self-construct is a major aspect of the relationship between student belongingness and the norms and values of the university (Suhlmann et al., 2018).

In addition to university retention, psychological well-being also affects the way students are involved in classroom participation (Carton & Goodboy, 2015). Carton and Goodboy's (2015) study examine how psychological issues such as depression, stress, and anxiety affect interaction involvement, and how these results could extrapolate to a classroom setting. The results indicated stress and depression were both negatively related to responsiveness and attentiveness, while anxiety was only related to attentiveness. It was concluded that these results could interfere with student class performance with symptomatology such as rumination, exhaustion, and poor sleep quality (Carton & Goodboy, 2015).

Problematic Technology Usage

Psychological health can be greatly affected by different forms of technology usage. Emerging literature has coined the phenomenon of technostress, which describes the struggles associated with adapting or coping with technologies in a healthy manner (La Torre et al., 2019). While emerging studies primarily focus on technostress because of workplace stress, technostress can be considered in other aspects of life. Specific forms of non-work-related technostress primarily stem from excessive usage of social networking services (SNS) and include issues such as communication or social interaction overload, internet multitasking, and compulsive

usage of smartphones. In a professional environment, technostress can lead to issues with psychological well-being such as worry, self-criticism, and a negative self-view (La Torre et al., 2019). Non-work-related technostress can result in conflicts between family and technology or work and technology. Furthermore, perceived stress stemming from technostress can lead to burnout, depression, or anxiety (La Torre et al., 2019). While current research on technostress is largely focused on work-related contingencies, non-work-related technostress is also important to consider given the major psychological effects of technostress symptoms.

Personality and Developmental Trends

While not explicitly labeled under the technostress definition, many studies have examined the psychological effects of technology dependency and personal factors that may be related to problematic technology usage. A study conducted by Montag et al. (2014) explored how personality factors may affect smartphone usage in college students. The researchers measured phone usage within their sample as well as participants' personality factors based on the big five personality traits (i.e., openness, conscientiousness, extraversion, agreeableness, and neuroticism). The results of the study indicated extraversion was highly associated with higher levels of phone usage (Montag et al., 2014). A similar study conducted by Hsiao (2017) also explored the correlates of technology usage with the big five personality traits. However, this study also included traits such as materialism and external locus of control, and technology usage was specified as compulsive usage of SNS and mobile game applications. Findings indicated that neuroticism, materialism, extraversion, and locus of control increase compulsive usage of SNS apps, while agreeableness, materialism, and locus of control influence the usage of game apps (Hsiao, 2017). Similarly, researchers have also examined phone usage in a young adult sample to understand individual differences in personality traits as it pertains to smartphone usage (Harari et al., 2019). Once again, extraversion was associated with higher levels of social behaviors, and thus more technology usage. Results showed openness to be associated with higher levels of social behaviors (Harari et al., 2019).

Tams et al. (2018) explored issues of locus of control in the context of technology dependency. In particular, the study describes the issue of Nomophobia, or the fear of not being able to access one's smartphone,

and correlations with technostress. In a work setting, technostress can lead to phone dependency, which in turn may result in Nomophobia and additional stress. However, when situational certainty is established, the effects of Nomophobia may decrease (Tams et al., 2018).

The effects of technology usage on adolescent psychological well-being has garnered much attention in recent years. For example, Twenge et al. (2018) measured self-reported levels of technology usage in multiple domains such as television viewing habits and new media screen activities and compared these usage levels to measures such as psychological well-being and levels of in-person interaction. Results indicated psychological well-being decreased as adolescent technology usage increased during the four-year period. Additionally, non-technology-based activities, such as using print media or sports and exercise that were associated with higher levels of psychological well-being declined over time (Twenge et al., 2018).

Several studies have noted the issues of problematic technology use in college students. De Leo and Wulfert (2013) explored the tenants of problematic Internet use (PIU) and how PIU relates to other externalizing negative behaviors such as illicit drug use or risky sex in a college student sample. The researchers found that PIU was not highly correlated with other forms of externalizing behaviors, and furthermore did not increase antisocial behaviors or affect academic performance. However, PIU behaviors were suggested to be risky for students who are experiencing socially anxious or withdrawn behaviors and may lead to interferences in daily functioning (De Leo & Wulfert, 2013). Beranuy et al. (2009) explored correlates between problematic Internet and phone use with perceived emotional intelligence and psychological distress. Findings indicated students who display higher levels of psychological distress also engage in higher levels of problematic technology use. Additionally, higher levels of attention to emotion, a component of emotional intelligence, were also associated with higher levels of maladaptive technology usage (Beranuy et al., 2009).

Specific fields of study may put students at risk for experiencing more symptoms of technostress. For instance, students in more technology-heavy fields of study, such as journalism and broadcasting, report higher levels of maladaptive technology usage, and female students show more consequences of maladaptive technology use than male students

(Beranuy et al., 2009). Bjornsen and Archer (2015) further explored the relationship between academic performance and problematic technology usage. Their study examined the in-class phone usage of a sample of college students and how the usage correlated with students' test scores. Results indicated phone usage was significantly negatively correlated with test scores and using a phone during class for social networking purposes was the activity most associated with lower test scores (Bjornsen & Archer, 2015). Similarly, Leep et al. (2014) examined the relationship between college students' cell phone usage and their quality of life, and how GPA and anxiety mediate the relationship. The study found students with higher levels of cell phone usage had lower GPAs, higher levels of anxiety, and overall lower levels of perceived quality of life. The researchers noted at the end of their study that recognizing the relationship between quality of life and cell phone usage is important for high-usage students to reflect on their habits (Lepp et al., 2014). In general, college students with poor mental health are more likely to engage in maladaptive technology-use behaviors, which may also affect their academic performance.

The Current Study

The purpose of this study is to examine the relationship between gaming, psychological well-being, and GPA in a college student sample. Previous research indicates that video games have the potential to improve psychological well-being, but a poor relationship with technology may have negative psychological and academic consequences. The researcher is interested in seeing if students who play video games casually (CVGs) report higher levels of psychological well-being compared to non-gamers (NGs) and gamers meeting the criteria for internet gaming disorder (AGs). Additionally, the researcher seeks to compare academic performance via GPAs between the three groups. Lastly, the researcher wishes to see if AGs also have more issues with technology boundary management compared to casual gamers and non-gamers. This research adds to the existing literature about the relationship between psychological health, academic performance, and video game use as well as video games as a factor contributing to technostress.

Hypotheses

1. Is there a relationship between gaming and subjective well-being in college students? H1:

CVGs will report higher personal well-being compared with AGs and NGs. H2: NGs will report higher subjective well-being than AGs.
2. Is there a relationship between GPA and game usage among college students? H1: NGs will have a higher GPA compared with AGs and CVGs. H2: CVGs will have a higher GPA compared with AGs.
3. Is there a relationship between technology boundary management and gaming? H1: NGs will have lower levels of boundary management problems compared with AGs and CVGs. H2: CVGs will have lower levels of boundary management problems compared with AGs.

Methods

Data was collected from a sample of undergraduate students attending Texas Woman's University. The survey was published online using the PsychData Survey program after obtaining approval by the Institutional Review Board. The survey was used to collect self-reported data from students. The survey protocol included psychometric instruments as well as demographic measures. Participants electronically provided informed consent before participating in the survey and received SONA credits as an incentive to participate. The inclusion criteria required participants to be 18 years or older and currently enrolled in classes for the semester. Participants who did not meet the minimal age range were excluded. The data were examined using IBM's Statistical Package for Social Sciences (SPSS). Demographics of interest included age, gender, ethnicity, current number of credit hours, current GPA, types of video games played, specific genres of games played, whether the student plays games online or not, and number of hours played in a week. Groups were defined as NGs, AGs, and CVGs. NGs (non-gamers) are students who did not report playing video games at all. AGs (addicted gamers) are students who reported playing video games and met the minimum criteria for Internet Gaming Disorder based on their responses. Lastly, CVGs (casual gamers) are students who reported playing video games but did not meet the criteria for Internet Gaming Disorder.

The sample consisted mostly of Hispanic and Latino students (33.5%) followed by White (25.7%), Black and African American (20.4%), and other

ethnicities (20.4%). The mean age of students in the sample was 19.4 years (*SD* = 1.7). The gender ratio of the sample was 93.2% female, 6.5% male, and 0.3% non-binary or other. On average, students reported taking 13.8 credit hours (*SD* = 2.3) and had 3.3 GPAs (*SD* = 0.7). Students played 2.4 hours of video games a week on average (*SD* = 1.0).

Measures

The degree of gaming addiction in the sample was measured with the Internet Gaming Disorder Scale (IGD Scale). The IGD Scale (Lemmens et al., 2015) is a 27-item measure with a yes/no dichotomous scale. The IGD Scale is used to measure behaviors consistent with internet gaming disorder, such as overt preoccupation or persistence with gaming. The dichotomous version of the scale is internally consistent and possesses good criterion-related validity, with a Cronbach's alpha of .93 (Lemmens et al., 2015). More yes answers indicate more symptoms of IGD. An example of an item on the IGD Scale is "During the last year, have you been feeling tense or restless when you were unable to play games?" The *DSM-5* notes that, while the IGD diagnosis usually involves behaviors related to specific Internet games, it can involve non-Internet games (APA, 2013). Additionally, the *DSM-5* recognizes nine criteria for IGD: preoccupation, tolerance, withdrawal, persistence, escape, problems, deception, displacement, and conflict, as defined in Table 1 below. The *DSM-5* recommends a minimal threshold of experiencing five or more criteria for diagnostic purposes. As a result, addicted gamers, or AGs, are defined as gamers who meet this minimal threshold.

Perceived well-being will be measured with the Psychological Wellbeing Scale (PWB Scale; Ryff & Keyes, 1995). The shortened version of the PWB Scale was utilized and consists of 18 items on a seven-point Likert-type scale with anchors ranging from one (strongly agree) to seven(strongly disagree). This version of the PWB Scale has lower internal consistency but higher factorial validity; the scale has a Cronbach's Reliability over .88 (Lee et al., 2019). The PWB Scale is used to gauge psychological well-being in adults across multiple subscales including relationships with others and personal growth. We used all scales of the measure to determine how students perceive their psychological well-being. Higher scores indicate lower levels of perceived psychological well-being. An example of an item is "When I look at the story of my life, I am pleased with how things have turned out so far."

The Boundary Management Subscale (Asbury et al., 2018) is a nine-item measure with a three-point Likert-type scale with anchors ranging from one (never) to three (always). The Boundary Management Subscale has convergent reliability and internal consistency with a Cronbach's Alpha over .70 (Asbury et al., 2018). The Boundary Management Scale is used to measure boundary management behaviors related to technology use. Higher scores indicate more issues with boundary management. An example of an item is "When I go online, I lose track of time."

Results

Data Cleaning

Before conducting our analysis, the data was screened for outliers and missing data. Eight students were removed who were under the minimum age range or missing demographic information, 32 for missing significant portions of the PWB or BM surveys, and an additional 129 duplicate responses. A total of 169 responses were removed from the data set, and the final total sample was 382. Data met all assumptions regarding normality.

Overall, app games made up 34.4% of usage, gaming consoles represented 35%, and PC gaming at 30.7%. Most students who participated preferred one gaming platform type (42.6%), with 38.3% using two types, and 18.9% stated they played all three. The reported favored game genre within the sample was casual multi-player (46.4%) followed by causal single-player (30.1%), sports (4.9%), and RPG (4.6%). The full spread of demographics can be seen in Table 2 below.

Data Analysis

An ANOVA was conducted to test each of the hypotheses. The three gaming groups served as the independent variables, while psychological well-being, GPA, and boundary management served as the dependent variables. This analysis was used to examine potential differences between gaming usage and the dependent variables of psychological well-being, GPA, and boundary management respectively. After running the ANOVAs, group means were compared by running post-hoc tests. A Tukey HSD test was utilized as a conservative post hoc test for identifying significant main effects and interactions. Eta squared was also used to calculate the effect sizes between our means and measure the relationship between our variables.

A one-way between-subjects ANOVA was conducted to compare subjective well-being between non-gamers, addicted gamers, and casual gamers. There was a significant main effect of gaming time on personal well-being [$F(2, 370) = 3.69, p = 0.03$)]. Post-hoc comparisons using the Tukey HSD test indicated that the mean well-being score for AGs ($M = 92.45, SD = 13.57, n = 202$) was significantly different than the scores for CVGs ($M = 96.14, SD = 13.32, n = 141$). However, NGs' scores did not significantly differ from either AGs or CVGs ($M = 91.13, SD = 14.34, n = 30$). Taken together, these results indicate that gamers who met the criteria for addiction were more likely to report overall lower levels of subjective well-being compared to casual gamers. Non-gamers do not appear to report significantly better well-being than addicted gamers or casual gamers.

A second one-way ANOVA was conducted to compare GPA between NGs ($M = 3.31, SD = 0.55, n = 28$), AGs ($M = 3.25, SD = 0.68, n = 203$), and CVGs ($M = 3.38, SD = 0.62, n = 138$). There was no significant main effect of gaming on GPA [$F(2, 366) = 1.54, p = 0.22$]. As a result, gaming habits were not found to affect a student's GPA.

The final one-way ANOVA was conducted to compare boundary management levels between gamer types. There was a significant main effect of gaming on boundary management [$F(2, 379) = 8.97, p = 0.00$]. Post-hoc comparisons using the Tukey HSD test indicated that the mean boundary management score for AGs ($M = 1.99, SD = 0.32, n = 208$), was significantly different than boundary management scores for CVGs ($M = 1.84, SD = 0.31, n = 142$). NGs' scores ($M = 1.95, SD = 0.33, n = 32$) did not significantly differ from either AGs or CVGs. These results indicate that gamers who met the criteria for addiction are more likely to self-report more problems with technology boundary management than casual gamers. The results of my ANOVAs can be seen below in Table 3.

Discussion

The current study examined the relationship between gaming, psychological well-being, GPA, and technology boundary management. The researcher hypothesized addicted gamers would report lower levels of well-being, lower GPAs, and more struggles with technology boundary management compared to non-gamers and casual gamers. The researcher also hypothesized non- gamers would report higher levels of well-being, higher GPAs, and fewer struggles with boundary management compared to casual gamers and addicted gamers.

The analyses supported two of the three hypotheses. Definite conclusions could not be drawn about the NGs in the sample because of the few responses from NGs. However, the results suggest differences in psychological well-being and boundary management between the AGs and CVGs. The researcher expected GPA to also be significantly different between AGs and CVGs, but gaming did not appear to be a factor related to grades in college. The non-significant findings between GPA and gaming tendencies may be due to the sample. Texas Woman's University has a primarily female student population, and previous research on gender and GPA performance notes that women in general tend to have higher GPAs than men (Keiser et al., 2016). In turn, perhaps there is a ceiling effect in the sample where women's higher GPA may be due to increased abilities to self-discipline for academia (Duckworth & Seligman, 2006). The predominantly female sample may be useful to emerging research, as current studies on IGD seem to focus on male samples, and being male is often concluded to be a significant predictor of the disorder (Carlisle et al., 2019; Männikkö et al., 2019). A 2020 study compared a sample of male and female gamers and problematic technology usage towards video games or social media usage. The study found that female gamers tended to engage in problematic social media usage, while males were more likely to have problematic gaming tendencies (Cudo et al., 2020). An attempt at re-running the ANOVAs sans male participants ($n = 26$) resulted in no significant changes in outcomes. As IGD is still an emerging disorder, with little research focused on female-exclusive samples thus far, the researcher would caution against the generalization of the findings related to academic performance and IGD. However, future research on IGD in female samples may want to continue focusing on the overlap between IGD and problematic technology usage, particularly with social media.

Current findings do support the literature suggesting IGD is often comorbid with other psychological issues and problematic technology use

is associated with worse psychological outcomes. A longitudinal study on adolescents' pathological game usage noted that students with initially moderate symptoms were at a higher risk of developing increasing symptoms over time, including specific issues such as anxiety, depression, and problematic phone usage (Coyne et al., 2020). Another study noted additional correlations between addicted technology usage and psychological disorders, with men being more vulnerable to video game addiction and women to problematic social media usage (Andreassen et al., 2016). Recognizing the overlap between IGD and technology boundary management is also an important step in research, as recognizing symptoms and related effects for both areas is still limited (Zajac et al., 2017).

The preference towards game consoles within the sample is curious, as current research on gaming addiction is primarily centered around online gaming. Online games are in constant development, which encourages players to play often and play for long periods of time. Furthermore, online games offer prolonged opportunities to interact with other people online. Both factors may contribute to addictive gaming tendencies (Yildiz, 2019). Additionally, greater concerns are being levied about mobile game addiction. One study theorizes that mobile gaming addiction may be the result of phubbing, a phenomenon that results from individuals using phones at the behest of in-person social interaction (Yam & İlhan, 2020). This study also notes phubbing refers to the overlapping effects of mobile gaming, social media, internet, and phone addiction, which ties back to some of the previously discussed issues with technostress. Considering the preferred console of choice may be a point of interest in future IGD research.

Also, of interest within the sample is the high number of respondents who identified as Hispanic or Latino. Texas Woman's University has a high population of Latino and Hispanic students, estimated to be around 28.3% of the total student population ([TWU], 2020). Again, while current IGD research is limited, the few ethnocentric studies have primarily focused on Asian countries such as China or Korea due to extreme cases of game addiction leading to the death of an individual (Chen et al., 2018). According to the National Alliance on Mental Illness (NAMI), Hispanics and Latinos seek out mental health services less than the rest of the adult population. Delays in seeking treatment often lead to worse psychological health outcomes. Additionally, common psychological issues within these communities include generalized anxiety disorder, depression, post-traumatic stress disorder, and substance abuse (NAMI, 2020). Understanding the inherent mental illness risks within the Hispanic and Latino communities may be useful for clinicians in treating IGD within the population.

Another area of focus to consider is the reason why students may be motivated to play video games. Broader research points to a variety of factors that contribute to player enjoyment such as the pleasure and satisfaction from executing a behavior, entertainment, and the ability to socialize with others (Hsu & Lu, 2004). Video games can also empower individuals, particularly if an individual lives in an uncertain environment (King & Delfabbro, 2009). Additionally, personality and motivational factors can account for individual engagement in gaming (King & Delfabbro, 2009). Lastly, gaming may be used as a coping strategy for stress or other forms of psychological issues, though inherent disorders may put an individual at risk for gaming addiction (Chang et al., 2019; Kircaburun et al., 2019). Gaming motivation often differs between individuals but may account for the likelihood of addiction.

Limitations

This study is subject to several limitations. Data collected for the study was self-reported and subjected to response bias. Additionally, the study was quasi-experimental and causality cannot be inferred. Social desirability bias may have affected participant responses to the survey. This study also has limited generalizability because the sample primarily consists of Hispanic and Latino female college students. Due to the nature of the study, few NGs participated, which made it difficult to draw conclusions about NGs compared to AGs and CVGs.

Future Research

Future research should address the design limitations by expanding to college populations from other geographic regions to see how the model generalizes to other college students outside of the southern United States area. Additionally, further research should include more comparison data taken from nongamers, as well as more male and non-binary gamers and gamers of other ethnicities. A longitudinal study should be considered to understand the long-term effects of gaming on GPA and well-being to better permit

causal inferences to be made. It may also be of interest to expand the research population beyond college students and examine working adults' usage of video games, and how usage relates to technology boundary management and affects perceived wellbeing.

Conclusion

The study underscores the effects of IGD in the lives of students and provides insight into how IGD correlates with perceived psychological well-being and technology boundary management. Both psychological well-being and boundary management significantly correlate with gaming. Although the study does not fully address IGD psychological issues, the study offers valuable insight into understanding IGD and its related effects on mental health. Despite limitations, the study shows that issues with technology boundary management and lowered subjective well-being are associated with addicted gaming. Both factors should be evaluated during the treatment of IGD. Clinicians should consider the overlap between technology boundary management and addicted gaming tendencies, as well as incorporate interventions to improve well-being.

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Table 1

Nine Criteria for Internet Gaming Disorder From the DSM-5

Criterion	Description
Preoccupation	Preoccupation relates to being all-absorbed by gaming and spending substantial amounts of time thinking or fantasizing about gaming during times of non-play.
Tolerance	Tolerance is characterized by an increasing amount of time spent on games to feel their desired effects (e.g., excitement, satisfaction).
Withdrawal	Withdrawal refers to symptoms that emerge when unable to play or attempting to cut down or stop gaming. Symptoms typically involve feeling restless, irritated, angry, frustrated, anxious, or sad.
Persistence	Persistence entails an enduring desire for gaming or unsuccessful attempts to stop, control, or reduce gaming.
Escape	Escape relates to engaging in a behavior to escape from or relieve negative mood states, such as helplessness, guilt, anxiety, or depression.
Problems	This criterion refers to continued gaming despite being aware of the negative consequences of this behavior for central areas of life.
Deception	Deception refers to individuals lying to others about, or covering up the extent of, their gaming behaviors.
Displacement	The gaming behavior dominates, with a resulting diminishment of other social and recreational activities.
Conflict	This reflects more substantial issues as a result of gaming, referring to losing or nearly losing, an important relationship or opportunity related to schooling or employment.

Note. DSM-5 = Diagnostic and Statistical Manual of Mental Disorders (5th ed.; American Psychiatric Association, 2013). Adapted from "The Internet Gaming Disorder Scale by Lemmens, J. S., Valkenburg, P. M., & Gentile, D. A., 2015, Psychological Assessment, 27, p. 567.

Table 2

Demographics of Sample

N = 382	*Frequency (%)*
<u>Gender</u>	
Male	26 (6.5%)
Female	356 (93.2%)
Non-binary or Other	1 (0.3%)
<u>Ethnicity</u>	
White	98 (25.7%)
Hispanic or Latino	128 (33.5%)
Black or African American	78 (20.4%)
Other ethnicities	78 (20.4%)
<u>Platform Usage</u>	
App Games	120 (34.4%)
Console Games	122 (35.0%)
PC Games	107 (30.7%)
<u>Game Genres</u>	
MMO	1 (0.3%)
Simulation	3 (0.9%)
Adventure	2 (0.6%)
Puzzle	10 (2.9%)
Action	5 (1.4%)
Combat	4 (1.1%)
FPS	12 (3.4%)
Sports	17 (4.9%)
RPG	16 (4.6%)
Education	12 (3.4%)
Casual Single Player Casual	105 (30.1%)
Multiplayer	162 (46.4%)

Table 3

One-Way ANOVA Results for DVs by Gaming Group (N = 382)

Dependent Variable	$h2$	df	MS	F
Psychological Well Being	0.02	2.00	676.57	3.69
GPA	0.01	2.00	0.65	1.54
Boundary Management	0.05	2.00	0.88	8.97

Appendix A

Twenty-Seven Items for the Internet Gaming Disorder Scale Preoccupation
During the last year...
. . . have there been periods when you were constantly thinking about a game while at school or work?
. . . have there been periods when all you could think of was the moment that you could play a game?
. . . have there been periods when you were constantly fretting about a game?
Tolerance
During the last year...
. . . have you felt the need to continue playing for longer periods of time?
. . . have you felt the need to play more often?
. . . have you felt unsatisfied because you wanted to play more?
Withdrawal
During the last year...
. . . have you been feeling tense or restless when you were unable to play games?
. . . have you been feeling angry or frustrated when you were unable to play games?
. . . have you been feeling miserable when you were unable to play a game?
Persistence
During the last year...
. . . did you want to play less, but couldn't?
. . . did you try to play less, but couldn't?
. . . were you unable to reduce your time playing games, after others had repeatedly told you to play less?
Escape
During the last year...
. . . have you played games to forget about your problems?
. . . have you played games so that you would not have to think about annoying things?
. . . have you played games to escape negative feelings?

Problems
During the last year...
. . . have you skipped work or school so that you could play games?
. . . have you played throughout the night, or almost the whole night?
. . . have you had arguments with others about the consequences of your gaming behavior?
Deception
During the last year...
. . . have you lied to your parents or partner about the time you spent playing games?
. . . have you hidden the time you spend on games from others?
. . . have you played games secretively?
Displacement
During the last year...
. . . have you been spending less time with friends, partner or family to play games?
. . . have you lost interest in hobbies or other activities because gaming is all you wanted to do?
. . . have you neglected other activities (e.g., hanging out with friends, hobbies or sports) so that you could play games?
Conflict
During the last year...
. . . have you experienced serious problems at work or school because of gaming?
. . . have you experienced serious conflicts with family, friends or partner because of gaming?
. . . have you lost or jeopardized an important friendship or relationship because of gaming?

Appendix B

Psychological Wellbeing Scale
1. "I like most parts of my personality."
2. "When I look at the story of my life, I am pleased with how things have turned out so far."
3. "Some people wander aimlessly through life, but I am not one of them."
4. "The demands of everyday life often get me down."
5. "In many ways I feel disappointed about my achievements in life."
6. "Maintaining close relationships has been difficult and frustrating for me."
7. "I live life one day at a time and don't really think about the future."
8. "In general, I feel I am in charge of the situation in which I live."
9. "I am good at managing the responsibilities of daily life."
10. "I sometimes feel as if I've done all there is to do in life."
11. "For me, life has been a continuous process of learning, changing, and growth."
12. "I think it is important to have new experiences that challenge how I think about myself and the world."
13. "People would describe me as a giving person, willing to share my time with others."
14. "I gave up trying to make big improvements or changes in my life a long time ago"
15. "I tend to be influenced by people with strong opinions"
16. "I have not experienced many warm and trusting relationships with others."
17. "I have confidence in my own opinions, even if they are different from the way most other people think."
18. "I judge myself by what I think is important, not by the values of what others think is important."

Appendix C

Boundary Management Subscale
- I am on my cell phone while watching TV I am on my cell phone while driving
- Others get mad at me because I am on my cell phone frequently
- I leave my cell phone on and place it close to my bed when I go to sleep I am on my cell phone during dinner, even when dining with others When I go online, I lose track of time
- The time I spend online interferes with my personal relationships
- I neglect things that need to get done due to the time I spend online I get extremely anxious when I cannot use my cell phone