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Gaming Behaviors in Day-to-Day Life: Exploring a Problematic Gaming Behavior Scale

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A thesis

presented to

the faculty of the Department of Psychology  
East Tennessee State University

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In partial fulfillment

of the requirements for the degree

Doctor of Philosophy in Psychology

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by

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December 2018

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Keywords: Internet Gaming Disorder, Problematic Gaming Behaviors, Behavioral Addiction,

Scale Development

## ABSTRACT

Gaming Behaviors in Day-to-Day Life: Exploring a Problematic Gaming Behavior Scale

by

Christin N. Collie

Growing concern for the problematic use of video games has prompted new research in a now growing field of literature. Internet Gaming Disorder (IGD) is a proposed behavioral addiction in the *Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5)*. To examine the proposed criteria for IGD, a self-report problematic gaming behavior scale (PGBS) was developed for adults residing in the United States. One hundred eighty-nine participants completed an online questionnaire comprised of demographic items, general gaming information, the PGBS, and the Internet Gaming Disorder-20 Test (IGD-20 Test). Statistical analyses conducted at the conclusion of the study were consistent with previous research on the PGBS. Cronbach's alpha was .908 for the 19-item PGBS, one item was removed to improve reliability. Exploratory factor analysis strongly indicated a 1-factor structure to the PGBS. Logistic regression models were fit to analyze the predictive value of the PGBS total score. The PGBS total score did not predict positive endorsement of any of the four outcome items.

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## CHAPTER 1

### INTRODUCTION

Technological advances have provided many conveniences in day-to-day life. Today, many people have access to personal technologies, such as cellphones and computers. According to the Pew Research Center, 92% of U.S. adults own a cell phone and 73% own a desktop or laptop computer (Anderson, 2015). As technology has become more salient in society, more research has been conducted on the impact of its use. One area that has drawn particular interest in recent clinical mental health research is the potential impact of videogames, culminating most prominently in 2013 with the introduction of Internet Gaming Disorder in the *Diagnostic and Statistical Manual of Mental Disorders, fifth edition (DSM-5; American Psychiatric Association (APA), 2013)* as a condition of interest for future research. In January 2018, the World Health Organization announced that Gaming Disorder would be included in the Eleventh Revision of the International Classification of Diseases (ICD-11; WHO, 2018a).

#### **Internet Gaming Disorder**

Internet Gaming Disorder (IGD) is a proposed behavioral addiction in the *DSM-5*. IGD as a mental disorder is still being conceptualized, so it has been termed “Internet use disorder,” “Internet addiction,” “Internet addiction disorder,” “Gaming Disorder,” and “gaming addiction” in the literature (APA, 2013; Han et al., 2015). Appendix A of this document outlines the proposed criteria for IGD in the *DSM-5*, five of which are necessary over a one-year period to result in diagnosis. Areas of impairment that are included within the criteria are pervasive thoughts and activities related to Internet gaming, withdrawal, tolerance, impaired control, loss of interests, and interpersonal and/or occupational difficulties.

**Behavioral addiction.** Kardefelt-Winther and colleagues (2017) proposed an operational definition of behavioral addiction as “a repeated behaviour leading to significant harm or

distress. The behaviour is not reduced by the person and persists over a significant period of time. The harm or distress is of a functionally impairing nature” (p. 1710). Behavioral addictions are controversial because it is hard to know where to draw a line regarding abnormality (Dowling, 2014). Fawcett (2014) posits that the door was opened to the inclusion of behavioral addictions in the *DSM-5* when Gambling Disorder was moved from the Impulse Control Disorders section into the Substance Related and Addictive Disorders section in the most recent edition. Behavioral addictions are not only difficult to define but also lack strong empirical evidence (Yau & Potenza, 2014a).

In preparation for the publication of *DSM-5*, a Substance Use Disorder (SUD) work group was delegated to investigate behavioral addictions (i.e., gambling, Internet gambling, Internet use, Internet gaming, shopping, exercise, work). Lack of consensus regarding the inclusion of behavioral addictions in the *DSM* stems most notably from the possibility of opening the door to an array of problems that may be included in future editions that do not necessarily cause significant impairment or are not well established, such as chocolate addiction (Petry & O’Brien, 2013). There is concern for the over-pathologization of common behaviors both in general and specifically related to gaming (Aarseth et al., 2016; Bax, 2016; Bean et al., 2017). Bax (2016) even concludes that disorders such as IGD do not have a place in the *DSM* because “pathologizing” deviant behavior does not constitute a mental disorder. Overall, several researchers share concern that the inclusion of behavioral addictions may reduce the credibility of psychological disorders and research more broadly.

**Criticisms of the proposed diagnosis.** Semantically, it is unclear from the *DSM-5* denotation of *Internet Gaming Disorder* whether it refers to online games independently or is comprehensive in nature considering all gaming modalities both on and offline (Petry &

O'Brien, 2013). Some studies have maintained that participants endorse excessive online game-play (e.g., see Han et al., 2015; Lin, Dong, Wang, & Du, 2015; Lin, Zhou, Dong, & Du, 2015) while others defined IGD more broadly to include all types of gaming (e.g., see Beard & Wickham, 2016; Pontes, Király, Demetrovics, & Griffiths, 2014; Steadman, Garcia, & Collie, n.d.). In the ICD-11, Gaming Disorder contains 3 subtypes: predominantly online, predominantly offline, and unspecified (WHO, 2018b).

Many of the proposed symptoms for IGD are similar to those included in the Substance-related and Addictive Disorders section of the *DSM-5*; however several conflicts exist in the literature (Han et al., 2015). Aspects that may translate from addiction to IGD include: withdrawal, building tolerance, and impaired control (Dong & Potenza, 2014; Rehbein, Kliem, Baier, Mößle, & Petry, 2015b). The validity of the withdrawal criterion is questionable due to the inherent difference in the type of withdrawal symptoms that may be present in IGD compared to traditional substance use disorders (Kaptsis, King, Delfabbro, & Gradisar, 2016). Specifically, there are no physical or pharmacological withdrawal symptoms in the presentation of proposed IGD (APA, 2013). Ko and Yen (2014) discuss the possibility that tolerance would reflect an individual's experience with excessive gaming without the feeling of satisfaction; therefore, an increased amount of time spent gaming would be required to reach the same level of satisfaction previously achieved. Kardefelt-Winther (2014) argues against the inclusion of a tolerance criterion because it does not make logical sense in the context of a behavioral addiction, as he claims that it is only included to better align IGD with other substance use disorders already present in the *DSM-5*. However, others have found that participants have endorsed experiences of tolerance over time (Ko & Yen, 2014; Steadman et al., n.d.). As an example of an impaired-control symptom, individuals who may be diagnosed with IGD may

choose gaming over other activities, leading to an abandonment of hobbies and perhaps infringing on work and/or school responsibilities (Rehbein, Kliem, Baier, Mößle, & Petry, 2015a).

Beard and Wickham (2016) found evidence that individuals may seek out Internet games to affirm their self-worth, which some may consider to be consistent with criterion eight (i.e., use of Internet games to escape or relieve negative mood). This connection is further supported by additional data, as authors also noted that a person's perception of their self-worth in the gaming environment was associated with an increased level of endorsed IGD symptoms, as measured by the Internet Gaming Disorder 20-Test (IGD-20; Pontes et al., 2014) in Beard and Wickham's work. Still, despite these findings, others (Garcia & Steadman, n.d.; Steadman, Boska, Lee, Lim, & Nichols, 2014) have argued that balanced gaming-related self-affirmations of worth may actually be a feature of healthy, therapeutic levels of gaming, contributing to the ability of videogames to influence positive mental health outcomes.

Some researchers have drawn parallels between SUD risk factors and characterizations of IGD. In an fMRI study conducted in an inpatient unit for IGD and SUD in South Korea, Han and colleagues (2015) found that individuals with tendencies toward gaming problems showed deficits in the areas of executive functioning, which they hypothesized could affect impulse control and the ability to adapt to situations. In a study investigating brain density utilizing MRIs, it was concluded that individuals with IGD symptoms (determined by scores  $\geq 50$  on Young's Internet Addiction Test; 1999) had lower brain density in both white and gray matter (Lin et al., 2015a). The researchers noted in their discussion that these biological correlations could impact emotion regulation and decision-making behaviors.

More specifically, one type of decision-making behavior is the assessment of risks

associated with participating in any activity. In another study conducted by Lin and colleagues (2015b), where individuals completed a probability-discounting task, it was found that individuals with IGD symptoms (determined again by scores  $\geq 50$  on Young's Internet Addiction Test; 1999) have deficits in the area of risk assessment. This could speak to why an individual may continue to play games despite the consequences that could result. Another study suggested that individuals who may have IGD (determined by scores  $\geq 67$  on Chen Internet Addiction Scale; CIAS, Ko et al., 2009) tend to make decisions quickly without fully processing negative consequences that could arise from their actions.

Throughout the above discussion, several limitations should be noted for each of the studies described. First, the study populations were 100% male clinical samples in Asian countries. Also, the utilized scales are based upon outdated definitions of Internet addiction and have not been fully validated for use with IGD. Lastly, causal relationships are unclear. A likely scenario is that deficits in executive functioning, emotional instability, and impulsive choices are each factors that contribute to a wide array of problematic behaviors, of which gaming-related problems are only one potential subtype.

**Gaps in the literature.** Prevalence rates are hard to determine due to the lack of consensus regarding diagnostic criteria, utilized samples, and current assessment tools (Yau & Potenza, 2014b). There is an emerging trend of higher prevalence rates recorded in Asian countries, with one study finding a point prevalence of 8.4% for males and 4.5% for females (APA, 2013). A study exploring prevalence of IGD in a German sample of ninth graders found a rate of 1.16% (Rehbein et al., 2015a). The higher prevalence found in Asian studies could be due to lack of research conducted in the United States and Europe, but it could originate from the cultural differences in gaming behaviors. Further exploration of cultural differences seen in

Asian, European, and American populations could help researchers gain a better understanding about possible risk factors for problematic gaming.

At this time, structured diagnostic interviews are non-existent for assessing IGD symptoms (Kaptsis et al., 2016). King and Delfabbro (2014) note that several scales have been developed on a study-by-study basis; however the IGD-20 Test developed by Pontes and colleagues (2014) is the only validated measure assessing all nine *DSM-5* criteria. Furthermore, all current research has been conducted under the assumption that the existing proposed criteria for IGD are accurate, which may be problematic (Kardefelt-Winther, 2015). Aarseth and colleagues (2016) argue that IGD criteria rely too heavily on substance use and gambling criteria. Validating appropriate assessment measures is an important step to move forward (Griffiths, King, & Demetrovics, 2014). Petry and colleagues (2014) express the need for determining the optimal threshold for diagnosis, meaning both number of symptoms required as well as the frequency of symptoms. Considering the emphasis on development in *DSM-5*, it may be necessary to think about IGD across the lifespan, which may include variations in the presentation of symptoms at different stages in an individual's life (Ko & Yen, 2014).

Like other areas that have been discussed, there is also a lack of literature focusing on treatment of IGD (Dong & Potenza, 2014). Cognitive behavioral therapy (CBT), cognitive enhancement therapy (CET), cognitive bias modification (CBM), and mindfulness-based stress reduction have been considered in the treatment of IGD. In an international systematic review, it was found that CBT appears to have the strongest evidence-base for IGD, however, controversies surrounding the definition and measurement of symptoms cloud implications for treatment (King et al., 2017). Dong and Potenza (2014) discuss specific strategies that target the thoughts related to reducing excessive desire to play games and focus on long-term goals that

increase the importance of risk assessment and proper decision-making surrounding gaming.

Overall, more research in several domains including diagnostic criteria, prevalence, assessment tools, and intervention strategies is necessary. Gaps in these areas contribute to the presence of conflicting ideas in the field regarding any type of defined gaming disorder.

### **Problematic Gaming Behaviors**

The current study sought to investigate everyday behaviors related to gaming on a variety of platforms including cellphones, computers, game consoles, and others. Though little is known regarding the true course and etiology of IGD, the inclusion of the proposed disorder in the *DSM-5* further supports the need for additional research (Petry & O'Brien, 2013). There is a call to investigate IGD both more broadly and specifically.

“Studies are needed to identify defining features of the condition, obtain cross-cultural data on reliability and validity of specific diagnostic criteria, determine prevalence rates in representative epidemiological samples in countries around the world, evaluate its natural history and examine its associated biological features” (Petry & O'Brien, 2013, p. 1186).

Due to the unknown prevalence of IGD and lack of consensus on how it should be defined, a generalized definition of abnormality is required. There are several ways to conceptualize abnormality such as functional impairment, maladaptiveness, relative suffering, dangerousness, and violations of societal standards (Hooley, Butcher, Nock, & Mineka, 2017). However, since there is little known regarding functional impairment, violations of societal standards, and the like in regard to problematic gaming behavior, a statistical deviance approach is taken in the current work. This is described further below.

Problematic gaming behaviors (PGB) are conceptualized as behaviors that contribute to

impaired day-to-day functioning as a result of playing videogames via any means, both online and offline (Steadman et al., n.d.). The current study expands upon the earlier work of Steadman and colleagues (n.d.) in which item development, exploratory factor analysis, and predictive validity of a PGB scale (PGBS) was determined. Specifically, item analysis of an initial PGBS was performed to identify relative rates of problem behaviors in a US sample, which served to determine which behaviors were most “abnormal” by the definition of statistical deviancy (occurring in <15% of the sample). Those “abnormal” behaviors were then used as outcomes to see which specific, more common, PGBS items predicted a higher likelihood of abnormality. In the current study, the primary focus was further refining that initial PGB scale.

Steadman and colleagues originally developed a 31-item PGBS that gathered information regarding impaired control, social impairment, risky use, and pharmacological criteria-related items (n.d.). The original version of the PGBS contained 5 qualitative and 26 quantitative items. One quantitative item (“Have you ever had treatment of an addiction or a substance use disorder”) was removed due to having zero variance, meaning that no participant in the study had been treated for a substance use disorder. Final analyses were conducted on a 25-item PGBS (see Appendix B), consisting of only quantitative items. Exploratory factor analysis of this version of the PGBS supported a 1-factor structure with a Cronbach’s alpha of .815. Total scores were used to predict identified “outcome” items (e.g., “Do you believe you are addicted to videogames,” “Has anyone ever told you that they feel you have a problem with videogames”). Overall, the total scores were useful at identifying “true negatives” (i.e., those who did not endorse items) with some predictive value in the positive direction, meaning a small percentage of true positives were identified by the scale.

However, it became clear during the initial study on the PGBS, described above, that

some further refinements to the scale would likely improve overall findings. First, dichotomous (yes/no) items were changed to Likert-scale responses, to allow for more variability within the data and potentially differentiate severity of problematic behaviors, separating those that are relatively common from those that are not. Thus, in the current study, all items on the PBGS were transformed into a congruently anchored 5-point Likert scale. Additionally, redundant (based on quantitative item analysis) and “confusing” items (based on initial participant feedback) were removed from the scale and/or re-worked to increase clarity. The current study, then, utilizes this reformed scale, with a goal of performing reliability and factor analysis on the new scale.

## CHAPTER 2

### METHOD

#### **Participants**

Convenience and snowball sampling were utilized to recruit participants. A link to the online survey supported by the REDCap platform was shared via East Tennessee State University's SONA program, social media platforms (e.g., FaceBook), and e-mail Listservs at ETSU. The online advertisement utilized for recruitment is included in Appendix C. Snowball sampling provided the opportunity for greater generalization outside of the ETSU community. ETSU students who participated in the study via SONA received one credit for their participation. All other participants were entered into a drawing to receive one of 46 gift cards valued at \$10 if they chose to provide their email address following the submission of their survey response. E-mails were collected separately from survey responses to maintain anonymity of survey results. Odds of winning were dependent upon the number of participants. Winners were notified via e-mail after the conclusion of the study. This study sought to identify PGB in a "normative" sample, meaning that recruitment was general and broad in nature and did not focus on a particular population, such as "gamers."

#### **Procedure**

An online survey was administered using REDCap, an online data-collection service hosted in this study through ETSU (Harris et al., 2009). Upon completing an electronic informed consent document (Appendix D), participants were prompted to complete the online survey consisting of 66 items. The survey was estimated to take between 15 and 20 minutes to complete. The survey is found in Appendix E and was designed to identify behaviors that could be considered abnormal in the general population related to impaired day-to-day functioning as a

result of gaming.

The survey consisted of 11 demographic items including gender identity, gender expression, ethnicity and racial identity, age, marital/relationship status, number of children, work status, annual income, and state of residence. Six questions inquired about an individual's gaming platform usage and typical amount of time spent gaming. The 25-item PGBS (see Appendix E) explored problematic gaming behaviors based on proposed criteria for Internet-gaming Disorder (APA, 2013; see Appendix A;). There were four dichotomous outcome items included in the full survey. The outcome items consisted of "abnormally endorsed" responses, as determined through the previously described study by Steadman and colleagues (n.d.).

**Problematic Gaming Behavior Scale (PGBS).** As described previously, the PGBS is made up of 20 quantitative items and five qualitative items. A total score was calculated by summing the 20 quantitative items. These items explore the frequency of behaviors that respondents experience. Seventeen items have a 5-point Likert response from zero to four points in value with descriptors ranging from "Never" to "Often." One item ("How many breaks, during an average week, would you estimate you take from work or school-related activities in order to play games") allows respondents to type a numerical digit response. A follow-up item referring to the length of time a participants' breaks are from work or school-related activities on average has an 8-point Likert response ranging from zero to seven points in value. The last quantitative item on the PGBS is a 6-point Likert response ranging from zero to five points and investigates withdrawal symptom reduction. To obtain more detailed information on certain symptoms, five qualitative items gathered specifics regarding participants' physical and psychological reactions as well as asking about other types of addictions they may endorse.

## Statistical Analyses

**Descriptive statistics.** Frequencies and descriptive statistics were calculated for several variables, including gender identity, gender expression, ethnicity and racial identity, age, marital/relationship status, number of children, work status, annual income, and state of residence. Descriptive statistics were also calculated for gaming platform usage, qualitative item endorsement, and outcome item endorsement.

**Scale analysis.** To expand upon exploratory factor analysis (EFA) conducted by Steadman and colleagues (n.d.) in previous research, EFA was conducted to explore the hypothesized unidimensionality of the updated PGBS. Internal consistency was investigated by reporting Cronbach's Alpha.

**Logistic regression.** Logistic regression models were constructed utilizing PGBS total scores to predict outcome variable responses. These analyses allow for the predictive value of the PGBS to be explored by illustrating how well the scale identifies both true negatives (i.e., individuals who *do not* endorse abnormal (rare) PGB) and true positives (i.e., individuals who *do* endorse abnormal (rare) PGB).

## CHAPTER 3

### RESULTS

#### Sample Characteristics

The survey was accessed by 247 individuals during the data collection period from April 12, 2018 through April 27, 2018. One hundred twenty-seven individuals accessed the survey through the undergraduate research pool, and 120 people accessed the survey via the public, online link. Fifty-eight subjects' data were removed due to incomplete survey responses. One hundred eighty-nine participants provided complete responses. Table 1 illustrates descriptive statistics calculated from the sample. The sample predominantly identified as female (64%;  $n = 121$ ), with 33.9% identifying as male ( $n = 64$ ), and 1.1% of the sample identifying as transgender ( $n = 2$ ) and gender queer ( $n = 2$ ), respectively. When asked about gender expression, 63.5% expressed feminine gender ( $n = 120$ ), 34.9% expressed masculine gender ( $n = 66$ ), and 1.6% expressed a neutral or flexible gender ( $n = 3$ ). Participants' ages ranged from 18 to 73 with a mean of 25.08 and standard deviation of 9.09. The sample was 86.2% ( $n = 163$ ) White, 11.1% ( $n = 21$ ) Black or African American, 4.2% ( $n = 8$ ) Asian, 2.2% ( $n = 5$ ) American Indian or Alaska Native, 1.1% ( $n = 2$ ) Native Hawaiian or other Pacific Islander, and 1.1% ( $n = 2$ ) described themselves as belonging to another race that was not listed.

Table 1

#### *Descriptive Statistics for Demographic Information*

<b>Gender Identity</b>	Frequency ( $n$ )	%
Male	64	33.9
Female	121	64.0
Transgender	2	1.1
Gender queer	2	1.1
<b>Gender Expression</b>		
Male	66	34.9
Female	120	63.5
Neutral or flexible	3	1.6

<b>State of Residence</b>		
Alaska	1	0.5
California	3	1.6
Colorado	2	1.1
Florida	2	1.1
Georgia	2	1.1
Illinois	1	0.5
Indiana	1	0.5
Kansas	1	0.5
Maryland	1	0.5
Massachusetts	1	0.5
Michigan	1	0.5
Missouri	1	0.5
New Jersey	7	3.7
North Carolina	28	14.9
Oregon	1	0.5
Pennsylvania	3	1.6
South Carolina	1	0.5
Tennessee	115	61.2
Texas	1	0.5
Virginia	13	6.9
Washington	1	0.5
Wisconsin	1	0.5
<b>Ethnicity</b>		
Hispanic/Latino/Spanish Origin	9	4.8
Non-Hispanic/Latino/Spanish Origin	180	95.2
<b>Race</b>		
American Indian or Alaska Native	5	2.6
Asian	8	4.2
Black or African American	21	11.1
Native Hawaiian/Other Pacific Islander	2	1.1
White	163	86.2
Not Listed	2	1.1
<b>Marital/Relationship Status</b>		
In a committed relationship, and living together	54	28.6
In a committed relationship, and living apart	54	28.6
Single or not in a committed relationship	81	42.9
<b>Job Status</b>		
Full time work	43	22.8
Full time student	61	32.3
Part time work	8	4.2
Part time student	4	2.1
Combination of work and student	55	29.1

Homemaker (unpaid)	4	2.1
Unemployed	11	5.8
Retired	3	1.6
<b>Annual Household Income</b>		
Less than \$10,000	29	15.3
\$10,000-\$19,999	21	11.1
\$20,000-\$29,999	17	9.0
\$30,000-\$39,999	17	9.0
\$40,000-\$49,999	21	11.1
\$50,000-\$59,999	16	8.5
\$60,000-\$69,999	10	5.3
\$70,000-\$79,999	4	2.1
\$80,000-\$89,999	9	4.8
\$90,000-\$99,999	18	9.5
\$100,000-\$149,999	15	7.9
\$150,000 or more	12	6.3

When asked to describe marital or relationship status, an equal number of people described themselves as being in a committed relationship living together and in a committed relationship living apart (28.6%;  $n = 54$  respectively). Eighty-one participants described their relationship status as single or not in a committed relationship (42.9%). The largest group of participants described themselves as full-time students (32.3%;  $n = 61$ ), while an almost equally as large group were both students and working (29.1%;  $n = 55$ ). The next largest group of the sample reported their job status as full-time work (22.8%;  $n = 43$ ). The median income of the sample was between \$30,000 and \$39,999.

### **Descriptive Statistics**

Participants were asked to select the gaming platforms they have used to play games. Table 2 illustrates the all-time and most used per week frequency of each type of platform. The most frequently selected answer was mobile phones, with 88.9% ( $n = 168$ ) of individuals reporting they have used a mobile phone to play games. The second most frequent response was consoles (81.5%;  $n = 154$ ). Tablets, handheld gaming consoles, and online gaming platforms were selected by roughly 50% of participants. Around one-third of participants indicated they

used mobile phones and consoles the most per week to play games, respectively.

Table 2

*Platform Usage*

Platforms Used	(All-time) Frequency ( <i>n</i> )	%	(Most used/week) Frequency ( <i>n</i> )	%
None	5	2.5	23	12.2
Mobile Phone	168	88.9	66	34.9
Tablet	102	54.0	13	6.9
Handheld gaming console	113	59.8	6	3.2
Console	154	81.5	63	33.3
Online	109	57.7	17	9.0
Other	6	3.2	1	0.5

Seventy-one individuals reported playing games one to two days during a typical week (37.6%), while 15.3% reported playing three to four days during their average week ( $n = 29$ ). Another 15.3% reported not playing any games at all during a typical week ( $n = 29$ ). Only 9% of the sample reported playing games every day during an average week ( $n = 17$ ). Almost half of the sample indicated they typically play games one to four hours per week (49.2%;  $n = 93$ ). Eighty-seven participants reported not spending any time gaming online during a typical week (46%), while 34.9% of the sample reported spending one to four hours gaming online during an average week ( $n = 66$ ). Most participants reported they would like to play games one to four hours per week (47.6%;  $n = 90$ ). Twenty-nine people reported they would like to spend zero hours playing games per week (15.3%). Table 3 illustrates the frequencies of how the sample reported their time spent gaming.

Table 3

*Time Spent Gaming*

Days/Week Gaming	Frequency ( <i>n</i> )	%
None	29	15.3
1-2	71	37.6
3-4	29	15.3
Nearly every day 5-6	43	22.8

Every day 7	17	9.0
<b>Hours/Week Gaming</b>		
0	27	14.3
1-4	93	49.2
5-9	37	19.6
10-19	15	7.9
20-29	14	7.4
30-39	2	1.1
40+	1	0.5
<b>Hours/Week Online</b>		
0	87	46.0
1-4	66	34.9
5-9	16	8.5
10-19	10	5.3
20-29	7	3.7
30-39	1	0.5
40+	2	1.1
<b>Hours/Week Would Like to Play</b>		
0	29	15.3
1-4	90	47.6
5-9	26	13.8
10-19	23	12.2
20-29	14	7.4
30-39	3	1.6
40+	4	2.1

Table 4 summarizes the qualitative item endorsement concerning positive and negative psychological and physiological reactions to gaming. Approximately half the sample reported experiencing no negative physical or psychological reaction attributed to playing games. The most frequently endorsed negative physical reactions were headaches (36%) and impaired sleep (28%). The most frequently endorsed negative psychological reactions were irritability (22.8%) and anger (36%). Several positive physical and psychological reactions to gaming were endorsed by participants. The most frequently endorsed positive physical reactions were “heart racing in excitement” (48.7%) and “feeling of physical relaxation,” (48.1%) while satisfaction (67.2%), relaxation (56.1%), excitement (56.1%), happiness (50.3%) and joy (45.5%) were the most frequently endorsed positive psychological reactions.

Table 4

*Qualitative Item Endorsement*

<b>Negative Physical Reaction</b>	Frequency ( <i>n</i> )	%
None	99	52.4
Headaches	68	36.0
Impaired Sleep	53	28.0
Nausea	4	2.1
Weight Loss	2	1.1
Weight Gain	7	3.7
Lack of Appetite/Skipping Meals	27	14.3
Impaired Hygiene	18	9.5
Blurry or Double Vision	23	12.2
Passing Out	1	0.5
Seizure(s)	1	0.5
Other	8	4.2
<b>Positive Physical Reaction</b>		
None	47	24.9
Heart Racing in Excitement	92	48.7
Feeling of Physical Relaxation	91	48.1
Enhanced Sensations	47	24.9
Other	4	2.1
<b>Negative Psychological Reaction</b>		
None	93	49.2
Sadness	27	14.3
Irritability	43	22.8
Anger	68	36.0
Depression	5	2.6
Rage	20	10.6
Jealousy	10	5.3
Envy	10	5.3
Guilt	12	6.3
Shame	7	3.7
Fear	15	7.9
Anxiety	35	18.5
Other	5	2.6
<b>Positive Psychological Reaction</b>		
None	28	14.8
Joy	86	45.5
Satisfaction	127	67.2
Happiness	95	50.3
Relaxation	106	56.1
Release/Catharsis	53	28.0
Warmth	21	11.1
Acceptance	23	12.2

Bravery	26	13.8
Excitement	106	56.1
Other	3	1.6

Table 5 describes outcome item endorsement. Participants were asked about personal perceptions of gaming addiction as well as what others have told them regarding being addicted to games. The most widely endorsed outcome was (“Do you believe that you may be addicted to anything [other than games] (e.g., substance, gambling, caffeine)”), which was endorsed by 34.4% of participants ( $n = 65$ ). Qualitatively, 3.2% ( $n = 6$ ) indicated they may be addicted to a substance such as alcohol or illicit drug, 6.9% ( $n = 13$ ) reported some other type of addiction (e.g., nicotine, sugar, or food), 25.9% ( $n = 49$ ) indicated a caffeine addiction, while no one endorsed a gambling addiction.

Table 5

*Frequencies of Outcome Item Endorsement*

Item	Frequency		%	
	No	Yes	No	Yes
Has anyone ever told you that they feel like you have a problem with gaming?	167	22	88.4	11.6
Do you feel like you have a problem with gaming?	181	8	95.8	4.2
Do you believe that you may be addicted to playing games?	178	11	94.2	5.8
Do you believe that you may be addicted to anything else?	124	65	65.6	34.4

Figure 1 shows the PGBS total score distribution. The mean total score was 18.156 with a standard deviation of 14.453. The observed minimum PGBS total score was zero and the maximum observed total score was 66. Overall, the distribution was positively skewed, with more lower scores than higher scores. Total scores were converted to Z-scores to allow for

easier interpretation. Seventeen participants scored at 1.5 standard deviations or more above the mean on the PGBS (see Figure 1), meaning less than 1% of the sample met the “statistical deviance” definition of abnormality.

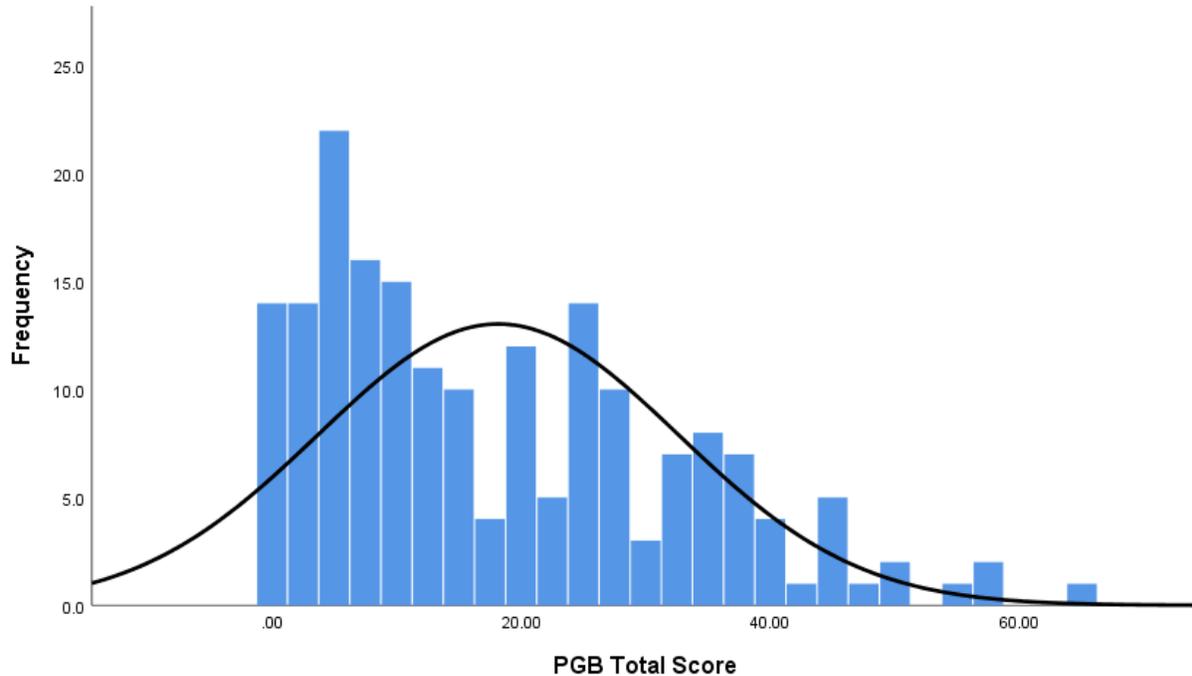


Figure 1. PGBS Total Score Distribution

### Exploratory Factor Analysis

Due to data entry error, one question was not included in the PGBS (“Have you ever had any social or interpersonal problems related to gaming (e.g., gotten into an argument or fight with a friend/family member over gaming; stayed home to play games rather than spend time with friends/family; get made fun of or ridiculed by others because of playing too much)”). Based on the results of the previous study analyzing the PGBS, this was a low frequency item (only 10% stating such problems occur more than “rarely.”) and only very rarely added more than 1-point to the PGB total score. (Steadman et al, n.d.). Therefore, it is unlikely that omission of this item caused practical, meaningful changes to the overall PGB total score in this study and

consequently, overall findings are suspected to be minimally impacted.

EFA was completed by entering the 19 remaining items into a principal components analysis in SPSS. As indicated by figure 2, the scree plot indicates a strong 1-factor structure of the PGBS. Given the purpose of this study was to conduct EFA, four factors were extracted to complete principal axis factoring. Factor loadings from a principal axis factoring procedure are reported in table 6. The PGBS items were strongly correlated to factor 1, supporting the hypothesis of this project.

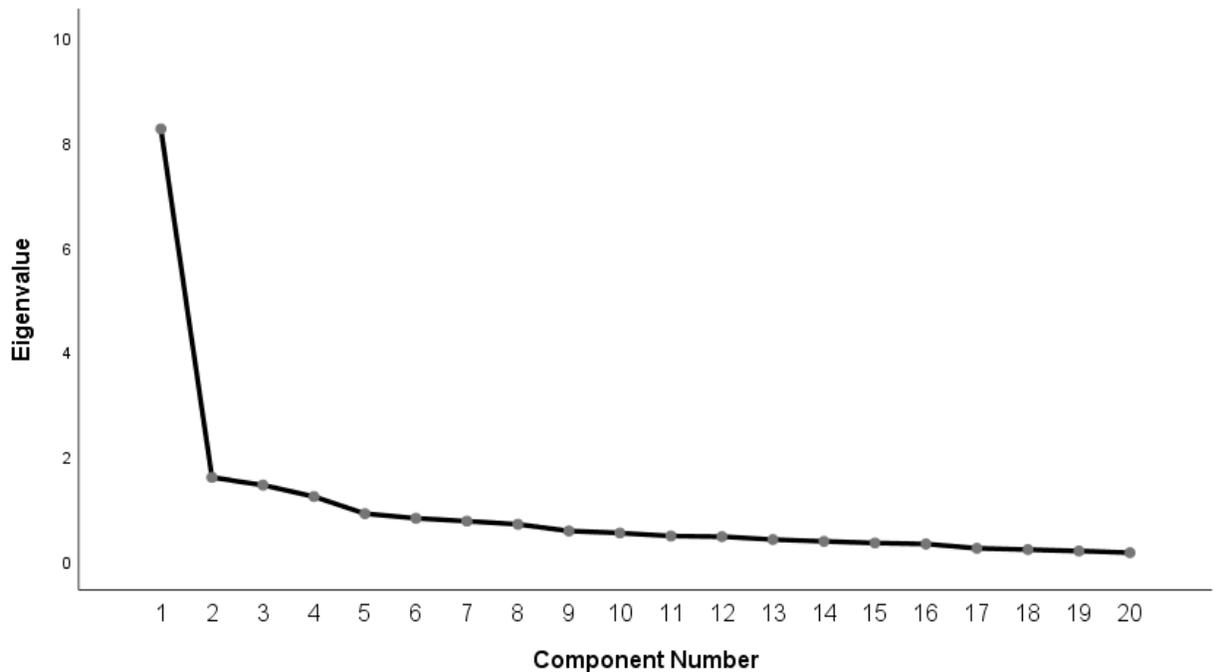


Figure 1. PGBS Scree Plot

Table 6

*Exploratory Factor Analysis of the PGBS*

Item	Factor Loading			
	1	2	3	4
1 Have you ever neglected or delayed another obligation so you could play or continue to play games?	.734	.142	-.197	.131
2 Have you ever played games for a longer period of time than you intended to (either in one sitting or over a weekend or week, etc.)?	.741	-.073	-.078	.070

3 Have you ever continued to play a game even though you promised yourself or someone else that you would quit (e.g., you said you would play only one more level, but instead you played multiple levels)?	.661	.053	-.338	.028
4 How often have you had a desire to cut back on or decrease your time spent gaming?	.530	.312	-.349	-.044
5 How often do you spend time obtaining, using, reading about, or otherwise engaged in activities related to games?	.623	-.237	.024	.105
6 Has there ever been a time when you had such strong urges to play a game that you couldn't think of anything else?	.712	.130	.055	-.086
7 How often have you skipped work or school in order to play games?	.505	.180	-.169	.059
8 Have you ever been unable to complete a chore or job/school-related assignment because you were playing games?	.612	.189	-.233	-.133
9 How many breaks, during an average week, would you estimate you take from work or school-related activities in order to play games?	<i>Item not included in EFA</i>			
10 How long, on average, would you estimate your breaks from work or school-related activities in order to play games are (in minutes)?	.542	-.094	-.132	.185
11 Have you ever given up other activities that you or others consider to be important in order to play games?	.629	.249	-.176	.107
12 Have you ever had a negative physical reaction as a result of playing games?	.664	.037	.001	-.086
13 Have you ever continued to play (e.g., to finish a level/task) even though you are experiencing some negative physical reactions?	.689	.017	.095	-.181
14 Have you ever had a positive physical reaction as a result of playing games?	.666	-.399	.085	.198
15 Have you ever had a negative psychological reaction as a result of playing games?	.693	-.295	.154	-.452
16 Have you ever continued to play (e.g., to finish a level/task) even though you are experiencing some negative psychological reactions?	.676	-.246	.077	-.306
17 Have you ever had a positive psychological reaction as a result of playing games?	.687	-.531	.108	.319
18 Have you ever found yourself feeling the need to play for longer periods of time or at more intense intervals in order to achieve the same positive reactions you used to feel with less play?	.537	.085	.153	-.064
19 Have you ever experienced any negative physical or psychological reactions/feelings because you are NOT or have not been playing games?	.475	.363	.433	.085
20 If you have experienced these negative reactions/feelings, do they go away when you begin playing games again?	.570	.419	.566	.145

**Reliability.** Cronbach's Alpha for the 20-item PGBS was .886. Analyses revealed that Cronbach's Alpha would increase to .908 if "How many breaks, during an average week, would you estimate you take from work or school-related activities in order to play games" were

removed. This item was removed due to the possible variance in responses. The EFA previously described was conducted after the removal of this item.

### **Logistic Regression**

Logistic regression models were fit to analyze the predictive value of the PGBS. Models were fit for each of the four outcome items. The PGBS total score did not predict positive endorsement of any of the four outcome items.

## CHAPTER 4

### DISCUSSION

Growing concern for the negative impacts of gaming have prompted the development of new diagnoses regarding gaming in *DSM-5* and the ICD-11. Though diagnostic criteria have been published, prevalence rates are relatively unknown. Many studies have been conducted with samples recruited specifically from online gaming forums and communities, but that is a limitation because this method assumes those that contribute and belong to these domains have disordered gaming patterns. The current study investigated problematic gaming behaviors in the general U.S. population and contributes to the literature of measurement development in relation to IGD and more recently, Gaming Disorder, by confirming the factor structure of the PGBS after modifying items to increase variability in scores. The PGBS was refined to gather more information about the frequency of behaviors as opposed to dichotomous items indicating the presence or absence of behaviors.

The frequencies calculated for the gaming platforms utilized by the sample indicated over 80% of participants have played games on their mobile phones as well as on gaming consoles (e.g., PlayStation, Xbox). Approximately half the sample reported playing games on tablets and online platforms (e.g., Blizzard). During a typical week, this sample reported using mobile phones and consoles to play most. This data suggests that there are a variety of platforms on which games are played, even in a small sample of participants. Though evidence from a larger sample would enhance this argument, it may be beneficial to expand the conceptualization of Internet Gaming Disorder by explicitly defining the variety of platforms that problematic gaming could occur on. In the future, possible differences between gaming habits on these different platforms may also be explored. Time spent gaming may also be an important factor to consider.

There may be differences in gaming behaviors between those who play less and those who play more. Furthermore, different behaviors may be observed among those with greater dissatisfaction in the amount of time they spend gaming (e.g. those who may report that they would like to spend more time gaming). In our data, 9% of respondents indicated they play games at least 20 hours per week, and 11.1% stated they wished they could play at least 20 hours per week. Another 7.9% played games 10-19 hours per week. In the future, researchers may wish use these data to stratify samples, with <10 hours per week being quite common and with 10-19 hours per week being actually less common than 20+ hours per week. Currently, there are more questions than answers as to the differences in gaming behaviors among these different stratifications. More research is certainly warranted, and the PGBS may be a useful tool in the future for conducting this research.

Analyses of the current version of the PGBS confirmed the unidimensionality found in previous studies with the PGBS. The EFA of the PBGS conducted in the current work can now be confirmed by confirmatory factor analysis (CFA) in a future project. In future studies, the PGBS is best conceptualized as a “total score,” meaning there is no evidence supporting the need to break the measure into subscales.

From a clinical standpoint, it is necessary to establish functional impairment, not strictly presence of symptoms. The PGBS may be better equipped to establish functional impairment compared to the IGD-20 Test, which measures the degree of agreement with statements tied to diagnostic criteria. The PGBS Likert responses include definitive anchors about the frequency in which the various assessed behaviors occur, providing for a more concrete interpretation by respondents and establishing measurable markers from which further hypotheses can be developed about the overall frequencies of potentially problematic behaviors among different

populations of gamers. For example, future analyses may be able to review a “cut point” of behavioral frequency that is more likely to identify someone at risk for Gaming Disorder. Future studies with the PGBS, then, should focus on the scale’s ability to predict clinical impairment. Functional outcomes, such as sleep quality, days missed from school/work, and potentially other measurable health-related outcomes could serve as useful proxies for clinical impairment.

### **Limitations**

A data entry error during the construction of the online survey in REDCap resulted in the exclusion of one item concerning social and interpersonal functioning. This exclusion places this version of the PGBS in similar company to other scales that have been developed that do not cover all nine criteria. Without this item, this domain of functioning was not addressed in the current study. In future versions of this scale, items that explore social and interpersonal functioning as it relates to gaming should be included.

The sample obtained in the current work is small for the statistical analyses performed. The data collection period was short, which restrained the overall sample size . A longer data collection period combined with a broader recruitment strategy may allow for greater statistical power in future research. Not only was the sample size small, it was also lacking in diversity. The sample was predominantly White; over half of the sample identified as female, and 61.2% of the sample reported they currently reside in Tennessee. Overall, this sample does not generalize well to the greater population of the U.S.

Focusing on obtaining a general sample may have limited the ability of the PGBS to differentiate those who meet criteria for IGD or gaming disorder and those who do not. However, it is unknown at the present time how such samples can be identified in the United States given definitive criteria have not been incorporated into the *DSM* and the ICD-11 criteria

were released only recently. Some ways that researchers may identify clinical samples are through more specific recruitment strategies, explicitly recruiting for people who either self-identify or who have been identified by others as having a problem with games, and through supplementation of survey data with clinical interview, in which expert clinicians can more systematically identify functional impairment. Though clinical samples cannot be identified based on having a diagnosis of IGD, other factors could be considered such as time spent gaming, time that the individual would like to spend gaming, and endorsement of functional outcome items such as those previously mentioned.

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## APPENDICES

### Appendix A

#### Proposed Criteria for Internet-Gaming Disorder in *DSM-5*

Persistent and recurrent use of the Internet go engage in games, often with other players, leading to clinically significant impairment or distress as indicated by five (or more) of the following in a 12-month period:

1. Preoccupation with Internet games. (The individual thinks about previous gaming activity or anticipates playing the next game; Internet gaming becomes the dominant activity in daily life).  
**Note:** This disorder is distinct from Internet gambling, which is included under gambling disorder.
2. Withdrawal symptoms when Internet gaming is taken away. (These symptoms are typically described as irritability, anxiety, or sadness, but there are no physical signs of pharmacological withdrawal).
3. Tolerance – the need to spend increasing amounts of time engaged in Internet games.
4. Unsuccessful attempts to control the participation in Internet games.
5. Loss of interest in previous hobbies and entertainment as a result of, and with the exception of, Internet games.
6. Continued excessive use of Internet games despite the knowledge of psychosocial problems.
7. Has deceived family members, therapists, or others regarding the amount of Internet gaming.
8. Use of Internet games to escape or relieve a negative mood (e.g., feelings of helplessness, guilt, anxiety).
9. Has jeopardized or lost a significant relationship, job, or educational or career opportunity because of participation in Internet games.

**Note:** Only nongambling Internet games are included in this disorder. Use of the Internet for required activities in a business or profession is not included; nor is the disorder intended to include other recreational or social Internet use. Similarly, sexual Internet sites are excluded.

*Specify current severity:*

Internet gaming disorder can be mild, moderate, or severe depending on the degree of disruption of normal activities. Individuals with less severe Internet gaming disorder may exhibit fewer symptoms and less disruption of their lives. Those with severe Internet gaming disorder will have more hours spent on the computer and more severe loss of relationships or career or school opportunities.

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## Appendix B

### Original Problematic Gaming Behavior Scale (PGBS; Steadman and colleagues, n.d.)

1. Have you ever neglected or delayed another obligation so you could play or continue to play videogames?
  - a. Yes
  - b. No
2. Have you ever played videogames for a longer period than you intended to (either in one sitting or over a weekend or over week, etc.)?
  - a. Yes
  - b. No
3. Have you ever continued to play a videogame even though you promised yourself or someone else that you would quit (e.g., you said you'd play "only one more level," but instead you played multiple levels)?
  - a. Yes
  - b. No
4. Have you ever had a desire to "cut back" on or decrease videogame use?
  - a. Yes
  - b. No
5. Would you say that you spend a great deal of time obtaining, using, reading about, or otherwise engaged in activities related to videogames?
  - a. Yes
  - b. No
6. Has there ever been a time when you had such strong urges for videogames that you couldn't think of anything else?
  - a. Yes
  - b. No
7. How often have you skipped work or school in order to play videogames?
  - a. Often (>2 times per month)
  - b. Regularly (About once per month)
  - c. Sometimes (once every 2-3 months)
  - d. Rarely (has happened, but not more than just a few times, and not very frequently)
  - e. Never (I've never skipped work or school just to play videogames)
8. How often have you failed to do a chore or job/school-related assignment because you were playing videogames?
  - a. Often (>2 times per week)
  - b. Regularly (About once per week)
  - c. Sometimes (once every 2-3 weeks)
  - d. Rarely (has happened, but not more than just a few times, and not very frequently)
  - e. Never (Videogames never get in the way of doing my chores or assignments)
9. How often do you have social or interpersonal problems related to videogames (e.g., gotten into an argument or fight with a friend or family member over a videogame;

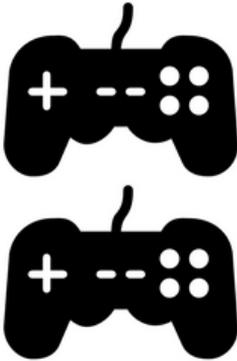
- stayed home to play videogames rather than spend time with friends; get made fun of or ridiculed by others because I play too much videogames, etc.)?
- a. Often (>2 times per week)
  - b. Regularly (About once per week)
  - c. Sometimes (once every 2-3 weeks)
  - d. Rarely (has happened, but not more than just a few times, and not very frequently)
  - e. Never (Videogames never cause me any social or interpersonal issues)
10. How often do you give up other activities that you or others consider to be important in order to play videogames?
- a. Often (>2 times per week)
  - b. Regularly (About once per week)
  - c. Sometimes (once every 2-3 weeks)
  - d. Rarely (has happened, but not more than just a few times, and not very frequently)
  - e. Never (Videogames never get in the way of important activities)
11. Do you have or have you ever had a negative physical reaction as a result of playing videogames? Examples of negative physical reactions may include, but are not limited to, headaches, impaired sleep, nausea, weight loss, weight gain, anorexia (lack of appetite/skipping meals), impaired hygiene (e.g., skipping showers, not brushing teeth), blurry or double vision, passing out, seizure(s), and others.
- a. Yes
  - b. No
  - c. If yes to above, what physical reaction(s) have you experienced?
    - i. Text box to input response
12. Do you sometimes continue to play (e.g., to finish a level/task) despite some negative physical reactions?
- a. Yes
  - b. No
13. Do you have or have you ever had a positive physical reaction as a result of playing videogames? Examples of positive physical reactions include, but are not limited to, heart racing in excitement, a feeling of physical relaxation, enhanced sensations, etc.
- a. Yes
  - b. No
  - c. If yes to above, what positive physical reaction(s) have you experienced?
    - i. Text box to input response
14. Do you have or have you ever had a negative psychological reaction as a result of playing videogames? Examples of negative psychological reactions may include, but are not limited to, sadness, anger, depression, rage, jealousy, envy, guilt, shame, fear, anxiety, and so on.
- a. Yes
  - b. No
  - c. If yes to above, what negative psychological reactions have you had?
    - i. Text box to input response
15. Do you sometimes to continue to play despite some negative psychological reactions?

- a. Yes
  - b. No
16. Do you have or have you ever had a positive psychological reaction as a result of playing videogames? Examples of positive psychological reactions may include, but are not limited to, joy, satisfaction, relaxation, release/catharsis, warmth, acceptance, bravery, excitement, and so on.
- a. Yes
  - b. No
  - c. If yes to above, what positive psychological reactions have you had?
    - i. Text box to input response
17. Do you ever find that sometimes you have a feeling of needing to play videogames for longer periods or at more intense intervals in order to achieve the same positive reactions you used to feel with less videogame play?
- a. Yes
  - b. No
18. Do you ever experience negative physical or psychological feelings as a result of **NOT** playing videogames (use same examples as above for possible reactions that may be considered negative)?
- a. Yes
  - b. No
19. If yes to above, do these feelings go away when you begin playing videogames again?
- a. Yes
  - b. No
20. Has anyone ever told you that they feel you have a problem with videogames?
- a. Yes
  - b. No
21. Do you feel you have a problem with videogames?
- a. Yes
  - b. No
22. Do you feel that your videogame use is abnormal? In other words, do you feel that the way you use games (e.g., the amount you use them, or the times you play, etc.) is different from the way most people use games? Or do you feel that your reactions to videogames (either physical or psychological or both) are more intense than the reactions most people have?
- a. Yes
  - b. No
23. Do you believe you are addicted to videogames?
- a. Yes
  - b. No
24. Do you believe you are addicted to anything else (substance, gambling, internet, social media, caffeine, etc.)?
- a. Yes
  - b. No

25. Have you ever had treatment for an addiction or a substance use disorder?
- a. Yes
  - b. No

Appendix C

Recruitment Advertisement



**HAVE YOU EVER PLAYED  
GAMES ON YOUR PHONE,  
COMPUTER, CONSOLE, OR  
TABLET?**

Help me define gaming behaviors by taking a short  
survey!

It only takes **15-20 minutes**

Enter a **random drawing** for an electronic Target  
gift card valued at **\$10**



**Must be 18 or older**

**Must currently reside in the United States**

Participation in this research is  
**strictly voluntary**

Please **type the link below in your browser** to view the  
**informed consent** document to participate in the study

**<https://etsuredcap.etsu.edu/surveys/?s=FEHKMDLKH4>**

Christin Collie, B.A., Principal Investigator  
collic@etsu.edu

Jason L. Steadman, Psy.D., Faculty Advisor  
steadmanjl@etsu.edu

## Appendix D

### **Informed Consent Page SONA**

Dear Participant:

My name is Christin Collie. I am a Graduate Student in the Clinical Psychology Ph.D. program at East Tennessee State University (ETSU). I am working on a research project that seeks to learn about how people play video/digital games (e.g., mobile, console, online). I am interested in understanding how games may impact a person's daily life.

You should be at least 18 years old to participate in this study. If you are under 18, please exit the survey now.

The purpose of this study is to explore how games may impact a person's daily life, both positively and negatively. I would like to give an anonymous online survey to anyone, even if you do not play games regularly. It should take between 15-20 minutes to complete. You will be asked questions about yourself, your gaming habits, and your typical daily life. There are no to minimal risks associated with completing the survey. You will not be asked to do anything that is not considered a part of everyday life. Students participating in this study will receive 1 SONA credit. The results of this study will be summarized anonymously. The results will be published through ETSU as part of a Master's Thesis. The study will be available through ETSU's library system when it is published.

Your confidentiality will be maintained to the degree permitted by the technology used. No guarantees can be made regarding the interception of data sent via the Internet by any third parties, like emails. Every effort will be made to ensure that your name is not connected with your responses. Study data will be collected and managed using REDCap electronic data capture tools hosted at ETSU. Although your rights and privacy will be maintained by the anonymity of data collection, the ETSU IRB and the research staff of Dr. Jason Steadman have access to the study records.

Participation in this study is voluntary. You may refuse to participate. You may choose to quit at any time. If you do not wish to continue with the survey, you may click "I DO NOT AGREE" below. If you start the survey, but decide to quit in the middle, you may exit the online survey form. We will remove your data if you decide to quit in the middle. SONA credit is awarded at the end of the survey; however, you can skip individual questions if you prefer to do so. Once you finish the survey, we cannot remove your data. We will have no way of knowing which data are yours. You are not able to leave the study after data collection.

If you have any research-related questions or problems, you may contact the primary researcher, Christin Collie, at [colliec@etsu.edu](mailto:colliec@etsu.edu). The chairperson of the Institutional Review Board at East Tennessee State University is available at (423) 439-6054 if you have questions about your rights as a research participant. If you have questions or concerns about the research and want to talk to someone independent of the research team or you are unable to reach the study staff, you may call an IRB Coordinator at (423) 439-6055 or (423) 439-6002.

Sincerely,  
Christin Collie

Clicking the AGREE button below indicates:

- I have read the above information
- I agree to volunteer
- I am at least 18 years old
- I reside in the United States

## **Informed Consent Page REDCap (Non-SONA Participants)**

Dear Participant:

My name is Christin Collie. I am a Graduate Student in the Clinical Psychology Ph.D. program at East Tennessee State University (ETSU). I am working on a research project that seeks to learn about how people play video/digital games (e.g., mobile, console, online). I am interested in understanding how games may impact a person's daily life.

You should be at least 18 years old to participate in this study. If you are under 18, please exit the survey now.

The purpose of this study is to explore how games may impact a person's daily life, both positively and negatively. I would like to give an anonymous online survey to anyone, even if you do not play games regularly. It should take between 15-20 minutes to complete. You will be asked questions about yourself, your gaming habits, and your typical daily life. There are no to minimal risks associated with completing the survey. You will not be asked to do anything that is not considered a part of everyday life. Participating in the study will give you a chance to win one \$10 gift card. There are 46 gift cards that can be claimed by participants. There will be a drawing at the end of the study. The odds of winning depend on the number of participants. Winners will be notified via e-mail in May 2018. E-mail addresses will not be connected to survey responses. The results of this study will be summarized anonymously. The results will be published through ETSU as part of a Master's Thesis. The study will be available through ETSU's library system when it is published.

Your confidentiality will be maintained to the degree permitted by the technology used. No guarantees can be made regarding the interception of data sent via the Internet by any third parties, like emails. Every effort will be made to ensure that your name is not connected with your responses. Study data will be collected and managed using REDCap electronic data capture tools hosted at ETSU. Although your rights and privacy will be maintained by the anonymity of data collection, the ETSU IRB and the research staff of Dr. Jason Steadman have access to the study records.

Participation in this study is voluntary. You may refuse to participate. You may choose to quit at any time. If you do not wish to continue with the survey, you may click "I DO NOT AGREE" below. If you start the survey, but decide to quit in the middle, you may exit the online survey form. We will remove your data if you decide to quit in the middle. You will not be able to enter your email address to enter the drawing for the gift care until the end of the survey; however, you can skip individual question if you prefer to do so. Once you finish the survey, we cannot remove your data. We will have no way of knowing which data are yours. You are not able to leave the study after data collection.

If you have any research-related questions or problems, you may contact the primary researcher, Christin Collie, at [colliec@etsu.edu](mailto:colliec@etsu.edu). The chairperson of the Institutional Review Board at East Tennessee State University is available at (423) 439-6054 if you have questions about your rights

as a research participant. If you have questions or concerns about the research and want to talk to someone independent of the research team or you are unable to reach the study staff, you may call an IRB Coordinator at (423) 439-6055 or (423) 439-6002.

Sincerely,  
Christin Collie

Clicking the AGREE button below indicates:

- I have read the above information
- I agree to volunteer
- I am at least 18 years old
- I reside in the United States

## Appendix E

### Questionnaire

**Instructions:** Please answer the following questions to the best of your ability as it applies to your day to day life.

1. What is your gender identity? For the purpose of this study, gender identity is defined as one's sense of self as male, female, transgender, or gender queer. This means how you identify yourself, regardless of what society recognizes and regardless of what gender you usually choose to express yourself.
  0. Male
  1. Female
  2. Transgender
  3. Gender queer (having no gender or a fluid gender identity)
2. What is your gender expression? For the purpose of this study, gender expression is defined as the way in which you act to communicate gender within your culture. This may include how you dress, how you communicate, your interests, and so on. This does not necessarily need to match your gender identity, but think of it as the gender you usually show to others.
  0. Male
  1. Female
  2. Neutral or flexible, I show neither gender or I show different genders depending on my feelings.
3. What is your age (in years)? Please type the number below.
  0. Text box to input number
4. What state do you live in?
  0. List states
5. Are you of Hispanic, Latino, or of Spanish origin?
  0. No
  1. Yes
6. How would you describe yourself? Select all that apply.
  0. American Indian or Alaska Native
  1. Asian
  2. Black or African American
  3. Native Hawaiian or Other Pacific Islander
  4. White
  5. Not listed, please specify:
    - i. Text box
7. What is your marital/relationship status?
  0. In a committed relationship, and living together
  1. In a committed relationship, and living apart
  2. Single or not in a committed relationship
8. Do you have any children? If so, please input the number below. If you have no children, please type "0". If you have step-children, please include them in the count for this question.

0. Text box to input number
9. How many people live in your home?
  0. Text box to input number
10. What is your job status?
  0. Full time work
  1. Full time student
  2. Part time work
  3. Part time student
  4. Combination of work and student
  5. Homemaker (unpaid)
  6. Unemployed
  7. Retired
11. What is your average annual household income?
  0. Less than \$10,000
  1. \$10,000-\$19,999
  2. \$20,000-\$29,999
  3. \$30,000-\$39,999
  4. \$40,000-\$49,999
  5. \$50,000-\$59,999
  6. \$60,000-\$69,999
  7. \$70,000-\$79,999
  8. \$80,000-\$89,999
  9. \$90,000-\$99,999
  10. \$100,000-\$149,999
  11. \$150,000 or more
12. There are several platforms that games can be played on today. Of the following, please select all of the platforms you have played games on.
  0. None, I have never played games before.
  1. Mobile phone (e.g., iPhone, Galaxy S7)
  2. Tablet (e.g., iPad, Galaxy Tab)
  3. Handheld gaming console (e.g., Nintendo DS, GameBoy)
  4. Console (e.g., Xbox, PlayStation)
  5. Online (e.g., Blizzard, Steam, GOG, GamersGate, via FaceBook)
  6. Other, please specify below.
    - i. Text box
13. Of the following, which platform do you spend the most time playing games on during your typical week?
  0. None, I do not play games.
  1. Mobile phone (e.g., iPhone, Galaxy S7)
  2. Tablet (e.g., iPad, Galaxy Tab)
  3. Handheld gaming console (e.g., Nintendo DS, GameBoy)
  4. Console (e.g., Xbox, PlayStation)
  5. Online (e.g., Blizzard, Steam, GOG, GamersGate, via Facebook)
  6. Other, please specify below.
    - i. Text box
14. During your typical week, how often do you play games?

- 0. None, I do not play games.
  - 1. 1-2 days per week
  - 2. 3-4 days per week
  - 3. Nearly every day (5-6 days per week)
  - 4. Every day (7 days per week)
15. During your typical week, how many **hours** do you spend playing games, on average?
- 0. 0 hours, I do not play games.
  - 1. 1-4 hours
  - 2. 5-9 hours
  - 3. 10-19 hours
  - 4. 20-29 hours
  - 5. 30-39 hours
  - 6. 40+ hours
16. During your typical week, how many **hours** do you spend playing online games? Online gameplay includes any game played over a network connection and can include any platform. Some examples include Blizzard, Steam, GOG, GamersGate, via Facebook).
- 0. 0 hours, I do not play online games.
  - 1. 1-4 hours
  - 2. 5-9 hours
  - 3. 10-19 hours
  - 4. 20-29 hours
  - 5. 30-39 hours
  - 6. 40+ hours
17. During your typical week, how many hours **would you like** to spend playing games (either online or offline), on average?
- 0. 0 hours, I do not want to play games.
  - 1. 1-4 hours
  - 2. 5-9 hours
  - 3. 10-19 hours
  - 4. 20-29 hours
  - 5. 30-39 hours
  - 6. 40+ hours
18. Have you ever neglected or delayed another obligation so you could play or continue to play games?
- 0. Never (I have never neglected or delayed another obligation to play games)
  - 1. Rarely (has happened, but not more than just a few times, and not very frequently)
  - 2. Sometimes (about once every 2-3 weeks)
  - 3. Regularly (about once per week)
  - 4. Often (more than 2 times per week)
19. Have you ever played games for a longer period of time than you intended to (either in one sitting or over a weekend or week, etc.)?
- 0. Never (I have never played games for a longer period than intended)
  - 1. Rarely (has happened, but not more than just a few times, and not very frequently)
  - 2. Sometimes (about once every 2-3 weeks)
  - 3. Regularly (about once per week)
  - 4. Often (more than 2 times per week)

20. Have you ever continued to play a game even though you promised yourself or someone else that you would quit (e.g., you said you would play “only one more level,” but instead you played multiple levels)?
0. Never (I have never continued to play after promising someone I would stop)
  1. Rarely (has happened, but not more than just a few times, and not very frequently)
  2. Sometimes (about once every 2-3 weeks)
  3. Regularly (about once per week)
  4. Often (more than 2 times per week)
21. How often have you had a desire to “cut back” on or decrease your time spent gaming?
0. Never (I have never had the desire to “cut back”)
  1. Rarely (has happened, but not more than just a few times, and not very frequently)
  2. Sometimes (about once every 2-3 weeks)
  3. Regularly (about once per week)
  4. Often (more than 2 times per week)
22. How often do you spend time obtaining, using, reading about, or otherwise engaged in activities related to games?
0. Never (I have never spent time obtaining, using, reading about, or otherwise engaged in activities related to games)
  1. Rarely (has happened, but not more than just a few times, and not very frequently)
  2. Sometimes (about once every 2-3 weeks)
  3. Regularly (about once per week)
  4. Often (more than 2 times per week)
23. Has there ever been a time when you had such strong urges to play a game that you couldn't think of anything else?
0. Never (has never been a time when I had such strong urges that I couldn't think of anything else)
  1. Rarely (has happened, but not more than just a few times, and not very frequently)
  2. Sometimes (about once every 2-3 weeks)
  3. Regularly (about once per week)
  4. Often (more than 2 times per week)
24. How often have you skipped work or school in order to play games?
0. Never (I've never skipped work or school just to play games)
  1. Rarely (has happened once or twice, but always more than 3 months apart)
  2. Sometimes (once every 2-3 months)
  3. Regularly (about once per month)
  4. Often (more than 2 times per month)
25. Have you ever been unable to complete a chore or job/school-related assignment because you were playing games?
0. Never (games never get in the way of doing any chores or assignments)
  1. Rarely (has happened, but not more than just a few times, and not very frequently)
  2. Sometimes (about once every 2-3 weeks)
  3. Regularly (about once per week)
  4. Often (more than 2 times per week)
26. How many breaks, during an average week, would you estimate you take from work or school-related activities in order to play games? Please specify the number of breaks below.

0. Text box
27. How long, on average, would you estimate your breaks from work or school-related activities in order to play games are (in minutes)?
0. 0 minutes (I do not take breaks from work or school to play games)
  1. 1-10 minutes
  2. 11-20 minutes
  3. 21-30 minutes
  4. 31-40 minutes
  5. 41-50 minutes
  6. 51-60 minutes
  7. 60+ minutes (over 1 hour)
28. Have you ever had any social or interpersonal problems related to gaming (e.g., gotten into an argument or fight with a friend/family member over gaming; stayed home to play games rather than spend time with friends/family; get made fun of or ridiculed by others because of playing too much)?
0. Never (gaming has never caused any social or interpersonal issues for me)
  1. Rarely (has happened, but not more than just a few times, and not very frequently)
  2. Sometimes (once every 2-3 weeks)
  3. Regularly (about once per week)
  4. Often (more than 2 times per week)
29. Have you ever given up other activities that you or others consider to be important in order to play games?
0. Never (gaming never gets in the way of important activities)
  1. Rarely (has happened, but not more than just a few times, and not very frequently)
  2. Sometimes (once every 2-3 weeks)
  3. Regularly (about once per week)
  4. Often (more than 2 times per week)
30. Have you ever had a **negative physical** reaction as a result of playing games? Examples of negative physical reactions may include, but are not limited to: headaches, impaired sleep, nausea, weight loss, weight gain, lack of appetite/skipping meals, impaired hygiene (e.g., skipping showers, not brushing teeth), blurry or double vision, passing out, seizure(s), and others.
0. Never (have never had negative physical reaction as a result of gaming)
  1. Rarely (has happened, but not more than just a few times, and not very frequently)
  2. Sometimes (once every 2-3 weeks)
  3. Regularly (about once per week)
  4. Often (more than 2 times per week)
31. What types of **negative physical** reactions have you experienced as a result of playing games? Select all that apply.
0. None, I have never experienced a negative physical reaction as a result of gaming.
  1. Headaches
  2. Impaired sleep
  3. Nausea
  4. Weight loss
  5. Weight gain
  6. Lack of appetite/skipping meals

7. Impaired hygiene (e.g., skipping showers, not brushing teeth)
  8. Blurry or double vision
  9. Passing out
  10. Seizure(s)
  11. Other, please specify.
    - i. Text box
32. Have you ever continued to play (e.g., to finish a level/task) even though you are experiencing some **negative physical** reactions?
0. Never (have never continued to play despite experiencing negative physical reactions)
  1. Rarely (has happened, but not more than just a few times, and not very frequently)
  2. Sometimes (once every 2-3 weeks)
  3. Regularly (about once per week)
  4. Often (more than 2 times per week)
33. Have you ever had a **positive physical** reaction as a result of playing games? Examples of positive physical reactions may include, but are not limited to: heart racing in excitement, a feeling of physical relaxation, enhanced sensations, and others.
0. Never (have never had a positive physical reaction as a result of gaming)
  1. Rarely (has happened, but not more than just a few times, and not very frequently)
  2. Sometimes (once every 2-3 weeks)
  3. Regularly (about once per week)
  4. Often (more than 2 times per week)
34. What types of **positive physical** reactions have you experienced as a result of playing games? Select all that apply.
0. None, I have never experienced a positive physical reaction as a result of gaming.
  1. Heart racing in excitement
  2. Feeling of physical relaxation
  3. Enhanced sensations
  4. Other, please specify.
    - i. Text box
35. Have you ever had a **negative psychological** reaction as a result of playing games? Examples of negative psychological reactions may include, but are not limited to: sadness, irritability, anger, depression, rage, jealousy, envy, guilt, shame, fear, anxiety, and others.
0. Never (have never experienced negative psychological reactions as a result of gaming)
  1. Rarely (has happened, but not more than just a few times, and not very frequently)
  2. Sometimes (once every 2-3 weeks)
  3. Regularly (about once per week)
  4. Often (more than 2 times per week)
36. What types of **negative psychological** reactions have you experienced as a result of playing games? Select all that apply.
0. None, I have never experienced a negative psychological reaction as a result of gaming.
  1. Sadness
  2. Irritability

3. Anger
  4. Depression
  5. Rage
  6. Jealousy
  7. Envy
  8. Guilt
  9. Shame
  10. Fear
  11. Anxiety
  12. Other, please specify.
    - i. Text box
37. Have you ever continued to play (e.g., to finish a level/task) even though you are experiencing some **negative psychological** reactions?
0. Never (have never continued to play despite experiencing negative psychological reactions)
  1. Rarely (has happened, but not more than just a few times, and not very frequently)
  2. Sometimes (once every 2-3 weeks)
  3. Regularly (about once per week)
  4. Often (more than 2 times per week)
38. Have you ever had a **positive psychological** reaction as a result of playing games? Examples of positive psychological reactions may include, but are not limited to: joy, satisfaction, happiness, relaxation, release/catharsis, warmth, acceptance, bravery, excitement, and others.
0. Never (have never experienced a positive psychological reaction as a result of gaming)
  1. Rarely (has happened, but not more than just a few times, and not very frequently)
  2. Sometimes (once every 2-3 weeks)
  3. Regularly (about once per week)
  4. Often (more than 2 times per week)
39. What types of **positive psychological** reactions have you experienced as a result of playing games? Select all that apply.
0. None, I have never experienced a positive psychological reaction as a result of gaming.
  1. Joy
  2. Satisfaction
  3. Happiness
  4. Relaxation
  5. Release/Catharsis
  6. Warmth
  7. Acceptance
  8. Bravery
  9. Excitement
  10. Other, please specify.
    - i. Text box
40. Have you ever found yourself feeling the need to play for longer periods of time or at more intense intervals in order to achieve the same positive reactions you used to feel

with less play?

0. Never (I have never found myself needing to play for longer/more intense intervals)
  1. Rarely (has happened, but not more than just a few times, and not very frequently)
  2. Sometimes (once every 2-3 weeks)
  3. Regularly (about once per week)
  4. Often (more than 2 times per week)
41. Have you ever experienced any **negative** *physical or psychological* reactions/feelings because you are **NOT** or have not been playing games (e.g., anxiety, sadness, rage, headaches, impaired sleep, nausea, and others listed previously)?
0. Never (have never experienced any negative reactions as a result of NOT gaming)
  1. Rarely (has happened, but not more than just a few times, and not very frequently)
  2. Sometimes (once every 2-3 weeks)
  3. Regularly (about once per week)
  4. Often (more than 2 times per week)
42. If you have experienced these negative reactions/feelings, do they go away when you begin playing games again?
0. Never (I have never experienced negative reactions/feelings as a result of NOT gaming)
  1. Never (these negative reactions/feelings do not go away when you begin to play)
  2. Rarely (has happened, but not more than just a few times, and not very frequently)
  3. Sometimes (once every 2-3 weeks)
  4. Regularly (about once per week)
  5. Often (more than 2 times per week)
43. Has anyone ever told you that they feel like you have a problem with gaming?
0. No
  1. Yes
44. Do you feel like you have a problem with gaming?
0. No
  1. Yes
45. Do you believe that you may be addicted to playing games?
0. No
  1. Yes
46. Do you believe that you may be addicted to anything else (e.g., substance, gambling, caffeine)?
0. No
  1. Yes
47. What else do you believe that you may be addicted to?
0. Substance (e.g., alcohol, illicit drug)
  1. Gambling
  2. Caffeine
  3. Other, please specify.
    - i. Text box

## VITA

- Education: Public Schools, Barco, North Carolina  
B.A. Psychology, Lenoir-Rhyne University, Hickory, North Carolina 2016  
B.A. Sociology, Lenoir-Rhyne University, Hickory, North Carolina 2016
- Professional Experience: Graduate Assistant, East Tennessee State University, College of Arts and Sciences, 2016-2018  
Clerkship, ETSU Family Medicine & Associates; Johnson City, Tennessee 2016-2017  
Practicum, ETSU Behavioral Health & Wellness Clinic; Johnson City, Tennessee 2018  
Externship, ETSU Behavioral Health & Wellness Clinic; Johnson City, Tennessee 2018
- Honors and Awards: Lenoir-Rhyne University First Honor Graduate  
Lenoir-Rhyne University Honors Academy  
President's List 2012-2016  
Psi Chi International Honors Society in Psychology  
Pi Gamma Mu International Honor Society in Social Sciences  
Alpha Kappa Delta The International Sociology Honor Society