

# Video Game Addiction and College Performance Among Males: Results from a 1 Year Longitudinal Study

Zachary L. Schmitt, BA,<sup>1</sup> and Michael G. Livingston, PhD<sup>2</sup>

## Abstract

This study explored the pattern of video game usage and video game addiction among male college students and examined how video game addiction was related to expectations of college engagement, college grade point average (GPA), and on-campus drug and alcohol violations. Participants were 477 male, first year students at a liberal arts college. In the week before the start of classes, participants were given two surveys: one of expected college engagement, and the second of video game usage, including a measure of video game addiction. Results suggested that video game addiction is (a) negatively correlated with expected college engagement, (b) negatively correlated with college GPA, even when controlling for high school GPA, and (c) negatively correlated with drug and alcohol violations that occurred during the first year in college. Results are discussed in terms of implications for male students' engagement and success in college, and in terms of the construct validity of video game addiction.

## Introduction

VIDEO GAMES ARE PLAYED by the majority of Americans between the ages of 2 and 17, with males showing higher usage rates and preferring games with more violent and explicit content.<sup>1,2</sup> The harmful consequences of violent video games have been well researched. These consequences include increased aggressive behaviors, cognitions, and affect, as well as decreased empathy and prosocial behavior.<sup>3,4</sup> At the same time, a number of positive benefits have been documented, including improved spatial reasoning, attention,<sup>5</sup> and management of emotional moods.<sup>6</sup>

Recently, concern about the negative effects of video games has focused on gaming as a behavioral addiction or pathology, one of several kinds of behavioral addictions associated with new technologies that include addictions to the Internet, social media, and texting.<sup>7</sup> In a representative national survey of 1,178 American youth between the ages of 8 and 18 years, 8.5% were diagnosed as pathological gamers. These pathological gamers, compared to nonpathological gamers, had lower grade point averages (GPAs), had more trouble paying attention in class, were more likely to have been involved in a physical fight within the past year, were more likely to have friends who are addicted to video games, and were more likely to be diagnosed with attention disorders. The researcher also found that the frequency of reported

symptoms was markedly different for boys and girls: 11.9% of boys were classified as pathological gamers compared with only 2.9% of girls.<sup>1</sup>

A two-wave longitudinal study of 851 Dutch youth, 543 of whom were gamers, found that low social competence, low self-esteem, and loneliness were predictors of pathological gaming 6 months later.<sup>8</sup> In addition, pathological gaming appeared to increase loneliness and displace real world social interaction.<sup>8</sup> A 2 year longitudinal study of pathological gaming carried out in Singapore found a rate of pathological gaming similar to that found in the United States. Further, the researchers found that more time spent playing video games, lower social competence, and greater impulsivity appeared to be risk factors for video game addiction, while depression, anxiety, and lower academic achievement appeared to be outcomes of video game addiction.<sup>9</sup>

Several studies have focused on video game usage among college students. In a survey of 245 students randomly selected from five postsecondary institutions in New York, the researcher found a statistically significant relationship between SAT scores, GPA, and video game usage. As video game usages increased, SAT scores and GPA decreased.<sup>10</sup> In a second study of 813 college students, researchers found large differences between females and males for both overall video game usage and for usage of violent video games.<sup>11</sup>

<sup>1</sup>Department of Academic Affairs, and <sup>2</sup>Department of Psychology, College of St. Benedict and St. John's University, Collegeville, Minnesota.

One unexplored question is the impact that gaming could have on student engagement. Student engagement is defined as the time and energy students invest in purposeful educational activities, as well as the institutional efforts devoted to effective educational practices.<sup>12</sup> College student engagement has been found to be an important variable associated with college GPA and persistence.<sup>13</sup> Further, males show lower levels of engagement than females, spending less time and effort studying or engaging in active learning activities.<sup>14</sup>

The present study examines the impact of video game addiction on college performance. First, the time spent playing and the types of games preferred in a cohort of new entering male college students, including the extent of video game addiction, is assessed. Second, the relationship between video game addiction, participants' expectations regarding college engagement, participants' academic performance defined as college GPA, and participants' conduct defined as the number of alcohol and drug violations is examined. Specifically, it is hypothesized that students' video game addiction scores will be negatively correlated to expectations regarding college engagement at the beginning of their college education, will be negatively correlated to GPA at the end of the first year of college, and will be positively correlated with the number of alcohol and drug violations. A secondary purpose of the present study is to evaluate a revised version of the Video Game Addiction Scale.<sup>1</sup>

## Methods

### Participants

Participants were 477 entering students at an all-male residential liberal arts university. These students represented approximately 96% of the college's entering class; the remaining 4% were not present during new student orientation—the survey administration site. The average age of the participants was 18 years. Of the entering class, 3.6% were international students and 96.4% were American students. Of the American students, 15.9% were students of color and 84.1% were white.

### Materials

All participants completed two different surveys: an online Video Game Survey and a paper-and-pencil New Entering Student Survey prior to the first day of class. The Video Game Survey contained 16 items that asked for the participant's name and ID number, whether they played video games, the type of video games they played, and video game hardware and genre preferences. Embedded in the survey were 10 items modified and adapted from Gentile's Video Game Addiction Scale<sup>1</sup> (described below). After the questions related to video game addiction, the survey included a question on time spent playing per day on average over the previous year. Participants were asked to complete a grid with the average hours of video game playing in specified time periods.<sup>15,16</sup> Most participants also completed a New Entering Student Survey. This survey included items regarding levels of expected student engagement. Those items regarding expected student engagement were combined into an Engagement in the College Experience Scale (described below).

**Revised Video Game Addiction Scale.** The Video Game Addiction Scale was developed by Gentile<sup>1,9</sup> based on the

Diagnostic and Statistical Manual of Mental Disorders IV criteria for pathological gambling. The original scale consisted of 11 items, each item corresponding to a symptom of gambling addiction modified for videogame addiction. Respondents answered "yes," "sometimes," or "no" to each question. Gentile then summed the responses with yes = 1, sometimes = 0.5, and no = 0. A score of 6 out of a possible 11 was needed to define a gamer as pathological, that is, addicted to gaming.

Gentile<sup>1</sup> suggested that the Video Game Addiction Scale needed to be modified because of problems that they encountered. First, he argued that the "yes" and "sometimes" responses may have been ambiguous to the respondents. Second, he argued that the questions should be time bound (e.g., "In the past year, how much have you...?"). The Revised Video Game Addiction Scale used in this study incorporates both of these changes. In addition, one item has been removed from the original 11-item scale regarding stealing to support gaming habits. The removal of this question was required by of the Institutional Review Board. Thus, the revised scale consisted of 10 items.

In the revised scale, each item was rated on a 5-point Likert scale. The first three items were rated 1 = "strongly disagree" to 5 = "strongly agree." Items 4–10 were rated 1 = "never" to 5 = "very frequently." Given the new scoring system for the 10 items in the revised scale, scores could range from 10 (lowest) to 50 (highest), with a higher score indicating a greater addiction. In the present study, scores ranged from 10 to 34, with a mean score of 16.80 ( $SD = 5.20$ ). Cronbach's alpha for the revised scale was 0.84.

**Engagement in the College Experience Scale.** The Engagement in the College Experience Scale consisted of nine items modified from the CIRP Freshman Survey<sup>17</sup> embedded in the New Entering Student survey. Participants were asked how likely they were to engage in the following activities during college: earn a 3.0 GPA during college; participate in community service opportunities while in college; develop close friendships with other students; socialize with a person of a different racial or ethnic group from their own; study abroad; complete an internship or practicum; communicate regularly with their professors; engage in a research or creative activity; and be satisfied with the college experience. Participants selected from a 5-point Likert scale that ranged from 1 = "no chance" to 5 = "very good chance." Scores on the Engagement in the College Experience Scale could range from 9 (lowest engagement) to 45 (highest engagement). In the present study, scores ranged from 18 to 36 with a mean score of 31 ( $SD = 3.2$ ). Cronbach's alpha for the scale was 0.70.

### Procedure

The online Video Game Survey and the paper-and-pencil New Student Survey were administered to 96% of entering students during the week before classes as part of orientation activities. The scores on the Revised Video Game Addiction Scale thus represent their addiction scores at the start of their college education. Likewise, the Engagement in the College Experience Scale also represents students' expectations about engagement at the start of their college education.

At the end of their first year of college, two measures of college performance were collected: cumulative GPA and the number of reported drug and alcohol violations occurring on campus.

TABLE 1. VIDEO GAME GENRE PREFERENCES ( $N=383$ )

Genre	N	%
First person shooter (e.g., Halo 3)	285	74%
Sports simulation (e.g., Madden Football)	284	74%
Action (e.g., Grand Theft Auto IV)	231	60%
Adventure (e.g., Legend of Zelda: Skyward Sword)	139	36%
Fighting (e.g., Street Fighter IV)	133	35%
Racing (e.g., Mario Kart)	128	33%
Role-playing (e.g., Mass Effect 3)	126	33%

Note. Participants: 383 participants indicated that they regularly play video games. Those who indicated they did not play video games were not included. Participants were able to select more than one genre preference.

## Results

Eighty-one percent of participants indicated they played video games on a regular basis. The average amount of time participants spent playing video games over the past year was 11.17 hours per week ( $SD=10.2$  hours). The reported number of hours spent playing per week over the past year was highly correlated with the amount of time participants expect to play during their first year in college,  $r=0.54$ ,  $n=383$ ,  $p<0.01$ . Similar to previous research with adolescents,<sup>1</sup> the present study found time spent playing per week over the past year was highly correlated with the participants' video game addiction score,  $r=0.48$ ,  $n=383$ ,  $p<0.01$ . The mean GPA for all first year students at the end of the first semester was 2.89 ( $SD=0.77$ ). The range of GPA was from 0.0 to 4.0. Descriptive statistics on video game genre preferences can be seen in Table 1.

Video game addiction score was negatively correlated with the Engagement in the College Experience Scale,  $r=-0.18$ ,  $n=383$ ,  $p<0.05$ . Table 2 contains intercorrelations among video game addiction and the individual expected college engagement measures.

Significant intercorrelations were found among key variables (see Table 3). Therefore, in order to isolate video game addiction as a unique predictor of college GPA and drug and alcohol violations, hierarchical regression was used. The participants' age, race/ethnicity, and ACT scores were not significantly related to video game addiction and therefore were not used in subsequent regression analyses. Participants' video game addiction scores, high school GPA, and college GPA were standardized using a z-score transformation prior to all regression.<sup>18</sup> Furthermore, a reflected square root transformation was used on the measure of college GPA to reduce negative skew.<sup>19</sup> Following the transformation, the measure of college GPA was reflected a second time to return the measure to its original form. All other variables were approximately normal and were not transformed.<sup>19</sup>

To demonstrate the impact of video game addiction on first year college GPA, a hierarchical linear regression analysis was conducted. Cumulative high school GPA was entered in step 1, video game addiction score was entered in step 2, and the interaction between high school GPA and the video game addiction score was entered in step 3. The video game addiction score was a significant negative predictor of first year college GPA, even when controlling the participants' high school GPA (see Table 4). These results are similar to those observed among gamers aged 8–18 years.<sup>1</sup>

In order to test the impact of video game addiction on drug and alcohol violations on-campus, hierarchical logistic regression analysis was conducted. The majority of participants that were cited for a drug or alcohol violation were cited for a single violation during their first year. Therefore, since the majority of violations were one-time offenses, drug and alcohol violations were coded as a dichotomous variable (0=zero violations; 1=one or more violations) rather than on a continuous scale.

College GPA, a covariate of the occurrence of drug and alcohol violations, was entered in step 1. In step 2, the video game addiction score was entered. In step 3, the interaction between college GPA and video game addiction score was entered. The video game addiction score was a significant negative predictor of drug and alcohol violations, even when

TABLE 2. INTERCORRELATIONS AMONG VIDEO GAME ADDICTION AND EXPECTED COLLEGE ENGAGEMENT MEASURES ( $N=383$ )

	1	2	3	4	5	6	7	8	9
1. Video Game Addiction Scale	—								
2. Earn a 3.0 GPA	-0.12*	—							
3. Be satisfied with college	-0.01	0.08	—						
4. Engage in community service	-0.12*	0.17**	0.16**	—					
5. Develop close friendships	-0.11*	0.17**	0.35**	0.18**	—				
6. Communicate with professors	-0.09	0.19**	0.13**	0.33**	0.27**	—			
7. Socialize with student of different racial/ethnic group	-0.14**	0.21**	0.16**	0.27**	0.26**	0.37**	—		
8. Participate in study abroad	-0.15**	0.14**	0.07	0.33**	0.15**	0.24**	0.28**	—	
9. Complete an internship	-0.10*	0.17**	0.15**	0.24**	0.24**	0.21**	0.20**	0.39**	—
10. Complete an original research project or an original creative work	-0.07	0.19**	0.20**	0.26**	0.17**	0.27**	0.29**	0.25**	0.35**

Note. Participants: 383 participants indicated that they regularly play video games. Those who indicated they did not play video games were not included. Video game addiction: higher score indicated higher levels of addiction. Engagement measures: higher score indicated higher levels of expected college engagement.

\* $p<0.05$ ; \*\* $p<0.01$ .

GPA, grade point average.

TABLE 3. CORRELATION AMONG KEY VARIABLES ( $N=383$ )

	1	2	3	4	5
1. Video Game Addiction Scale	—				
2. High school GPA	-0.10*	—			
3. Expected engagement in the college experience scale	-0.18**	0.12*	—		
4. First year college GPA	-0.17**	0.52**	0.20**	—	
5. Drug and alcohol violations	-0.12*	0.09	-0.03	-0.10*	—

Note. Participants: 383 participants indicated that they regularly play video games. Those who indicated they did not play video games were not included. Drug and alcohol violations were coded such that 0=zero violations and 1=one or more violations. High school and college GPA was scored on a 4-point scale. Video game addiction: higher score indicated higher levels of addiction. Expected engagement in the college experience scale: higher score indicated higher levels of expected college engagement.

\* $p < 0.05$ ; \*\* $p < 0.01$ .

controlling for college GPA (see Table 5). The results suggest that participants with a high level of video game addiction were significantly less likely to be charged with a drug and alcohol violation during their first year of college.

### Discussion

In line with the hypotheses, the authors found, first, that video game addiction score had a negative relationship with expectations regarding college engagement: the higher the video game addiction score, the lower the expectations for college engagement. Second, it was found that the higher the video game addiction score, the lower the first year GPA after controlling for high school GPA. Contrary to the hypothesis, the higher the video game addiction score, the lower the number of drug and alcohol violations.

In addition, the Revised Video Game Addiction Scale seemed to be an effective measure of the construct. The revised scale had a Cronbach's alpha of 0.84—higher than that of the original scale, which had an alpha of 0.78.<sup>1</sup> The questions on the revised scale were framed with a particular time period (which increases accuracy of self-report), and the answers were mutually exclusive (unlike the original scale). Video game addiction was treated as a continuous variable, as opposed to a dichotomous variable as in the original study.<sup>1</sup> In the absence of studies that can estimate the sensitivity and specificity of psychological tests such as the original scale, as well as the appropriate cutting scores for the

scale, the scores on the tests should be treated as continuous variables instead of dichotomous variables.<sup>20</sup>

The relationship between video game addiction scores and college GPA at the end of the first year is especially interesting. High school GPA is a powerful predictor of college GPA. In this study, high school and college GPA were correlated,  $r=0.52$ ,  $n=445$ ,  $p < 0.01$ . The results extend previous findings on the relationship of video game addiction and GPA in elementary through high school students<sup>1,8,9</sup> to college students and show that video game addiction scores significantly predicts college GPA even when controlling for high school GPA. High school GPA is a complex indicator of ability, motivation, and previous academic preparation—video game addiction scores predicts college GPA above and beyond this measure.

In addition, the results show that video game addiction has a negative relationship with expectations for college engagement. What students get out of college depends inherently on how engaged they are in the entire college experience,<sup>31</sup> and men are less engaged than women.<sup>14</sup> Video game addiction may be an important element in the complex set of factors that contribute to these gender differences given that men play video games much more frequently than women and have much higher rates of video game addiction.<sup>1</sup> As such, video game addiction would have a long-term impact on success both in college and after college.

One limitation of the study is its use of self-report: the measures of college engagement and video game addiction used in the present study are vulnerable to self-report bias.

TABLE 4. HIERARCHICAL REGRESSION PREDICTING FIRST YEAR COLLEGE GPA WITH VIDEO GAME ADDICTION SCORE ( $N=383$ )

		$B$	$SE_B$	$\beta$	$t$	$\Delta R^2$
Step 1	High school GPA	0.14	0.01	0.57	13.3**	0.33
Step 2	Addiction score	-0.02	0.01	-0.09	-2.0*	0.01
Step 3	Interaction	-0.01	0.02	0.19	0.42	0.00

Note. Participants: 383 participants indicated that they regularly play video games. Those who indicated they did not play video games were not included. High school and college GPA were scored on a 4-point scale. A reflected square root transformation was conducted on cumulative college GPA to reduce negative skew. Cumulative college GPA was reflected a second time in order to return the measure to its original direction. Video game addiction: higher score indicated higher levels of addiction.

\* $p < 0.05$ ; \*\* $p < 0.01$ .

TABLE 5. HIERARCHICAL LOGISTIC REGRESSION PREDICTING THE OCCURRENCE OF DRUG AND ALCOHOL VIOLATIONS WITH VIDEO GAME ADDICTION SCORE ( $N=383$ )

		$B$	$SE$	$Wald$ <i>statistic</i>	$df$	$R^2$
Step 1	College GPA	-0.26	0.12	4.49*	1	0.02
Step 2	Addiction score	-0.39	0.15	6.71**	1	0.05
Step 3	Interaction	-0.02	0.03	0.34	1	0.05

Note. Participants: 383 participants indicated that they regularly play video games. Those who indicated they did not play video games were not included. Drug and alcohol violations were coded such that 0=zero violations and 1=one or more violations. College GPA was scored on a 4-point scale. Video game addiction score: higher score indicated higher levels of addiction.

\* $p < 0.05$ ; \*\* $p < 0.01$ .



Furthermore, the video game addiction survey may have been influenced by retrospective report bias. In addition, the measure of college engagement represents a snapshot of the participants' expectation of college engagement and is not sensitive to changes that may occur in engagement over time. In addition, the measure of alcohol and drug use is an indirect measure (i.e., number of times a person was caught and cited). On this campus, most students cited for alcohol and drugs are attending parties where alcohol and drugs are present. It is possible that students with high video game addiction scores are simply attending parties and other social events less frequently. A final limitation of the present study is that participants are solely from an all-male liberal arts college. Further investigation is needed to determine the extent to which video game addiction is related to expectations of college engagement, college GPA, and on-campus drug and alcohol violations among female students and students attending other types of colleges.

The present study is a first report from a longitudinal study of video game addiction, college engagement, and college success. As this cohort is followed through graduation and beyond, it will be possible to examine the impact of video game addiction scores on college persistence, graduation rates, cumulative GPA, behavioral measures of engagement (as seen through the National Survey of Student Engagement<sup>12</sup> instrument), and job placement. The results of the present study warrant concern and possible action by colleges, while also providing results that are similar to data from studies done on children and adolescents.<sup>1,8,9</sup> These results suggest that many students have not matured out of their video game addiction by the end of their first year of college, or possibly that the addiction continues to have an impact on their performance even after maturing out. While more research needs to be done, these results strengthen the validity of video gaming addiction as a construct.

### Acknowledgments

The authors would like to thank Pamela Bacon, Richard Wielkiewicz, and the Higher Education Research Institute.

### Author Disclosure Statement

No competing financial interests exist.

### References

- Gentile D. Pathological video-game use among youth ages 8 to 18: a national study. *Psychological Science* 2009; 20: 594–602.
- Lenhart A, Kahne J, Middaugh E, et al. (2008) Teens, video games, and civics: teens' gaming experiences are diverse and include significant social interaction and civic engagement. Pew Internet and American Life Project. [www.pewinternet.org/2008/09/16/teens-video-games-and-civics/](http://www.pewinternet.org/2008/09/16/teens-video-games-and-civics/) (accessed July 10, 2014).
- Anderson CA, Dill KE. Video games and aggressive thoughts, feelings, and behavior in the laboratory and in life. *Journal of Personality & Social Psychology* 2000; 78: 772–790.
- Anderson CA, Shibuya A, Ihori N, et al. Violent video game effects on aggression, empathy, and prosocial behavior in eastern and western countries: a meta-analytic review. *Psychological Bulletin* 2010; 136:151–173.
- Uttal DH, Meadow NG, Tipton E, et al. The malleability of spatial skills: a meta-analysis of training studies. *Psychological Bulletin* 2013; 139: 352–402.
- Ruggiero TE. Uses and gratifications theory in the 21st century. *Mass Communication & Society* 2000; 3:3–37.
- Chóliz M, Marco C. (2012) *Adicción a Internet y redes sociales*. Madrid: Psicología Alianza.
- Lemmens JS, Valkenburg PM, Peter J. Psychosocial causes and consequences of pathological gaming. *Computers in Human Behavior* 2011; 27:144–152.
- Gentile DA, Choo H, Liau A, et al. Pathological video game use among youths: a two-year longitudinal study. *Pediatrics* 2011; 127(2):e319–e329.
- Anand V. A study of time management: the correlation between video game usage and academic performance markers. *CyberPsychology & Behavior* 2007; 10:552–559.
- Padilla-Walker LM, Nelson LJ, Carroll JS, et al. More than just a game: video game and Internet use during emerging adulthood. *Journal of Youth & Adolescence* 2010; 39:103–113.
- Kuh GD. Assessing what really matters to student learning: inside the National Survey of Student Engagement. *Change* 2001; 33:10–17, 66.
- Kuh GD, Cruce TM, Shoup R, et al. Unmasking the effects of student engagement on first-year college grades and persistence. *The Journal of Higher Education* 2008; 79:540–563.
- Kinzie J, Gonyea RM, Kuh GD, et al. (2007) The relationship between gender and student engagement in college. Annual Conference of the Association for the Study of Higher Education, Louisville, KY.
- Menon G. (1994) Judgments of behavioral frequencies: memory search and retrieval strategies. In Schwarz N, Sudman S, eds. *Autobiographical memory and the validity of retrospective reports*. New York: Springer, pp. 161–172.
- Greenberg BS, Sherry J, Lachlan K, et al. Orientation to video games among gender and age groups. *Simulations & Gaming* 2010; 41:238–259.
- Higher Education Research Institute UCLA. (2013) Cooperative institutional research program (CIRP) freshman survey. [www.heri.ucla.edu/cirpoverview.php](http://www.heri.ucla.edu/cirpoverview.php) (accessed May 14, 2014).
- Aiken LS, West SG. (1991) *Multiple regression: testing and interpreting interactions*. Newbury Park, CA: Sage.
- Tabachnick BG, Fidell, LS. (2013) *Using multivariate statistics*. 6th ed. Boston: Pearson, pp. 61–116.
- Glaros AG, Kline RB. Understanding the accuracy of tests with cutting scores: the sensitivity, specificity, and predictive value model. *Journal of Clinical Psychology* 1988; 44:1013–1023.
- The Gallup–Purdue Index Report. (2014) Great jobs, great lives: a study of more than 30,000 college graduates across the U.S. [www.gallup.com/strategicconsulting/168791/gallup-purdue-index-inaugural-national-report.aspx](http://www.gallup.com/strategicconsulting/168791/gallup-purdue-index-inaugural-national-report.aspx) (accessed July 16, 2014).

Address correspondence to:  
Zachary L. Schmitt  
St. John's University  
Quad 163C, 2850 Abbey Plaza  
Collegeville, MN 56321

E-mail: zschmitt@csbsju.edu

Copyright of CyberPsychology, Behavior & Social Networking is the property of Mary Ann Liebert, Inc. and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.