



The Relationship Between Video Gaming, Gambling, and Problematic Levels of Video Gaming and Gambling

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Published online: 18 August 2018
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Abstract

The relationship between video gaming and gambling was examined in a large cross-sectional sample of 3942 Canadian online panelists who responded to a solicitation recruiting individuals who regularly gambled or played video games. Most past year video gamers reported gambling in the past year (78.5%) and most past year gamblers reported playing video games in the past year (70.7%). However, frequency of involvement in gambling as well as all individual types of gambling was only weakly correlated with frequency of involvement in video games. Problem gamblers and problem gamers were found to have similar demographic features as well as high rates of mental health problems and impulsivity. Some differences did exist, with problem video gamers tending to be younger, somewhat less impulsive, less likely to have a substance use disorder, and more likely to have depression. Despite having similar profiles, overlap between problematic levels of gaming and gambling was modest, with only 10.5% of the 466 problem gamblers also being problem video gamers and 24.1% of the 203 problem video gamers also being problem gamblers. In general, the evidence would suggest that although the risk factors and manifestations of problem gaming and problem gambling are similar, involvement and/or overinvolvement in one is not a strong predictor of involvement and/or overinvolvement in the other.

Keywords Gambling · Gaming · Problem gambling · Problem video gaming

Introduction

There has been long-standing speculation on the relationship between video gaming and certain types of electronic gambling such as slot machines and video lottery terminals due to their very similar automated function, immersive experience, and prominent audiovisual elements (Wood et al. 2004). Individuals with excessive involvement in either gaming or gambling are known to have similar attributes. This includes higher rates of mental health problems (Allison et al. 2006; Lorains et al. 2011), substance

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abuse and dependence (Lorains et al. 2011; Wenzel et al. 2009), and executive functioning deficits (Ledgerwood et al. 2012; Reid et al. 2012). Some similarities have also been noted in the area of personality, with some evidence indicating both groups to have higher rates of hostility and aggression (Kim et al. 2008; Mishra et al. 2017), sensation-seeking (Fortune and Goodie 2010; Mehroof and Griffiths 2010), narcissism (Kim et al. 2008; Lakey et al. 2008), and propensity for boredom (Chiu et al. 2004; Fortune and Goodie 2010).

Despite these parallels, there have been relatively few direct empirical comparisons between gamblers and video game players or problem gamers and problem gamblers within the same study. There have been mixed results concerning the extent of co-involvement in both video gaming and gambling. A large scale study of Australian adolescents found very little association between involvement in video games and greater likelihood of problem gambling (Delfabbro et al. 2009). Similarly, King et al. (2012) did not find an association between video game playing and either gambling involvement or problem gambling in young Australian adults. A more recent study by this research group again found that gambling frequency and gaming frequency were unassociated, with age being the only predictor of gaming addiction and gambling frequency (Forrest et al. 2016). In contrast, a recent study of Canadian adolescents found that gamblers were likely to play video games, and video game players likely to gamble. Furthermore, those who were addicted to video games were significantly more likely to gamble than non-addicted video game players. A small sample of dual problem gamblers/addicted video game players were also identified (McBride and Derevensky 2016).

A few studies have looked at the demographic, behavioural, and mental health similarities and differences among the subset of individuals who are both video gamers and gamblers. Gupta and Derevensky (1996) found that higher frequency video game players were more apt to take greater gambling risks and more likely to perceive chance-based gambling activities as requiring a similar level of skill as video games. Wood et al. (2004) found that problem gambling youth were significantly more likely to spend excessive time on video games, report a dissociative experience while playing video games, and more likely to report video games as both relaxing and arousing. Walther et al. (2012) found that problem gamblers were more likely to also be problem computer gamers and to have several shared characteristics in terms of male gender, low parental monitoring, high impulsivity, and a diagnosis of Attention Deficit Hyperactivity. A couple studies have found differences between problem gamblers and problem video game players. For example, Choi et al. (2014) found that individuals with DSM-5 Internet Gaming Disorder reported significantly greater impulsivity whereas those with gambling disorder demonstrated greater compulsivity. Müller et al. (2014) found that low levels of conscientiousness and extraversion distinguished disordered video game players from pathological gamblers.

In summary, people with over-involvement in either gaming or gambling have many demographic, mental health, and personality parallels but relatively few studies have directly examined this relationship within the same sample. Those studies that have, have found inconsistent results about the extent of co-involvement as well as the characteristics shared by individuals with co-involvement or that differentiate the groups. The goal of the present research is to add to the research literature and shed further light on these issues with a large scale cross-sectional sample of Canadian adults. The specific research questions are: (1) What is the extent of dual involvement in gambling and video gaming, as well as dual problem gambling and problem video game playing? (2) Which variables distinguish problem gamblers from problem video game players as well as dual problem gamblers/video game players?

Methods

Procedure

Participants were recruited from LegerWeb, Canada's largest online panel. Online internet panels consist of thousands of individuals who are recruited to respond to survey requests for which they receive compensation (Göritz 2007). They are structured to be demographically representative of the general population. An e-mail solicitation was sent to LegerWeb online panelists 18 years and older with the question "Do you regularly gamble and/or play video games?" The survey was available in English or French, Canada's two official languages. Data was collected between August 8–September 11, 2016, and all research received Institutional Review Board ethical approval.

Measures

Gambling and Video Game Involvement

Participants were asked about their frequency and expenditure on each of 11 different types of gambling in the past 12 months: raffle and fundraising tickets, instant lottery tickets (scratch cards), lottery tickets, sports betting, horse race betting, casino table games, bingo, slot machines or video lottery terminals, social betting on games of skill, internet gambling, purchasing high-risk stocks. Response options were provided for frequency (ranging from 0 = never, to 6 = daily or almost daily), whereas the response for expenditure was open-ended. The specific question wordings and response options employed have been demonstrated to be both reliable and valid in the assessment of gambling participation (Williams et al. 2017).

With regard to video gaming, participants were asked about their frequency of involvement in 17 different types of video games in the past 12 months: action/adventure, Facebook/browser games, fighting games, first-person shooter, non-monetary gambling games, Massive Multiplayer Online Role Playing games (MMORPG), Multiplayer Online Battle Arena (MOBA), platform games, puzzle games, racing games, role playing, rhythm/music, sandbox, simulation, sports, strategy, traditional, and 'other'. Given the ambiguity between game genres, several examples of each game type were provided (i.e. Facebook/Browser (e.g. Farmville, Candy Crush, Café World)). For consistency of analysis the same frequency response options used for gambling were used for each type of video game played. Participants were also asked about the total number of hours spent playing video games in a typical month as a measure of level of involvement.

Problem Gambling

The Problem and Pathological Gambling Measure (PPGM) was used to assess problem gambling (Williams and Volberg 2014). The PPGM assesses domains of impaired control, and significant negative consequences deriving from impaired control. It comprehensively assesses a range of potential harms derived from gambling. The tool was designed for population-based assessment, and possesses high internal consistency, very good re-test reliability, as well as convergent and discriminant validity. It also has

excellent classification accuracy when compared against clinically assessed problem gamblers (Williams and Volberg 2014).

Problem Video Game Play

Problematic video game play was assessed using the Behavioral Addiction Measure—Video Games (BAM-VG) an 18-item scale developed and patterned after the PPGM (Sanders and Williams 2016). Problematic video game play is assessed when the person demonstrates evidence of both impaired control and significant harm deriving from this impaired control. The BAM-VG possesses very good internal consistency, retest reliability, as well as construct and criterion validity (Sanders and Williams 2016).

Mental Health, Impulsivity, and Related Behaviors

DSM-5 criteria (APA 2013) were used to assess a range of mental disorders, including: Substance Use Disorder, Major Depressive Disorder, Generalized Anxiety Disorder, Post-traumatic Stress Disorder, Social Anxiety Disorder, Panic Disorder, and Antisocial Personality Disorder. Each respondent endorsed whether they experienced symptoms of these disorders and the presence of disorder was calculated based on DSM-5 criteria. In addition, respondents were asked in one question whether they had any self-identified problems with sex/pornography, social media, and/or other internet behaviors (excluding gambling and video games). Respondents also completed the UPPS-P impulsivity scale, short form (Billieux et al. 2012). This version of the UPPS-P assesses five domains of impulsivity within two higher-order factors. This test has good internal consistency, retest reliability, and factorial and external validity (Billieux et al. 2012).

Participants

A total of 4006 respondents completed the online survey, and 3942 were retained after eliminating cases with incomplete or inconsistent answers. Mean age of the sample was 43.6 (15.9 *SD*), with 50.5% being female. The majority of participants were married or cohabiting ($n=2303$, 58.9%). It was a fairly educated sample with the majority completing some type of postsecondary education (college or university) ($n=2121$, 54.2%). The sample was predominantly from Ontario (43.2%) followed by British Columbia (14.4%), Alberta (13.5%), Quebec (9.0%), Manitoba (7.5%), Saskatchewan (4.2%), Nova Scotia (3.3%), Newfoundland and Labrador (2.2%), New Brunswick (1.6%), and Prince Edward Island (1.1%).

In terms of group status, 10.6% were classified as problem gamblers (PG) ($n=417$), 3.9% were classified as problem video game players (PVG) ($n=154$), 1.2% were both problem gamblers and problem video game players (PG/PVG) ($n=49$) and 84.3% ($n=3322$) were neither problem gamblers or problem video game players (NP).

Results

Research Question 1 What is the extent of dual involvement in gambling and video game activities as well as dual problem gambling and problem video gaming?

Involvement in both gambling and video game play was found to be common. More specifically, 78.5% of video game players reported gambling in the past year, and 70.7% of gamblers had played video games in the past year. While casual co-involvement was common, the magnitude of co-involvement was fairly modest. More specifically, there was a significant but weak correlation between overall gambling frequency and overall video game frequency ($\tau\text{-}b = .11, p < .05$), as well as between overall gambling frequency and hours playing video games ($\tau\text{-}b = .09, p < .05$). This same significant but weak relationship occurred when examining individual types of gambling. The strongest relationship was between frequency of video gaming and frequency of internet gambling ($\tau\text{-}b = .23, p < .05$). The relationship was similarly weak but significant for casino table games ($\tau\text{-}b = .10, p < .05$), sports betting ($\tau\text{-}b = .09, p < .05$), lottery tickets ($\tau\text{-}b = .08, p < .05$), and scratch tickets ($\tau\text{-}b = .06, p < .05$). There was no significant correlation between video game frequency and frequency of other types of gambling, including electronic gambling machines ($\tau\text{-}b = .04, p > .05$).

Among the 466 problem gamblers, a total of 49, or 10.5% were found to also be problem video gamers. Among the 203 problem video game players, a total of 49, or 24.1% were found to also be problem gamblers.

Research question 2 Which variables distinguish the four groups (i.e., PG, PVG, dual PG/PVG, NP)?

Respondents were classified into four groups: Problem Gamblers (PG), Problem Video Gamers (PVG), dual PG/PVG, and people who were neither PG nor PVG (non-problem, NP). The descriptive statistics for all four groups is shown in Table 1. A series of three binary logistic regressions were employed to identify the variables that best distinguished (a) NP from problem (P) groups; (b) PG from PVG; and (c) dual PG/PVG from individuals who were either PG or PVG. In all cases the independent variables were the variables listed in Table 1. Entry of the variables into the equation was forward stepwise. Variable entry order was determined by the size of the Wald statistic, with a minimum entry level of $p = .05$ and a removal level of $p = .10$.

For the first analysis, 11 variables were found to significantly differentiate between the NP and P groups. Table 2 shows regression coefficients, Wald statistics, and odds ratios for each of the 11 predictors. In order of importance, the following variables predicted being in one of the problem groups: higher impulsivity, substance use disorder, generalized anxiety disorder, panic disorder, antisocial personality disorder, marital status (not co-habiting), not having a social anxiety disorder, problems with social media, problems with other internet use, male gender, and problems with sex/pornography. The variance accounted for was modest, with Nagelkerke R squared = 18.4%. Classification accuracy was also modest with 71.1% of non-problem participants correctly classified and 61.4% of problem participants.

For the second analysis, four variables were found to significantly differentiate between the PG and PVG groups. Table 3 shows regression coefficients, Wald statistics, and odds ratios for each of the four predictors. In order of importance, the following variables significantly predicted being a problem video gamer: younger age, less impulsivity, not having a substance use disorder, and major depression. Nagelkerke R squared was 14.6%. A total of 67.4% of problem gamblers were correctly classified and 60.0% of problem video game players.

Table 1 Descriptive statistics for the four groups

| Variable | Non-problem group (<i>n</i> = 3322) | Problem gamblers (PG) (<i>n</i> = 417) | Problem video-gamers (PVG) (<i>n</i> = 154) | Dual PG/PVG (<i>n</i> = 49) |
|------------------------------------|---|--|---|---------------------------------|
| Age | 44 (16) | 42 (14) | 36 (15) | 38 (14) |
| Male (%) | 48.6 | 54.4 | 51.9 | 56.3 |
| Relationship status | | | | |
| Never married (%) | 27.6 | 32.1 | 48.7 | 38.8 |
| Married (%) | 41.8 | 37.9 | 26.0 | 30.6 |
| Co-habiting (%) | 18.7 | 15.2 | 17.5 | 22.4 |
| Previously married (%) | 11.9 | 14.7 | 7.8 | 8.2 |
| Education | | | | |
| Did not complete high school (%) | 3.6 | | | |
| Completed high school (%) | 19.8 | 4.1 | 2.6 | 6.3 |
| Some university/college (%) | 21.1 | 22.3 | 20.8 | 12.5 |
| Completed university/college (%) | 46.8 | 24.7 | 36.4 | 20.8 |
| Advanced degree (%) | 8.7 | 42.0 | 33.1 | 50.0 |
| Employment status | | | | |
| Full-time (%) | 48.9 | 47.8 | 34.2 | 57.1 |
| Part-time (%) | 12.0 | 13.2 | 18.4 | 10.2 |
| Student (%) | 6.5 | 6.7 | 17.1 | 16.3 |
| Not employed (%) | 32.7 | 32.2 | 30.3 | 16.3 |
| Substance use disorder (%) | 5.0 | 22.3 | 13.0 | 28.6 |
| Major depression (%) | 10.1 | 20.6 | 29.9 | 30.6 |
| Generalized anxiety (%) | 8.6 | 25.7 | 27.9 | 26.5 |
| Post-traumatic stress disorder (%) | 7.0 | 16.3 | 18.2 | 22.4 |
| Social anxiety disorder (%) | 2.9 | 3.6 | 9.7 | 6.1 |
| Panic disorder (%) | 9.2 | 24.7 | 19.5 | 28.6 |
| Antisocial personality (%) | 2.0 | 14.1 | 8.4 | 26.5 |
| Sex/pornography problems (%) | 3.2 | 10.1 | 16.2 | 16.3 |
| Social media problems (%) | 2.4 | 9.1 | 13.0 | 16.3 |
| Other internet use problems (%) | .8 | 4.8 | 10.4 | 6.1 |
| Impulsivity (UPPS-P) | 43 (8) | 49 (8) | 47 (8) | 51 (8) |

For the third analysis, only one variable was found to significantly differentiate between membership in the dual PG/PVG group versus either the PG or PVG groups. Table 4 shows the regression coefficient, Wald statistic, and odds ratio for impulsivity, which was significantly higher in the dual PG/PVG group. Further evidence that there were very few differences between the groups is seen in the fact that Nagelkerke *R* squared was only 4.1%.

Table 2 Logistic regression predicting membership in the problem group (versus non-problem group)

| Variable | Regression coefficients (<i>B</i>) | Wald statistics | Odds ratios |
|---------------------------------|---|-----------------|-------------|
| Impulsivity (UPPS) | .06 | 62.1* | 1.1 |
| Substance use disorder | .79 | 24.6* | 2.2 |
| Generalized anxiety disorder | .73 | 22.9* | 2.1 |
| Panic disorder | .52 | 12.3* | 1.7 |
| Antisocial personality disorder | .72 | 11.0* | 2.1 |
| Marital status | | 9.2* | |
| Social anxiety disorder | – .69 | 6.0* | .50 |
| Social media problems | .54 | 5.6* | 1.7 |
| Other internet problems | .77 | 5.3* | 2.2 |
| Gender | – .25 | 5.2* | .78 |
| Sex/pornography problems | .36 | 2.7 | 1.4 |
| Constant | – 4.1 | 122.5* | .02 |

* $p < .05$ **Table 3** Logistic regression predicting membership in the problem video game group (versus problem gambler group)

| Variable | Regression coefficients (<i>B</i>) | Wald statistics | Odds ratios |
|------------------------|---|-----------------|-------------|
| Age | – .05 | 25.6* | .96 |
| Impulsivity (UPPS) | – .06 | 15.7* | .94 |
| Major depression | .67 | 6.9* | 2.0 |
| Substance use disorder | – .68 | 5.3* | .51 |
| Constant | 3.5 | 16.8* | 33.2 |

* $p < .05$ **Table 4** Logistic regression predicting membership in the dual problem video game and problem gambler group (versus membership in just one group)

| Variable | Regression coefficients (<i>B</i>) | Wald statistics | Odds ratios |
|--------------------|---|-----------------|-------------|
| Impulsivity (UPPS) | .06 | 8.7* | 1.1 |
| Constant | – 5.7 | 24.9* | .003 |

* $p < .05$

Discussion

The present study found that involvement in both gambling and video game play is common, with the large majority of video game players having gambled in the past year, and the large majority of gamblers reporting playing video games in the past year. This finding is consistent with recent research undertaken in Canada (McBride and Derevensky 2016) suggesting overlap between casual gambling and video game play. The magnitude of co-involvement is not as strong, however. Although frequency of gambling involvement was

significantly associated with both frequency and hours of video game involvement, both correlations were quite weak, which is also fairly consistent with the magnitude of the relationship observed in previous Australian research (Forrest et al. 2016; King et al. 2012). (The much larger sample size in the present study being the reason the present associations were statistically significant). This weak relationship was also found when examining individual types of gambling and their relationship to video game frequency, with frequency of internet gambling having the strongest relationship to frequency of video gaming. This latter finding suggests that the main commonality between gambling and gaming has to do with the modality of access rather than any structural similarities between the games.

As suggested by previous research, both problem gamblers and problem video game player do have similar demographic features as well as high rates of mental health problems and impulsivity, with these features significantly differentiating these groups from people who do not have problems with either gaming or gambling. Some differences did exist between individuals with problematic gaming versus problematic gambling, with problem video gamers tending to be younger, somewhat less impulsive, less likely to have a substance use disorder, and more likely to have depression. Almost no differences existed between people with either problem gaming or problem gambling and people having both disorders.

Despite having similar profiles, the overlap between problem gambling and problem video gaming was not large, with only 10.5% of problem gamblers also being problem video gamers and 24.1% of problem video game players also being problem gamblers. Combined with the evidence showing a fairly weak relationship between level of gambling involvement and level of video game involvement, the evidence would suggest that although the risk factors and manifestations of problem gaming and problem gambling are similar, involvement and/or overinvolvement in one activity only modestly predisposes involvement and/or overinvolvement in the other activity.

Limitations

There were limitations in this study with regard to sample characteristics. The average age of sample was fairly old at 43.6, with different results potentially occurring if the data was restricted to just young adults (which has largely been the focus of previous research). Another limitation has to do with the fact that the present sample is exclusively Canadian, and there may well exist differences between jurisdictions. A final issue concerns the use of an online panel to collect the sample. Although online panels are structured to be demographically representative of the population, other differences exist. Online panels exclude the small percentage of the population that do not have internet access. Also, because most online panelists have opted-into join an online panel rather than randomly selected, motivational, personality and other behavioral difference have also been observed (e.g., Lee et al. 2015). Exacerbating this non-representativeness is the fact that the present study selectively recruited online panelists who self-identified as regular gamblers and/or video gamers. This was done to ensure a large sample of both groups as well as a sufficient sample of people having problematic levels of one or the other. However, the effect on the representativeness of the video gamers and gamblers recruited is unknown.

One key limitation in assessing video game play was the many genres of video games and the ambiguity between them. As video game play continues to grow so do the genres and platforms by which to play them. Further, this research did not account for the

increasing presence of currencies or microtransactions in video games that are relevant to gambling. Finally, due to its cross-sectional nature this research does not lay to rest debate as to whether video gaming serves as an entry point or “gateway” to gambling.

Conclusion

Past research has identified a number of commonalities between gambling and video gaming and hypothesized shared characteristics between problem gamblers and problem video game players. Co-involvement in these activities is common in Canada but there is little relationship between extent of play between gambling and gaming. Gambling and video gaming are ubiquitous in Canada and co-involvement in both is likely due to increasing online access rather than structural similarities between them. As expected, problem gamblers and problem video game players are more likely than non-problem participants to exhibit impulsivity, mental health problems, and other problematic behaviours. There were relatively modest differences between the two groups, however, with problem video game players being younger and more likely to have depression, and problem gamblers more likely to be impulsive and have a substance use disorder. Although risk factors associated with problem gambling and problem video game playing are similar, little differentiates those with problematic involvement in one activity from those in both activities. While concurrent problematic involvement between these activities is uncommon, future research may clarify commonalities between gambling/gaming activities and whether a longitudinal relationship exists.

Acknowledgements This research was supported by a grant from the Alberta Gambling Research Institute.

Compliance with Ethical Standards

Conflict of interest The authors declare no conflicts of interest.

Ethical Approval This study involving human participants was in accordance with the ethical standards of the University of Lethbridge Office of Research Ethics.

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