

# FACTORS DISTINGUISHING PROBLEM GAMBLERS, PROBLEM VIDEO-GAMERS, AND DUAL PROBLEM GAMBLERS/VIDEO-GAMERS

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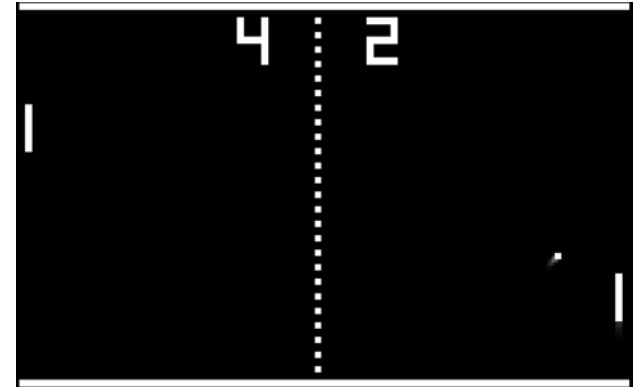
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# Disclosure

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# Video games

- First commercially available games emerged in 1970s
- These games available on arcade games, gaming consoles, and home computers
- Arcade games more prominent



# Video games

- By the 1980s-1990s game consoles and games on home computers improved in quality
- Some portable games were introduced
- Arcade games continued to offer a higher quality game experience



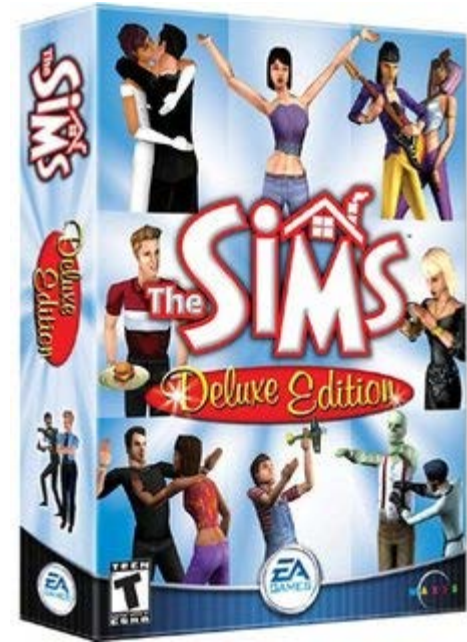
# Video games

- Online-type games have been available since the 1970s but there was little demand without in-home internet access
- Some early online games involved directly connecting to another player via modem
- Later, game players could connect to dedicated servers which hosted many players at once
- Early online games were available on computers and later on consoles



# Video games

- Traditionally, video games have been thought of as a male-dominated activity
- A number of games marketed toward women have been developed, including cooperative and story-driven games
- In Canada, nearly half of video game players are women





# Video games

- Video games have expanded onto mobile phones and tablets
- Games can be readily downloaded and played
- Many games are offered free but involve in-app purchases
- Games are also embedded in social media



# Problematic video game play

- First reports of “addiction” in the 1980s
- Debate in the research regarding terminology (excessive vs. problematic vs. addiction; computer games vs. video games vs. internet games)
- Criteria for Internet Gaming Disorder introduced in DSM-5 (2013)



# Internet Gaming Disorder

- In Section III, as a condition that requires further study
- Non-Gambling gaming
- Criteria (5 or more of following in past 12 months)
  - Preoccupation with internet games
  - Withdrawal symptoms when internet gaming taken away
  - Increased tolerance
  - Unsuccessful attempts to control participation
  - Loss of interest in hobbies and entertainment as a result of internet games
  - Continued excessive use despite knowledge of psychosocial problems
  - Deceived others regarding amount of internet gaming
  - Use as escape or relief of negative mood
  - Jeopardized relationship and opportunities because of participation in internet games

# Summary

- Advancing technology allows video game players to conveniently access and play video games
- Online access has expanded types of games played and how games are played
- “Video game addiction” has been a concern identified in research
- Some types of games may be more problematic than others
- Many who grew up in a “video game generation” are now adults

# Video game play in Canada

- More than half of Canadian adults regularly play video games, with 48% of those being women (ESAC, 2013)
- Turner et al. (2012) assessed 2,832 adolescents aged 12 to 19 from a central-Canadian province using an in-class survey, where 9.4% were classified with problematic gaming behaviour
- To our knowledge, no prevalence studies of problematic video game play have been undertaken in Canada previously

# Video game play in Canada

- 1,238 adults were contacted via online panel, with 44% (n = 542) reporting regular video game play. 93% of those (n = 506) completed the entire survey.
- The average age of video game players was 41.7 (*Range* = 18-88, *SD* = 14.3).
- Males accounted for 61% (n = 309) and females 39% (n = 197).
- Numerous genres (16) were identified, with the most commonly played being Facebook/Browser games (19.4%, n = 98).
- About half played primarily online (52.8%, n = 267).
- 3.1% of the entire sample (n = 38) met IGD criteria

# Video game play in Canada

- Forward stepwise binary logistic regression was used to identify predictors of IGD
  - Moderate classification accuracy (68%) was obtained
  - Moderate percentage of variance explained (Nagelkerke R Square = .36)
  - Predictors of IGD were as follows:
    - engaging in primarily *online* video game play
    - being employed less than full-time
    - early age of onset of video game play
    - being male
    - lower levels of education
    - esteem or competitive motives

# Relationship between problem gambling and gaming

- Previous research has explored the relationship between problem gambling and problem video/internet gaming
  - Delfabbro et al., 2009
    - VG play itself is unlikely to be a risk factor for pathological gambling
  - King, Ejova, & Delfabbro, 2012
    - VG playing associated with increased perception of control over chance-based gambling activities
  - Walther, Morgenstern, & Hanewinkel, 2012
    - Shared characteristics (male, low parental monitoring, and high impulsivity and ADHD) between problem gamblers and problematic computer gamers
  - Müller et al., 2014
    - Low conscientiousness and low extraversion distinguish IGD from pathological gamblers
  - Choi et al., 2014
    - IGD greater impulsivity overall than Gambling Disorder, but Gambling Disorder greater compulsivity than IGD
  - Forrest, King, & Delfabbro, 2016
    - Gambling and gaming frequency unassociated, age only predictor of gaming 'addiction' and gambling frequency
  - McBride & Derevensky, 2016
    - Adolescent gamblers more likely to play VG, and VG players more likely to gamble
    - Addicted VG more likely to gamble than social VG
    - Small sample of dual problem gamblers/addicted VG

# Purpose

- People having over-involvement in problem gambling (PG) and problem video-gaming (PVG) appear to share many demographic, mental health, and personality characteristics.
- This research aims to better understand the similarities and differences between PG and PVG.
- Additionally, this study will evaluate another group, dual PG and PVG players, in comparison to PG or PVG.



# Procedure

- Participants were recruited from a Canada-wide online panel. Online internet panels consist of thousands of individuals who are recruited to respond to survey requests for which they receive compensation (Görizt, 2007).
- To recruit participants, an e-mail solicitation was sent to online panelists 18 years and older with the question “Do you regularly gamble and/or play video games?”

# Measures

- Demographics
- Gambling/game-play characteristics
- Problem and Pathological Gambling Measure (PPGM)
- Behavioural Addiction Measure – Video Games (BAM-VG)
- DSM-5 criteria for various disorders
- UPPS-P (impulsivity)
- Self-report statements of problems in related activities  
(sex/pornography, social media, other unrelated internet use)

# Problem and Pathological Gambling Measure (PPGM)

- Assesses domains of 1) impaired control, and 2) significant negative consequences deriving from impaired control
- Comprehensively assesses range of potential harms deriving from gambling, and minimizes false positives and false negatives
  - requiring monthly or more gambling to be designated as a problem gambler
  - designating people with subclinical levels of symptomatology as problem gamblers if their expenditure and frequency of gambling is equivalent to unambiguously identified problem gamblers
- Cronbach alpha = .76 - .81 and one month test-retest reliability ( $r = .78$ ) equivalent to CPGI, SOGS, and operationalizations of DSM criteria
- PPGM has better overall classification accuracy (kappa = .96) compared to either the CPGI (kappa = .56), DSM-IV (kappa = .68), or SOGS (kappa = .62) when compared to clinical assessment (Williams & Volberg, 2014).

# Behavioural Addiction Measure – Video Games (BAM-VG)

- Developed based on PPGM (Sanders & Williams, 2016)
- Good internal consistency (Cronbach's alpha = 0.87) and retest reliability (tau b [462] = 0.73,  $p < 0.01$ )
- Criterion-related validity and construct validity demonstrated by significant correlations with: time spent playing, self-identification of video game problems, and scores on other instruments designed to assess video game addiction (DSM-5 IGD, IGD-20)
- Principal component analysis identified two components underlying the BAM-VG that roughly correspond with impaired control and significant negative consequences deriving from this impaired control

# DSM-5 criteria

- Substance Use Disorder
- Major Depressive Disorder
- Generalized Anxiety Disorder
- Posttraumatic Stress Disorder
- Social Anxiety Disorder
- Panic Disorder
- Antisocial Personality Disorder

# UPPS-P

- 20 item scale assessing impulsivity
- Good internal consistency (Cronbach  $\alpha$  ranged from .70 to .84 for the various subscales) and strong retest reliability (.84 to .92) (Billieux, et al., 2012)
- Factorial validity suggests a hierarchical model with 2 higher order factors, or distinct 5 facets (Billieux, et al., 2012)
- External validity established with correlations with AUDIT, STAI, and BDI (Billieux, et al., 2012)
- The sum of the UPPS-P was used for analysis

# Analysis

- Analyses were undertaken to answer the following research questions:
  1. What variables distinguish problem gamblers from problem video game players?
  2. What variables distinguish dual problem gamblers/video game players from those with one of problem gambling/video game playing?
- Univariate analysis included chi square and Mann Whitney U tests
- Multivariate analysis included Forward Stepwise Binary Logistic Regression (weighted)



# Results

- 4,006 respondents completed the survey
- 3,942 were retained after cleaning (mean age 43.6, 50.5% female)
- The majority were married or cohabiting (n = 2,303, 58.9%)
- Educated sample with majority completing postsecondary program (n = 2,121, 54.2%)
- Median household income between \$60,000-\$69,999
- 78.5% of video game players gambled, and 70.7% of gamblers played video games. More participants were involved in both activities than not ( $\chi^2(3,870) = 131.730, p = <.001$ )
- 10.6% were classified PG (n = 417), 3.9% were PVG (n = 154), and 1.2% were concurrent problem gamblers and problem video game players (PG/PVG) (n = 49).

# Research question #1

What variables distinguish  
problem gamblers from  
problem video game players?

Variables distinguishing PG from PVG		Demographics			
		None	PG	PVG	PG/PVG
		%	%	%	%
Sex	Male	48.6%	54.4%	51.9%	56.3%
	Female	51.4%	45.6%	48.1%	43.8%
Marital Status*	Never married	27.6%	<b>32.1%</b>	<b>48.7%</b>	38.8%
	Married	41.8%	<b>37.9%</b>	<b>26.0%</b>	30.6%
	Co-habiting	18.7%	<b>15.2%</b>	<b>17.5%</b>	22.4%
	Previously married	11.9%	<b>14.7%</b>	<b>7.8%</b>	8.2%
Education	Did not complete high school	3.6%	4.1%	2.6%	6.3%
	Completed high school	19.8%	22.3%	20.8%	12.5%
	Some university or college	21.1%	24.7%	36.4%	20.8%
	Completed university or	46.8%	42.0%	33.1%	50.0%
	Professional Degree, Masters,	8.7%	7.0%	7.1%	10.4%
Employment*	Not employed	32.7%	<b>32.2%</b>	<b>30.3%</b>	16.3%
	Full-time student	6.5%	<b>6.7%</b>	<b>17.1%</b>	16.3%
	Part-time employment	12.0%	<b>13.2%</b>	<b>18.4%</b>	10.2%
	Full-time employment	48.9%	<b>47.8%</b>	<b>34.2%</b>	57.1%

	Continuous variables (age & UPPS)							
	None		PG		PVG		PG/PVG	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age*	44.24	(16.07)	<b>42.11</b>	<b>(13.91)</b>	<b>36.38</b>	<b>(14.79)</b>	37.77	(13.91)
UPPS-P* (Impulsivity)	43.24	(7.96)	<b>48.79</b>	<b>(7.53)</b>	<b>46.51</b>	<b>(8.19)</b>	51.07	(8.16)

\* =  $p < 0.05$

Variables Distinguishing PG from PVG	DSM-5 Diagnoses			
	None	PG	PVG	PG/PVG
	%	%	%	%
Substance Use Disorder*	5.0%	<b>22.3%</b>	<b>13.0%</b>	28.6%
Major Depressive Disorder*	10.1%	<b>20.6%</b>	<b>29.9%</b>	30.6%
Generalized Anxiety Disorder	8.6%	25.7%	27.9%	26.5%
PTSD	7.0%	16.3%	18.2%	22.4%
Social Anxiety Disorder*	2.9%	<b>3.6%</b>	<b>9.7%</b>	6.1%
Panic Disorder	9.2%	24.7%	19.5%	28.6%
Antisocial Personality Disorder	2.0%	14.1%	8.4%	26.5%

\* =  $p < 0.05$

Variables Distinguishing PG from PVG	Other related problems (self-report)							
	None		PG		PVG		PG/PVG	
	n	%	n	%	n	%	n	%
Sex or pornography*	107	3.2%	<b>42</b>	<b>10.1%</b>	<b>25</b>	<b>16.2%</b>	8	16.3%
Social media (i.e. Facebook)	79	2.4%	38	9.1%	20	13.0%	8	16.3%
Other internet use (not gambling, video games, pornography, or social media)*	26	.8%	<b>20</b>	<b>4.8%</b>	<b>16</b>	<b>10.4%</b>	3	6.1%

\* =  $p < 0.05$

# Multivariate differences predicting PVG (vs PG) group membership

Forward Stepwise Binary Logistic Regression (weighted)  
(Nagelkerke R Square = 0.190)

<b>Variable</b>	<b>beta</b>	<b>Odds Ratio</b>	<b>Wald</b>	<b>p Value</b>
UPPS-P (Impulsivity)	-0.05	.951	20.418	<0.05
Age	-0.28	.973	15.529	<0.05
Problems with other Internet use	1.018	2.769	7.994	<0.05
Marital Status	-	-	7.827	<0.05
Antisocial Personality Disorder	-.821	.440	6.461	<0.05
Major Depressive Disorder	.532	1.702	6.190	<0.05
Substance Use Disorder	-.549	.577	5.470	<0.05
Social Anxiety Disorder	.864	2.373	4.722	<0.05

## Research question #2

What variables distinguish dual problem gamblers/video game players from those with one of problem gambling/video game playing?



Variables distinguishing PG from PG/PVG		Demographics			
		None	PG	PVG	PG/PVG
		%	%	%	%
Sex	Male	48.6%	54.4%	51.9%	56.3%
	Female	51.4%	45.6%	48.1%	43.8%
Marital 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%	4.1%	2.6%	6.3%
	Completed high school	19.8%	22.3%	20.8%	12.5%
	Some university or college	21.1%	24.7%	36.4%	20.8%
	Completed university or	46.8%	42.0%	33.1%	50.0%
	Professional Degree, Masters,	8.7%	7.0%	7.1%	10.4%
Employment*	Not employed	32.7%	<b>32.2%</b>	30.3%	<b>16.3%</b>
	Full-time student	6.5%	<b>6.7%</b>	17.1%	<b>16.3%</b>
	Part-time employment	12.0%	<b>13.2%</b>	18.4%	<b>10.2%</b>
	Full-time employment	48.9%	<b>47.8%</b>	34.2%	<b>57.1%</b>

	Continuous variables (age & UPPS)							
	None		PG		PVG		PG/PVG	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age*	44.24	(16.07)	<b>42.11</b>	<b>(13.91)</b>	36.38	(14.79)	<b>37.77</b>	<b>(13.91)</b>
UPPS-P (Impulsivity)	43.24	(7.96)	48.79	(7.53)	46.51	(8.19)	51.07	(8.16)

\* =  $p < 0.05$

Variables Distinguishing PG from PG/PVG	DSM-5 Diagnoses			
	None	PG	PVG	PG/PVG
	%	%	%	%
Substance Use Disorder	5.0%	22.3%	13.0%	28.6%
Major Depressive Disorder	10.1%	20.6%	29.9%	30.6%
Generalized Anxiety Disorder	8.6%	25.7%	27.9%	26.5%
PTSD	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 Disorder*	2.0%	<b>14.1%</b>	8.4%	<b>26.5%</b>

\* =  $p < 0.05$

Variables Distinguishing PG from PG/PVG	Other related problems (self-report)			
	None	PG	PVG	PG/PVG
	%	%	%	%
Sex or pornography	3.2%	10.1%	16.2%	16.3%
Social media (i.e. Facebook)	2.4%	9.1%	13.0%	16.3%
Other internet use (not gambling, video games, pornography, or social media)	.8%	4.8%	10.4%	6.1%

\* =  $p < 0.05$

Variables distinguishing PVG from PG/PVG		Demographics			
		None	PG	PVG	PG/PVG
		%	%	%	%
Sex	Male	48.6%	54.4%	51.9%	56.3%
	Female	51.4%	45.6%	48.1%	43.8%
Marital 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%	4.1%	2.6%	6.3%
	Completed high school	19.8%	22.3%	20.8%	12.5%
	Some university or college	21.1%	24.7%	36.4%	20.8%
	Completed university or	46.8%	42.0%	33.1%	50.0%
	Professional Degree, Masters,	8.7%	7.0%	7.1%	10.4%
Employment	Not employed	32.7%	32.2%	30.3%	16.3%
	Full-time student	6.5%	6.7%	17.1%	16.3%
	Part-time employment	12.0%	13.2%	18.4%	10.2%
	Full-time employment	48.9%	47.8%	34.2%	57.1%

	Continuous variables (age & UPPS)							
	None		PG		PVG		PG/PVG	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Age	44.24	(16.07)	42.11	(13.91)	36.38	(14.79)	37.77	(13.91)
UPPS-P* (Impulsivity)	43.24	(7.96)	48.79	(7.53)	<b>46.51</b>	<b>(8.19)</b>	<b>51.07</b>	<b>(8.16)</b>

\* =  $p < 0.05$

Variables Distinguishing PVG from PG/PVG	DSM-5 Diagnoses			
	None	PG	PVG	PG/PVG
	%	%	%	%
Substance Use Disorder*	5.0%	22.3%	<b>13.0%</b>	<b>28.6%</b>
Major Depressive Disorder	10.1%	20.6%	29.9%	30.6%
Generalized Anxiety Disorder	8.6%	25.7%	27.9%	26.5%
PTSD	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 Disorder*	2.0%	14.1%	<b>8.4%</b>	<b>26.5%</b>

\* =  $p < 0.05$

Variables Distinguishing PVG from PG/PVG	Other related problems (self-report)			
	None	PG	PVG	PG/PVG
	%	%	%	%
Sex or pornography	3.2%	10.1%	16.2%	16.3%
Social media (i.e. Facebook)	2.4%	9.1%	13.0%	16.3%
Other internet use (not gambling, video games, pornography, or social media)	.8%	4.8%	10.4%	6.1%

\* =  $p < 0.05$

# Multivariate differences predicting Dual PG/PVG (vs either PG or PVG) group membership

Forward Stepwise Binary Logistic Regression (weighted)  
(Nagelkerke R Square = 0.178)

<b>Variable</b>	<b>beta</b>	<b>Odds Ratio</b>	<b>Wald</b>	<b>p Value</b>
UPPS-P (Impulsivity)	.064	1.066	42.560	<0.05
Employment Status	-	-	40.355	<0.05
Problems with Social Media	.863	2.370	13.443	<0.05
Generalized Anxiety Disorder	-.587	.556	10.565	<0.05
Antisocial Personality Disorder	.559	1.749	8.461	<0.05
PTSD	.504	1.655	7.105	<0.05



# Discussion – PG vs PVG

- PG predicted impulsivity, antisocial personality disorder, and substance use disorder
- PVG predicted lower age, depression, social anxiety, and problems with internet use. Problems with sex/pornography were identified in univariate analyses
- These distinctions between PG and PVG/IGD seem consistent with previous research (Choi et al., 2014; Müller et al., 2014)

# Discussion – Dual PG/PVG

- Compared to PG, Dual PG/PVG were younger and presented with higher rates of Antisocial Personality Disorder
- Compared to PVG, Dual PG/PVG had greater impulsivity and higher rates of Antisocial Personality Disorder and Substance Use Disorder
- Multivariate analysis suggested that compared with PG or PVG, Dual PG/PVG had greater impulsivity and higher rates of Antisocial Personality Disorder, PTSD, and problems with social media
- These results suggest that antisociality and, to a lesser extent, impulsivity and SUD may be associated with the presence of dual behavioural addictions
- Previous research has identified Problem Gambling as “generality of deviance”, a co-occurrence of risky and antisocial behaviour (Mishra et al., 2017)

# Limitations

- No data available on panelists who were not gamblers or game players
- Online panels
  - Tend to oversample for pathology
  - Access to internet required

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