

# What is the link between video gaming and gambling?

## Supplementary materials

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## MEASURES

### Gambling

Gambling items were developed for LSAC.

At ages 16–17 years (Wave 7; 2016) and 18–19 years (Wave 8; 2018) the LSAC K cohort were asked to indicate 'Yes' or 'No' to whether they had spent any money on 10 different gambling products in the last 12 months. The 10 products were: 1) instant scratch tickets ('scratchies'); 2) bingo; 3) Lotto or lottery games; 4) Keno; 5) private betting with friends or family; 6) poker; 7) casino table games; 8) poker machines ('pokies'); 9) betting on horse or dog races; and 10) betting on sports.

### Gambling-related problems

Gambling-related problems are commonly assessed via the Problem Gambling Severity Index (PGSI).<sup>1</sup> The PGSI provides a measure of at-risk behaviour in problem gambling during the previous 12-month period. It consists of nine items (questions):

- a. Have you bet more than you could really afford to lose?
- b. Have you needed to gamble with larger amounts of money to get the same feeling of excitement?
- c. When you gambled, did you go back another day to try to win back the money you lost?
- d. Have you borrowed money or sold anything to get money to gamble?
- e. Have you felt that you might have a problem with gambling?
- f. Has gambling caused you any health problems, including stress or anxiety?
- g. Have people criticised your betting or told you that you had a gambling problem, regardless of whether or not you thought it was true?
- h. Has your gambling caused any financial problems for you or your household?
- i. Have you felt guilty about the way you gamble or what happens when you gamble?

Response options are: never (0); sometimes (1); most of the time (2); and almost always (3). Scores are summed for a total between 0 and 27. Respondents are grouped into four categories based on their scores: non-problem gambling (0), low-risk gambling (1–2), moderate-risk gambling (3–7), and problem gambling (8–27). Respondents scoring 1+ may be classified as being at some risk of, or already experiencing, gambling-related problems.

<sup>1</sup> Ferris, J., & Wynne, H. (2001). *The Canadian problem gambling index: Final report*. Ottawa, ON: Canadian Centre on Substance Abuse.

## Video gaming

From Wave 5 (aged 12–13 years) to Wave 7 (aged 16–17 years), Young people were asked how often they used a computer or computer-like device to play games. We used the most frequent category ‘Almost every day’ as an indicator of daily video gaming. In Wave 7, they were also asked the following question:

*Some electronic games are like gambling but do not involve betting money. Thinking about the last 12 months, since [current month], how often have you played free games like these?*

*For example, Zynga Poker, Slotomania, Big Fish Casino. Such games could be played on social network sites (e.g. Facebook), smartphone or tablet devices or gaming consoles (e.g. PlayStation, Xbox).*

## FULL RESULTS

We estimated sequential bivariate probit models to deal with endogeneity.<sup>2</sup> For the equation for playing video games daily, we used the information on whether these young people had access to video games in their bedroom aged 14–15 years old as an instrumental variable. For the equation for gambling-like video games, we used access to internet in their bedroom at aged 14–15 years old as an instrumental variable. The control variables used in the models were: age; gender; things engaged in after left school (study or work); weekly income; living in a parent’s home; speaking a language other than English at home; having a sibling; drinking more than 10 alcoholic drinks in the last seven days; state; living in a major city; living in a socially disadvantaged area; parent’s gambling; parenting style; personality traits (Big 5);<sup>3</sup> and risk preference.

**Table S1:** Estimated effects of playing video games daily on gambling participation

Spent money on gambling in the last 12 months	Any	Scratchies	Casino table games	Pokies	Racing	Sports
	Marginal effects	Marginal effects	Marginal effects	Marginal effects	Marginal effects	Marginal effects
Playing video games every day (aged 16–17)	-0.26	-0.08	-0.18	-0.05	-0.05	0.03
	[0.25]	[0.21]	[0.11]	[0.20]	[0.10]	[0.06]
Instrument						
Access to electronic games in bedroom (aged 12–13)	0.08***	0.09***	0.09***	0.09***	0.09***	0.09***
	[0.03]	[0.03]	[0.03]	[0.03]	[0.03]	[0.03]
Observations	1,547	1,538	1,534	1,541	1,534	1,539
Log pseudo-likelihood	-1,773	-1,393	-1,295	-1,630	-1,291	-1,216
Wald test	480.9***	373.7***	537***	466.3***	403.7***	471.8***
Wald test of rho = 0	0.60	0.30	2.16	0.01	0.39	0.31

**Notes:** Sequential bivariate probit models were estimated. \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ . Standard errors in brackets. Marginal probabilities are computed with  $y = \text{Pr}(\text{Playing video games daily at age 16–17} = 1, \text{Gambling at age 18–19} = 1)$ . Only main variables are reported.

<sup>2</sup> Wooldridge, J. (2010). *Econometric Analysis of Cross Section and Panel Data, 2nd edition*. Cambridge: The MIT Press.

<sup>3</sup> Rammstedt, B., & John, O. P. (2007). Measuring personality in one minute or less: A 10-item short version of the Big Five Inventory in English and German. *Journal of Research in Personality, 41*(1), 203–212.

**Table S2:** Estimated effects of simulated gambling games on gambling participation

Spent money on gambling in the last 12 months	Any	Scratchies	Casino table games	Pokies	Racing	Sports
	Marginal effects	Marginal effects	Marginal effects	Marginal effects	Marginal effects	Marginal effects
Playing simulated gambling games (aged 16-17)	0.40**	0.28	0.26***	0.21	0.29***	0.21***
	[0.17]	[0.17]	[0.08]	[0.17]	[0.05]	[0.07]
Instrument						
Access to internet in bedroom (aged 12-13)	0.06***	0.06***	0.06***	0.06**	0.06***	0.06***
	[0.02]	[0.02]	[0.02]	[0.02]	[0.02]	[0.02]
Observations	1,559	1,551	1,545	1,553	1,545	1,550
Log pseudo-likelihood	-1,617	-1,298	-1,197	-1,531	-1,197	-1,118
Wald test	394.7***	214***	428.3***	339.6***	459.8***	419.5***
Wald test of rho = 0	1.59	1.30	3.60*	0.84	12.52***	4.19**

**Notes:** Sequential bivariate probit models were estimated. \*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ . Standard errors in brackets. Marginal probabilities are computed with  $y = \text{Pr}(\text{Playing simulated gambling games at aged 16-17} = 1, \text{Gambling at age 18-19} = 1)$ . Only main variables are reported.

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