

Are General and Activity-Specific PGSI Scores Consistent?

Eva Monson,¹ Sylvia Kairouz,² Matthew Perks,³ & Nicole Arsenault²

¹ Département des sciences de la santé communautaire, Faculté de médecine et des sciences de la santé, Université de Sherbrooke, Longueuil, Québec, Canada

² Department of Anthropology and Sociology, Concordia University, Montreal, Québec, Canada

³ Department of Sociology and Legal Studies, University of Waterloo, Waterloo, Ontario, Canada

Abstract

Gambling research has highlighted substantial activity-specific differences in gambling behaviours, but measures of problem gambling remain non-specific. This paper aims to examine the consistency of general versus activity-specific Problem Gambling Severity Index (PGSI) scores among a sample of moderate-risk and problem gamblers in Québec, Canada. Correlations and *t* tests were conducted to examine associations and differences between general and activity-specific PGSI scores. Results were analyzed by number of activities reported and activity rank for lottery, video lottery terminals (VLTs), and slot machines and suggested that PGSI scores may not accurately reflect problem gambling severity for all specific activities. General and activity-specific PGSI scores were more highly correlated when lottery was the primary activity, whereas for VLTs, scores were highly correlated regardless of number or rank of activities. General PGSI scores were significantly higher than activity-specific scores for lottery, but general and activity-specific scores were not significantly different for VLTs, demonstrating that the PGSI is a better indicator of activity-specific scores for some forms of gambling over others. Researchers conducting population surveys should exercise caution in assigning general PGSI scores to specific activities.

Keywords: gambling, problem gambling, Problem Gambling Severity Index, activity-specific, assessment, lottery, video lottery terminals, slot machines

Résumé

La recherche sur le jeu a mis en évidence des différences majeures dans les comportements de jeu spécifiques à des activités, mais les mesures du jeu problématique demeurent non spécifiques. L'étude vise à examiner la cohérence entre les scores généraux de l'indice de gravité du jeu problématique (IGJP) et ceux propres à des

activités parmi un échantillon de joueurs à risque modéré et de joueurs compulsifs en [province, pays]. Des corrélations et des tests de Student ont été effectués pour examiner les associations et les différences entre les scores IGJP généraux et ceux spécifiques à des activités. Analysés en fonction du nombre d'activités déclarées et du classement des activités de loterie, d'appareils de loterie vidéo (ALV) et de machines à sous, les résultats laissent entendre que les scores IGJP pourraient ne pas refléter avec précision la gravité du jeu pathologique en ce qui concerne des activités particulières. Dans le cas où la loterie était l'activité principale, les scores IGJP généraux et ceux propres à l'activité étaient très fortement corrélés; pour les appareils de loterie vidéo, les scores étaient fortement corrélés, quels que soient le nombre ou le classement des activités. En ce qui concerne la loterie, les scores IGJP généraux étaient largement plus élevés que les scores propres à l'activité, mais ils n'étaient pas très différents dans le cas des ALV, ce qui démontre que l'IGJP est un meilleur indicateur seulement pour certaines formes de jeu. Les chercheurs qui mènent des enquêtes auprès de la population doivent faire preuve de prudence lorsqu'ils attribuent des scores IGJP généraux à des activités spécifiques.

Introduction

Gambling research has highlighted substantial activity-specific differences in gambling behaviours, but standard measures of problem gambling remain non-specific, failing to account for potential variations in problem gambling assessment between activities. To derive activity-specific gambling outcomes, studies have assigned general problem gambling scores to groups who report that they exclusively, or even non-exclusively, participate in a specific form of gambling. To date, no research has critically assessed the ability of problem gambling assessment tools to accurately describe activity-specific outcomes.

The Problem Gambling Severity Index (PGSI) is currently considered a gold standard assessment tool for the evaluation of problem gambling (Ferris & Wynne, 2001). Given its popularity and commonplace use, evaluating its capacity to adequately capture problem gambling for specific activities is of vital interest. The quantitative subsection of the Canadian Problem Gambling Index, the PGSI is a nine-item continuous scale widely used in Canadian and international population surveys to assess problem gambling severity (Currie, Hodgins, & Casey, 2013; Ferris & Wynne, 2001; Patton, Brown, Dhaliwal, Pankratz, & Broszeit, 2002; Romild, Volberg, & Abbott, 2014; Smith & Wynne, 2002; Wenzel, McMillen, Marshall, & Ahmed, 2004; Wiebe, Single, & Falkowski-Ham, 2001). The standardized items assess gambling-related problems through questions regarding gambling behaviours and potential negative consequences (Currie et al., 2013; Ferris & Wynne, 2001). Although previous research has demonstrated that the PGSI has strong validity and

reliability, it has yet to be validated for the assessment of activity-specific problem gambling (Currie et al., 2013; Wynne, 2003).

Research has repeatedly shown that gambling patterns and problems vary greatly according to the type and number of activities, as well as gambling-specific contextual factors such as location of venue, availability, and accessibility (Binde, 2011; Binde, Romild, & Volberg, 2017; Calado & Griffiths, 2016; Costes, Kairouz, Monson, & Eroukmanoff, 2018; Kairouz, Nadeau, & Paradis, 2011; Kairouz, Paradis, & Monson, 2015; Stevens & Young, 2010). Studies have found associations between specific types of gambling activities and problem gambling. Binde (2011) reported that across problem gambling prevalence surveys, electronic gambling machines (EGMs), casino, Internet, and unregulated gambling were consistently the four forms of gambling found to be most strongly associated with problem gambling, whereas lotteries and instant lotteries were weakly associated. Research has also demonstrated that among exclusive lottery gamblers, the prevalence of problem gambling is significantly lower than that among non-exclusive lottery gamblers (Costes et al., 2018; Holtgraves, 2009; Subramaniam et al., 2016). In addition, it is well established that problem gamblers are more likely to engage in high-risk activities such as EGMs, whereas non-problem gamblers tend to participate in low-risk activities such as lottery (e.g., Lund, 2006). Problem gamblers are also more likely to engage in a larger range of activities (Binde et al., 2017; Kessler et al., 2008) but tend to focus on one primary form of gambling (Breen & Zimmerman, 2002).

Some longitudinal studies have examined the link between participation in specific gambling activities and subsequent development of at-risk and problem gambling (e.g., Reith & Dobbie, 2013; Williams et al., 2015). For example, a recent longitudinal study from Ontario, Canada, demonstrated that continuous forms of gambling with high frequency and levels of reinforcement (e.g., EGMs) were strongly predictive of subsequent problem gambling (Williams et al., 2015). Reith and Dobbie (2013) reported in their qualitative longitudinal study of gambling behaviour that, among individuals whose gambling became more problematic, machine gambling (i.e., EGM) featured more prominently. Examples such as these demonstrate that structural differences between different forms of gambling might result in different patterns of problem gambling development, with the most problematic and addictive gambling activities being those that involve continuous, high-frequency activities with short intervals between stake and payout (e.g., EGMs; e.g., Calado & Griffiths, 2016; Williams et al., 2015).

Although recent research has established the distinct characteristics of specific forms of gambling in relation to the severity of gambling patterns and problems, it remains unclear whether the PGSI is a suitable indicator of gambling-related problems across the full spectrum of gambling activities. It is important to determine whether the PGSI score is equally effective in assessing problems across all types of gambling activities and whether general PGSI scores accurately reflect the severity of problems associated with distinct gambling activities. Thus, this paper aims to examine the consistency between general PGSI scores and scores reported for specific activities

among moderate-risk and problem gamblers. Given that empirical data have repeatedly demonstrated that not all forms of gambling represent the same level of risk for problems, we hypothesized that differences would be found between general PGSI scores and those for specific activities.

Method

Data Sources

Data were derived from the 2009 cross-sectional survey ($N = 11,888$) of the ENHJEU-Québec Survey and are representative of the adult population of Québec, Canada (Kairouz et al., 2011). Details of the ENHJEU-Québec 2009 survey sampling design can be found in depth elsewhere (Kairouz et al., 2011). Participants from the ENHJEU-Québec Survey who reported having gambled, in the past year, more than \$500 CAD or having gambled more than 52 times (excluding lottery), or who felt they had a gambling problem, were asked to complete the PGSI. Those who were identified as moderate-risk (PGSI score of 3–7) or problem gamblers (PGSI score of ≥ 8) were included in this study ($N = 192$).

Study Measures

Respondents were asked to report the following demographic characteristics: age, sex, employment status, marital status, education level, and household income adequacy (calculated by using total gross household income and number of persons living in the household). Participants were asked about their previous 12-month gambling participation for each of the following 11 activities: lottery, bingo, horse racing, slot machines, video lottery terminals (VLTs), poker, table games (excluding poker), keno, sports betting, card games, and games of skill. Respondents who indicated having participated in at least one of the 11 activities were then asked to specify the amount of money spent, over the past 12 months, on each of their gambling activities.

Problem gambling was assessed on the ENHJEU-Québec questionnaire by using the PGSI, which consists of nine items on gambling-related behaviours and consequences (Ferris & Wynne, 2001). Responses were self-reported on a 4-point Likert scale (“never,” “sometimes,” “most of the time,” “almost always”). From the PGSI problem gambling categories, respondents were categorized as either non-problem (score of 0), low-risk (1 or 2), moderate-risk (3–7), or problem gamblers (≥ 8). The PGSI demonstrates strong internal validity and reliability, as well as satisfactory temporal reliability, in both test and re-test samples (Currie et al., 2013; Ferris & Wynne, 2001). After completing the PGSI questionnaire, all moderate-risk and problem gamblers were asked to provide activity-specific answers to all PGSI items for which they gave a positive answer for each of their top three highest spending activities. This generated an overall PGSI score and a separate activity-specific PGSI score for up to three activities, which were ranked as primary, secondary, or tertiary on the basis of spending.

Analyses

Correlations were conducted to examine associations between general and activity-specific PGSI scores. These correlations were analyzed by activity rank and number of activities reported. We conducted *t* tests to compare means of general and activity-specific PGSI scores. Preliminary analyses revealed that lottery, slot machines, and VLTs were the most reported primary, secondary, and tertiary activities. The eight remaining activities were combined into an “other” category. All analyses were performed with Stata statistical analysis software (StataCorp, 2013).

Results

The final sample ($N = 192$) comprised 132 moderate-risk gamblers (PGSI 3–7; 68.8%) and 60 problem gamblers (PGSI ≥ 8 ; 31.2%). The mean age was 50.42, with respondents ranging in age between 19 and 85 years. The final sample consisted of 100 males (52.1%) and 92 females (47.9%). The majority of participants were employed (52.6%), 28.1% were retired, and 19.3% were students, at home, unemployed, or otherwise not employed at the time of the survey. A large proportion of participants were married or in a civil union (43.2%), 28.1% were single or never married, and 28.7% were widowed, separated, or divorced. The educational level of the majority of the sample (65.1%) was high school or less, with 34.9% having more than high school education. For household income adequacy, 16.7% of participants were categorized as low income, 35.1% as lower-middle income, 29.2% as higher-middle income, and 19.1% as high income.

In the past 12 months, the majority (52.9%) of the sample reported gambling on three or more activities, with 30.9% reporting two activities and 16.2% reporting a single activity. Of those who gambled on a single activity, the vast majority (90.3%) gambled on lottery; no individuals reported gambling exclusively on VLTs or slot machines. Lottery remained the most popular activity among those who reported gambling on two activities, and VLTs were the most reported primary activity among gamblers who reported three or more activities. A full breakdown of activities and their ranks can be found in Table 1.

Of the gamblers who reported gambling on a single activity in the past year, 9.7% were problem gamblers, whereas 90.3% were moderate-risk gamblers. Over a quarter (27.1%) of gamblers who reported two activities were problem gamblers and almost three-quarters (72.9%) were classified as moderate-risk gamblers. The group who reported gambling on three or more activities had the highest percentage of problem gamblers (40.2%), as well as 58.8% of moderate-risk gamblers.

Associations Between General PGSI and Activity-Specific Scores

When we compared the activity-specific PGSI scores for all activities combined with the general PGSI scores, results indicated that single-activity scores were highly correlated ($r = .8253$, $p \leq .001$). For gamblers reporting two activities, PGSI scores were highly correlated for primary activities ($r = .8911$, $p \leq .001$), whereas

Table 1
Observations in Sample by Number of Activities and Rank

Number of activities and rank	All activities ^a		Lottery		VLTs		Slot machines		Other ^b	
	<i>n</i>	%	<i>n</i>	% ^c	<i>n</i>	% ^c	<i>n</i>	% ^c	<i>n</i>	% ^c
1 Activity	31	16.2								
Primary	31		28	90.3	0	0	0	0	3	9.7
2 Activities	59	30.9								
Primary	59		23	39.0	10	16.9	15	25.4	11	18.6
Secondary	54 ^d		30	55.6	2	3.7	9	16.7	13	24.1
≥3 Activities	102	52.9								
Primary	101 ^d		27	26.7	42	41.6	12	11.9	20	19.8
Secondary	97 ^d		31	32.0	13	13.4	14	14.4	39	40.2
Tertiary	80 ^d		21	26.3	10	12.5	21	26.3	28	35.0

Note. VLTs = video lottery terminals.

^aActivity-specific Problem Gambling Severity Index (PGSI) scores for all activities combined. ^bAll activities other than lottery, VLTs, or slot machines. ^cRepresents the proportion of each different activity within a specific rank. ^dSome participants reported two or more activities but did not complete the activity-specific PGSI for all activities.

correlations were moderate for secondary activities ($r = .4518, p \leq .001$). When three or more activities were reported, correlations remained consistently high; the association for primary activity was highest ($r = .8659, p \leq .01$), followed by tertiary ($r = .7097, p \leq .001$) and then secondary activities ($r = .6638, p \leq .001$). Table 2 includes detailed correlations for each of the specific activities.

Comparison of General and Activity-Specific PGSI Means

When we compared the means of activity-specific PGSI scores for all activities combined with those of general PGSI scores for all activities, the general means were significantly higher regardless of the number of activities or their rank. For single-activity gamblers, the activity-specific mean score for all activities combined ($M = 2.48, SD = 3.38$) was significantly lower than the general mean score, $M = 4.61, SD = 2.65, t(30) = 6.21, p \leq .001$. For two-activity gamblers for all activities combined, the general means for primary activities were also significantly lower ($M = 6.85, SD = 5.56$) than activity-specific means, $M = 5.25, SD = 5.75, t(58) = 4.62, p \leq .001$. In addition, the mean general PGSI score ($M = 7.11, SD = 5.74$) was significantly higher than the activity-specific mean, $M = 2.61, SD = 4.54, t(53) = 6.04, p \leq .001$, for secondary activities for gamblers who reported two activities. For those reporting three or more gambling activities, when all activities were combined, activity-specific PGSI scores were also lower for all ranks. For the primary activity, the general mean was 8.06 ($SD = 5.44$) and the activity-specific mean was 6.37, $SD = 5.53, t(100) = 5.99, p \leq .001$; for the secondary activity, the general mean was 8.08 ($SD = 5.48$) and the activity-specific mean was 3.93, $SD = 4.95, t(96) = 9.51, p \leq .001$; and for the tertiary activity, the general mean was 7.76 ($SD = 5.05$) and the activity-specific mean was 3.54, $SD = 5.54, t(79) = 9.31, p \leq .001$. Regarding specific

Table 2
Correlation Between General and Activity-Specific PGSI Scores by Number of Activities and Rank

Number of activities and rank	All activities ^a		Lottery		VLTs		Slot machines	
	<i>n</i>	<i>r</i>	<i>n</i>	<i>r</i>	<i>n</i>	<i>r</i>	<i>n</i>	<i>r</i>
1 Activity								
Primary	31	.8253***	28	.8278***	--	--	--	--
2 Activities								
Primary	59	.8911***	23	.6877***	10	.9788***	15	.6605**
Secondary	54	.4518***	30	.4102*	2	^b	9	.3896
≥3 Activities								
Primary	101	.8659**	27	.8669***	42	.8877***	12	.7974**
Secondary	97	.6638***	31	.4413*	13	.9557***	14	.6495*
Tertiary	80	.7097***	21	.6052**	10	.9308***	21	.9076***

Note. PGSI = Problem Gambling Severity Index; VLTs = video lottery terminals.

^a Activity-specific PGSI scores for all activities combined. ^b *n* < 5; non-publishable results.

p* ≤ 0.05. *p* ≤ 0.01. ****p* ≤ 0.001.

activities, *t* tests showed that the consistency between means of general and activity-specific PGSI scores fluctuated, depending on the number and rank of specific activities. For detailed results broken down by activity type and rank, see Table 3.

Discussion

This paper aimed to assess whether the PGSI accurately reflects the level of severity of problems experienced with specific forms of gambling. With few exceptions, our findings demonstrate adequate levels of correlation between general and specific PGSI scores. Given that this is a type of test-retest scenario that uses the same form of assessment, correlations would be expected to be high and differences in means small. However, our findings highlight important variations in the associations and the convergence between general and activity-specific PGSI scores observed when the number and rank of specific activities is considered. Overall, the PGSI seems adequate to assess problem gambling severity for primary activities but is less accurate in capturing the reality of gambling patterns for secondary activities. For tertiary activities, the PGSI is more accurate, especially for VLTs and slot machines. This increased consistency for gamblers who report participation in three or more activities reflects the fact that this group is distinct; it includes a higher proportion of problem gamblers who are likely to have higher scores across all activities. The analyses performed for this study also yielded two notable trends.

Lottery

Lottery gambling was pervasive within this sample. Of the three main activities examined, lottery was the only single, or exclusive, reported activity. These findings

Table 3
Results of *t* tests Between General and Activity-Specific PGSI Scores by Number of Activities and Rank

Number of activities and rank	All activities ^a (N = 192)			Lottery (n = 187)			VLTs (n = 119)			Slot machines (n = 84)		
	General M (SD)	Specific M (SD)	df	t	General M (SD)	Specific M (SD)	df	t	General M (SD)	Specific M (SD)	df	t
1 Activity												
Primary	4.61 (2.65)	2.48 (3.38)	30	6.21***	4.68 (2.79)	2.64 (3.51)	27	5.46***	--	--	--	--
2 Activities												
Primary	6.85 (5.56)	5.25 (5.75)	58	4.62***	4.83 (2.64)	2.65 (2.57)	22	5.06***	14.90 (7.40)	14.00 (7.41)	9	1.87
Secondary	7.11 (5.74)	2.61 (4.54)	53	6.04***	8.13 (6.84)	2.23 (5.14)	29	4.85***	_b 7.11 (3.37)	5.00 (4.09)	8	1.52
≥ 3 Activities												
Primary	8.06 (5.44)	6.37 (5.53)	100	5.99***	6.19 (4.21)	3.52 (4.02)	26	6.50***	9.71 (5.90)	9.17 (5.56)	41	1.29
Secondary	8.08 (5.48)	3.93 (4.95)	96	9.51***	8.94 (6.02)	2.65 (4.47)	30	6.15***	7.54 (4.79)	6.31 (4.39)	12	3.12**
Tertiary	7.76 (5.05)	3.54 (5.54)	79	9.31***	6.52 (4.34)	1.19 (2.91)	20	7.05***	7.70 (6.95)	4.90 (7.09)	9	3.38**

Note. PGSI = Problem Gambling Severity Index; VLTs = video lottery terminals.

^aActivity-specific PGSI scores for all activities combined. ^bn < 5; non-publishable results.

** p ≤ .01. ***p ≤ .001.

align with previous studies that have consistently demonstrated lottery gambling is popular and that many people gamble on this activity exclusively (Costes et al., 2018; Subramaniam et al., 2016). Because lottery gamblers are the majority of single-activity gamblers in this sample, it is perhaps unsurprising that fewer problem gamblers were observed in this group, as previous research has found that lottery gamblers are less likely to be problem gamblers (Subramaniam et al., 2016).

For lottery gamblers, general and activity-specific PGSI scores were more highly correlated when lottery was the primary activity regardless of how many activities were reported. There was a higher correlation for lottery as the tertiary activity in the case of three or more activities. Mean differences between general and activity-specific PGSI scores for lottery were much greater than were those for VLTs and slot machines. Significant mean differences were observed across all numbers and ranks of activity for lottery. In all cases, the activity-specific mean was significantly lower than the general PGSI score means. There were notable shifts between PGSI categories within these results. For example, when lottery was a secondary activity, means decreased from an average that would be categorized as problem gambling to a low-risk categorization. This is an important finding, given that these scores were highly correlated; yet, results suggest that general PGSI scores overestimate lottery-specific problem gambling severity. As a result, participants who are categorized as problem gamblers may in reality not demonstrate the same level of gambling-related problems in their lottery-specific experiences. Although average general PGSI scores for lottery gamblers were all in the moderate-risk and problem gambling range, lottery-specific scores, on average, were almost all in the low-risk gambling range. This aligns with previous research that has demonstrated that lottery does not seem to be a high-risk activity, even in multiple activity scenarios (Binde, 2011; Costes et al., 2018).

These large mean differences and moderate correlations between general and activity-specific scores when lottery is not the only gambling activity reported may be the result of the general PGSI capturing behaviours from other activities. Yet, for exclusive lottery gambling, the general and activity-specific PGSI scores would be expected to be nearly perfectly correlated and statistically similar, given that it is the same activity being reported at both times. Thus, our results may seem surprising, but they also align with previous research indicating that gamblers do not tend to conceive of their lottery-specific gambling as problematic (e.g., Costes et al., 2018). Differences between general and activity-specific scores for exclusive lottery gamblers could also be due, in part, to legacy effects from previous gambling patterns (even with other activities). These results clearly indicate that lottery is a distinct form of gambling that might require particular assessment in comparison with other forms of gambling. Public health officials and policy makers should be aware that administering the PGSI may not capture the reality of lottery-specific gambling-related problems and might be creating noise when grouped with other forms of gambling, such as VLTs and slot machines, in population surveys.

Electronic Gambling Machines

VLT scores were highly correlated regardless of number or rank of activities. VLTs represented the most consistent pattern of correlations of all activities examined. These findings are further highlighted by the mean difference results. For VLTs, mean differences were less significant than they were for lottery. Differences in VLT scores were even non-significant when VLTs were reported as the primary activity. These results could perhaps be explained by the fact that VLT gambling is associated with a much higher prevalence of problem gambling patterns. VLTs are known to be a high-risk activity (Binde, 2011; Lund, 2006) and this activity might inflate general scores. This may indicate that VLT gambling experiences influence an individual's general score over other activities. When VLTs were reported as secondary or tertiary activities, activity-specific scores were lower than general scores. On average, the difference in means for VLTs did not represent a change in classification between moderate-risk and problem gambling PGSI categories (as seen with lottery).

Slot machines presented a high variance in correlations. In terms of mean differences, slot machines exhibited a similar pattern to VLTs in which the mean general PGSI scores were similar to specific PGSI scores, except when slot machines were the secondary or tertiary activity among three or more activities. These results should be interpreted with caution because of the small sample sizes of slot machine gamblers.

Limitations

There are several limitations to this study that should be taken into consideration when interpreting results. The filter applied in identifying the subsample analyzed did not consider several potential factors, such as the spending patterns of respondents on certain activities in comparison with other activities. This sample consisted only of moderate-risk and problem gamblers. Future research should consider activity-specific PGSI outcomes across all levels of problem gambling severity. The size of the moderate-risk and problem gambling population sampled was small and results should therefore be interpreted with caution. The variability in our results is potentially limited by the fact that participants responded only to activity-specific PGSI items that they had previously endorsed on the general PGSI. Scores were thus more likely to decrease than to increase; however, the possibility of indicating higher scores on particular items remained. There is also a potential issue of bias, given that the data were self-reported and participants may have been more or less forthcoming about some activities than about others.

In future research, investigators should consider replicating these analyses for activity-specific scores in which the activities are chosen based on factors such as popularity, frequency, and time spent on each activity. Potential differences between different types of lottery gambling should also be considered, as well as whether specific PGSI questions can be identified that are more highly correlated with specific item endorsement on the basis of activity. Research has already shown differences between low-risk, moderate-risk, and problem gambling populations and that specific items are correlated differently with specific subpopulations (Binde, 2011). In future,

there may be a need to develop standardized tools to assess activity-specific problem gambling or assessment tools specific to high- and low-risk activities. Our findings may indicate a need for instruments that are more focused than the PGSI, as well as for continued activity-specific research.

Conclusion

To date, this was the first study to investigate activity-specific PGSI scores compared with general PGSI scores in a moderate-risk and problem gambling sample. Our results suggest that general PGSI scores might not be an accurate reflection of an individual's problem gambling severity across all activities. The general PGSI score is not consistent with an activity-specific score for lottery but seems to be a better indicator of activity-specific scores for VLTs. The PGSI was more effective in capturing problem gambling severity for primary gambling activities and for gamblers who engage in three or more activities. Researchers conducting population surveys should exercise caution in assigning general PGSI scores to specific activities.

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Submitted April 20, 2018; accepted January 4, 2019. This article was peer reviewed. All URLs were available at the time of submission.

For correspondence: Sylvia Kairouz, Ph.D., Department of Sociology and Anthropology, Concordia University, 1455 De Maisonneuve West, H-1125-31, Montreal, Quebec, Canada H3G 1M8. E-mail: sylvia.kairouz@concordia.ca

Competing interests: None declared (all authors).

Ethics approval: The Concordia University Human Research Ethics Committee approved the research project “Les Québécois et leurs habitudes de jeu: Prévalence, incidence et trajectoires sur 4 ans” (UH2009-017) on January 29, 2009.

Acknowledgements: SK received support as the chair holder of the Research Chair on Gambling Studies funded by the Fonds de recherche - Société et culture. EM received postdoctoral salary support from the Canadian Institutes of Health Research (CIHR), the Fonds de recherche du Québec—Santé (FRQ-S), and the Research Chair on Gambling Studies.