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Online Poker Gambling Among University Students: Risky Endeavour or Harmless Pastime?

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Abstract

This study aims to describe online poker gambling patterns and associated problems in a representative sample of university students. The study sample consisted of 366 past-year online and offline poker gamblers and was drawn from a larger survey sample of full-time undergraduate students (N=2,139) randomly selected across four university campuses in Montreal, Canada. The questionnaire included self-reported measures of poker gambling patterns and problems, negative consequences of gambling, drinking problems, and illicit drug use. Online poker was found to be associated with problem gambling, over-spending and debt, as well as problems with university studies, interpersonal relationships, and illicit drug use. Given the propensity of university students to adopt risky behaviours, on-campus prevention programs are warranted in the midst of the online poker craze, especially given that online gambling remains unregulated. Detection tools should be available for students to recognize critical shifts in their gambling habits from a leisure activity to a risky endeavour.

Résumé

Cette étude vise à décrire les habitudes de jeu de poker en ligne et les problèmes connexes dans un échantillon représentatif de la population étudiante. L'échantillon, tiré d'un échantillon plus vaste d'étudiantes et d'étudiants de premier cycle (N=2 139) sélectionnés au hasard dans quatre campus à Montréal, au Canada, était composé de 366 personnes ayant joué au poker en ligne et hors ligne au cours de l'année dernière. Le questionnaire comportait des mesures autodéclarées des habitudes et des problèmes de jeu de poker, des conséquences négatives du jeu, des problèmes de consommation d'alcool et d'usage illicite de drogues. Il a été constaté que le poker en ligne était associé au jeu compulsif, aux dépenses excessives et à l'endettement, ainsi qu'aux problèmes dans les études, les relations interpersonnelles et l'usage illicite de drogues. Compte tenu de la propension de la population

étudiante à adopter des comportements risqués, il est recommandé de mettre sur pied des programmes de prévention sur les campus pour répondre à l'engouement pour le poker en ligne, surtout dans le contexte où le jeu en ligne n'est toujours pas réglementé. La population étudiante devrait avoir accès à des outils de détection pouvant l'aider à reconnaître les changements critiques dans ses habitudes de jeu, lorsque le jeu n'est plus seulement un divertissement, mais une entreprise risquée.

Introduction

Over the last decade, gambling culture on university campuses has been characterized by two phenomena: the rising popularity of poker, or the so-called ''poker craze,'' and the rapid increase in online gambling (Brown, 2006; Hardy, 2006; McComb & Hanson, 2009). For instance, despite the $10,000 buy-in for the World Series of Poker Main Event, the number of entrants has increased from over 200 in 1991 to 8,773 in 2006 (Dalla, 2009). Reasons for such an increased interest in poker are numerous and multidimensional. Intensive promotions through media coverage, advertisements, and celebrity endorsements are key elements, along with the popular belief that poker is predominantly a game of skill (Bjerg, 2010; Lee, Lemanski, & Jun, 2008; Parke, Griffiths, & Parke, 2005; Shead, Hodgins, & Scharf, 2008; Wood, Griffiths, & Parke, 2007) and a useful means to develop propitious personal and professional skills (Parke et al., 2005).

The internet has also played a role in fuelling the explosion of poker's popularity among university students (Conrad, 2008). For instance, people can learn how to play for free at demo sites online, and can play for low stakes until they become better at the game. With the introduction of the internet, the so-called poker craze begot a worldwide surge in online poker gambling (Siler, 2010), with the fastest growth occurring among younger adults (Hardy, 2006). For institutions of higher education, there are genuine concerns over the harms associated with online poker gambling; with the 24/7 availability of gambling websites and widespread access to the Internet, the need for on-campus education and prevention programs is indisputable.

Online poker gambling has been linked to negative affective states including depression, anxiety, and stress in a sample of adult online poker players self-selected from poker forums and network sites (Hopley & Nicki, 2010) and a sample of college students self-defined as poker players (Wood et al., 2007). In these groups, online poker gambling has also been associated with risky behaviours such as higher problem gambling rates and harmful drinking patterns (Shead et al., 2008; Tryggvesson, 2009) as measured by the Alcohol Use Disorders Identification Test (AUDIT) (Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). Almost one fourth or 23% of 1,356 American college students recruited at three university campuses

admitted to having gambled on the internet, of whom 16.7% gambled online infrequently and 6.3% did so frequently (Petry & Weinstock, 2007).

Moreover, 23.9% of infrequent and 61.6% of frequent internet gamblers were diagnosed as probable pathological gamblers, reporting a score of 5 or higher on the South Oaks Gambling Screen (SOGS) (Lesieur & Blume, 1987; Stinchfield, 2002). Similarly, a study conducted with 179 online poker players who at least supplemented their income playing online Texas Hold'em poker – including both adults and a smaller number of students – showed that 9% could be diagnosed as problem gamblers (Hopley & Nicki, 2010). This rate was found to be double (18%) in another study of 422 university students in the United Kingdom who played poker online (Wood et al., 2007). The severity of gambling problems was positively correlated with the likelihood of playing other online games and higher frequency of online gaming, as well as winning and losing greater amounts when betting online. Players associated online gambling with anonymity, detachment, social isolation, and sometimes fiercer competition than that present in more traditional gambling formats (Cotte & Latour, 2009). Those factors, combined with increased accessibility, virtual money, and higher-speed games, are believed to put players at a higher risk for gambling addictions compared with more traditional forms of gambling (Griffiths, 2003).

Online poker gambling might also be associated with other indicators of unhealthy lifestyle among university students. For instance, students who are poker players reported significantly higher scores on an alcohol disorders screening measure compared with non-poker players (Shead et al., 2008). Similarly, past-year internet gamblers drawn from a representative national sample of adults in the United Kingdom (N=9,003) were found to be more likely than non-internet gamblers to drink heavily (Griffiths, Wardle, Orford, Sproston, & Erens, 2009). Moreover, the higher prevalence of gambling problems among online poker gamblers may put them at a greater risk for drinking problems: in an American study of 1,348 university students, 74% of pathological gamblers reported an episode of binge drinking (5+ drinks in the past two weeks), compared with 40% of non-gamblers and 47% of social gamblers (Engwall, Hunter, & Steinberg, 2004). In the same vein, a recent study of 908 freshman college students found that alcohol use and dependence were positively correlated with gambling frequency (Martens et al., 2009), which is known to be a strong predictor of gambling pathology (Welte, Barnes, Wieczorek, Tidwell, & Parker, 2004). Indeed, the uniqueness of university students as a group vulnerable to risky behaviours is noteworthy. Often referred to as *emerging adults* (Arnett, 2000, 2005), they tend to be risk-takers during this developmental stage of self-exploration and identity formation.

From a public health standpoint, addressing the ecological attributes of poker games and the importance of the online setting is instrumental in developing promising strategies for the prevention of excessive gambling on campuses. To this end, it is particularly important to disentangle the specific effects of poker as an

activity and the effects of the internet as a setting, and to understand their combined effects on gameplay patterns and associated problems. Empirical studies tend to reveal that university students constitute a population vulnerable to online gambling and its associated problems. However, few studies have examined in-depth patterns of online poker gambling with unique measures of spending and debt as well as associated problems. Moreover, the majority of these findings are based on convenience samples, making it impossible to assess the extent to which they are representative of all students who gamble online. Hence, this study aims to examine differences between online and offline poker gamblers in gameplay patterns and associated problems – namely, gambling problems and harmful drinking – by using a representative sample of university students in Montreal, Canada. Based on previous findings, we hypothesize that compared with offline poker gamblers, online poker gamblers will be more likely to 1) exhibit excessive gameplay patterns with higher spending and debt, gamble more frequently and bet larger sums of money, and 2) be characterized by higher rates of pathological gambling and greater involvement in other addictive behaviours.

Method

Participants

The study sample was derived from the *University Student Gambling Habit Survey 2008/ Enquête sur les Habitudes de Jeu des Étudiants Universitaires* (ENHJEU), a campus-stratified survey targeting the population of full-time undergraduate students attending any of the two French-speaking and the two English-speaking universities in the city of Montreal, Canada, totaling 85,789 students (Association of Universities and Colleges of Canada, 2009). Because one of the English-speaking universities declined participation, half of the initial sample (N=3,000) was allocated to the only remaining English-speaking university and the other half of the sample (N=3,000) was equally distributed across the two French-speaking universities, ensuring equal representation of the bilingual demographic identity of the city. The final sample consisted of 2,139 respondents for an overall response rate of 41%, which was deemed satisfactory compared with previous national university surveys (Adlaf, Demers, & Glicksman, 2005). The sample was representative of full-time undergraduate students enrolled in the participating universities in Montreal, Canada. The average age of participants was 22.6 years (SD=4.3), of whom 62.6% were female. For this paper, only past-year poker gamblers were retained for the analysis (N=366, or 19.5% of the overall sample), excluding two participants who were outliers on age and had missing information concerning their full-time academic status. Almost 55% of questionnaires were filled out in English, and the remaining (45%) in French, a proportion comparable to that observed in the general sample. For the estimation of the prevalence of poker gamblers in the population and the associated variance, the analysis was weighted adjusting for gender.

Design and Procedure

The Office of the Registrar of each eligible university was contacted, and upon approval, university staff generated a random sample of all undergraduate students registered full-time as of October 2008. Data collection occurred over a period of eight weeks. Students were initially mailed a paper copy of the questionnaire followed by six consecutive reminders sent by either mail or email. They were given the option to complete and return the paper copy of the questionnaire in a pre-paid envelope or to complete the survey online on a secure website. One third of the respondents (33.5%) completed the survey by mail, and 66.5% did so online. The use of mixed web- and mail-based strategy has numerous advantages, in particular a positive impact on response rates (Dillman, Smyth, & Christian, 2008; Pealer, Weiler, Pigg, Miller, & Dorman, 2001), and the suitability of a web-based survey when addressing socially threatening items (Pealer et al., 2001). Respondents were also assured that participation was voluntary and that answers would remain confidential. The project was approved by the Concordia University Ethics Committee, and access to the students' nominal information was approved by the Quebec Commission for Information Access.

Measures

Type and Amount of Gambling. Gambling measures were primarily adapted from the Canadian Problem Gambling Index (Ferris & Wynne, 2001). We assessed four types of indicators of gambling involvement: type of gambling activity, number of gambling formats, frequency of play, and spending. Respondents reported their gambling participation by indicating whether they had bet or spent money over the past 12 months on any of the 10 listed gambling activities, one of which was poker (i.e., ''During the past 12 months, have you bet or spent money on poker?'' ('yes' or 'no')). A measure was derived for the total number of gambling activities in which people had participated over the past 12 months (ranging from 1 to 10). For each gambling activity, we proposed a measure of frequency of gambling in a number of locations (*never*, *less than once a month*, *1 to 4 times a month*, *2 to 6 times a week*, or *every day*), which was recoded to determine who gambled at least once a week. The proposed locations were meant to exhaustively capture places where people can gamble, which for poker gambling included *internet*, *private residence*, *on campus*, *work*, *casino*, *bar/pub/tavern/resto-bar*, and *other*. Online poker gamblers (referred to as Internet/online poker gamblers throughout the paper) included those who had bet or spent money on poker over the internet in the past 12 months. Almost all online poker gamblers reported gambling on both poker and other activities offline as well, but that they did so less frequently than on the internet. Respondents also indicated their typical monthly spending and annual debt associated with each gambling activity. Those continuous variables were transformed into 3 categories (*$0–20*, *$21–100*, and *$100 and over*) due to the positive skew of the distribution.

Gambling Problem Severity. To assess individuals' gambling problem severity, we used the Problem Gambling Severity Index (PGSI) (Ferris & Wynne, 2001). The

nine-item scale assessed loss of control over spending and gambling-related problems using a 4-point Likert scale (*never*, *sometimes*, *most of the time*, or *almost always*). The total score ranged from 1 to 27 and was recoded into four groups of gamblers: 1) non-problem gamblers (score of 0), 2) low-risk gamblers (score between 1 and 2), 3) moderate-risk gamblers (score between 3 and 7), and 4) problem gamblers (score between 8 and 27). Moreover, each individual item of the scale was dichotomized (0=*no* and 1 to 3=*yes*) to assess the occurrence of specific problems. In addition, we devised a series of questions to assess perceived problems due to poker gambling in four life areas (''During the past 12 months, would you say your betting on poker has caused problems in your: 'relationships with family members,' 'relationships with friends,' 'studies,' and ''finances'?'').

Drinking Patterns and Problems. Based on measures of frequency of alcohol use in the past 12 months (*never*, *once a month or less*, *2 to 4 times a month*, *2 to 3 times a week*, or *4 or more times a week*) and the past 30 days (*never*, *less than once a month*, *1 to 3 times a month*, *once a week*, *2 to 3 times a week*, *4 to 6 times a week*, or *every day*), we derived two binary variables (*yes* or *no*) assessing alcohol use in the past year and in the past month. We also used *The Alcohol Use Disorders Identification Test* (Babor et al., 2001), a brief scale developed to screen for harmful alcohol consumption, with a standard cut-off score of 8 or more being indicative of problem drinking and a cut-off score of 11 or more indicating potential alcohol dependence.

Cannabis and Illicit Drug Use. We assessed lifetime and past-year cannabis use (*yes* or *no*) based on the frequency of use (*less than monthly*, *monthly but not weekly*, or *weekly or more often*). Lifetime and past-year illicit drug use were derived from the reported frequency of use (i.e., *never in my life*, *in my life but not in the past 12 months*, *in the past 12 months, but not in the past 30 days*, or *used in the past 30 days*) of 15 non-medical drugs. Drugs were also grouped into five categories: *cocaine*, *other stimulants* (Ritalin, Dexedrine or Adderall and other amphetamines), *sedatives* (tranquilizers and barbiturates), *opiates* (heroin and other opiate-type prescription drugs), and *hallucinogens* (LSD, other psychedelics or hallucinogens, Ecstasy, and other party drugs).

The questionnaire included a series of demographic measures that are listed in Table 2.

Statistical Procedures

Multinomial and binomial logistic regression analyses were performed to assess differences between online and offline poker gamblers with respect to gameplay patterns and gambling problems, as well as alcohol and illicit drug use and problems. Odds ratios were estimated using 95% confidence intervals. All models were controlled for gender, place of birth, and survey mode (mail versus web).

Results

The analyses revealed that 19.5%, 95% CI [17.8, 21.3] of full-time undergraduate university students have gambled on poker over the past year (see Table 1). Poker was the second most prevalent gambling activity after lottery (39.3%), and slightly more popular than gambling on video lottery terminals (VLTs) (17.6%).

As shown in Table 2, one fifth (19.9%) of all students who played poker did so on the internet. Even though most internet poker gamblers (95.9%) gambled in offline locations as well, they gambled online more frequently than they did offline. Overall, participation in online poker gambling was significantly higher among men than among women, *OR*=7.53, 95% CI [3.2, 17.9], and among students born outside Canada compared with those born in Canada, *OR*=2.13, 95% CI [1.1, 4.1]. However, there were no significant differences between online and offline poker gamblers with respect to the language spoken at home, the year of study, or whether they lived on-campus or off-campus.

Gameplay Patterns and Gambling Problems

Compared with offline poker gamblers, online poker gamblers were more likely to be frequent gamblers, reporting gambling at least weekly, *OR*=14.2, 95% CI [3.4, 58.5], as displayed in Table 3. They also reported engaging in a greater number of gambling activities: they were more likely than offline poker gamblers to report engaging in four activities or more over the past year, *OR*=5.02, 95% CI [2.1, 12.2]. The two groups differed in their poker spending and debt. Online poker gamblers were more likely to report higher monthly spending on poker and higher annual debt as a result of gambling on poker. In particular, they were more likely to report monthly spending of more than $100, *OR*=13.27, 95% CI [4.8, 37.0], as well as annual debt of more than $100, *OR*=6.06, 95% CI, [2.2, 16.9].

Table 1
*Prevalence of Gambling Activities Among University Students (*N=*2,139)*

Type of gambling activity	%	95 % CI
Lottery	39.3	37.1–41.5
Table poker	19.5	17.8–21.3
Video lottery terminals/Coin slot machines	17.6	16.0–19.5
Games of skill	9.5	8.2–10.9
Betting on sports or sporting events	5.8	4.9–7.0
Table games	5.5	4.5–6.5
Speculative investments	4.8	3.9–5.9
Card games/Board games	3.1	2.4–3.4
Bingo	3.9	3.1–4.9
Horse/Dog racing	0.7	0.4–1.2

Note. CI=confidence interval.

Table 2
Comparison of Offline and Online Poker Players on Socio-Demographic Indicators (N=366)

	Offline poker players (N=293)	Online poker players (N=73)	
	%	%	OR
General	80.1%	19.9%	-
Gender			
Female	40.3	8.2	ref.
Male	59.7	91.8	7.53***
Place of birth			
In Canada	87.6	76.8	ref.
Outside Canada	12.4	23.2	2.13*
Language spoken at home			
English only	8.8	11.6	ref.
French only	55.5	43.5	0.60
French and English	15.5	14.5	0.71
French and/or English and/or other	20.1	30.4	1.15
Residence			
On campus	6.4	1.5	ref.
Off campus	93.6	98.5	4.48
Living partners			
Alone	7.2	4.5	ref.
With family	75.5	78.8	1.65
With friends/other	17.4	16.7	1.51
Year of study			
1st year	36.0	34.8	ref.
2nd year	26.9	26.1	1.01
3rd year	25.1	26.1	1.08
4th year	12.0	13.0	1.13
Age	M (SD)	M (SD)	
	22.0 (2.5)	22.0 (2.4)	

Note. OR=odds ratio, ref.=reference category.
Significance levels: * p<.05. **p<.01. ***p<.001.

Logistic regressions revealed a gradient in the association between online gambling and the severity of gambling problems. For instance, online poker gamblers were significantly more likely than offline poker gamblers to be at low or moderate risk for gambling problems. Online poker gamblers also had a significantly greater likelihood of being problem gamblers, *OR*=30.34, 95% CI [6.6, 138.5].

Co-occurring Addictive Behaviours and Associated Problems

While online and offline poker gamblers did not differ significantly in terms of the prevalence of past-year and past-month alcohol use, the analyses revealed that

Table 3
Comparison of Offline and Online Poker Players on Gambling Patterns and Gambling Severity (N=366)

	Offline poker players (N=293)	Online poker players (N=73)	
	%	%	OR
Weekly gambling[a]			
Online	-	26.4	-
Offline	1.0	12.5	14.20***
Number of activities			
One	25.3	15.1	1.00
Two	35.2	31.5	2.13
Three	25.6	19.2	1.50
Four or more	14.0	34.2	5.02***
Spending (monthly)			
$0 to $20	81.0	49.2	1.00
$21 to $100	16.3	22.4	2.30*
$100+	2.7	28.4	13.27***
Debt (annual)			
$0 to $20	80.1	54.4	1.00
$21 to $100	16.7	27.9	1.89
$100+	3.2	17.6	6.06***
Gambling problem severity			
Non-problem gamblers	78.9	47.1	1.00
Low-risk gamblers	14.7	22.1	2.23*
Moderate-risk gamblers	5.3	13.2	3.48*
Problem gamblers	1.1	17.6	30.34***
Gambling problem severity items (ref. "No")			
Betting more than could afford to lose	6.3	30.9	5.70***
Need to bet more money for same excitement	5.3	32.4	7.45***
Went back another day to win back lost money	6.0	32.4	5.65***
Borrowed/sold something for money to gamble	3.2	16.2	6.31***
Felt might have problem with gambling	3.2	22.1	7.20***
Health problems due to gambling	3.2	22.1	9.40***
Others criticized betting or gambling	4.6	25.0	5.65***
Financial problems due to gambling	2.5	22.1	10.47***
Felt guilty about gambling	7.0	29.9	5.30***

Note. Controlled for gender, place of birth, and survey mode in all regression analyses. OR=odds ratio. ref.=reference category.
[a] Frequency of play for all 10 activities in any location (i.e., online or offline).
Significance levels: * p<.05. **p<.01. ***p<.001.

online poker gamblers were more likely to be dependent on alcohol compared with offline poker gamblers, *OR*=1.92, 95% CI [1.0, 3.6], as shown in Table 4.

Although the two groups of poker gamblers did not differ significantly in the prevalence and the frequency of cannabis use, online poker gamblers were more likely to report using other illicit drugs over the past year, *OR*=2.15, 95% CI [1.2,

Table 4
*Comparison of Offline and Online Poker Players on Co-occurring Addictive Behaviours and Academic Performance (*N=*366)*

	Offline poker players (n=293)	Online poker players (n=73)	
	%	%	OR
Drinking patterns and problems			
Past-year alcohol use	98.9	100.0	([a])
Past month alcohol use	95.3	92.5	0.67
Harmful drinking	21.2	14.9	0.57
Potential alcohol dependence	22.1	32.8	1.92*
Cannabis use			
Lifetime cannabis use	77.5	71.0	0.82
Past-year cannabis use	53.2	60.9	1.39
Frequency of cannabis use			
Less than monthly	52.8	35.7	1.00
Monthly but less than weekly	18.0	26.2	2.13
Weekly or more	29.2	38.1	1.48
Illicit drug use			
Lifetime illicit drug use	43.7	46.4	1.35
Past-year illicit drug use	18.3	29.0	2.15*
Cocaine	3.5	14.5	5.47***
Other stimulants	6.3	11.6	2.46
Sedatives	1.8	5.8	7.46*
Opiates	3.2	4.3	1.54
Hallucinogens	10.9	20.3	2.00
Academic performance (GPA)			
A	26.7	22.6	1.00
B	58.5	56.4	1.11
C or lower	14.8	21.0	1.44
Perceived problems due to poker gambling (ref. ''No'')			
Problems with family	1.8	20.3	8.36***
Problems with friends	4.9	11.4	1.76
Problems with studies	1.1	31.3	32.52***
Problems with finances	3.5	27.1	7.22***

Notes. Controlled for gender, place of birth, and survey mode in all regression analyses. OR=odds ratio. ref=reference category.
[a] Omitted due to collinearity.
Significance levels: * p<.05. **p<.01. ***p<.001.

4.1], in particular cocaine, *OR*=5.47, 95% CI [2.0, 15.1] and sedatives, *OR*=7.46, 95% CI [1.5, 35.9].

Lastly, online and offline poker gamblers did not differ significantly in academic performance. However, compared with offline poker gamblers, online poker gamblers were more likely to subjectively report experiencing problems with their family due to poker gambling, *OR*=8.36, 95% CI [2.6, 26.8], as well as experiencing problems in their studies, *OR*=32.52, 95% CI [8.8, 128.2] and with their finances, *OR*=7.22, 95% CI [3.0, 17.5].

Discussion

This paper sought to profile university students who bet on poker online and explore their gameplay patterns and the risks of gambling pathology, co-occurring addictive behaviours, and problems in comparison with offline poker gamblers. The sample examined in the present study was in a precarious life stage (Arnett, 2000, 2005) that might be particularly conducive to the negative effects of online gambling (Shead et al., 2008; Tryggvesson, 2009; Wood et al., 2007), such as dropping out of school, family and interpersonal problems, or setting the stage for future addictions.

The study findings supported both of our hypotheses; namely that compared with offline poker gamblers, online poker gamblers demonstrated greater gambling involvement patterns, and were more prone to pathological gambling behaviour and other risky activities. This study revealed that participation in online poker gambling is not equally distributed among the university student population, with greater participation reported by men and those born outside of Canada. This result is in accordance with one of the basic tenets in modern social epidemiology, which holds that lifestyle behaviours are determined to a great extent by social membership through differing social norms and rules of actions. For instance, poker playing among males has historically been more acceptable compared with other forms of gambling, and the frequent reports of female gender-swapping while playing poker online illustrate women's attempts to avoid being perceived as less capable or as outsiders in a primarily male arena (Wood et al., 2007).

Online poker was also more heavily participated in by students born outside of Canada. This difference could perhaps be explained in view of acculturation processes. Potential lack of social support and inability to fit into the mainstream culture, as well as language difficulties, coupled with a desire to find relief from the stress and anxiety often accompanying immigrant life (Raylu & Oei, 2004), could prompt one to engage in online gambling, an activity in which national and cultural borders can be transcended (Agger, 2004).

Online poker gamblers reported significantly more severe problems related to gambling than their offline counterparts, along with more frequent gambling and higher spending and debt. This finding corroborates a growing body of research on

internet gambling that shows the online medium to have negative effects on problem gambling behaviours (Griffiths & Barnes, 2008; Griffiths et al., 2009; Petry & Weinstock, 2007; Wood et al., 2007). The reasons for this association are numerous and multifaceted, with a prominent role attributed to the characteristics of the online setting. For instance, in contrast with traditional poker settings, online poker is more accessible and convenient, providing opportunities to play at an increased speed. In practice, gamblers are also exposed to a series of near misses or small wins that effectively retain their interest in the act of gambling. A greater involvement can also be sustained by the opportunity to play multiple games simultaneously (Siler, 2010), along with the virtual cash, which disguises the true value of the player's bets (Schull, 2005). In sum, online gambling is characterized by a degree of virtualization lacking in traditional poker settings, which is likely to increase the risk of excessive gambling patterns and problems.

In addition to the continuous and uninterrupted flow of play, the solitary nature of the activity might be considered an enabling factor for excessive behaviours. With online poker, any social interaction is entirely optional, and the cultural meanings of such interactions are not the same as in a physical social context. Put simply, it can be argued that offline poker belongs to the sphere of the social, whereas online poker belongs to the sphere of the virtual and is therefore subject to much weaker social regulations by virtue of the players' anonymity. Indeed, the notion of social control can be a potent inhibitor of behavioural excesses and deviance because, as it is sometimes argued (e.g., Social Issues Research Centre, 1998), informal social prescriptions of both behaviour and interaction are more powerful in enforcing compliance than external policies and regulations. However, besides the risk associated with the online setting as a gambling medium, one could argue that the risk resides in its combination with some of the qualities of poker as a gambling format. Poker remains falsely perceived as a game that offers mostly controllable outcomes (Parke et al., 2005; Wood et al., 2007). Indeed, poker is phenomenologically different from other types of gambling in that poker players vie against others and not against the house and in that it is regarded as mostly a game of skill (Bjerg, 2010; McDonald, 2004; Parke et al., 2005). This experiential meaning of gambling should also be considered as a contributing factor in excessive behaviours.

It is worth noting that the greater risk for gambling problems among online gamblers might put them at risk for other related problems. Previous studies have revealed significant associations between problem gambling and other behavioural problems among college students (Ladouceur, Dube, & Bujold, 1994; Lesieur et al., 1991; Stinchfield, Hanson, & Olson, 2006). This study showed that Internet poker gamblers also feel that they experience more problems in major life areas than non-Internet poker gamblers, including in academic, financial, and interpersonal spheres.

Consistent with previous research findings (Shead et al., 2008; Tryggvesson, 2009), this study revealed a significant association between potential alcohol dependence and online poker gambling. In addition, as expected, online poker gamblers were

more likely to report illicit drug use. Unlike excessive drinking, illicit drug use is less socially acceptable and significantly less prevalent among students. Online poker gamblers who are illicit drug users might constitute a group of individuals who are at greater risk for problems, i.e., such problems that might necessitate clinical intervention. In this context, co-morbid conditions might also be exacerbated by the absence of a social protective environment and by the anonymity characterizing the online setting.

More broadly, these findings suggest that the overall number of online poker gamblers was considerably lower than that of offline poker gamblers (20% vs. 80%). These data suggest that, although online poker gamblers may be more likely to encounter negative consequences from online gambling, they are a relatively small subset of the total number of university students who have played poker in the past year. Therefore, a potentially interesting comparison to be considered in future studies might include the addition of a non-poker playing group, which when compared with offline poker players may reveal risky behaviour patterns for the latter group that were not observed in the present study, and which could be attributed to the specifics of poker as a game.

Moreover, this study revealed the heavy prominence of poker playing among online gamblers. It focused solely on poker and online poker gambling because the participation in online gambling activities other than poker was marginal (13 respondents out of 86), rendering separate analysis of the gambling patterns of individuals participating in gambling activities other than poker impossible.

This study has limitations that should be borne in mind. Evidently, its cross-sectional design precludes inferences of causality between online gambling and the observed excessive behaviours and problems. It is unclear whether it is addiction-prone individuals who are drawn to internet poker gambling as well as other risk-taking behaviours, or whether it is the type of gambling or the gambling environment that triggers excessive gambling behaviours and problems. One should also keep in mind that this study examined the co-occurrence of online poker gambling and alcohol and substance use, which limits any assessment of the simultaneity of these risky behaviours. These two limitations indicate the necessity for longitudinal data in future research endeavours to disentangle the complexity of consequential problems associated with online gambling. Longitudinally-designed studies might also elucidate a fundamental developmental issue; namely, that of the trajectories of high-risk patterns of online gambling among younger adults. Such research might clarify whether the presently-observed excessive behaviours are part of a transitional developmental stage of identity exploration typical of this age period and therefore likely to fade away or whether, for some types of individuals or groups, they will persist throughout later adulthood.

It is also important to acknowledge that because of the small number of problem gamblers in the sample, the generated point estimates of their prevalence among

online and offline poker gamblers should be interpreted with caution. Nonetheless, inspection of individual items of the Problem Gambling Severity Index (PGSI) provides support for the findings that online poker gamblers are more likely to report all of the listed individual problem gambling behaviours and gambling related problems compared with offline poker gamblers.

This study revealed that online poker playing was associated with both excessive gambling involvement and increased problems in various life areas. For colleges and universities, health prevention programs might benefit from targeted components for online poker gambling. College students are a vulnerable group that might face even more detrimental effects from online poker playing during those important transitional years towards adulthood. Online gambling might affect school performance and school dropout rates as a consequence of increased gambling debt and financial problems. Moreover, online gambling might set the stage for mental health problems and future addictions. In the context of the significant popularity of poker and nearly universal access to the internet among students, health and social services on campuses should be equipped with screening measures for gambling problems and with procedures for referrals to clinical resources both on campus and in the community. Efforts to better understand online gambling are particularly important because of the rapid expansion of virtual societies. Future studies could use more controlled methodologies, such as longitudinal designs, to assess any persisting impacts that online poker gambling might have on health behaviours such as drug use and other addictions.

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