

Gambling Among Emerging Adults: How Gender and Risk Level Influence Associated Problem Behaviours

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Abstract

This study investigates mental health and substance use problems associated with gambling among Canadian emerging adults (ages 18–20 years). Drawing on a cross-sectional wave of 624 (47.8% male) participants from the Manitoba Longitudinal Study of Young Adults, our findings suggest that among emerging adults, problem gambling should be understood as part of a wider syndrome. The profile of syndromic associations varies with both problem gambling risk level and gender. With respect to risk level, regression models indicate that, relative to no-risk gamblers, lower risk gamblers are more likely to use drugs and alcohol, whereas higher risk gamblers report greater symptoms of depression and anxiety. Males and females present different barriers to recovery: High-risk female gamblers are more likely to rely on escape-avoidance coping mechanisms, whereas their male counterparts tend to lack perceived social support. Given the centrality of these two variables and the lack of literature addressing how they interact, we conclude that further research is needed to understand how gender and gambling severity interact to simultaneously influence gambling-related behaviours among emerging adults.

Keywords: gender, problem gambling, emerging adults, substance abuse, symptomology

Résumé

Cette étude porte sur les problèmes de santé mentale et de toxicomanie associés au jeu chez les jeunes adultes canadiens (âgés de 18 à 20 ans). Fondés sur une vague transversale de 624 participants (47,8% d'hommes) de l'étude longitudinale des jeunes adultes du Manitoba (MLSYA), nos résultats laissent entendre que, parmi les jeunes adultes, le jeu problématique devrait être abordé comme faisant partie d'un syndrome plus vaste. Le profil des associations syndromiques varie selon le niveau de risque de jeu problématique et le genre. En ce qui concerne le niveau de risque, les modèles de régression indiquent que, par rapport aux joueurs sans risque, les joueurs à faible risque sont plus susceptibles de consommer de la drogue et de l'alcool, tandis

que les joueurs à risque plus élevé montrent des symptômes plus importants de dépression et d'anxiété. En parallèle, les hommes et les femmes rencontrent différents obstacles au rétablissement : les joueuses à haut risque sont plus susceptibles de compter sur des mécanismes d'adaptation comme l'échappement ou l'évitement, tandis que leurs homologues masculins ont tendance à manquer de soutien social perçu. Compte tenu de la centralité de ces deux variables et du manque de littérature traitant de leurs interactions, nous concluons qu'il est nécessaire de poursuivre les recherches pour comprendre les interactions entre le genre et la gravité du jeu pathologique afin d'influencer simultanément les comportements liés au jeu chez les jeunes adultes.

Introduction

Problem gambling (PG) among adolescents and emerging adults has become a central concern for gambling researchers and policy makers over the last two decades. This is for good reason. The social and emotional consequences of PG affect emerging adults as much as older adults (Chambers & Potenza, 2003). Further, emerging adults are especially susceptible to developing gambling habits that are manifestations or co-morbidities of other “problem behaviours” (Jessor & Jessor, 1977), including sensation seeking, depression and anxiety, substance abuse, delinquency, impulsivity, and lack of effective coping strategies (Carbonneau, Vitaro, Brendgen, & Tremblay, 2015; Edgerton, Melnyk, & Roberts, 2015; Sanscartier, Edgerton, & Roberts, 2018). More recently, researchers have started to explore the ways in which these related problem behaviours are not simply the consequences of PG, but are indirectly related through antecedent biological, psychosocial, and demographic factors (Chinneck, Mackinnon, & Stewart, 2016; Mutti-Packer et al., 2017; Scholes-Balog, Hemphil, Toumbourou, & Dowling, 2015).

Broadly, two kinds of studies map the symptomology of PG among emerging adults. One branch of research relies on typologies developed primarily in reference to older adults, modifying them to deductively classify emerging adult problem gamblers into families of problem behaviours. Three syndromic clusters of problem gamblers typically include those who (a) abuse alcohol and other drugs, (b) exhibit symptoms of depression and anxiety, and (c) engage in impulsive, violent, or delinquent tendencies (Allami et al., 2017; Barnes, Welte, Hoffman, & Tidwell, 2011; Gupta et al., 2013; Lorains, Cowlshaw, & Thomas, 2011; also see Blaszczynski & Nower, 2002). These *deductive* studies tend to have etiological goals, testing already well-theorized typological structures in different samples of emerging adults.

A related but contrasting branch of literature is more *inductive*, linking behaviours related to PG in more particular and exploratory ways than deductive typological studies do. These behaviours include substance abuse (Cheung, 2014; Petry & Champine, 2012; Welte, Barnes, & Hoffman, 2004), depression and anxiety (Chinneck et al., 2016; Martin, Usdan, Cremeens, & Vail-Smith, 2014), maladaptive

coping behaviours (e.g., distancing and avoidance strategies; Edgerton et al., 2015; Getty, Watson, & Frisch, 2000; Gupta, Derevensky, & Margret, 2004; Slezcka, Braun, Grüne, Bühringer, & Kraus, 2016), and impulsivity and delinquency (Chamberlain, Stochl, Redden, Odlag, & Grant, 2017; Mishra, Lalumiere, & Williams, 2017). Although these studies are less concerned with etiological links between these behaviours and PG, they identify novel and nuanced relationships of problem behaviours, especially with respect to how they are moderated via demographic (e.g., gender, ethnicity, socio-economic status) and gambling level risk factors (typically measured by using the Problem Gambling Severity Index [PGSI]/South Oaks Gambling Screen; see e.g., Matheson, Wohl, & Anisman, 2009; Sanscartier et al., 2018; Wong, Zane, Saw, & Chan, 2013). This study, in line with this more inductive kind of research, examines the simultaneous effects of two key variables in the literature: gender and gambling severity. Although the effects of each have been independently documented in the literature, no study has adequately examined how they work in tandem to structure behaviours related to PG in emerging adults.

The separate relationships of gender and severity of PG risk (i.e., low, moderate, or high) to syndromic problem behaviours are well-known to researchers. Studies focused on gender have found that young men who gamble heavily are more likely than young women to engage in alcohol use and impulsive behaviours. Conversely, young female gamblers who gamble heavily tend to more often report depression and anxiety as both motivators and consequences of problematic gambling (Barnes et al., 2011; Blanco, Hasin, Petry, Stinson, & Grant, 2006; Gupta et al., 2013). With respect to severity of PG risk, studies with older adults have found that gamblers at higher risk levels for PG tend to more frequently report the presence of mental disorders; those at lower risk levels are more likely to report (ab)use of alcohol and other drugs (e.g., Canale et al. 2017; Hodgins et al., 2012; Hounslow, Smith, Battersby, & Morefield, 2011; Winters, Stinchfield, Botzet, & Slutske, 2005). Researchers have also found that perceived social support tends to be lower among those with higher PG risk (Moghaddam, Yoon, Campos, & Fong, 2015; Weinstock & Petry, 2008). Notably, the differences in behaviours of men and women who gamble, or of those who are at lower or higher risk for PG, need to inform interventions targeted towards various populations; for example, researchers have recommended targeting sensation-seeking tendencies when tailoring PG interventions for men and addressing underlying depression when tailoring interventions for women (Khanbhai, Smith, & Battersby, 2017; Toneatto & Wang, 2009).

To our knowledge, no study has yet adequately assessed the simultaneous effects of gender and severity of PG risk. This is a serious gap in the literature, given that scholars have called for interventions that are tailored to both gender and PG risk. So far, however, these calls have been made independently of each other. Although men and women display different clusters of problem behaviours, and the same is true of those at low and high PG risk, little commentary exists on whether distinct differences exist in syndromic problem behaviours between men and women as they respectively climb the PG risk scale. A common finding is that gender affects syndromic behaviours when PG risk is included as a control variable. In contrast,

our key research question is, does this well-researched impact of gender vary across the risk spectrum? For example, although social support has been found to be lower among those at high risk for PG, does this affect men and women equally? Additionally, are men and women at lower risk for PG equally likely to (ab)use alcohol or other drugs? Aside from such unanswered questions, in addition, few studies map syndromic behaviours of PG risk specifically among emerging adults. Given that they are at especially high risk for developing problem behaviours related to PG, this kind of research is important for tailoring interventions to different demographic groups within the emerging adult population.

This study therefore sought to accomplish two tasks to advance the literature on syndromic behaviours related to PG. The first was an understanding of how gender and level of PG risk simultaneously structure co-occurring problem behaviours. The second was to grow the nascent literature whose explicit goal is to map differences in syndromic behaviours of emerging adults across levels of PG risk.

Method

Data Set

Data for this study came from the Manitoba Longitudinal Study of Young Adults (MLSYA). The MLSYA was commissioned jointly by three regulatory bodies in the Canadian province of Manitoba: the Manitoba Gaming Control Commission, the Manitoba Lotteries Corporation, and the Addictions Foundation of Manitoba. Data from young adults aged 18–20 years were collected in four waves from December 2007 to December 2011; in each wave, respondents filled out their choice of an online or mail-out paper survey. The first wave of respondents was a mix of a convenience sample of youth who were gambling in casinos, and other youth who were contacted by random digit dialling (Edgerton et al., 2015, p. 6). Respondents in subsequent waves were added by snowball sampling, wherein each participant was given a \$5 gift card for recruiting new respondents, with a maximum of one referral per participant. Descriptive statistics for the sample are found in Table 1.

Although the survey itself was longitudinal, the present analysis focused on a cross-section of data from the second wave of participants ($n = 624$, 47.8% male), collected from December 2008 to January 2009. The MLSYA sample was mostly Caucasian (80%) and from the Winnipeg region (79%). On the basis of revised PGSI cut-offs, 10.1% of the sample were non-gamblers, 69.6% were non-problem gamblers, 17.2% were low risk, 2.1% were moderate risk, and 1% were problem gamblers (Liquor and Gaming Authority of Manitoba, 2016). In addition, 32.8% of the sample were employed and 64.1% were students (the rest identified as looking for work, caring for children, or doing household work). We use Wave 2 herein because it contains key variables not found in Wave 1: impulsivity and ways of coping. We assessed the available variables in the MLSYA data set for relevance to both gender and gambling severity in the PG literature. Selected variables are listed in more detail below.

Table 1
Univariate Descriptive Statistics

Predictors	<i>N</i>	<i>M</i>	<i>SD</i>
Impulsivity	604	33.6	10.35
Social support	605	5.47	1.16
Planful problem solving	599	6.95	3.8
Distancing	599	5.61	3.47
Escape-avoidance	599	6.13	4.85
Alcohol use	624	0.97	1.64
PGSI (Wave 2)			
No risk/non-gamble	489	78.40%	
Low risk	86	13.80%	
Moderate/high risk	49	7.80%	
Depression and/or anxiety			
Present	164	26.30%	
Absent	460	73.70%	
Drug use			
Yes	257	41.90%	
No	357	58.10%	
Gender			
Men	298	47.80%	
Women	326	52.2%	

Note. PGSI = Problem Gambling Severity Index.

Finally, although we did not require ethics approval to use the MLSYA because it is a secondary data set, all interviews were conducted in accordance with the ethical standards of the relevant government bodies and in consultation with academics at Manitoba post-secondary institutions.

Dependent variable. The MLSYA used the PGSI for measuring gambling severity. The PGSI is a valid and reliable tool for measuring both current gambling problems and propensity to problematic gambling tendencies in the future (Currie, Hodgins, & Casey, 2013; Edgerton et al., 2015).

Two important caveats concern the use of the PGSI in our analysis, both related to preserving statistical power in a relatively small sample size. The first is that we used original cut-off scores of the PGSI, where scoring 0 means no risk, 1–2 low risk, 3–7 moderate risk, and 8+ a problem gambler (Wynne, 2003). Use of the revised cut-offs advised by Williams and Volberg (2013) would have meant that only 21 respondents in our sample would be considered moderate risk or higher. Although this is consistent with PG rates in the literature, using these cut-offs would introduce unacceptably low variability across categories in our dependent variable. Second, we combined the categories moderate risk and problem gamblers into a moderate/high-risk category (7.8% of sample). This strategy has been used by other authors for the PGSI as a measurement of PG in order to preserve statistical power because a score

of 8+ typically constitutes only about 2% of samples (cf. Afifi, Cox, Martens, Sareen, & Enns, 2010; Crockford et al., 2008; Currie et al., 2013). Most important, neither caveat impeded our goal of providing a more detailed look at syndromic associations between PG risk level and associated problem behaviours.

Using original PGSI cut-offs, we found that only 43.4% of the no-risk group were male ($n = 212$) but that males comprised 60.5% ($n = 52$) of the low-risk group and 69.4% ($n = 34$) of the moderate/high-risk group. This aligns with patterns in the literature showing that men gamble more often than women and tend to take bigger financial risks when doing so (Delfabbro, 2011).

Gender. As gender is the other key variable in the literature linked to syndromic behaviours related to PG, it was included in the study. Male was coded in the analysis as “1” and female was coded as “0.”

Substance use. Scales for both drug and alcohol use were developed by Statistics Canada (2003) and adapted from the Canadian Community Health Survey (Liquor and Gaming Authority of Manitoba, 2016). Alcohol use and dependency were measured with a modified (short) form of the Composite International Diagnostic Interview (CIDI-SF). Those who responded to having a drink at least “once a month” over the past 12 months were asked a series of nine questions, each question ranked ordinally from 0 to 9, creating a summative index of alcohol dependency ($\alpha = .72$). Questions asked respondents about the frequency and intensity of their drinking habits, as well as about their reliance on alcohol to mitigate psychological distress. For example, respondents were asked whether, over the past 12 months, they had to drink more alcohol to reach the same effect as before and whether they drank for longer than they intended.

For drug use, a dichotomous measure developed by Statistics Canada (2003) was used in the MLSYA. The measure is coded 1 for regular drug use (considered one to three times per month or more) over the past 12 months. 0 is coded to indicate infrequent or non-use.

Depression and anxiety. Depression and anxiety were measured with the CIDI-SF. Introduced by the World Health Organization, the CIDI-SF is a commonly used and psychometrically sound measurement of major depressive and anxiety disorders and is appropriate for use among emerging adults (Aalto-Setälä et al., 2002; Kessler, Andrews, Mroczek, Ustun, & Wittchen, 1998). Because of the low number of respondents with either depression or anxiety, we relied on the stem questions for both conditions. Respondents are considered as having depression if they reply “yes” to feeling sad, blue, or depressed for two or more consecutive weeks. Likewise, anxiety is considered present if the respondent answers “yes” to having felt worried, tense, or anxious for one or more consecutive months. Both categories were combined into a “depression/anxiety” category to warrant enough variability for analysis.

Social support. This study relied on the Multidimensional Scale of Perceived Social Support ($\alpha = .90$). The scale consists of 12 items, each item ranked from 1 (*very strongly disagree*) to 7 (*very strongly agree*). Higher scores indicate greater

social support. The scale has demonstrated strong internal reliability among samples of adolescents, as well as among young and older adults (Weinstock & Petry, 2008; Zimet, Powell, Farley, Werkman, & Berkoff, 1990). It asks respondents the extent to which they can rely on family, friends, and a significant other as sources of comfort, and with whom they can share problems and celebrations. Taken together, the survey assesses the extent to which individuals can rely on primary social networks (family, close friends, life partner) for affective support.

Coping styles. Respondents' strategies for coping with stressful situations were measured by using the Ways of Coping Questionnaire. This is a 66-item scale that measures various strategies for coping (Lazarus & Folkman, 1984). As three coping styles are most relevant to PG, for the sake of parsimony, they were the only coping measures included in our model: distancing ($\alpha = .95$), escape-avoidance ($\alpha = .80$), and planful problem solving ($\alpha = .75$).

Impulsivity. Impulsivity ($\alpha = .84$) was measured with the Barratt Impulsiveness Scale, a commonly used measure of impulsivity.

Data Analysis

To analyse characteristics and behaviours associated with different levels of PG, we ran multinomial logistic regressions in Mplus 8. Prior to analysis, a series of interaction terms were created in SPSS 20, primarily to identify the moderating effects of gender on other predictors such as social support and alcohol dependency. Last, as there was less than 5% missing data in the sample, we analysed data by using full information maximum likelihood estimation with Monte Carlo integration in order to maximize statistical power.

To examine gender moderation, we created a series of interaction terms for inclusion in the final model. Because we were interested primarily in gendered effects, we first crossed gender with all other variables listed above. We also created a Drug \times Alcohol interaction term to test whether the use of drugs acts as a moderator with respect to the association between alcohol use and PG. Although this interaction is not directly relevant to gender, we understand the relationship between drug use and alcohol as being relevant to the wider question of what syndromic behaviour looks like across the risk spectrum. Where drug use positively moderates the association of alcohol with gambling severity, all three are likely being used to cope with wider psychological issues (Blazczynski & Nower, 2002).

We then dropped two interaction terms with the lowest significance and impact (Gender \times Drugs and Gender \times Mental health), comparing this more compact model with the first on the basis of the Bayesian information criterion (BIC). As the study is exploratory, we opted to explore all significant interaction terms post hoc to examine moderating effects on gambling severity (see Holmbeck, 2002). Given that the more parsimonious model had a smaller BIC by a difference of over

10 ($34420 < 34506$; see Raftery, 1995) we chose the second, more parsimonious model. Shrinking the model further resulted in higher BIC values. Three models were run in total (our initial model, one interaction model with all possible terms, and a last model with non-significant variables removed). Reported values in Tables 3 and 4 are from the first and third models, as the second was discarded in favour of the more concise third model.

Results

Correlation Matrix

Table 2 shows the correlation matrix for all variables. Bivariate correlations indicate that all of the predictors in the model, except planful problem solving, are related to gambling severity, as expected. Correlations with the PGSI range from very weak (depression/anxiety; $r = .088$, $p < .05$) to moderate (escape-avoidance coping, $r = .256$, $p < .01$). Correlations, as well as variability inflation factors (VIFs), indicated no collinearity among predictors ($r < .80$; Berry & Feldman, 1985; all VIFs $< 2.$).

Initial Model

Table 2 summarizes results from the initial model. Males were over twice as likely to be in the low-risk gambler category than in the no-risk category (odds ratio [OR] = 2.109). Escape-avoidance coping scores were associated with an increased likelihood of being low risk (OR = 1.099). Similarly, higher alcohol dependence scores were associated with an increased likelihood of belonging to the low-risk group (OR = 1.170). Males were more than three times as likely to belong in the moderate/high-risk risk category as in the no-risk category (OR = 3.211). Reporting symptoms of depression/anxiety was associated with increased odds of higher risk gambling (OR = 1.767), and increased escape-avoidance scores were associated with greater odds of being in the moderate/high-risk category than in the no-risk category (OR = 1.132). Reporting symptoms of depression/anxiety increased the odds of being in the moderate/high-risk category than in the low-risk category by over two and a half times (OR = 2.586).

Interaction Model

Results for the full model, with interaction terms, are found in Table 3. When interaction terms were introduced to the first-order model, there were a few changes in significance among the original variables. First, the association between alcohol dependence and membership in the low-risk group (compared with the no-risk group) was even stronger (OR = 1.379). The use of drugs was now associated with more than double the odds of belonging to the low-risk group than to the no-risk group (OR = 2.165). Although being male was associated with more than triple the odds of belonging to the low-risk group (OR = 3.405), this was no longer statistically significant. Likewise, escape-avoidance was no longer significant in this model.

Table 2
Bivariate Correlations

Study variables	1	2	3	4	5	6	7	8	9	10
1. PGSI	-									
2. Gender (male)	0.171**	-								
3. Drug use	0.174**	0.070	-							
4. Alcohol use	0.191**	0.660	.365**	-						
5. Depression/anxiety	0.088*	-.083*	.109**	0.054	-					
6. Social support	-0.171**	-.225**	-0.042	0.006	-.131**	-				
7. WOC - distancing	0.147**	-0.140	0.041	0.138**	0.070	0.009	-			
8. WOC - escape-avoidance	0.256**	-.106**	0.125**	0.190**	0.231**	-0.094*	0.540**	-		
9. WOC - problem solving	0.040	-0.038	0.018	0.126**	.108**	0.185**	0.448**	0.407**	-	
10. Impulsivity	0.226**	0.065	0.241**	0.254**	0.044	-0.18**	0.135**	0.272**	-0.062	-

Note. PGSI = Problem Gambling Severity Index; WOC = Ways of Coping Questionnaire.
* $p < .05$. ** $p < .01$.

Table 3
Initial Multivariate Logistic Regression Model

Predictors	Low vs. No Risk			Moderate/High vs. No Risk			Moderate/High vs. Low Risk		
	B	SE	OR	b	SE	OR	b	SE	OR
Gender (male)	0.746**	0.261	2.109	1.166***	0.362	3.211	0.420	0.411	1.523
Drug use	0.481	0.267	1.618	0.322	0.369	1.379	-0.160	0.421	0.852
Alcohol use	0.157*	0.072	1.170	0.117	0.089	1.124	-0.041	0.097	0.960
Depression/anxiety	-0.381	0.304	0.683	0.569*	0.344	1.767	0.950*	0.408	2.586
Social support	-0.031	0.117	0.969	-0.251	0.139	0.778	-0.220	0.162	0.803
WOC - distancing	0.040	0.044	1.041	0.028	0.057	1.029	-0.012	0.065	0.988
WOC - escape/avoidance	0.095*	0.032	1.099	0.124**	0.041	1.132	0.029	0.048	1.030
WOC - problem solving	-0.072	0.040	0.931	-0.020	0.053	0.980	0.052	0.061	1.053
Impulsivity	0.011	0.013	1.011	0.041*	0.018	1.042	0.030	0.021	1.030

Note. Bayesian information criterion = 17844.158; pseudo-loglikelihood = -8771.16; OR = odds ratio; WOC = Ways of Coping Questionnaire.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Table 4
 Multivariate Logistic Regression Model With Interaction Terms

Predictors	Low vs. No Risk			Moderate/High vs. No Risk			Moderate/High vs. Low Risk		
	b	SE	OR	b	SE	OR	b	SE	OR
Gender (male)	1.225	1.183	3.405	3.280*	1.143	26.583	2.055	1.437	7.807
Drug use	0.772*	0.313	2.165	0.926*	0.447	2.524	0.153	0.508	1.166
Alcohol use	0.321*	0.144	1.379	0.100	0.236	1.105	-0.221	0.251	0.801
Depression/anxiety	-0.386	0.308	0.679	0.718*	0.356	2.051	1.105**	0.421	3.019
Social support	-0.108	0.171	0.897	0.080	0.217	1.083	0.188	0.251	1.207
WOC – distancing	0.104	0.063	1.109	0.041	0.090	1.042	-0.063	0.102	0.939
WOC - escape/avoidance	0.067	0.046	1.07	0.225***	0.070	1.252	0.157*	0.079	1.170
WOC - problem solving	-0.054	0.083	0.947	0.056	0.089	0.933	-0.015	0.102	0.985
Impulsivity	0.022	0.025	1.022	0.028	0.027	1.029	0.007	0.031	1.007
Interactions									
Drugs × Alcohol	0.282	0.150	1.326	0.424*	0.202	1.529	0.142	0.213	1.152
Gender × Alcohol	0.052	0.141	1.054	0.442*	0.222	1.555	0.389	0.24	1.476
Gender × Support	0.141	0.207	1.151	-0.431	0.245	0.65	-0.572*	0.288	0.564
Gender × Distancing	-0.125	0.088	0.882	-0.004	0.119	0.996	0.121	0.121	1.129
Gender × Escape/Avoidance	0.064	0.065	1.066	-0.147	0.092	0.864	-0.211*	0.102	0.810
Gender × Problem Solving	-0.036	0.083	0.964	0.056	0.110	1.057	0.092	0.127	1.096
Gender × Impulsivity	-0.019	0.025	0.981	0.028	0.032	1.009	0.028	0.037	1.028

Note. Bayesian information criterion = 34420.653; pseudo-loglikelihood = -16811.16; OR = odds ratio; WOC = Ways of Coping Questionnaire.
 * $p < .05$. ** $p < .01$. *** $p < .001$.

Being male increased the odds of belonging to the moderate/high-risk group than to the no-risk group by over 25 times (OR = 25.583). Reporting drug use (OR = 2.524) or symptoms of depression/anxiety (OR = 2.051) more than doubled the odds of being higher risk, and reporting higher use of escape-avoidance strategies increased the odds of being higher risk by 25% (OR = 1.252). Finally, when we compared moderate/high-risk gamblers to low-risk gamblers, symptoms of depression/anxiety were associated with triple the odds of belonging to the former group (OR = 3.019). Higher escape-avoidance strategies also increased the odds of belonging to the moderate/high-risk group (OR = 1.170).

Moving on to the interaction terms, there were no significant interactions in the low-risk versus no-risk comparisons. When we compared moderate/high-risk gamblers to no-risk gamblers, each unit increase in alcohol dependency increased the odds of being no risk by 53%, but only for drug users. This specification became non-significant when higher risk groups were compared with lower risk groups. In addition, the interaction between gender and alcohol was significant; although alcohol dependence did increase the risk of belonging to the higher risk group (OR = 1.555, or 55% more likely per unit score increase), this held only for males. When we compared moderate/high-risk to low-risk gamblers, we found that higher levels of social support were related to a decreased risk of belonging to the higher risk group, roughly a 46% decrease in odds per unit higher (OR = 0.564). Put another way, a 1-point decrease in perceived social support corresponded to a 77% increase in the odds of belonging to the moderate/high-risk group, but only for males (see Figure 1). A final and interesting distinction between these groups was that the first-order relationship between escape-avoidance coping and level of gambling risk was flipped. As male is coded “1” in the model, the direction of the interaction suggested that the association between gambling severity and escape-avoidance is true only for females (OR = 0.810). Figure 2 visually maps this interaction.

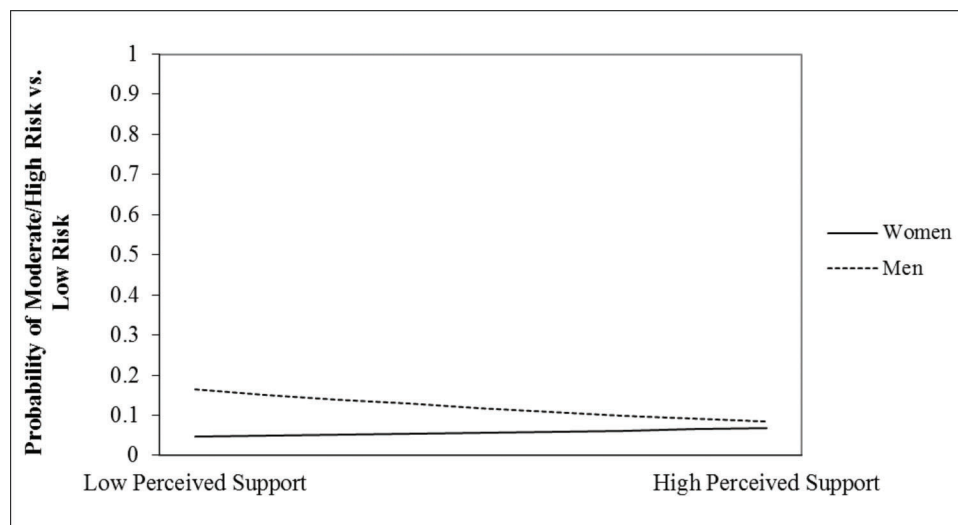


Figure 1. Moderating effects of gender between gambling severity and perceived social support.

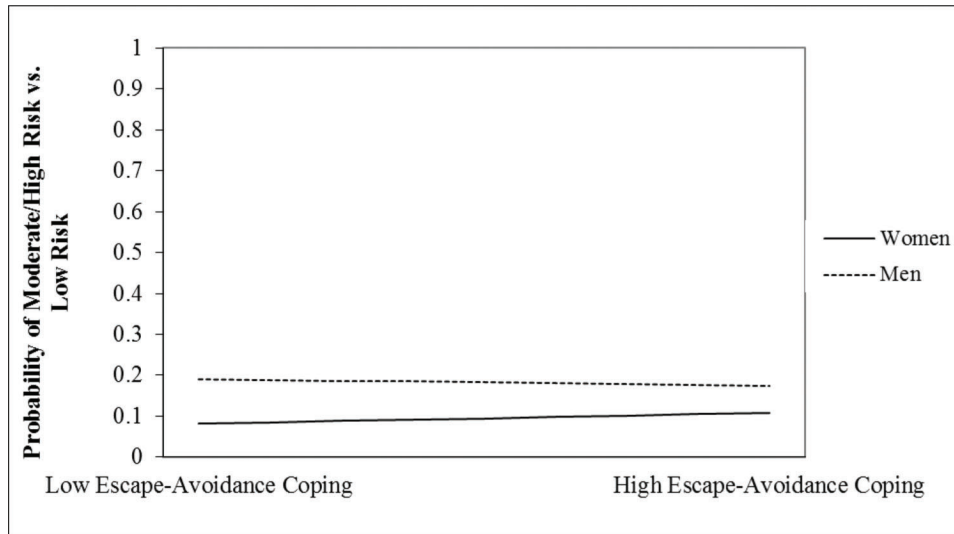


Figure 2. Moderating effects of gender between gambling severity and escape-avoidance coping styles.

Discussion

Findings from the initial models (i.e., no interaction terms) are consistent with the wider literature. First and foremost, our model finds that young men are at higher risk for developing gambling problems than are their female counterparts—a well-documented gender effect among emerging adults (Blanco et al., 2006; Edgerton et al., 2015; LaBrie, Shaffer, LaPlante, & Wechsler, 2003). Other significant correlates, including drug and alcohol use, depression/anxiety, and maladaptive coping, are also consistent with the wider literature on gambling-related problem behaviours. The model has four important findings, each relevant to the intervention of PG among emergent adults.

First, among both first-order and interaction models, there are behavioural shifts as the model moves from no-risk to high-risk gamblers. Alcohol dependence, in general, is useful for identifying low-risk gamblers and high-risk male gamblers. The relationship between higher risk gambling and alcohol use among males has been well-documented in the literature (Barnes et al., 1999; Mutti-Packer et al., 2017). More broadly, as risk increases, the effects of substance abuse are partially displaced by psychological variables, including depression/anxiety, maladaptive coping strategies, and impulsivity (in the initial model). This finding is consistent with that of Hodgins et al. (2012), who reported that it is primarily psychological factors, rather than substance use, that differentiates no-risk and low-risk gamblers from pathological gamblers.

Our model hence supports a wider picture of a syndromic gradient. Alcohol and drug use are associated with gambling at the lower end of the of gambling severity spectrum and are especially useful for distinguishing low-risk from no-risk gamblers in the sample. For moderate- and high-risk gamblers, psychological distress takes on a more salient (but not exclusive) role compared with that in their low- and no-risk counterparts. The significant Drug \times Alcohol interaction term further indicates that

drug use in combination with alcohol is more relevant to moderate- and high-risk gamblers than is alcohol use alone. Hence, the model suggests a set of moderate- to high-risk gamblers who show stronger associations with depression and/or anxiety, as well as drug use (and potential further alcohol use).

This higher risk cluster is particularly reminiscent of Blazczynski and Nower's (2002) "emotionally vulnerable" group who engage in gambling and substance use to cope with psychological dysfunction. Notably, although our data contain no biopsychosocial antecedents—and hence we cannot typologically profile participants, nor is it our goal to do so—they do point to the necessity of a "differential targeted prevention approach" (Allami et al., 2017, p. 1164) among Canadian emerging adults according to both gender and risk level. For low-risk male gamblers, a holistic intervention will need to screen for, and potentially address, alcohol dependence; for higher risk male and female gamblers, both psychological distress and drug use should be considered.

Second, the non-significant interaction between gender and depression/anxiety contrasts with other research linking gender and psychiatric co-morbidity. Evidence assessing this link is mixed; internationally, some studies have shown higher levels of depression and/or anxiety among young women (Martin et al., 2014; Merkouris et al., 2016; Sanscartier et al., 2018). Other studies have shown little or no difference across gender in depression, anxiety, and/or psychological distress (Grant, Odlaug, & Mooney, 2012; Husky, Michel, Richard, Guignard, & Beck, 2015; Potenza et al., 2001; Wong et al., 2013). Given this mixed evidence, and the paucity of studies that map syndromic problem behaviours across both gender and gambling severity, our analyses tentatively suggest that depression and anxiety have more to do with severity of gambling than with gender, specifically among emerging adults.

Third, like depression and anxiety, escape-avoidance coping is useful for differentiating the higher risk problem gamblers from their no-risk and low-risk counterparts. We found, however, unlike the case for depression and anxiety, a gendered relationship between escape-avoidance coping style and gambling severity. The significant Gender \times Escape-avoidance interaction term suggests that female gamblers at higher PG risk rely more on escape-avoidance coping strategies than do their male counterparts; gambling for females, then, may act as more of a coping mechanism than it does for men.

This relationship is consistent with other broader studies that show that maladaptive coping differentiates recreational from pathological gamblers among young adults (Bergevin, Gupta, Derevensky, & Kaufman, 2006; Wohl et al., 2006). The gender-specific relationship is also consistent with the work of Getty and colleagues (2000), who found that female problem gamblers rely more on avoidant coping techniques than do their male counterparts. Echoing Kushnir, Godinho, Hodgins, Hendershot, and Cunningham (2016, pp. 977–978), we suggest that this finding may reflect the fact that women are more likely than men to be shame-prone gamblers and therefore more likely to engage in avoidant coping behaviours (see also Schlagintweit,

Thompson, Goldstein, & Stewart, 2017; Yi, 2012). Men, on the other hand, tend to attribute negative consequences of gambling to external factors. Psychological distress may therefore be a consequence of PG for women as much as it is a cause. In any case, our results suggest that escape-avoidance strategies are a risk factor specifically for women with respect to gambling severity and that gambling itself may be one such strategy.

Last, although the simple slope of social support for PG risk level was non-significant across all comparisons, the significant interaction term did indicate a gendered relationship when we compared moderate- and high-risk gamblers with low-risk gamblers. That is, males who reported less perceived social support were more likely than females to belong to the moderate/high-risk group. Thus, our model specifies, by gender, the inverse relationship established by Weinstock and Petry (2008) between social support and gambling severity. This finding is also situated in the wider literature that shows that females tend to have wider, more diverse, and more accessible networks of social support (Mackinnon, 2012; Tinajero, Martínez-López, Rodríguez, Guisande, & Páramo, 2015; Weckwerth & Flynn, 2006). Moreover, Matheson and colleagues (2009) reported that both women and men tend to rely on support-seeking and problem-solving strategies to deal with gambling problems, but that their use diminishes as PG risk increases. Although we did not find any diminishing effects, we can speculate that it may be the case that the men in our sample (a) have less perceived social support because they have objectively smaller networks and (b) do not actively tap their existing networks to deal with gambling-related issues. This finding has particularly important implications for preventing young male gamblers from progressing to higher levels of PG risk.

Limitations of the Study

When considering these results, it is important to keep in mind a few limitations of the study. The first, and perhaps most significant, is the use of cross-sectional data. Because we did not use longitudinal data, we took care not to dismiss the relationship between pathological gambling, gender, and psychiatric co-morbidity on the basis of our non-significant interaction term. The literature on gambling and gender suggests that this relationship may be more relevant to older female gamblers who are into middle adulthood before symptoms of depression/anxiety manifest—therefore, we were careful to restrict our commentary to emerging adults.

Another limitation of the data itself is the relatively small sample size, especially the low count ($n = 15$) of high-risk women in the study. As a result, our ability to generalize to all young adults is limited. Third, the lack of antecedent psychosocial variables in the MLSYA data set, such as family histories and psychological history, prevents us from etiologically linking different symptoms, such as in the pathways model (Blazczynski & Nower, 2002; Scholes-Balog et al., 2015). Further, bivariate correlations and ORs between the PGSI and other study variables showed mostly moderate-to-small effect sizes, possibly because of the way the dependent variable was coded to preserve statistical power and variability among categories. A final

limitation is that we did not include type of gambling activity in our models; the kind of gambling that young adults participate in is associated with some of our study variables. For example, social support is likely higher among those who gamble informally with friends rather than anonymously online or at a casino (see Di Cicco-Bloom & Romer, 2012).

Conclusion

Notwithstanding these limitations, the results of this study show two important implications with respect to screening and intervention of emerging adults at risk for gambling problems. First, we identify clear associations between riskier gambling, drug use, and depression/anxiety. We suggest that, when emerging adults are screened for potential gambling problems, those scoring a 3 or higher on the PGSI should be further screened for psychological distress. These syndromic associations may exacerbate gambling behaviours (Chinneck et al., 2016), meaning that a holistic intervention must be used to address gambling. Those scoring for lower risk for PG, in turn, are at higher risk of engaging in alcohol or substance abuse. Interventions should therefore be different for those at low risk versus those at high risk; it would be unwise to assume that needs across the risk gradient are the same.

Second, for emerging adults at higher PG risk, there are important gender implications with respect to tailoring treatment. Our findings suggest that what differentiates higher risk from lower risk gamblers varies by gender. Maladaptive coping strategies are associated with higher gambling risk for young women, whereas for young men, the more important variable is (lower) perceived social support. Each of these can, in different ways, perpetuate pathological gambling cycles through feelings of shame and isolation, respectively (Weinstock & Petry, 2008; Yi & Kanetkar, 2011). Hence, interventions must be sensitive to gender-specific needs, particularly when dealing with those at higher levels of risk. We suggest that whereas young women at risk for PG should learn more productive coping strategies, young men at risk for PG need to learn how to build accessible networks of social support. The use of a group therapeutic setting may be especially appropriate for young men at high risk of PG (or who are problem gamblers). This finding also suggests that it would be especially worthwhile to undertake further research on the relationship between young men who gamble problematically and how social support may act as a buffer against higher risk behaviours. At present, there is a serious lack of research addressing this relationship.

Last, evidence of gender differences in the correlates of gambling severity, we hope, will encourage further research into the utility of gender-specific interventions for PG and co-morbid disorders. Our findings reinforce the notion that a syndromic model should be used to understand PG and its link to other problem behaviours, including substance and alcohol abuse, maladaptive coping mechanisms, and psychological distress. Crucially, the profile of this syndromic problem behaviour shifts on the axes of gambling severity and gender. Screening and treatment must be multidimensional, touching not only on gambling, but also on mental health and drug and alcohol use

more broadly. We suggest gambling interventions should be tailored according to gender and gambling severity; interventions for substance abuse alone will not be especially effective for higher risk gamblers with depression/anxiety and vice versa. Mapping this intersection is especially important for emerging adults, who require early intervention to stop problematic behaviours. We have taken a first step in this direction, but call for others to continue to explore how gambling patterns simultaneously vary by both gender and gambling severity.

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