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Alberta Gambling Research Institute Conference 2019: Blurred Lines in Gambling Research

Browne, Matthew; Clark, Luke; Cunningham, John; Hilbrecht, Margo; Johnson, Mark R.; Quilty, Lena C.; Rodda, Simone; Sanders, James; Tavares, Hermano; Tremblay, Joël...

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<th>1</th>
<th>Co-occurring Gambling, Alcohol, and Drug Use: A Focused Investigation in Northwestern Ontario</th>
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<tr>
<td><strong>S. Allen</strong> ¹</td>
<td>Background: Research has long documented the high co-occurrence of substance use disorders in those with risky levels of gambling involvement. Gambling modernization and cannabis legalization in Ontario, highlights the critical value of health promotion initiatives focusing on concurrent gambling and substance use, particularly within remote and rural regions of Ontario with elevated risk.</td>
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<tr>
<td>E. Todd ²</td>
<td>Methods: Participants included 740 adults from the Kenora and Rainy River region of Ontario. Participants completed measures as part of the Northwestern Ontario Wellness (NOW) Gambling Response Program, a longitudinal participatory research program associated with problem gambling prevention and health promotion and clinical service development and training in the region.</td>
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<tr>
<td>L. Green ²</td>
<td>Results: Participants reported elevated levels of risky gambling behaviours and associated harms. Problem gambling was associated with concurrent substance use difficulties, as well as the use of alcohol and drugs during gambling sessions. Gambling attitudes, motivations, and craving were also associated with the presence of gambling and substance use concerns. Conclusions: Results confirm the co-occurrence of risky gambling and substance use in this community sample from northwestern Ontario. Results also implicate drug and alcohol use during gambling sessions, as well as gambling attitudes, motivations, and cravings as potential targets for prevention and health promotion initiatives.</td>
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<td>J. Robinson ²</td>
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<th>2</th>
<th>Comorbid Conditions in Individuals Seeking Treatment for Problem Gambling in Brazil: An Exploratory Analysis</th>
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<tr>
<td><strong>Matthew A. Budd</strong> ¹</td>
<td>Evidence suggests that individuals with problem and/or pathological gambling (PG) experience higher rates of comorbid substance dependence, substance use disorders, mood disorders, and anxiety disorders compared to general population estimates. While an understanding of these risks may help guide clinical treatment for PG, there is relatively little evidence delineating this relationship across gambling intensity. This study addressed this gap by examining PG symptom severity and its overlap with comorbid psychiatric conditions among individuals voluntarily seeking treatment for PG at a specialized health service in São Paulo, Brazil (N=259). Included in these data are systematic assessments of PG symptom severity and psychological and substance use comorbidities using well-established self-report measures and semi-structured interviews. Preliminary analyses suggest that individuals with extreme or severe symptom severity (n=101), relative to those with mild or moderate symptoms (n=143), are at greater risk of major depressive episodes (OR[95% CI] = 3.3[1.9-5.7], p&lt;0.001) and social phobia (3.5[1.6-7.8], p=0.002). Our goal is to generate a comprehensive, systematic exploration of potential associations and risks for comorbid conditions among these individuals, stratified by PG symptom severity. Taken together, these data provide an opportunity to inform evidence-based clinical services for this vulnerable population in accordance with the goals of personalized care.</td>
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<tr>
<td>Daniel S. McGrath ¹</td>
<td>¹ University of Calgary</td>
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<td>Hyoun S. (Andrew) Kim ¹</td>
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<td>David C. Hodgins ¹</td>
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<td>Hermano Tavares ²</td>
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### An Examination of the Cognitive Correlates of Comorbid Schizophrenia and Gambling Disorder

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Lianne M. Tomfohr-Madsen

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Gambling disorder (GD) and schizophrenia co-occur at relatively high rates, though little research has investigated mechanisms to explain this comorbidity. Separately, research has found that both GD and schizophrenia are associated with cognitive deficits, including impairments in executive functions such as working memory (WM). Thus, it may be the case that elevated rates of GD in schizophrenia are related to executive dysfunction (e.g., deficits in WM, inhibitory control) that has been postulated to lead to increased risk-taking behaviours, impulsive decision-making, and reduced self-regulation. The current study aimed to examine the cognitive correlates of comorbid schizophrenia and GD (i.e., WM, behavioural impulsivity). Schizophrenia patients (N=83) were recruited and assessed for GD. Fifteen (18%) participants endorsed symptoms of GD with 9 (11%) meeting full criteria. Three WM tasks (N-Back, Maintenance and Manipulation, Digit Span) and one behavioural impulsivity task (Delay Discounting) were administered to all participants. Results found no significant cognitive differences (and small effect sizes) between participants who endorsed symptoms of GD and those who did not. The current study does not provide support for the hypothesis that schizophrenia patients with GD exhibit greater cognitive dysfunction. Rather, it may be the case that other factors besides cognitive impairment are leading some schizophrenia patients to engage in problematic gambling while others do not.

### Portrait of Couples Seeking Help for Gambling Disorder

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Magali Dufour  
Karine Betrand  
Marianne St-Jacques  
Francine Ferland  
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Gambling disorder has important repercussions on romantic partnerships. Despite this, most treatments are of individual nature. **Objective:** To describe individual and dyadic functioning of couples comprising a member with gambling disorder. **Method:** Couples (n = 98) are recruited at a specialized treatment center. **Results:** Gamblers are mostly men (73.4 %) with a mean age of 42 years (SD = 13.1). They have bet 64.2 % (SD= 118.9) of their personal income over the last year, and 29.9 % (SD= 43.9) of their marital income. One third of gamblers and 39.0 % of partners have a high level of psychological distress (IDPESQ-29), which is higher than in the general population (15 %). Further, 19.4 % of partners and 20.4 % of gamblers have attempted suicide in their lifetime. These couples have been living together for a mean duration of 11.5 years (SD = 11.4) and suffered significantly more physical, sexual and psychological violence over a year than the general population (CTS-2). Half of the gamblers (50.0 %) and over half of the partners (57.7 %) report marital dissatisfaction (DAS-4). These results emphasize the necessity of interventions tailored for romantic partners, but also for couples comprising a member with gambling disorder.
### 5 Gender Differences in the Patterns and Clinical Correlates of Treatment-Seeking Gamblers who Engage in Non-Suicidal Self-Injury

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Gambling Disorder (GD) is a public health concern with tremendous implications. The disorder rarely occurs in isolation, often presenting with other conditions. Suicidal ideation and attempts are common among treatment-seeking gamblers. An important yet overlooked risk factor for suicidality is non-suicidal self-injury (NSSI). Previous research has found gender differences in the forms, regulatory functions, and clinical correlates of individuals who engage in NSSI. However, these gender differences are comparatively overlooked within a gambling population. Therefore, we investigated gender differences in the forms, functions, and clinical correlates of 205 treatment-seeking gamblers who have engaged in NSSI in the past year. Overall, females endorsed more hair pulling and engagement in NSSI to relieve negative emotions and for attention or the facilitation of resources. Females also evidenced higher rates of psychiatric disorders including a current major depressive episode and generalized anxiety disorder. Finally, while females engaged in more problematic shopping and tobacco use, males reported greater problematic alcohol use. Understanding gender differences of treatment-seeking gamblers who engage in NSSI can provide important insight into appropriate treatment opportunities. Given the relationship of NSSI to suicidality, understanding these differences may inform prevention and intervention efforts for this vulnerable population.

### 6 Self-imposed Limit-setting and Positive Play

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Although uptake of limit-setting tools has generally been modest, many players nonetheless report setting their own limits. Drawing from a sample of 406 members of a local casino’s loyalty program, we examine the gambling attitudes and beliefs of those who report that they typically set different kinds of limits (hard/soft, money/time) with those who do not. Analyses indicate that hard money limits are the most common type of limit set, with 63% of the sample stating that they set such limits at least 70% of the times they play. Hard time limits were next most common type of limit set, with 45% of the sample setting such limits at least 70% of the time. Those who report typically setting hard money limits report greater gambling literacy, assume more personal responsibility for their play, and score lower on the PGSI than those who do not typically set such limits. Similar analyses comparing those who typically do or do not set soft money or time limits yield much weaker and often non-significant differences in PGSI, gambling literacy, and responsibility. The data suggest that players who are at the greatest risk for developing gambling-related problems are most in need of limit setting tools.
| 7 | The Involvement of a Concerned Significant Other in Gambling Disorder Treatment Outcome |
|-----------------------------------------------|
| **Amparo del Pino-Gutierrez**, Jöel Tremblay | Interpersonal distress is a common feature in gambling disorder (GD) and adding a concerned significant other (CSO) to the recovery process could be an effective tool for improving treatment outcome. However, little empirical evidence is available regarding the effectiveness of including a CSO to interventions. We aimed to compare treatment outcomes (compliance with therapy guidelines, dropout from treatment, and relapse during treatment) in a CBT program involving a CSO to CBT treatment as usual (TAU) without a CSO. The sample comprised male DG patients (N = 675). The manualized CBT intervention consisted of 16 weekly outpatient group sessions and a 3-month follow up period. Patient CSOs attended a predetermined number of sessions with the patient and were provided with resources to acquire a better understanding of the disorder, to manage risk situations, and to aid patients in adhering to treatment guidelines. Patients with a CSO had significantly higher treatment attendance and reduced dropout compared to patients receiving TAU. Moreover, patients whose spouse was involved in the treatment program were less likely to relapse and adhered to the treatment guidelines more than those with a non-spousal CSO. Our results suggest that incorporating interpersonal support to GD interventions could potentially improve treatment outcomes. |
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| 8 | Does Depression Lead to Compulsion in an Animal Model for Gambling Addiction? |
| Danika L. Dorchak | Blaszczynski and others have suggested that there are three subtypes of people prone to developing problem gambling, one of which is the “emotionally-vulnerable” group. Would this hold true for phenotypically depressed rats in a gambling paradigm? In this study, we compared the performance of 12 Wistar-Kyoto (WKY) rats, a strain used as a model for depression, with 12 Wistar (WIS) controls. The rats worked on random-ratio schedules, similar to those of slot machines, for food rewards. After four weeks of testing, the animals underwent three addiction tests, which measure response persistence in the face of increasing work (progressive ratio) or punishment (progressive aversion), and the tendency to respond after abstinence (reinstatement). While the WKY rats had slower response rates and longer pauses between trials, they performed at the same level as their WIS counterparts during progressive ratio and reinstatement testing. However, the WKY rats responded more during periods when a cue indicated that reward was unavailable and persisted for longer in the progressive aversion task, both suggesting compulsive tendencies. These findings indicate that WKY rats are more likely to develop compulsion after prolonged exposure to a gambling-like reward schedule and may point the way towards a depressive animal gambling model. |
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**Hasty High Rollers: Assessing the Role of Impulsivity in Individuals with Gambling Disorder and Problematic Cocaine Use**

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**Background:** Gambling disorder (GD) shares clinical and neurobiological similarities with problematic substance use, particularly those involving psychostimulant drugs. Though research has identified elevated trait impulsivity as an important determinant of GD and PSU, separately, the influence of impulsivity as a shared feature of GD and problematic substance use has yet to be examined. Therefore, the aim of the current study was to clarify whether dimensions of trait impulsivity, as assessed using the UPPS-P Impulsive Behavior Scale (UPPS-P), are a mutual feature of problematic cocaine use (PCU) and DG.

**Method:** A community sample of 155 gamblers who had used cocaine in their lifetime were recruited by the means of a crowdsourcing platform (Amazon’s Mechanical Turk). Participants completed an online survey, GD severity, cocaine involvement severity, and trait impulsivity.

**Results:** GD severity was significantly correlated with the UPPS-P subscales of positive urgency, perseverance, and negative urgency. Significant correlations were found between cocaine involvement severity and the positive urgency subscale of impulsivity. Hierarchical regression analyses revealed that cocaine involvement severity was a significant predictor of GD severity. Furthermore, cocaine use severity remained a significant predictor of GD severity with the addition of the impulsivity dimensions. Positive and negative urgency were the only subscales of impulsivity that significantly predicted GD severity in the second step of the regression model.

**Conclusions:** These findings suggest that the tendency to act rashly when exposed to extreme emotions (i.e., negative or positive) is a shared feature among individuals with who engage in GD and PCU.

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**Impulsivity Mediates the Relationship between Gambling Problem Severity and Binge Eating**

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Binge eating has been found to frequently co-occur in individuals with gambling disorder. Additionally, co-morbid gambling disorder and binge eating disorder are associated with greater severity of gambling-related problems and psychopathology compared to the general population. However, the mechanism that links these two co-morbid disorders has not been examined. The aim of the present study was to examine whether impulsivity mediated the relationship between gambling problem severity and binge eating severity in a sample of individuals seeking treatment for gambling disorder at a university outpatient hospital in Brazil (N = 210). Participants completed psychometrically sound self-reported measures of gambling problem severity (Gambling Symptom Assessment Scale), binge eating severity (Binge Eating Scale), and impulsivity (Barratt Impulsiveness Scale -11). There was no direct relationship between gambling problem and binge eating severity. In contrast, gambling problem severity was significantly associated with impulsivity and higher levels of impulsivity were associated with greater symptoms of binge eating. Bootstrapping analysis indicated that impulsivity significantly mediated the association between gambling problem and binge eating severity. Impulsivity may be a shared feature that links co-morbid gambling and binge eating. From a transdiagnostic perspective, targeting impulsivity may help reduce symptoms of both gambling and binge eating.
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<th>Ethnic Differences in Gambling Experiences in a Representative Sample of Brazilian Lottery Players</th>
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| 11 | **Ximena Garcia**<sup>1</sup>  
Hyoun S. Kim<sup>1</sup>  
David C. Hodgins<sup>1</sup>  
Daniel S. McGrath<sup>1</sup>  
Hermano Tavares<sup>2</sup> |
|   | There is a paucity of research investigating ethnic differences among gamblers. Studies on ethnic differences have been mostly conducted in Western countries and have found non-Caucasians to be at increased risk for gambling problems. The present research investigated ethnic differences in a representative sample of Brazilian lottery players (N = 5,368). Lottery is the most popular form of legalized gambling in Brazil. The participants were recruited from lottery kiosks all across Brazil (stratified by population). The sample closely resembles the demographics of the Brazilian census and was comprised of 47.5% Caucasians, 40.9% African-Caucasians and 11.6% Africans. Results revealed that African-Caucasians start gambling and experience their first problems due to gambling at a younger age. They also are more likely to play Jogo do Bicho (illegal lottery) and to meet criteria for gambling disorder compared with Caucasians. Africans were also more likely than Caucasians to play Jogo do Bicho. Despite the earlier onset and higher gambling severity in non-Caucasians, there were no between group differences in regard to treatment seeking. The results suggest that ethnicity may be a risk factor for gambling disorder in Brazil and could be used to inform ethnic sensitive practice and cultural competence in the treatment and prevention of gambling problems in Brazil. |
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<th>12</th>
<th>Family Study of Executive Functioning Deficits in Gambling Disorder</th>
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|  | **Vina M. Goghari**<sup>1</sup>  
David C. Hodgins<sup>2</sup> |
|   | Approximately 2-3% of Albertans have trouble controlling their gambling habits. Gambling disorder causes significant impairment - affecting a person’s ability to maintain successful interpersonal relationships, work productivity, and health. Currently, however, there is a lack of information on the cognitive, biological, environmental and genetic underpinnings of these impairments. Executive functioning deficits are found in individuals with gambling disorder and are conceptually related to the behavioural symptoms of the disorder. Therefore, in this project we used a family study design to investigate deficits in executive functioning in people with gambling disorder and their family members, as well as community controls. This design makes it likely that deficits that are identified in both affected and unaffected relatives are familial vulnerability markers of cognitive changes that might be risk factors for gambling disorder. Thus far, we have examined 40 people with gambling disorder, 20 of their first-degree biological relatives, and 40 community comparison subjects. Participants completed a task of cognitive control (Color-Word Interference Test) and a task requiring planning (Tower Test). Preliminary results suggest no group differences in the executive functioning tasks between the three groups. However, recruitment is ongoing and updated results with an enhanced sample size will be presented. This study will provide further information whether executive functioning deficits (if present) are related to familial and/or disease-specific effects in gambling disorder. |
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## 13 Gaming or Gambling? Assessing the Correlates of Problematic Social Casino Gaming Use

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**Hyoun S. Kim**<sup>1</sup>  
**Matthew Rockloff**<sup>2</sup>  
**David C. Hodgins**<sup>1</sup>  
**Daniel S. McGrath**<sup>1</sup>  
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Social casino games (SCGs) are popular free-to-play casino-style games played for points rather than money. Despite being a relatively recent phenomenon, the SCG market has expanded globally, generating 4.4 billion in revenue during 2017. Past research has traditionally focused on its role as a proxy for gambling, however, little is known about social casino gamers who engage in non-monetary problematic play (e.g., harms emanating from excessive time commitment). The current study assessed possible correlates of problematic SCG use. Non-problematic (n=169) or problematic (n=137) social casino gamers completed a questionnaire that assessed demographics (e.g., age, sex), play habits (e.g., use of microtransactions), motivations for playing, belief in luck and skill related to gambling, and disordered gambling severity. Multivariate analyses revealed that problematic SCG use was associated with disordered gambling severity, a history of microtransactions, higher employment levels, stronger belief in luck related to gambling, and being motivated to engage in SCG as a coping mechanism against negative affect. Altogether, this suggests that problem social casino gamers experience overlapping indicators of psychopathology compared to gamblers, although differences were still present. Future research could expand on potential risk factors in migration between SCG and gambling to increase understanding of shared vulnerabilities in addiction.

## 14 Why do Females Gamble? A Retrospective and Daily Diary Assessment of Gambling Behaviors and Negative Mood across the Menstrual Cycle

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**Amanda Hudson**<sup>2</sup>  
**Roisin O’Connor**<sup>3</sup>  
**Abby Goldstein**<sup>4</sup>  
**Michael Ellery**<sup>5</sup>  
**Daniel McGrath**<sup>6</sup>  
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Despite increases in female gambling, little research investigates female-specific gambling factors. Several addictive behaviors appear to fluctuate across menstrual cycle phase (MCP), however, gambling requires further investigation. In two studies, we examined associations between MCP, negative affect, and three gambling behaviors (GB): time and money spent gambling, and the probability of drinking while gambling. We predicted, consistent with self-medication theory (SMT), increases in risky GBs (Studies 1 and 2) and negative affect (Study 2) would occur premenstrually/menstrually relative to other MCPs. Thirty-three (Study 1) and 20 (Study 2) female gamblers collected data using a retrospective timeline followback procedure and a prospective 32-day, daily diary method, respectively. Salivary progesterone levels verified self-reported MCP validity (Study 2). Findings revealed significant, but somewhat inconsistent, MCP-GB effects across studies. SMT was partially supported. Increases, relative to other MCP(s), were found for time spent gambling menstrualy/premenstrually, money spent gambling menstrualy, drinking while gambling premenstrually, and negative affect premenstrually. Unexpectedly, findings more consistently indicated GBs increase during ovulation, suggestive of enhanced reward-sensitivity. Assays validated self-reported MCP. Results suggest ovarian hormones may influence females GBs and negative affect. Findings may lead to the identification of female-specific gambling factors and more effective interventions for females with problematic gambling.
### 15 An Experimental Study of the Social Casino Gaming-Gambling Link: Testing the Role of Inflated Payout Rates and Psychological Characteristic on the Decision to Gamble

**Hyoun S. Kim**<sup>1</sup>  
R. Diandra Leslie<sup>1</sup>  
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A growing body of empirical evidence suggests social casino games (i.e., free to play simulated gambling games such as Slotomania) may increase the propensity for real money gambling<sup>1</sup>. We used an experimental design to investigate whether inflated payout rates in social casino game increase players’ willingness to engage in real money gambling. Furthermore, we assessed differences in psychological characteristics between social casino gamers who decided to engage in subsequent gambling compared to those who did not. An online sample of current social casino gamers who also engage in gambling (N=306) were recruited and asked to play a social casino game – Lucky Lolly Slots – and provide their impressions of the game. Unbeknownst to participants, they were randomly assigned to one of three experimental conditions: inflated payout (n=99), break even (n=102), or losing (n=105). After playing Lucky Lolly slots, participants were offered a chance to gamble their remuneration on an online roulette game, which served as the binary outcome (i.e., gambled vs. did not gamble). A total of 268 (87.6%) elected to gamble with no differences across conditions. Nevertheless, participants who elected to gamble reported higher levels of problem gambling severity and urgency (positive and negative). The results suggest that rather than structural characteristics (i.e., inflated payout rates), clinical and dispositional characteristic may be of importance in understanding the social casino gaming-gambling link.

<sup>1</sup>Rockloff, M, Greer, N, Armstrong, T, Thorne, H, Langham, E, Browne, M, Moskovsky, N, Goodwin, B, Li, E, 2018, Mobile EGMs Apps – The perfect substitute or the perfect storm?, Victorian Responsible Gambling Foundation, Melbourne

### 16 Growing Up Online: A Toolkit for Service Providers Working with Children, Youth, and Families Experiencing Problematic Use of Digital Technology

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Alberta Health Services  
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There continues to be considerable debate in the mental health community as to what constitutes normal, problematic, or pathological use of digital technology among children, youth, and families. Digital technology includes the use of applications (apps), programs, platforms and other online involvement, or digital screen time in general. The Growing Up Online Toolkit reflects current language, trends, and explores this ever-evolving topic specifically in the areas of: a) Gaming, b) Online Gambling, c) Online Pornography, and d) Social Networking. There is understanding that gambling is addictive. There seems to be no consistent formal recognition that the other three areas of concern mentioned have the same impact on children and youth. Increasingly the line between gambling, gaming, pornography and social networking have become blurred as gambling has been infused in these areas of technology. The purpose of this Toolkit is to assist service providers with evidence-based practice information, screening and assessment tools, and resources in instances when digital technology is problematic for families.
### 17 Pleasure to Play, Flow to Stay: How Flow Predicts Urge-to-Play in Candy Crush

| Chanel J. Larche | Retrospective self-reports suggest that flow is related to excessive, potentially problematic videogame play (Hull, 2013). However, research has yet to experimentally explore how flow influences a player’s urge to continue gameplay in a real game. Research thus far has reliably shown arousal to be tightly linked to player urge in a gaming context. Thus, the aim of the current study is to ascertain the role of both flow and arousal in players’ urge to continue gameplay. Since flow has classically been manipulated by altering the balance between perceived game challenge and player skill, we recruited sixty-four Candy Crush players to play a block of games of varying difficulty: easy games, regular games that centered around their personal level standing, and hard games. Players rated their level of skill, challenge, arousal, urge to keep playing, and degree of flow after each game. Ratings of skill and challenge were most similar (i.e., balanced) for the regular games, and least balanced for the easy and hard games as predicted. For all difficulty conditions, both flow and arousal were correlated with urge. Using hierarchical multiple regression, flow accounted for additional urge variance over and above arousal. Here we demonstrate that flow and arousal combine to increase urge to keep playing – an imperative step to understanding the role of flow in problem gaming. |
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### 18 Pramipexole Administration Induces Behavioural Addiction in Rats by Altering Dopamine-Mediated Reward Systems

| Catherine S. Laskowski | Individuals treated for Parkinson’s disease using dopamine agonists that preferentially target D3 receptors develop gambling addiction at much higher rates than the general population. We investigated whether administration of a D3 agonist, pramipexole (PPX), could induce behaviours consistent with addiction and whether animals trained to respond for food reward on a slot machine-like, random ratio schedule of reinforcement would be more likely to produce this phenotype. After training on either a random or fixed ratio schedule of reinforcement, 50 rats were implanted with either an osmotic pump, which delivered 1.0 mg/kg/day of PPX over 28 days, or a dummy pump. After implantation, animals were assessed for addiction-like behaviours using a battery of behavioural tests. We found that PPX increased motivation to work for food reward and interfered with rats’ ability to limit reward-seeking behavior when cues indicated that reward was not available. The largest changes were observed in the fixed ratio group of rats receiving PPX. Random ratio schedules decreased time between trials, but had no other main effect. Our results suggest that the effects of PPX in inducing addiction-like behavior are not specific to gambling, but rather have a more general effect on motivation and compulsive tendencies. |
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| Danika L. Dorchak | |
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A number of experimental studies and real-world events demonstrate a puzzling phenomenon—anxious uncertainty, which primarily inspires caution, often increases risk-taking. This fundamental motivational process may lead to undesirable outcomes within certain domains. For example, gambling losses may induce anxious uncertainty, which leads to increased preference for risk-taking and thus more losses, perpetuating the cycle. We conducted four studies to test whether this puzzling phenomenon is due to the regulation of anxious uncertainty via reactive approach motivation (RAM), which makes people less sensitive to negative outcomes. In Studies 1 and 2, experimentally manipulated anxious uncertainty led to increased preference for risk-taking. In Study 3, experimentally manipulated approach motivation caused increased preference for risk-taking. Finally, using EEG in Study 4, anxious uncertainty caused increased approach-related brain activity and reduced neural sensitivity to negative outcomes. Importantly, approach-related brain activity mediated the effect of anxious uncertainty on reduced neural sensitivity to negative outcomes. These results support a RAM interpretation of particular instances of risk-taking. Implications of this research could lead to identifying potential dispositional and situational risk factors for harmful risk-taking, such as problem gambling. Critically, if anxious uncertainty can lead to problem gambling then anxiolytic interventions may help curb this behavior.

### Oppressed Social Groups as Social Entrepreneurs: The Creation of First Nations Casinos as Social Enterprises

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<th>Author</th>
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Management research has suggested that social enterprises, combining business and social logics, are powerful mechanisms to alleviate grand challenges such as poverty and inequality. However, the literature has only focused on mainstream dominant actors as social entrepreneurs and only studied social enterprises created for oppressed social groups—the most concerned groups of poverty and inequality. In this study, I shift attention to oppressed groups and explore how oppressed groups can act as social entrepreneurs and create social enterprises for themselves. By qualitatively studying the creation of First Nations casinos in Canada, analyzing documents and interviews, I demonstrate three overarching processes that can support oppressed groups as social entrepreneurs: forging ingroup settlements, regulative maneuvering and resourcing stigma. These processes together constitute a bold, confrontation pathway of social entrepreneurship. I contribute to the entrepreneurship literature by revealing how actors with low resources and power can be social entrepreneurs, and to the stigma literature by demonstrating how stigma can be resourced to support inclusion. In addition, I prompt First Nation casinos as exemplary social enterprises that benefit indigenous development.
## Examining the Latent Relationship Between Feelings of Disadvantage and General Risk Preference

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Previous studies have found that feelings of relative deprivation (feelings of resentment and perceived unfair disadvantage) are associated with more risk-accepting attitudes, personality traits, and behaviours. These relationships have been hypothesized by the need-based pathway of the relative state model: people will be more likely to take risks when individuals experience a disparity between one’s present and one’s desired (or goal) state. This risk-prone “state of need” has been argued to play a causal role in risk-taking across many domains, such as gambling, criminality, and risky health behaviours. Recently, researchers have provided evidence that a single factor of “risk preference” can account for variance across measures such as impulsivity, nicotine dependence, gambling, and health-based risk attitudes. Previous studies investigating the disadvantage-risk relationship have relied on correlations between feelings of disadvantage and self-report and in-lab measures of risk-taking. However, the question remains whether feelings of disadvantage can account for the shared variance between measures of risk-acceptance. The current study will use structural equation modelling in a large ($n = 1200$) crowdsourced sample to (1) replicate the model of risk preference, and (2) determine whether a feelings of relative disadvantage have a significant relationship with the latent factor of so-called “risk preference.”

## Institutional Logics as an Analytical Framework for Understanding the Organizational Delivery of Problem Gambling Treatment in Alberta, Ontario, and Saskatchewan

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The purpose of this study was to examine the process of diffusion of the concept of integration of mental health and substance use services in Alberta, Ontario, and Saskatchewan and its effect on the delivery of problem gambling treatment. The provinces represent case examples of integration-related changes occurring sequentially. Data collection methods included document analyses and semi-structured interviews with decision makers at the provincial/regional/service provider level. The institutional theory perspective was used to develop a model for understanding integration as a new institutional logic introduced to provide the organizing principles for the newly restructured organizational fields. Findings suggest that a) the development of a dominant institutional logic needs to be worked out over time and accepted by all-level organizational actors; b) the competing interests of all-level actors are connected to co-existing institutional logics that can sustain over time; c) micro-level actors manage the existence of competing institutional logics by developing localized structures and systems; and d) the dynamics of institutional change include the acceptance of nuanced alterations of implementation through modification or jurisdictional and local customization of integration.
### Effects of Perception of Gambling Availability on Gambling Severity: Main and Modifying Effects

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Few empirical studies have documented the relationship between perceptions of the availability of gambling products and venues and gambling severity in the adult population. The aim of this study was to examine the relationship between perceived gambling availability and gambling severity, and to determine the moderating effects of sociodemographic characteristics, depression, and use of substance using the Alberta 2008/2009 Social Impact and Gambling Survey. Bivariate and multivariate regression analyses showed that perception of gambling availability is associated with about 1.3-fold gambling severity in adults, even when sociodemographics, problems with depression, and use of substance are controlled. Factors such as age, gender, place of residence, and problems with depression had significant moderating effects on the relationship. Our findings indicate that perception of gambling availability is an important determinant of gambling severity in the general adult population.

### A Multi-Method Assessment of Pathological and Normative Personality Across the Spectrum of Gambling Involvement

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**Background:** Pathological Gambling (PG) has been linked to both specific personality traits and certain personality disorders (PDs). However, previous studies have used a wide variety of research designs that muddies the conclusions about the personality features that distinguish adults with pathological gambling from other groups. The current investigation sought to advance this research by using an expansive sample including adults who do not gamble, who gamble socially, and who endorse PG, using self-report, informant-report, and interview-rated measures of personality traits and disorders.

**Methods:** A total of 245 adults completed measures of gambling behaviour, normative and pathological personality over two assessment visits. A multivariate ANCOVA was conducted to investigate differences between groups.

**Results:** Analyses supported numerous group differences including differences between all groups on the Neuroticism facet of Impulsivity, and between non-gambling/socially gambling adults and PGs on the Conscientiousness facet of Self-Discipline. Adults with PG exhibited more symptoms of Borderline, Paranoid, Schizotypal, Avoidant, and Dependent PDs than adults who gamble socially or not at all. **Discussion:** The current investigation provides a comprehensive survey of personality across a wide range of gambling involvement, using a multi-method approach. Our findings have clinical implications in helping to identify personality risk factors for PG.
**Relative Deprivation Partially Mediates the Effect of Embodied Capital on Problem Gambling**

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<tr>
<th>Nabhan Refaie</th>
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Embodied capital describes knowledge, skills, or traits (e.g., intelligence, physical ability, attractiveness) that confer competitive (dis)advantage in social competition. Competitive disadvantage has been related to risk taking behaviours such as problem gambling. However, the psychological mechanism by which competitive disadvantage is related to problem gambling has yet to be explored. We propose that this mechanism is personal relative deprivation, or a feeling of anger and resentment resulting from a subjective feeling of unfair disadvantage compared to similar others. The present study explored the mediating effect of personal relative deprivation on the relationship between embodied capital indices and problem gambling symptoms. We administered the Problem Gambling Severity Index and the Personal Relative Deprivation Scale (Revised) to 328 community members. In addition, we measured participants’ levels of attractiveness, physical dexterity and intelligence (three measures of embodied capital). Results show that personal relative deprivation partially mediated the relationships between all embodied capital indices and problem gambling symptoms, suggesting that personal relative deprivation is a good candidate as a psychological mechanism by which people who experience competitive disadvantage engage in problematic gambling.

**The Effect of Alcohol Cues on Attentional Biases for Gambling Among Poker Players who Drink**

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<tr>
<th>Emma V. Ritchie</th>
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Alcohol is consistently present in most, if not all, public spaces devoted to gambling activities. Given its prominence in these venues, and considering that many gamblers choose to drink while they gamble, understanding the effect that alcohol has on gambling is of utmost importance. Relatedly, a large percentage of individuals who are disordered gamblers have a comorbid alcohol use disorder. This research project seeks to further explore the relationship between gambling and alcohol use by focusing on two potential underlying mechanisms: attentional biases and cross-cue reactivity. Specifically, this project directly examines the influence of alcohol cues on gambling attentional biases and cross-cue reactivity, in an experimental design that utilizes exposure to alcohol cues prior to eye-gaze tracking. We hypothesize that exposure to alcohol cues will increase gambling cravings and attention to gambling images compared to exposure to neutral cues. The results of this study may shed light on the relationship between gambling and alcohol, and as such may inform strategies for responsible gambling and treatment strategies for disordered gambling.
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<th>27</th>
<th>Factors Associated with Changing Intentions to Engage in Risk Behaviours</th>
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| Gillian Russell 1  
Robert Williams 1  
Marvin Krank 2  
1 University of Lethbridge  
2 University of British Columbia  
g.russell@uleth.ca | One of the goals of prevention research in addictions is to identify risk factors for transitioning from a state of non-engagement to engagement. Equally important, are those factors associated with ceasing engagement in a behaviour. This study is aimed at identifying those variables associated with youth stating their intentions to transition their engagement in risk behaviours (i.e. from non-participant to participant and from participant to non-participant), namely: gambling, alcohol use, and cannabis use. Importantly, we will be examining whether there are variables that are specific to a particular behaviour and variables that are associated with more than one behaviour. Data was collected from 1111 students in grades 8 through 10 from School District 22 in Vernon, British Columbia in Fall of 2018 as part of a comprehensive prevention program targeting alcohol, substance use, and gambling. This study has implications for future school-based prevention programming and the treatment of addictions in youth. |

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<th>28</th>
<th>Probabilistic Discounting Among Individuals with Current and Past Disordered Gambling: Implications for Its Role in the Maintenance of Gambling Disorder</th>
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| Magdalen Schluter  
David C. Hodgins  
University of Calgary  
magdalen.schluter@ucalgary.ca | Probabilistic discounting (PD), the relative preference for larger-uncertain over smaller-certain rewards, is robustly associated with problematic gambling. However, whether it contributes to the development or maintenance of gambling disorder (GD) is not yet understood. This study sought to investigate the potential role of PD in the maintenance of GD. Using a two-stage recruitment procedure, a sample (N=407) of individuals with current or past GD, as well as 97 healthy controls were recruited through Amazon’s Mechanical Turk. Participants first completed self-report measures of gambling involvement and current and lifetime GD symptoms. Eligible participants were invited to complete a follow-up study, which included a random-adjustment PD task. To examine differences in PD across the three groups, one-way ANOVA was conducted and linear contrasts with Holm’s correction were utilized. Individuals with a current GD diagnosis showed greater preference for larger-uncertain rewards over smaller-certain rewards compared to individuals with past GD diagnosis only. Both GD groups showed greater preference for uncertain rewards than controls. Overall, these results suggest that individuals with past GD symptoms may have greater risk aversion compared to individuals with current GD symptoms, supporting the hypothesis that PD may be important in the maintenance of GD. |
### When to Go ‘All-In’: The Effect of Relative Deprivation on Gambling Behaviour

**Anthony Schoen**¹  
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Substantial population-level research has demonstrated a link between higher levels of economic inequality and risk-taking behaviours such as gambling. A proposed explanation for this link is relative deprivation theory which posits that individuals are sensitive to their relative status among others in society. Individuals who feel relatively deprived compared to others will take more risks in an attempt to narrow the gap between themselves and others. Surprisingly, very little individual-level research has looked at the effects of relative deprivation and risk-taking. This secondary analysis of 2552 South Australian youth compares gambling behaviours of students from schools with a homogenous socio-economic makeup to schools with a more heterogeneous socio-economic makeup. Economic inequality is within closer proximity for students attending heterogenous schools; therefore, some of these students are more likely to feel relatively deprived. The effects of relative deprivation on individual gambling behaviour will be presented.

### Gender Differences in Treatment Seeking Gamblers with a Comorbid Eating Disorder

**Maryam Sharif-Razi** ¹  
R. Diandra Leslie ¹  
Hyoun S. Kim¹  
Kristin M von Ranson ¹  
Dan S. McGrath ¹  
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Recent literature suggests that gambling and eating disorders may co-occur more frequently than once thought. However, no studies have directly examined whether gender differences exist in comorbid gambling and eating disorders. The present study investigated gender differences in current gambling behaviours, gambling severity, gambling-related cognitive distortions, and psychiatric comorbidities in dual-diagnosed participants. The sample consisted of 349 treatment-seeking gamblers at a university hospital in São Paulo, Brazil. Gambling disorder and other psychiatric comorbidities were assessed via comprehensive clinical interviews. Of the total sample, 43 participants met criteria for both a gambling and eating disorder, and subsequently completed a series of self-report measures. No gender differences were found in any gambling variables. In contrast, several gender differences were found in current psychiatric co-morbidities. Although women were more likely to have an eating disorder diagnosis (n = 28; 8.0%) than men (n = 15; 4.3%), men were more likely to report comorbid depression, alcohol use disorder, and compulsive sexual behaviors. The gender differences observed provide further evidence for the need to consider gender-specific patterns of presentation in treatment for eating disorders.
### Judicial Recognition of Gambling Addiction

| **Derek Spencer** | Rosalie Gurske began working at a credit union in 1995. Following decades of dedicated service, by 2007 she was responsible for the branch’s daily cash flow. Unfortunately, Ms. Gurske had a secret, siphoning nearly $1 million dollars from the branch over six years and gambling the money away. Ultimately, after her crimes were uncovered, she was sentenced to 3.5 years in prison. This sad case is just one of many examples of Canadian’s who committed crimes to support a gambling addiction. Funded through Manitoba Problem Gambling Research, my study examines inspections of problem gambling and the law. The present poster presentation focuses on when judges recognize gambling addiction, and when judges accept the addiction was the reason for the crime. Examining all reported cases from 2000-2018 (n=140), my poster will explore recognition and understanding of gambling addiction by judges across Canada. |
| University of Winnipeg | d.spencer@uwinnipeg.ca |

### A Near-Miss by Any Other Name: Investigating the Influence of Game Structure on Player Experience in Scratch Cards

| **Madison Stange** | Near-misses occur when a player reveals an arrangement of symbols that fall just short of a jackpot. Previous research has shown that scratch card near-miss outcomes in “match three” games (e.g., match three symbols to win a prize) are associated with increases in physiological and subjective arousal, frustration, and urge to continue gambling. However, many other types of scratch card games are available for purchase, and these games can vary widely in their structural characteristics. For instance, a common type of game requires players to match a “lucky” number to numbers in a game matrix to win (e.g., “number matching” games). We investigated physiological and subjective reactions to both “match three” and “number matching” games by creating custom-made scratch cards that emulated each game type. Each participant experienced two losses, one win, and one near-miss for each game type. Physiological arousal (skin conductance and heart rate) was recorded throughout play, and subjective evaluations of various affective dimensions were measured following each outcome. Results show that despite similar subjective evaluations across both game types, participants' physiological responses to the two game structures differed, indicating that physiological reactivity and subjective appraisals in scratch card games may be dissociable. |
| Mike J. Dixon | University of Waterloo | mstange@uwaterloo.ca |
### 33 Testing the Technical Hypothesis of Motivational Interviewing with Disordered Gamblers

**Jennifer L. Swan**  
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Motivational interviewing (MI) has shown promise as a brief, effective treatment for disordered gambling. The technical hypothesis of MI indicates the importance of MI-consistent therapist behaviours in eliciting client change language, which in turn predicts favourable outcome. The present study aimed to replicate and extend previous examinations of the technical hypothesis of MI within a sample of disordered gamblers (N = 50). Telephone interviews were coded for both therapist behaviours and client language counts using the Motivational Interviewing Skills Code 2.1 (MISC 2.1). Follow-up data on gambling involvement (days and dollars gambled) were collected at 3 and 12 months post-intervention. Therapist MI-consistent behaviours significantly predicted both client preparatory change talk and preparatory sustain talk. Client commitment language counts on their own did not significantly predict outcome; however, when change language was examined as a ratio, it significantly predicted days gambled at both 3- and 12-month follow-up (but not dollars gambled). The results suggest that it is the ratio of change to sustain language, rather than the presence of change language alone, that best predicts outcome in disordered gamblers. Implications for brief treatments for disordered gamblers as well as for the broader MI literature will be discussed.

### 34 The Development of BetMinder: A Mobile App to Help People Gamble Responsibly

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This session describes how we put evidence-informed responsible gambling into people’s hands, literally. Financial literacy and principles of behavioural science informed this novel gambling solution. Specifically, the app provide gamblers with ‘just in time’ information via notifications on their phone, and also helps gamblers to track their wins and losses. In addition, the app translates spending into real opportunity cost (e.g., the amount you spent is equivalent to a trip to New York). I trace the path from initial conversations, to commissioned report, to consultation and application development and the stumbling blocks along the way. Future evaluation efforts are also discussed. **Implications:** Participants will be inspired to think creatively about mobilizing evidence and benefit from our lessons learned in creating a mobile app. Participants will learn about a free-to-use app to support responsible gambling that may be useful for populations served.
Development and Validation of a Brief Screener for Gambling Disorder Among Brazilian Lottery Players

**Juan David Tovar** 1
Hyoun S. Kim 2
Mirella Martins de Castro Mariani 1
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Gambling is a partially prohibited activity in Brazil with state-run lotteries being the most popular form of legalized gambling. Despite this, the prevalence of people of gambling disorder (GD) in Brazil is similar to that of countries with legalized gambling. Given the rates of GD in Brazil, there is a need to develop a brief screening instrument to identify individuals with GD. Using the same methodological procedure in the creation of the NODS-CLiP, the present research aimed to develop a brief screening instrument for Brazilian lottery players. The final sample consisted of 5,407 lottery players recruited from lottery kiosks all across Brazil, who completed measures of GD including the full NORC DSM-IV Screen for Gambling Problems (NODS) adapted to DSM-5 criterion. Out of all two, three, and four item combinations, three items that assessed: withdrawal symptoms, gambling to escape problems (i.e., coping) and chasing had the greatest specificity and sensitivity in identifying people with GD. These three items are different from the original NODS-CLiP and suggests the importance of developing brief screening instruments based on specific populations. Additionally, the results of the present research may help to develop more efficient screening and treatment for the estimated 2 million people with GD in Brazil.

Effects of Stress and Gender on Impulsivity in Rats

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Impulsivity is often said to be correlated with susceptibility to various addictions, including gambling addiction. It is important to note that there are several different types of impulsivity and that events early on in life may change how impulsive an individual is. Stress, in particular has been identified as a risk factor for the development of impulsivity and problem gambling. Whether sex affects impulsivity has not been thoroughly studied. We measured the impulsivity of 30 rats using a task called the 5-Choice Serial Reaction Time Task. We wanted to see how shipping stress and sex differences affected the impulsivity levels of these rats, which in turn can affect performance on a gambling task. In this poster, we will present the results of this experiment. We expected that rats who were shipped would be more impulsive due to their early life stress, whereas the rats bred in-house would be less impulsive. We did not have a specific prediction about the direction of the sex differences.
37 Problem Gambling, Risk Attitudes, and Perceived Benefits of Risk-Taking

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Problem gambling has consistently and positively been associated with risk-taking, risk attitudes, and risky personality traits. However, to date, no one has considered the relationship between problem gambling and the perception of benefits from engaging in risk-taking. Given that the perception of benefits associated with risk-taking is a better predictor of real world risk-taking than simple risk attitudes, it is important to understand its relation to problem gambling. We examined associations between problem gambling, risk attitudes, and perceived benefits of risk-taking. Participants ($n = 295$) completed self-report measures of problem gambling; and risk attitudes and perceived benefits associated with risk-taking, across several domains. Hierarchical regression analyses indicate demographic variables and the perception of greater benefits in risk-taking accounted for a moderate to large amount (45%) of variance in problem gambling severity. The perception of greater benefits in risk-taking also explains unique variance in problem gambling severity, above and beyond that of demographics and risk preference. Results of this study perceived benefits of risk-taking may be a better predictor for assessing problem gambling than risk preference. These findings may have important implications for understanding the ontogeny of, and designing effective treatments for problem gambling.

38 Development of Canada’s National Lower-Risk Gambling Guidelines

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Shawn Currie  
Magali Dufour  
Marie-Claire Flores-Pajot  
David Hodgins  
Louise Nadeau  
Catherine Paradis  
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1 Université de Québec à Trois-Rivières  
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4 Canadian Centre on Substance Use and Addiction  
5 Université de Montréal  
6 Carleton University

**Objectives:** Using the same collaborative, evidence-driven approach that produced Canada’s Low Risk Alcohol Drinking Guidelines, this project aims to develop a workable set of national Lower-Risk Gambling Guidelines (LRGGs) with clear quantitative limits on gambling behaviour to help people make informed decisions about their gambling. **Methods:** In April 2016, a scientific working group was formed and tasked with synthesizing available evidence from ten Canadian and international population datasets on the relationship between gambling involvement (i.e., frequency, expenditure, and duration) and gambling-related harms (i.e., financial, relationship, emotional, and physical harms). A national advisory committee, including partners from government and industry, was formed to review the evidence and oversee the development of the LRGGs. **Results:** In 2018 preliminary LRGGs were developed, presented and discussed with a team of international collaborators and the national advisory committee. These preliminary limits will be included in the poster. A final technical report will be produced in March 2020 detailing the final guidelines, the evidence that informed their development, limitations, and essential contextual factors. **Conclusions:** It is hoped that development and promotion of these guidelines will contribute to the reduction of gambling-related harms.