

editorial/éditorial

Announcing the Winner of the Inaugural *JGI* Scholar's Award for Research Excellence (Category B: Cognitive, Developmental, Biobehavioral, and Neuroimaging Research)

Sherry H. Stewart, PhD, Editor-in-Chief

Last year, the Journal of Gambling Issues (*JGI*) launched a new initiative—the annual Scholar's Award. This new award was designed to highlight outstanding up-and-coming scholars in the gambling research field and to profile their work in an annual special issue. Post-doctoral fellows and graduate students in the problem gambling field were invited to submit their best articles to be considered for the award. All award submissions were simultaneously considered for publication in the Journal. We invited submissions in two streams: Category A—Clinical, Social, and/or Policy Research; and Category B—Cognitive, Developmental, Biobehavioral, and/or Neuroimaging Research. The *JGI* Editorial Board was successful in meeting its goal of using the award to increase submissions to the Journal from emerging gambling researchers. Specifically, we received a total of thirteen applications in response to the Scholar's Award call, seven for Category B and six for Category A. Articles submitted for the award underwent the usual double-blind peer review process that we use at the Journal for regular submissions. Manuscripts that passed the peer review process were then reviewed by one of two sets of judges, one set per stream, and drawn from the membership of the *JGI* Editorial Board. The respective judges for a given stream represented expertise across the broad research topics covered within the stream. To ensure transparency and fairness, those editorial board members who were supervising a trainee with a paper under consideration did not participate as a judge in that category where their trainee was competing. Submissions from trainees of the editor-in-chief were edited and processed by the associate editor. Neither person was involved in the judging process. The judges provided blind, independent evaluations of the manuscripts within their stream on the following dimensions: (1) design and conceptual innovation, (2) contribution to theory development, (3) literature coverage, (4) methodological rigor, and (5) analysis and discussion quality. Judges assigned scores of 1 to 10 to each article in each of the above five dimensions. The managing editor then calculated a total score from 5 to 50 for each paper for each judge. The three judges' scores were then totalled for each paper. The paper with the highest total score across judges was deemed the winning paper.

Given the relatively large number of submissions and the high rate of success of the submissions in the peer review process, we opted to publish the two streams of papers in two separate special sections of the Journal. The Category A winner was announced in the last issue of the Journal, where the six Category A papers were also published. In the current issue, we are devoting an indicated section to the publication of the seven Category B submissions, and we also announce here the winner of the Inaugural Scholar's Award for Category B: as noted, Cognitive, Developmental, Biobehavioral, and/or Neuroimaging Research.

All seven submissions in Category B passed the peer review process. The Category B judges had a challenging task in selecting a winner given the high quality of the submissions. In fact, it was quite a tight race! However, even when overall differences in the toughness of the judges were taken into account, a clear winner emerged.

It gives me great pleasure to announce the winner of the *JGI* Scholar's Award for Category B. Our inaugural winner is Dr. Amanda Hudson, a postdoctoral fellow from the Centre for Addiction Research at Dalhousie (CARD) in Halifax, Nova Scotia, Canada. She will be awarded a prize of \$1000 Canadian in recognition of the high quality of her research contribution. Dr. Hudson conducted this study in the Gambling Laboratory in the Department of Psychology and Neuroscience at Dalhousie University as part of her postdoctoral research program. Dr. Hudson's research interests include applications of cognitive psychology to the understanding of addictive behaviors, gender and addictions, and understanding the role of hormones in women's addictive behaviors. Her winning paper is entitled "Eye on the prize: High-risk gamblers show sustained selective attention to gambling cues." Prior research has shown that problem gamblers selectively attend to gambling cues in the environment (e.g., Molde et al., 2010). However, the cognitive tasks that researchers have used in prior attentional bias research with problem gamblers have not been able to tease apart at which particular stage of processing the attentional bias to gambling stimuli is occurring. Prior studies also have failed to determine how selective the attentional bias is towards gambling stimuli (e.g., does the bias extend to negatively- and/or positively-valenced stimuli in the gamblers' environment?). Dr. Hudson and her colleagues made clever use of an attentional task called the Rapid Serial Visual Presentation (RSVP) task to address these important gaps in the literature. The RSVP task allows for identification of which stage of processing is biased—attentional orienting or maintenance/disengagement—by employing different time lags between distractors and targets. Dr. Hudson and her colleagues compared groups of gamblers who were either high-risk or low-risk using a version of the RSVP task that examined selective attention to gambling stimuli, emotionally-positive stimuli, and emotionally-negative stimuli.

Only the high-risk gamblers displayed a selective attentional bias towards the gambling stimuli, one that occurred at the attentional maintenance/disengagement stage of processing. In other words, the high-risk gamblers showed difficulty in moving their attention away from a gambling distractor once it had caught their

attention, and this bias occurred quite selectively towards gambling stimuli. In contrast, the low-risk gamblers showed some evidence, albeit less robust, of a more general bias towards both gambling and negatively-valenced stimuli. The presence of an attentional bias for negative stimuli is seen to some degree in the general population and has been discussed in terms of evolutionary adaptability (Bradley, Codispoti, Cuthbert, & Lang, 2001). Thus, the fact that the high-risk gamblers in Dr. Hudson's study showed no attentional bias whatsoever to negative cues is quite interesting. Dr. Hudson and her colleagues discuss evidence that in addictions, stimuli other than those related to the addictive disorder in question (i.e., gambling stimuli for problem gamblers) can lose their salience. The Hudson et al. study has important implications both theoretically and practically. In terms of theoretical implications, the identification of a selective attentional bias for gambling stimuli in high-risk gamblers that is specific to the attentional disengagement (rather than initial orienting) stage is crucial as it may help explain the maintenance of problem gambling. This finding suggests that even when attempting to refrain from gambling, a problem gambler may have tremendous difficulty disengaging his or her attention from gambling stimuli in the environment. This sustained attentional bias would presumably be more difficult to resist than a more fleeting problem with having one's attention initially drawn towards gambling stimuli. In terms of practical applications of the findings, in other areas of addiction, cognitive bias modification tools are being developed that can successfully retrain these attentional biases and in turn improve intervention outcomes (Schoenmakers et al., 2010). Dr. Hudson's study will help pave the path towards the development of similar interventions for treating the attentional biases demonstrated by problem gamblers, thus increasing the armamentarium of tools that problem gambling therapists have available for helping their problem gambling clients.

While Dr. Hudson's paper emerged as the award winner, the remaining six Category B submissions were of notably high quality as well. I will introduce briefly each of the remaining six papers here, in no particular order, save that they are grouped by subtheme (i.e., cognitive vs developmental). Four of these papers examined cognitive aspects of problem gambling—from the role of explicit cognitions like cognitive distortions and gambling motives to the role of implicit cognitions (i.e., cognitions that are at least initially outside of conscious awareness). One study by Dr. Marcus Juodis of Dalhousie University and his supervisor built upon prior work on subtyping gamblers on the basis of their primary motivations for gambling (e.g., gambling to cope with negative emotions vs. gambling to enhance excitement). Specifically, his paper validated a method for classifying gamblers as to their primary motivation for gambling, using archival data gathered from 158 pathological gamblers, and making accessible a user-friendly method for clinicians and researchers alike to subtype problem gamblers. A qualitative study by Dr. Tara Hahmann of the University of Toronto examined the utility of Toneatto's (1999) typology of gambling distortions for organizing the beliefs of 43 moderate-risk and problem slot machine gamblers. Toneatto's typology needed to be somewhat revised to capture the gambling-related cognitions reported by these slot machine players, suggesting that game type needs to be considered as a potentially important factor in

determining specific gambling-related cognitive distortions. Another qualitative study by Hannah Thorne of Central Queensland University and her colleagues examined factors that determine electronic gaming environmental preferences among a sample of 59 recreational and problem electronic gambling machine (EGM) players in Australia. One of the features mentioned more often by problem than recreational EGM players in determining their choice of gambling environment was the perceived probability of winning (e.g., cognitive distortions about a particular venue being “lucky”)—a finding which underscores the social responsibility of venues to avoid creating environments that “feed in” to such problematic cognitions. Another pair of studies by Morgann Stiles of Dalhousie University and her colleagues examined regular gamblers’ strength of memory associations between gambling and positive outcomes using a novel Gambling Behavior Outcome Association Task (G-BOAT) where participants responded to a series of positive outcome phrases (e.g., “having fun”) with the first behaviors that came to mind. The number of responses generated that were gambling-related on the G-BOAT predicted gambling frequency over-and-above an established explicit gambling outcome expectancies measure underlining the importance of including such automatic memory association measures in future studies and pointing to the potential for targeting these memory associations in treatment.

The remaining two papers had a developmental focus. A cross sectional study by Dr. Jessica McBride of McGill University and her supervisor examined the overlap of gambling and video game playing among 1,229 adolescents and young adults. The results showed a substantial overlap of these two potentially addictive behaviors in this developmental phase, pointing to the need for future longitudinal research to determine whether adolescent video gaming is a risk factor for the development of problem gambling. A longitudinal study by Dr. Sean Mackinnon of Dalhousie University and his colleagues examined changes in personality over emerging adulthood from the perspective of the Five Factor Model of personality, and how those personality changes relate to gambling motives. The findings that increases in neuroticism over time predicted risky coping motives for gambling whereas increases in extraversion over time predicted risky enhancement motives for gambling provide useful information on who might best be targeted for motivation-matched preventative interventions in future.

I do hope you will enjoy reading this set of impressive contributions from these emerging scholars in the problem gambling field. The judges and the *JGI* editorial team have enjoyed this process very much.

I would like to extend our deep appreciation to the judges, Mr. Robert Murray (Category A), Dr. Vivien Rekkas (Category A), Mr. Wayne Skinner (Category A), Dr. David Hodgins (Category B), Dr. Nigel Turner (Category B), and Dr. Martin Zack (Category B). The judges put a great deal of time and effort into reading and rating the 13 submissions. We are very thankful for the contribution of their energy and expertise in making the first annual *JGI* Scholar Award such a success. I would also like to thank our associate editor, Dr. Serge Sévigny, and our managing editor,

Dr. Vivien Rekkas, for their dedicated assistance in helping me coordinate the judging, reviews, and processing of manuscripts for the special section.

Having had a successful response to our first call for Scholar Awards, the *JGI* is now pleased to announce our second annual Scholars Award for Research Excellence. Graduate students and postdoctoral fellows conducting research in problem gambling are once again invited to submit their best work for publication in a special section of the *JGI*. Again, articles are invited in two streams (Category A or Category B as described above). We particularly encourage papers using biobehavioral and neuroscience approaches to the understanding of problem gambling for submission to Category B as we did not have any entries in these two sub-disciplines submitted this year. For the complete details regarding the call for submissions, please consult the following link: <http://jgi.camh.net/page/award>. The first author of the winning article in each of the two streams will receive a prize of \$1,000 Canadian. We look forward to receiving another round of excellent submissions from emerging scholars in the problem gambling field and to featuring these trainees' work in a future special issue or special section(s) of the Journal.

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Annonce du gagnant de la bourse inaugurale *JGI* pour l'excellence en recherche (Catégorie B pour la recherche cognitive, développementale, biocomportementale ou en neuroimagerie

Sherry H. Stewart, PhD, rédactrice en chef

L'an dernier, le *Journal of Gambling Issues (JGI)* a lancé une nouvelle initiative: la bourse annuelle *JGI* pour l'excellence en recherche. Cette nouvelle bourse a pour but de souligner la contribution exceptionnelle de chercheurs de la relève dans le domaine de la recherche sur le jeu et de faire connaître leurs travaux en les réunissant chaque année dans un numéro spécial. Les chercheurs postdoctoraux et les étudiants des cycles supérieurs qui effectuent des recherches sur les problèmes de jeu ont été invités à soumettre leurs meilleurs travaux pour l'obtention de la bourse. Tous les articles soumis ont en outre été évalués en vue de leur publication dans le *Journal*. Nous avons donc lancé l'invitation à soumettre un dossier dans l'un des deux volets: la catégorie A pour la recherche clinique, sociale ou politique; et la catégorie B pour la recherche cognitive, développementale, biocomportementale ou en neuroimagerie. Le comité de rédaction du *JGI* visait à ce que cette bourse serve de levier pour accroître la soumission d'articles par de nouveaux chercheurs, et cet objectif a été atteint. Ainsi, nous avons reçu au total treize propositions à la suite de l'appel visant l'attribution de la bourse, dont sept pour la catégorie B et six pour la catégorie A. Ces textes ont fait l'objet de l'examen à double insu par les pairs auquel sont habituellement soumis les articles soumis au *Journal*. Les manuscrits qui ont réussi l'examen par les pairs ont ensuite été évalués par un des deux groupes de juges – un groupe par catégorie – choisis parmi les membres du comité de rédaction du *JGI*. Les juges du groupe assigné à une catégorie réunissaient une expertise représentant l'éventail des sujets de recherche à l'intérieur de celle-ci. Pour assurer la transparence et l'équité du processus, les membres du comité de rédaction n'ont pas agi à titre de juges pour la catégorie où un stagiaire dont ils assuraient par ailleurs la supervision avait soumis un article en vue d'obtenir la bourse. Les juges ont évalué de manière indépendante et à l'aveugle les manuscrits de leur catégorie en fonction de cinq critères: 1) l'innovation sur les plans de la conception et des notions, 2) la contribution au développement théorique, 3) la couverture de la documentation, 4) la rigueur méthodologique et 5) la qualité de l'analyse et de la discussion. Les juges ont attribué à chaque article un pointage de 1 à 10 pour chacun de ces critères. La directrice de rédaction a ensuite calculé le pointage total de chaque article, sur une échelle de 5 à 50, en faisant la somme des notes accordées par chacun des juges. Le gagnant était celui qui obtenait le pointage total le plus élevé.

Étant donné le nombre relativement important de textes soumis et leur taux élevé de succès dans l'examen par les pairs, nous avons choisi de publier les deux catégories d'articles dans deux sections spéciales distinctes du *Journal*. Le gagnant de la catégorie A a été annoncé dans le dernier numéro, où nous avons aussi publié les six articles soumis et acceptés dans cette catégorie. Dans ce nouveau numéro, nous consacrons une section spéciale à la publication des sept articles soumis dans la catégorie B, en plus d'annoncer le gagnant de la bourse inaugurale d'excellence en recherche pour cette catégorie dédiée à la recherche cognitive, développementale, biocomportementale ou en neuroimagerie.

Les sept articles présentés dans la catégorie B ont réussi l'examen par les pairs. La très grande qualité des articles soumis a rendu difficile, pour les juges de la catégorie A, la tâche de sélectionner un gagnant. En fait, ce fut une course extrêmement serrée! Toutefois, même en tenant compte du fait que certains juges pouvaient être dans l'ensemble plus sévères que d'autres, un article gagnant est apparu clairement.

C'est avec grand plaisir que je vous présente la gagnante de la bourse de recherche JGI de la catégorie B. Notre première lauréate est la D^{re} Amanda Hudson, chercheuse postdoctorale au Centre de recherche sur la toxicomanie de Dalhousie (CARD), à Halifax, en Nouvelle-Écosse, au Canada. Celle-ci recevra un prix de 1000\$CAN, en reconnaissance de la qualité supérieure de sa contribution en recherche. La D^{re} Hudson a réalisé l'étude en question au Laboratoire sur le jeu du Département de psychologie et de neurosciences de l'Université Dalhousie, dans le cadre de son programme de recherche postdoctoral. Ses recherches portent notamment sur l'application de la psychologie cognitive à la compréhension des comportements de dépendance, de la question du genre en lien avec les dépendances et du rôle des hormones dans les comportements de dépendance chez les femmes. L'article qui lui a valu la bourse s'intitule «Eye on the prize: High-risk gamblers show sustained selective attention to gambling cues». Des recherches antérieures avaient montré que les joueurs compulsifs perçoivent de manière sélective des indices environnementaux associés au jeu (p.ex., Molde et al., 2010). Toutefois les tâches cognitives précédemment utilisées par les chercheurs pour étudier la sélection attentionnelle chez les joueurs compulsifs n'avaient pas permis de déterminer avec précision à quelle étape du processus survient cette attention sélective aux stimulus associés au jeu. Les études antérieures n'étaient pas non plus parvenues à établir jusqu'à quel point les biais attentionnels étaient sélectifs à l'égard des stimulus associés au jeu (p.ex., la sélection se fait-elle à l'égard des stimulus de valence positive ou négative dans l'environnement des joueurs?). La D^{re} Hudson et ses collègues ont utilisé judicieusement une tâche attentionnelle appelée «présentation visuelle sérielle rapide» (PVSR) afin de combler ces lacunes importantes dans la documentation scientifique. En utilisant des laps de temps variables entre des distracteurs et des cibles, la tâche de PVSR permet d'établir, en considérant l'orientation ou le maintien et le désengagement de l'attention, quelle étape du processus est sélective. La D^{re} Hudson et ses collègues ont comparé des groupes de joueurs à risque élevé et à

risque faible en utilisant une version de la tâche de PVSR qui permet d'examiner l'attention sélective à l'égard de stimulus associés au jeu, associés à des émotions positives et associés à des émotions négatives.

Seuls les joueurs à risque élevé ont présenté un biais attentionnel sélectif à l'égard des stimulus associés au jeu, et celui-ci se produisait à l'étape du maintien ou du désengagement attentionnel. Autrement dit, les joueurs à risque élevé manifestent une difficulté à se détourner d'un distracteur associé au jeu une fois que celui-ci a attiré leur attention, et ce biais se produit de manière assez sélective à l'égard des stimulus liés au jeu. En comparaison, les joueurs à risque faible ont montré quelques signes, quoique moins marqués, d'un biais plus général à l'égard des stimulus associés au jeu et des stimulus associés à des émotions négatives. La présence d'un biais attentionnel à l'endroit des stimulus négatifs est observée à un certain degré dans l'ensemble de la population, et ce phénomène se rapporterait à l'adaptation évolutive (Bradley, Codispoti, Cuthbert, & Lang, 2001). Le fait que les joueurs à risque élevé ne présentent aucunement de biais attentionnel à l'endroit de signaux négatifs est une observation très intéressante découlant de l'étude de la D^{re}Hudson. La chercheuse et ses collègues examinent la possibilité d'une diminution, chez les personnes qui ont une dépendance, de l'influence de stimulus autres que ceux qui sont liés au trouble de dépendance en question (c.-à-d. les stimulus associés au jeu dans le cas des joueurs compulsifs). Leur étude a des implications théoriques et pratiques importantes. Sur le plan théorique, la reconnaissance d'un biais attentionnel sélectif à l'égard des stimulus associés au jeu qui correspondrait à l'étape du désengagement attentionnel (plutôt qu'à l'étape initiale de l'orientation) chez les joueurs à risque élevé est une contribution cruciale, car elle peut contribuer à expliquer le maintien de la dépendance au jeu. On peut en déduire que, même s'il tente de s'abstenir, un joueur compulsif risque d'éprouver d'énormes difficultés à désengager son attention de stimulus associés au jeu présents dans l'environnement. Ce biais attentionnel persistant risque d'être plus difficile à contrer que si le problème résidait dans le fait que l'attention de la personne est attirée initialement, de façon passagère, par des stimulus associés au jeu. Sur le plan pratique, des outils de modification des biais cognitifs ont été mis au point pour traiter d'autres types de dépendances et, en empêchant ces biais, ont permis d'améliorer les résultats des interventions (Schoenmakers et al., 2010). L'étude de la D^{re}Hudson contribuera à ouvrir la voie à des interventions du même type pour le traitement des biais attentionnels observés chez les joueurs compulsifs, ce qui enrichira la panoplie d'outils à la disposition des thérapeutes qui travaillent auprès de personnes qui présentent des problèmes de jeu.

Bien que l'article de la D^{re}Hudson se soit démarqué pour l'obtention de la bourse, les six autres articles soumis dans la catégorie B étaient aussi de très haute qualité. Je vais présenter brièvement chacune de ces contributions, sans autre ordre particulier que leur regroupement en sous-thèmes (c.-à-d. recherche cognitive ou développementale). Quatre de ces articles portent sur les aspects cognitifs du jeu compulsif – depuis le rôle des cognitions explicites, comme les distorsions cognitives et les raisons du jeu, jusqu'au rôle des cognitions implicites (c.-à-d. des cognitions dont la

personne, du moins au départ, n'a pas conscience). L'étude réalisée par le Dr Marcus Juodis de l'Université Dalhousie et son superviseur prend appui sur des travaux antérieurs ayant établi un sous-typage des joueurs selon leurs motivations principales par rapport au jeu (p.ex., jouer pour faire face aux émotions négatives ou jouer pour atteindre un état d'excitation). Plus particulièrement, cet article valide une méthode de classification des joueurs en fonction de leur motivation principale par rapport au jeu, en se fondant sur des données d'archives provenant de 158 joueurs pathologiques, et met à la disposition tant des cliniciens que des chercheurs une méthode facilitant le classement des joueurs compulsifs en sous-types. L'étude qualitative de la D^{re} Tara Hahmann, de l'Université de Toronto, porte sur la typologie des distorsions cognitives chez les joueurs proposée par Toneatto (1999) et sur l'utilité de celle-ci pour classer les croyances de 43 joueurs de machines à sous à risque modéré et problématiques. Il a fallu revoir quelque peu la typologie de Toneatto pour rendre compte des cognitions relatives au jeu rapportées par les joueurs de machines à sous, ce qui tend à montrer que le type de jeu est susceptible de contribuer largement à définir les distorsions cognitives présentes de façon particulière chez des joueurs. Également qualitative, l'étude présentée par Hannah Thorne de l'Université du centre du Queensland et ses collègues s'intéresse aux facteurs qui déterminent les préférences à l'égard de l'environnement de jeu chez 59 joueurs de machines de jeu électroniques, en Australie. L'une des caractéristiques mentionnée plus souvent par les joueurs problématiques que par les joueurs récréatifs de machines de jeu électroniques concernant leur choix d'un environnement, c'est ce qu'ils estiment être la probabilité de gagner (p.ex., les distorsions cognitives au sujet d'un lieu particulier qui serait « chanceux ») – une observation qui met en évidence la responsabilité sociale des lieux de jeu pour ce qui est d'éviter de créer des environnements qui alimentent ces distorsions problématiques. Deux autres études présentées par Morgann Stiles de l'Université Dalhousie et ses collègues se sont penchées sur les associations mémorielles fortes observées chez des joueurs réguliers entre le jeu et des résultats positifs, cela à l'aide d'une nouvelle tâche d'association comportement de jeu-résultat – la Gambling Behavior Outcome Association Task (G-BOAT) – qui demandait aux participants de répondre à une série d'énoncés de résultats positifs (p.ex., « s'amuser ») en nommant les premiers comportements qui leur venaient à l'esprit. Compte tenu du nombre de réponses liées au jeu, qui dépassait le niveau attendu d'anticipation explicite de résultats selon le G-BOAT, il apparaît important d'inclure ce genre de test d'association mémorielle dans les études à venir et de considérer les bienfaits possibles de traitements qui cibleraient ces associations.

Les deux derniers articles étaient consacrés à la recherche développementale. Une étude transversale effectuée par la D^{re} Jessica McBride de l'Université McGill et son superviseur s'est intéressée au chevauchement entre les jeux de hasard et les jeux vidéo chez 1229 adolescents et jeunes adultes. Les résultats ont montré un chevauchement important entre ces comportements susceptibles de devenir compulsifs à ce stade de développement, soulignant ainsi la nécessité de réaliser de nouvelles recherches longitudinales qui permettraient de déterminer si la pratique de jeux vidéo à l'adolescence est un facteur de risque dans le développement d'une dépendance au jeu.

L'étude longitudinale présentée par le Dr Sean Mackinnon de l'Université Dalhousie et ses collègues porte sur les changements de personnalité au cours du passage à l'âge adulte. En prenant comme référence le modèle des cinq facteurs de la personnalité, ces chercheurs ont examiné les liens possibles entre les changements de personnalité pouvant être observés et les raisons qui motivent les joueurs. L'étude a montré que l'augmentation progressive du névrosisme permet d'anticiper des motifs d'adaptation à risque par rapport au jeu, tandis que l'augmentation de l'extraversion au cours de cette période tend à prédire des motifs de renforcement à risque. Ces constats apportent un éclairage utile en ce qui a trait aux personnes les plus susceptibles de bénéficier d'interventions préventives ciblées selon les motivations.

J'espère que la lecture de cette série de contributions impressionnantes de la part de nouveaux chercheurs dans le domaine du jeu compulsif sera pour vous enrichissante. Les juges et l'équipe de rédaction du *JGI* ont participé avec un grand intérêt au processus.

J'aimerais vivement remercier les juges, M. Robert Murray (catégorie A), la D^{re} Vivien Rekkas (catégorie A), M. Wayne Skinner (catégorie A), le D^r David Hodgins (catégorie B), le D^r Nigel Turner (catégorie B) et le D^r Martin Zack (catégorie B). Ces personnes ont consacré beaucoup de temps et d'efforts à la lecture et à l'évaluation des treize articles soumis. Leur apport en tant qu'experts a contribué au succès de cette première bourse annuelle *JGI* pour l'excellence en recherche. Je tiens aussi à remercier notre rédacteur en chef adjoint, le D^r Serge Sévigny, et notre directrice de rédaction, la D^{re} Vivien Rekkas, qui m'ont considérablement aidée à coordonner l'évaluation et le traitement des manuscrits destinés à cette section spéciale.

Fort de cette réponse très positive à son premier appel, le *JGI* est maintenant heureux d'annoncer la tenue de son deuxième concours annuel en vue de l'attribution d'une bourse pour l'excellence en recherche. Nous invitons les étudiants des cycles supérieurs et les boursiers postdoctoraux dont les recherches portent sur les problèmes de jeu à présenter leurs meilleurs travaux en vue de leur publication dans la section spéciale du *JGI*. Nous recevrons encore cette fois des articles correspondant à deux regroupements, soit les catégories A et B décrites précédemment. Nous encourageons tout particulièrement la soumission d'articles qui adoptent des approches biocomportementales ou en neuroimagerie pour comprendre les problèmes de jeu, car aucun texte ne nous a été soumis cette année dans ces sous-catégories. Pour de plus amples renseignements concernant l'appel à soumission, veuillez consulter la page suivante: <http://jgi.camh.net/page/award>. Un prix de 1000\$ CAN sera décerné au premier auteur de l'article sélectionné dans chaque catégorie. Nous nous préparons avec enthousiasme à recevoir d'excellents articles de la part de chercheurs de la relève qui s'intéressent aux problèmes de jeu et à publier éventuellement leurs travaux dans une ou plusieurs sections spéciales du *Journal*.

Références

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Gambling-Related Employee Embezzlement: A Study of Swedish Newspaper Reports

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Abstract

It is well-known that severe problem gambling may lead to economic crime. This study explored a particular type of such criminality: embezzlement committed by problem gamblers in the workplace. The aim was to gain knowledge about the extent of such criminality in Sweden and the sums of money involved. The method used was a media study of newspaper reports, complemented with information about help-seeking problem gamblers obtained in interviews with therapists specializing in problem gambling and with peer counsellors in mutual support societies of problem gamblers. The results showed that gambling-related embezzlement occurs in all branches of the economy where employees have access to money. The sums embezzled can be huge and the crimes sustained over several years. However, this varies across professional categories, with bank managers embezzling larger sums of money than others, and for longer, before being detected. Although Swedish newspapers report on average about one case a month of gambling-related employee embezzlement, the true prevalence is likely to be at least 10 times higher. More efforts should be made to prevent embezzlement and other gambling-related harms in the workplace.

Keywords: problem gambling, crime, embezzlement, workplace

Résumé

On sait que le jeu problématique grave peut mener à la criminalité économique. Cette étude porte sur un aspect particulier de ce type de criminalité, soit le détournement commis par des joueurs problématiques dans leur milieu de travail. Elle vise à établir l'étendue de cette criminalité en Suède et les sommes d'argent en cause. À cette fin, on a effectué une analyse média des articles de journaux ainsi que des renseignements sur les joueurs problématiques ayant demandé de l'aide recueillis dans des entrevues avec des thérapeutes spécialisés en jeu problématique et avec des pairs-conseillers de groupes de soutien pour les joueurs problématiques. Il a été constaté que le détournement lié au jeu problématique se produit dans tous les secteurs de l'économie où les employés ont accès à l'argent. Les sommes détournées peuvent être considérables et les crimes, se perpétrer sur plusieurs années. La

situation varie toutefois selon la catégorie des professions, les directeurs de banque détournant des sommes plus élevées que les autres, et pendant de plus longues périodes, avant d'être découverts. Bien que les journaux suédois ne rapportent en moyenne qu'un cas de détournement par un employé joueur pathologique par mois, cette étude laisse entendre que la prévalence réelle est probablement dix fois plus élevée. Il est conclu que plus d'efforts doivent être faits pour prévenir le détournement et les autres dommages liés au jeu dans le milieu de travail.

Introduction

Although commercial gambling offers the pleasant dream of becoming rich, the joy of occasional wins, excitement, and opportunities for socializing (Binde, 2013), it also has its dark side. Problem gambling—also known as disordered gambling and in its severe form as gambling addiction—brings harm to the individual, significant others, and society more generally (Abbott et al., 2015; Langham et al., 2016). The individual suffers adverse consequences regarding his or her personal finances, general well-being, social relationships, and educational or professional life. Although difficult to estimate precisely, the social costs of problem gambling to society are likely significant (Productivity Commission, 2010, Chapter 6).

In commercial gambling, operators do not pay as much money to winning gamblers as they earn from losing gamblers. Therefore, gambling is in the long run profitable for gambling companies but unprofitable for gamblers. The more one gambles, the more one is likely to lose, and intense gambling costs huge sums of money. This constitutes the core problem for problem gamblers, who have impaired control over the extent of their gambling.

Individuals with severe gambling problems typically first exhaust their own financial resources and then seek to obtain more money in various ways. They may take loans, sell personal belongings, and eventually commit crimes. The nature of such criminality differs depending on incidental opportunities and on the abilities and social position of the gambler.

This article presents the results of an exploratory investigation of gambling-related embezzlement in the workplace, a topic rarely discussed in gambling studies. The investigation was initiated because anecdotal accounts suggested that such criminality causes particularly severe harm to the gambler, significant others, and the employer. In Sweden, representatives of employers, trade unions, and the Public Health Agency—which financed this investigation—wanted more knowledge about this aspect of problem gambling, as well as suggestions for preventive measures.

A multimodal methodological approach was used in this investigation, including interviews with different categories of informants and a study of newspaper articles.

This article reports quantitative results of the media study, supplemented by information from interviews. A second article outlines the typical case of gambling-related embezzlement in the workplace, as well as variations and other scenarios (Binde, 2016a). A third article discusses preventive strategies and interventions (2016b).

For those who are not familiar with gambling in Sweden, a brief outline will help to situate the study in a national context (for overviews, see Binde, 2014; Jonsson & Rönnerberg, 2009). According to a population study conducted in 2008-2009, slightly more than 70% of the adult population participate in gambling at least yearly, and about 44% of adult Swedes gamble regularly, that is, monthly or more often (Public Health Agency of Sweden, 2016). A wide variety of forms of gambling are offered by operators regulated in Sweden, including online poker, whereas other online casino games are offered only by companies operating from abroad without licenses in Sweden. In contrast to their regulation in some other countries, electronic gaming machines (EGMs) are tightly regulated in a state monopoly, with fewer than 7,000 EGMs outside of casinos (in a population of 9.6 million). There are four state-owned international-style casinos. Problem gambling prevalence is about 2% of the adult population and thus similar to the prevalence in many other Western countries. Judging from statistics about callers to the national helpline for problem gamblers, online casino, in particular online slots, is currently the most problematic form of gambling (about 50% of callers). Awareness in Sweden about the harms that gambling may cause is relatively high, including public health initiatives, reasonable availability of various forms of treatment and support, and regulation with the aim of finding a balance between allowing gambling to be available to consumers and reducing its harms. Thus, although gambling in Sweden might have some peculiar features, by and large the gambling scene is similar to that in other Western countries with a sizable gambling market. This makes the results of this study of potential interest for problem gambling research and prevention in other jurisdictions.

Review of the Literature

The association between problem gambling and crime is well-known. Numerous studies have found that approximately 10%–50% of problem gamblers have committed crimes related to gambling (for overviews, see Folino & Abait, 2009; Productivity Commission, 1999, Section 7.4; Zorland, Mooss, & Perkins, 2008). Although some criminals become problem gamblers, it is more common for problem gamblers to become criminals when they commit illegal acts to finance their gambling (Lind, Kääriäinen, & Kuoppamäki, 2015; Turner, Preston, McAvoy, & Gillam, 2013).

The 4th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-IV) diagnostic criteria for pathological gambling includes a criterion relating to criminality—“committed illegal acts to finance gambling” (American Psychiatric Association [APA], 1994). Analysis of prevalence study data and of samples from correctional populations has indicated that the more severe the gambling problems, the larger the proportion of individuals meeting this criterion (Strong & Kahler, 2007; Turner, Stinchfield, McCready, McAvoy, & Ferentzy, 2016). In the 5th edition

of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5 APA, 2013), the “illegal acts” criterion has been removed, however, because it did not contribute substantially to diagnostic accuracy; individuals meeting this criterion nearly always meet multiple other criteria (Petry et al., 2014; Petry, Blanco, Stinchfield, & Volberg, 2013). Nevertheless, in the DSM-5, criminal acts are subsumed under criterion A7, “lies to conceal the extent of involvement in gambling,” as this includes “covering up illegal behaviors such as forgery, fraud, theft, or embezzlement to obtain money with which to gamble” (APA, 2013, p. 586). The commitment of financial crime is thus still a behaviour of relevance when assessing gambling disorder, which has been shown in regard to clinical practice (Stinchfield et al., 2016), prison populations (Turner et al., 2016), and college athletes (Temcheff, Paskus, Potenza, & Derevensky, 2016).

Most crimes committed by problem gamblers are economic (Blaszczynski & McConaghy, 1994; Lind et al., 2015; Meyer & Stadler, 1999; Turner, Preston, Saunders, McAvoy, & Jain, 2009; Zurhold, Verthein, & Kalke, 2014), for example, theft, forgery, fraud, and the type of crime that this article examines: embezzlement in the workplace.

A substantial proportion of severe problem gamblers have embezzled in the workplace. In his classic sociological study, *The Chase: Career of the Compulsive Gambler*, Henry Lesieur (1984, p. 276f) found that about one third of the 50 pathological gamblers studied, most of them Gamblers Anonymous (GA) attendees, had embezzled. Similar proportions of embezzlers and gamblers stealing from the workplace (22%–37%) have been found in other studies of GA attendees and problem gamblers in treatment (Blaszczynski & McConaghy, 1994; Ladouceur, Boisvert, Pépin, Loranger, & Sylvain, 1994; Meyer & Stadler, 1999; Schwer, Thompson, & Nakamuro, 2003; Thompson, Gazel, & Rickman, 1996). A 20-year-old Swedish study of 42 pathological gamblers recruited in various ways (e.g., GA attendees, via social welfare authorities, and through media advertisements) found that 14% reported work-related theft, fraud, and embezzlement (Bergh & Kühlhorn, 1994). A more recent Norwegian study, examining a sample of 118 problem gamblers (help seekers and individuals identified in a survey of employees in the transport industry) found that 10% had stolen money from colleagues, 20% had “borrowed” money belonging to the employer, and 11% had stolen money from the employer (Buvik, 2009, p. 84).

In the 1940s, a survey of 20 surety and insurance companies in the United States found that gambling was one of the most common reasons for embezzlement and theft at places of work (Peterson, 1947). According to the surveyed employers’ estimates, 30%–75% of the total losses caused by employee dishonesty were related to gambling. In a more recent study in the United States that examined publicly known cases of major embezzlement in the period 2008–2012, the motivating factor was identified in 448 of 2,110 cases—among these cases, nearly a third of embezzlers reportedly had a gambling issue (Marquet International, 2013).

Criminological studies show that problem gambling is a common motive for embezzling and workplace fraud. An Australian study found that 15% of those sentenced for serious fraud cited gambling as the reason for committing the crime

and that nearly half of these gambling-related crimes were committed against employers (Sakurai & Smith, 2003). Another Australian study, analysing 208 court cases of serious fraud, found that gambling was the motive in 23% of cases (R. G. Smith, 2003). A third study from Australia found that of a total of 186 “larceny by servant/clerk” cases, 15%–20% were gambling related (Crofts, 2003a, 2003b). Two other Australian studies showed that gambling-driven employee fraud is common (Warfield, 2011) and that in the financial sector, gambling addiction is the motive in about 50% of cases (Warfield, 2013). In Germany, a study of court cases concerning crimes committed by problem gamblers found that 15% of cases involved embezzlement (Meyer & Fabian, 1996). In a Swedish study, 85 individuals holding central positions in companies were interviewed about economic crimes committed by employees; the study concluded that embezzlement is often caused by “personal tragedies,” such as “gambling addiction and alcoholism” (Liljewalch, 2003).

A characteristic of embezzling in the workplace is that it cannot normally occur unless the offender has gained a position of trust. Most embezzlers are therefore apparently “normal,” well-adjusted individuals with permanent work. This also seems to be the case when problem gambling is the underlying cause of embezzlement. A commonly occurring type of gambling-related embezzlement is the faithful servant who develops a severe but concealed gambling problem, “borrows” money for gambling from the workplace in the hope of recouping losses and when in desperate need for money for household expenses, and continues to lose money at gambling and to embezzle until the crime is detected (Binde, 2016a; Brown, 1987; Crofts, 2003b; Kelly & Hartley, 2010; Lesieur, 1984; Sakurai & Smith, 2003; G. Smith & Simpson, 2014). This picture of gambling-driven embezzlement corresponds to the picture of embezzling more generally, rendered in criminological research (Cressey, 1973; Zietz, 1981).

Method

The Retriever database *Mediearkivet* was searched to find articles about embezzlement committed in the workplace by problem gamblers. *Mediearkivet* is Scandinavia’s largest digital news archive with articles from all Swedish national newspapers, most regional and local newspapers, and hundreds of journals and magazines.

The search covered the 5 years from July 1, 2009, to June 30, 2014. The search criteria were that articles must include any of the three most commonly used Swedish terms for problem gambling: *spelberoende* (gambling addiction), *spelproblem* (problem gambling), or *spelmissbruk* (gambling abuse).

Of the 5,304 articles found, I read the headline and preamble of each and found approximately 300 articles on the topic of interest. Besides employee embezzlement, similar crimes were also considered. In Swedish legal classification, crimes in which money is misappropriated from the employer or from the employer’s customers, such as the account holders in a bank, may be classified as embezzlement, disloyalty to principal, fraud, or theft, depending on the circumstances. Disloyalty to principal

is similar to embezzlement in that damage is caused to the employer, but it does not require the perpetrator to have, in a judicial sense, possessed the money (it might instead have been transferred from the employer to someone else) and benefited from the crime. Thus, if there is doubt that possession and benefit can be proven in court, a prosecutor may choose to classify a crime as disloyalty to principal rather than embezzlement; the penalties for these two crimes do not differ much. However, gambling-related thefts of material goods at the place of work and thefts of money from colleagues were not included in this study.

I read the 300 newspaper articles carefully and found them to cover 55 specific cases, most being covered in several articles. Some of these articles were similar because they were derived from news distributed by a national news agency. Other articles covered the same cases but at different times as new facts came to light or when the embezzlers were brought to trial, first in local courts and then in courts of appeal. In most of the 55 cases, a court had determined that intense gambling had led to embezzlement or similar economic crimes committed in the workplace, that is, violating a position of trust to appropriate money from the employer or the employer's customers.

In many cases, the newspaper articles gave a fairly comprehensive overview of the embezzlement and its context. Often the articles quoted facts revealed in the court proceedings regarding the amounts of money embezzled and the duration of the crime. In the more spectacular cases, interviews with the problem gambler, colleagues, and managers in the workplace provided information on the wider context and the modus operandi of the crime. Data on the cases were entered into an electronic spreadsheet to facilitate quantitative and qualitative analysis.

The media study alone does not indicate how common it is for problem gamblers to embezzle money from the workplace. As this is a question of interest for policy and prevention, supplementary data on gambling-related embezzlement among help-seeking problem gamblers were obtained in interviews with five therapists who specialize in problem gambling and five semi-professional peer counsellors in mutual support societies of problem gamblers. The purpose of acquiring these data was to get a rough idea of the prevalence: Are there a few cases each year, many cases a day, or something in between? It is methodologically challenging to estimate the extent of a phenomenon that is concealed because it is both illegal and perceived as shameful. However, making a rough estimate was considered better than making no estimate at all.

The 10 individuals invited to participate in interviews were, to the best of my knowledge, those in Sweden who had the greatest experience with help-seeking problem gamblers; all agreed to participate. The therapists estimated that they had had, in total, approximately 1,500 problem gamblers as clients. The counsellors claimed knowledge of thousands of help seekers in mutual support societies, although the number was difficult for some of them to estimate precisely. These qualitative semi-structured interviews were conducted in the context of the larger

investigation and included three questions used in the current analysis, in which the interviewees were asked to (a) estimate the proportion of help seekers who had embezzled, (b) the proportion of embezzlers who had been reported to the police, and (c) the proportion of help-seeking embezzlers whose crimes had been covered in the press. The interview guides with questions were sent to the participants by e-mail at least a week in advance so that they could, if they wished, consult their records and their client and counselling statistics. Most participants made such preparations so that they could answer the questions as accurately as possible. These data were entered into an electronic spreadsheet to facilitate the calculation of the interviewees' pooled estimates. For example, a particular therapist had knowledge of 250 clients and estimated that 15%–20% of them had embezzled at their places of work, which amounts to about 43 clients. Corresponding figures were calculated for the estimates of the other interviewees, and an average percentage of embezzlers among help seekers could thus be calculated by using the figures for the total number of clients and the total number of embezzlers. Similar procedures were followed for calculating the proportion of embezzlers who had been reported to the police and the proportion of embezzlers whose cases had been covered in the press.

Results

Newspaper Study Results

First, the limitations of using data from a media study should be noted. Newspapers report mostly on cases that have ended up in court. Local and regional newspapers may report on minor cases, but national newspapers prefer to write about spectacular cases in which the sums embezzled are huge or some unusual feature is likely to catch the interest of readers. The data from the media study are therefore not representative of gambling-related embezzlement in Sweden and do not indicate how common this type of criminality is. Nevertheless, the data are valuable because they provide detailed information on many different cases that illustrate the economic harm caused by gambling-related embezzlement.

Quantitative data from the media study are displayed in Table 1. Five professional categories are listed: (1) employees and managers responsible for financial transactions at public authorities, municipal offices, or private companies other than stores, restaurants, or banks; (2) treasurers or others with positions of trust in non-profit organizations; (3) managers or employees of stores and restaurants; (4) mid-level bank managers; and (5) others.

Women were slightly more common among the cases—about half—than among problem gamblers in the Swedish general population, where about one in five problem gamblers are women (Public Health Agency of Sweden, 2016). This may be because more women than men have jobs that give them responsibility for money at non-profit organizations and municipal and other public offices. However, it could also be that newspapers prefer to write about female rather than male embezzlers because they consider this to be more remarkable.

Table 1
Quantitative Results from the Media Study

Number of cases	Professional category	Male/ female/ unknown sex	Sum embezzled (average) ^a	Sum embezzled (median) ^a	Duration (months, average) ^b	Duration (months, median) ^b
17	Employee or manager responsible for financial transactions at a public authority, municipal office, or private company (other than store, restaurant, or bank)	11/5/1	2,923,000	430,000	25	14
15	Treasurer or other position of trust in non-profit organization (e.g., political party, charity, trade union, sports association, or housing cooperative)	7/8/0	874,000	473,000	32	36
13	Manager or employee in store or restaurant	9/2/2	702,000	115,000	14	8
6	Bank manager (mid-level)	6/0/0	6,340,000	6,719,000	58	66
4	Other (journalist, bus driver, and unknown)	2/1/1	432,000	326,000	13	13
55	Total	35/16/4	2,060,000	386,000	28	17

^a Average and median values of the sums embezzled or wrongfully appropriated are rounded to SEK thousands (two missing values). SEK 1 is roughly equivalent to EUR 0.11 or USD 0.12. ^b Average and median durations in months of embezzling or wrongful appropriation have 11 missing values.

In 33 of the 55 cases, the precise or approximate age of the embezzler was stated (data not shown in the table). The lowest age was 21 years, the highest 59 years, with an average of 44 years. Thus, these problem gamblers were often middle aged, which is congruent with the typical case in which the embezzler has been employed for several years and gained a position of trust.

The sums of money embezzled can be huge. The average sum embezzled by the six mid-level bank managers (all men) was more than SEK 6 million (equivalent to EUR 637,000 or USD 730,000; SEK 1 is EUR 0.11 or USD 0.12). The sums embezzled by employees working in financial positions in private companies, authorities, and municipal offices, as well as by treasurers and individuals in positions of trust in non-profit organizations, were smaller, with median values in the SEK 430,000–473,000 range; the average amounts were larger because there were a few cases in which the sums were very large. Problem gamblers employed in stores or restaurants embezzled the smallest sums, a median of SEK 115,000, probably because access to huge amounts of money is uncommon in these professions. However, the sum was very large in a case involving a department store manager, which is why the average sum is about six times as large as the median sum.

The largest amount of money embezzled, and written about in the newspapers, was SEK 20.5 million. This embezzlement took place over a period of about 5 years and was committed by a middle-aged woman working at a municipal school office. She committed suicide in connection with the discovery of the embezzlement. Therefore, no trial was held, but it has been ascertained that she spent almost all the money on online gambling (the case is described in detail in Lindstedt & Nilsson, 2015).

The period during which embezzlement is sustained can be long. The problem gamblers employed at banks embezzled for an average (median value) of 66 months, that is, more than 5 years, before their wrongdoings were discovered. Those working in stores and restaurants were discovered relatively quickly, after 8 months (median value). These differences reflect the relative ease, or difficulty, of avoiding detection in these kinds of workplaces.

Supplementary Results of Interviews

In the media study, 55 cases were found over a 5-year period, meaning that at least 11 cases of gambling-related embezzlement are detected on average each year in Sweden. The true number of cases is certainly higher.

Supplementary data were obtained in interviews with five therapists and five semi-professional peer counsellors in mutual support societies. In the interviews, the therapists and peer counsellors were asked to estimate the proportion of embezzlers among their clients and peer problem gamblers whose cases had been written about in the press. All agreed that this was uncommon or very uncommon. Their pooled estimate, calculated as described in the Method section, was that about 8% had been covered in the press. According to this estimate, set in relation to the finding in the media study that on average 11 cases are reported in the press each year, the prevalence of detected gambling-related embezzlement in Sweden would be at least 137 cases a year.

Therapists and counsellors were also asked to estimate the proportion of embezzlers among their clients or peers; their pooled estimate was around 11%. Given that at least 1,000 people seek help for gambling problems each year in Sweden,¹ this estimate means that there are at least 110 cases of gambling-related embezzlement each year.

These two estimates, 137 and 110 cases, are of the same magnitude. Given that the estimates are approximate and that embezzlers who do not seek help for problem gambling are not included, I cautiously summarize the results as follows: In Sweden, it is likely that at least 10 cases of gambling-related embezzlement and similar economic workplace crimes are discovered each month.

Problem gambling therapists and peer counsellors were further asked to estimate how many of those who had embezzled had been brought to court and sentenced. Their pooled estimate was that only about one third of the embezzlers had been

sentenced. The others had either escaped detection (uncommon) or been discovered and discharged but not reported to the police (common). Employers refrained from reporting gambling-related embezzlement to the police because they did not wish to soil the company's reputation, did not deem it worth spending time and resources to help the police in their investigation, wished to put a quick end to the incident, felt pity for the problem gambler, or did not wish the police to investigate their business because their own unlawful activities might come to light.

Discussion

This study of newspaper reporting demonstrates that gambling-related embezzlement occurs in all branches of the economy in which employees have access to money. The sums embezzled can be huge and the crimes sustained for several years. The amounts of money that the problem gambler has access to at work, and the likelihood of avoiding detection, influence the severity of the embezzlement.

In principle, if the problem gambler has unlimited access to money, there seems to be no limit to how much he or she may spend on gambling. The largest ever gambling-related embezzlement in Sweden seems to have occurred in 1990 when a highly respected man working in international gold trading stole gold worth SEK 26 million, money that he used for betting on horses and paying usurious interest on loans he had taken for gambling (Edström, 1996, p. 68). An exceptionally extended gambling-related embezzlement was revealed in 1996 (Edström, 1996, p. 78f). A female employee had worked in a family business for 26 years. When she retired, it was found that she had embezzled millions of Swedish kronor over a period of 16 years. Internationally, it seems that the largest amount ever to have been embezzled by a gambling addict is CAD 10,200,000—the individual in this case worked in the 1980s as an assistant manager in a Canadian bank (Ross, 1987).

Problem gambling therapists and peer counsellors estimate that only about a third of detected embezzlers are brought to trial; this tallies well with the conclusion of Swedish criminologists that far from all detected economic crimes are reported to the police (Brottsförebyggande rådet, 2002).

The estimate that about 1 in 10 help-seeking problem gamblers has embezzled or stolen money from the workplace is lower than the previous figures reported in the literature of 22%–37%. Several reasons for this are possible. First, the interviewees in the present study may have underestimated the proportion of their clients who had embezzled because some clients did not tell the full story about their gambling problem. Second, some previous studies have included all kinds of theft at work, including theft of money from colleagues. Third, previous studies were conducted in the 1990s and early 2000s, when support for problem gamblers was not as available as it has been in Sweden over the past decade. The greater availability of help is likely to increase the proportion of less severe problem gamblers who seek help, which would presumably lower the proportion of severe problem gamblers, such as those who have committed crimes, among help seekers. Fourth, the use of cash in bank

and business transactions has declined in recent decades and electronic transactions have become more common. Although this creates new opportunities for advanced schemes of fraud and embezzlement, unsophisticated appropriation of money from the workplace has probably become more difficult because digital financial transactions can be more efficiently monitored and checked in audits.

Is the number of cases of gambling-driven employee embezzlement reported in the Swedish press—on average 11 cases a year—high, low, or about the same as the number reported in other countries (adjusted for differences in population size)? As no previous study has used the same methodology as was used in this research, a precise answer cannot be given to that question. However, two previous studies, one from the United States and one from Australia, are sufficiently similar in method to allow an approximate comparison. Details on how these studies were compared to the Swedish results are given in an endnote², and in Tables 2 and 3. The American study (Marquet International, 2013) concerned cases of major embezzlement (defined as the misappropriation of at least USD 100,000) that were publicly known through newspaper reporting or from court proceedings and came to the attention of the author of the study. The results suggest a prevalence of publicly known gambling-related employee embezzlement that is the same as that found in the present study for

Table 2
Comparison Between This Study and Marquet International, 2013

	This study (Sweden)	Marquet International, 2013 (USA)
Data	Comprehensive newspaper study	Publicly known cases—known through newspaper reporting or from court proceedings that came to the attention of the author of the study
Crime	Gambling-related employee embezzlement and similar crimes	Employee theft, major embezzlement, at least USD 100,000 misappropriated
Time frame	5 years (July 2009–June 2014)	5 years (2008–2012)
Number of cases	22 cases. Total number of cases was 55. In 22 of these, the equivalent of at least USD 100,000 was misappropriated	700 cases. (approximately). Total number of cases was 2,110. Among the cases in which the motivating factor was known, gambling was the motive in almost one third of the cases. If this ratio was the same among the cases in which the motivating factor was unknown, of a total of 2,110 cases in the past 5 years, about 700 cases would have been gambling related.
Population size	9.6 million (2012)	309 million (2010)
Number of cases in 5 years per million inhabitants	$22/9.6 = 2.3$ cases	$700/309 = 2.3$ cases

Table 3
Comparison Between This Study and Warfield, 2011

	This study (Sweden)	Warfield, 2011 (Australia)
Data	Comprehensive newspaper study	“... an extensive review of online law judgments as well as Australian newspaper articles containing court reports that provided details of judgments” (p. 5)
Crime	Gambling-related employee embezzlement and similar crimes	Gambling-motivated fraud
Time frame	5 years (July 2009–June 2014)	3 years (2008–2010)
Number of cases	55 cases	Of a total of 181 fraud cases, employees were responsible for about 60% = 108 cases.
Population size	9.6 million (2012)	21.3 million (2009)
Number of cases per million inhabitants and per year	$55/9.6 = 5.7$ cases in 5 years; $5.7/5 = 1.1$ cases per year	$108/21.3 = 5.1$ cases in 3 years; $5.1/3 = 1.7$ cases per year

newspaper reporting. The Australian study (Warfield, 2011) concerned gambling motivated fraud and was based on a review of online law judgements and newspaper articles on court cases. The prevalence of publicly known, gambling motivated fraud committed by employees was about 55% higher than the prevalence found in the present study. Future studies might tell if these similar figures are coincidental—appearing by chance in an attempt to compare studies with different methods and measures—or reflect an actual similarity in prevalence, across contemporary Western societies, of gambling-related embezzlement that comes to public attention through newspaper reporting and/or court files. Such a similarity across societies would not be surprising if the societies have comparable standards of living, prevalence of problem gambling, judicial systems, and practices of newspaper reporting on court cases.

In this investigation, I chose to explore gambling-related embezzlement by means of newspaper reporting. A limitation of this method is that the cases I found are not representative, as they were selected by newspapers on the basis of the interest they may have for the readership. The advantage is that the method relatively easily produces substantial and detailed material covering a wide range of cases. Supplementary data from interviews with professionals with extensive knowledge of help-seeking problem gamblers allowed me to add a quantitative dimension to the media study, although it was approximate and based on estimates that might be limited in accuracy because of recall errors and incomplete knowledge of the criminality of clients in therapy and of peers in mutual support societies.

Previous studies of gambling-related economic crime have mainly used two other methods having characteristic advantages and limitations. The first method is to study court files (e.g., Crofts, 2003b). Finding cases in that way might be more time-consuming than searching for articles in a digital newspaper archive, but it is likely to yield a more complete overview of the amounts of money stolen and of the durations and circumstances of the crimes. However, studying court files provides information only on cases reported to the police and brought to court. The second method is to use data from questionnaires administered to problem gamblers who are in treatment or attending GA (e.g., Meyer & Stadler, 1999). This has the advantage of including cases not reported to the police as well as undetected cases. One disadvantage is that some problem gamblers may be reluctant to tell about crimes they have committed; in addition, the method shares the other well-known drawbacks of self-reporting, such as recall biases and errors. Furthermore, far from all problem gamblers who have embezzled money from the workplace, whether detected or not, seek help.

The aim of this study was primarily descriptive—to give an idea of the size of the sums of money misappropriated in gambling-related employee embezzlement, the duration of the crimes, and their prevalence. Qualitative results from this investigation are reported in another article (Binde, 2016a), where it is argued that classic white collar crime theory—originating with the seminal work of Edwin Sutherland (1949) and subsequently expanded with particular respect to embezzlement (Cressey, 1973; Ramamoorti, 2008; Zietz, 1981)—is useful in gambling studies for understanding how law-abiding citizens who develop a gambling problem become entangled in a web of crime and lies, which in numerous cases ultimately leads to imprisonment, huge debts, and a ruined professional reputation. A theoretical key term is “trust violator” (Cressey, 1973); embezzlement is made possible by having a position of trust. A useful theoretical model is the “fraud triangle,” which has emerged as a synthesis of criminological studies in this field (Dorminey, Fleming, Kranacher, & Riley, 2010). According to this model, embezzlement occurs when (1) there is opportunity, (2) there is perceived need or pressure, and (3) the embezzler rationalizes wrongdoings as excusable or even justified. The perceived need or pressure is typically hidden and unknown to others. It is often something shameful that requires a lot of money to be handled, such as having a gambling addiction and therefore constant economic troubles; it is an “un-sharable problem” (Cressey, 1973; Lesieur, 1984). A typical rationalization in gambling-driven employee embezzlement, at least in the initial phase, is that money is just “borrowed” from work for a short while and will be restored as soon as further gambling brings big wins. The problem gambler is caught in a vicious circle in which the position of trust, access to money, addiction to gambling, theft of money being rationalized as a “loan,” and seductive offers of commercial gambling companies may result in—as described in this article—criminal behaviour sustained over long periods and involving huge sums of money.

The policy implication of this study is that more efforts are needed to prevent the harmful consequences of problem gambling in the workplace (Binde, 2016b). These harms include not only the type of crime explored here, but also theft from colleagues, theft of goods from the workplace, and decreased productivity because

of preoccupation with gambling and the distress and ill health brought about by problem gambling. Although gambling-related embezzlement may be relatively uncommon compared with other harms caused by problem gambling, the consequences for the gambler, significant others, and the employer may be particularly severe and extended in time. According to the risk assessment formula, in which the need for prevention is determined by the frequency of a phenomenon multiplied by the severity of the harm that it causes, gambling-related embezzlement may be high in prevention priority.

Conclusion

Private companies, public authorities, and non-profit organizations may lose huge sums of money through gambling-related embezzlement and similar economic crimes. Such crimes may continue for several years before being detected. The gambler and significant others may suffer severe harm over an extended period when problem gambling has led to criminal activities. Not only does the employer lose money, but the reputation of the business or organization is hurt and damage control efforts are often needed to address the organizational disarray and emotional reactions among colleagues when the crime is detected. There seem to be no branches of the economy that are free of this problem. The Swedish press reports, on average, about one detected case each month. However, the results of this study suggest that the prevalence is likely to be at least 10 times as high. More efforts should be allocated to preventing embezzlement and other gambling-related harms in the workplace.

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Endnotes

¹No statistics are available on the yearly number of problem gamblers in Sweden who begin therapy or start to attend mutual support meetings. According to personal communication with representatives of mutual support societies in Sweden, which are connected through a national organization, about 440 gamblers sought help in 2014 (not counting those who at the same time underwent conventional therapy). The national network for problem gambling therapists, who work on behalf of municipalities and counties, reported that in 2013, approximately 291 clients began therapy (Socialdepartementet, 2015, p. 70). However, numerous therapists and counsellors in municipalities and counties are not members of this network, but nevertheless receive clients with gambling problems. There are also therapists in private practice who receive problem gambling clients. From this information, it is reasonable to assume that at least 1,000 problem gamblers each year begin therapy or start to attend mutual support meetings. This estimate also seems reasonable when considering that 1,518 problem gamblers contacted the national helpline in 2013 via phone, chat or e-mail (Folkhälsomyndigheten, 2015). Not all of these gamblers began therapy or started to attend mutual support meetings (and about 120 were counted twice because they called multiple times), but far from all of those who begin therapy or mutual support have called the helpline. Another indication that at least 1,000 individuals is a reasonable lowest estimate is that, according to the 2008–2009 Swedish population study of gambling and problem gambling (Public Health Agency of Sweden, 2016), approximately 2,800 individuals had sought help for gambling problems once and 7,600 had sought help several times. The time frame was “ever,” but as specific help for problem gambling has not existed in Sweden for much more than a decade, it is reasonable to assume that most of the help seeking occurred in the past 10 years, that is, at least about 1,000 individuals per year. According to the same population study, there were approximately 23,700 individuals with a gambling problem, defined as scoring at least 8 points on the Problem Gambling Severity Index (Ferris & Wynne, 2001). If 5% of these problem gamblers seek help in the following year, that would amount to 1,185 individuals; international estimates, using various time frames and definitions of problem gambling, suggest help-seeking rates of between 6% and 17% (Productivity Commission, 2010, p. 7.3).

²Tables 2 and 3 show the results from this study in comparison with results from two other studies (Marquet International, 2013; Warfield, 2011) on the prevalence of publicly known cases and newspaper reports of gambling-related employee embezzlement. The comparison should be seen as approximate because of differences in data collection, definitions of the crimes included, and other factors that influence the results. In summary, the prevalence observed in this study is the same as that suggested by the American study (Marquet International, 2013) and similar to (about 35% lower) the results of the Australian study (Warfield, 2011). It should be kept in mind that these figures do not include undetected cases and cases that have not come to public attention or been brought to court.

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A Baseline Study of Past-Year Problem Gambling Prevalence Among Ohioans

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Abstract

Historically, the scope of legalized gambling was limited in Ohio, but everything changed when a new constitutional amendment allowed four casinos to open. To better understand the impact of gambling expansion, a household survey was commissioned to determine the baseline estimate of problem gambling behaviours in the state before casinos opened. Participants were selected through multi-stage probability sampling, with over 3,500 respondents completing valid surveys. Nearly 60% of Ohioans gambled in the past year, but the statewide prevalence of problem gambling was relatively low; only 1.4% of persons scored high enough on the Problem Gambling Severity Index to be classified as a potential problem gambler (score ≥ 3). Regional estimates of problem gambling were highest for Franklin and Hamilton counties (both 5.0%) and lowest for Lucas and Cuyahoga counties (3.2% and 2.1%, respectively). Exploratory logistic regression modelling found that race, employment, education, family history of problem gambling, and feelings of depression increased the odds of being a problem gambler. Results will inform the discussion about current gambling problems and enable policy makers to design prevention strategies.

Keywords: gambling, prevalence, risk factors, gambling correlates, addiction, Problem Gambling Severity Index

Résumé

Sur le plan historique, la légalisation du jeu était limitée en Ohio, mais tout a changé lorsqu'une nouvelle modification constitutionnelle a permis à quatre casinos d'ouvrir leurs portes. Afin de mieux comprendre l'incidence de l'augmentation du jeu, une enquête auprès des ménages a été commandée pour établir une estimation de référence des comportements de jeu problématique dans l'État avant l'ouverture des casinos. Les participants ont été sélectionnés au moyen d'un échantillonnage aléatoire à plusieurs degrés, et plus de 3 500 répondants ont rempli les sondages valides. Près de 60 % des Ohioans ont joué l'an dernier, mais la prévalence du jeu problématique à l'échelle de

l'État était relativement faible; seulement 1,4 % des personnes a obtenu un résultat suffisamment élevé sur l'indice de gravité du jeu pathologique pour être classé comme joueur potentiellement problématique (résultat ≥ 3). Les estimations régionales du jeu problématique étaient plus élevées pour les comtés de Franklin et de Hamilton (5,0 % dans les deux cas) et plus faibles pour les comtés de Lucas et de Cuyahoga (3,2 % et 2,1 %, respectivement). Un modèle de régression logistique et exploratoire a permis de constater que la race, l'emploi, l'éducation, les antécédents familiaux de jeu problématique ainsi que les sentiments de dépression augmentaient les risques d'être un joueur problématique. Les résultats de l'étude alimenteront la réflexion sur les problèmes de jeu pathologique actuels et aideront les décideurs à mettre au point des stratégies de prévention.

Introduction

Opportunities for legalized gambling have been historically limited in Ohio. State regulations promulgated about gambling limited its availability to games such as the Ohio lottery, betting at harness racing and thoroughbred racetracks, and charitable gaming. Like many other states, Ohio has been faced with referendums about the legalization of additional forms of gambling, and most legalization efforts have met with success over time. Ohioans have faced several referendums about casino gambling. Although constitutional amendments to allow casino gambling were turned down in 2006 and 2008, proponents of the measure finally succeeded in getting the amendment passed in 2009. This amendment allowed four casinos to open in urban areas, with the first casino opening in June 2012. Legislators took a pro-gambling stance after the law's passage and also changed the Ohio Revised Code to allow video lottery terminals (VLTs) at racetracks (i.e., racinos). Over 10,000 VLTs have been placed across the state since June 2012, presenting Ohioans with even more opportunities to gamble.

The expansion of gambling in Ohio has offered the state new revenue sources, but it has also raised concerns about the public health consequences of increased access. Although a majority of people gamble without experiencing difficulties, a small percentage of gamblers exhibit problem gambling, or “negative consequences for the gambler, others in his social network, or for the community” as a result of excessive gambling (Ferris & Wynne, 2001, p. 2). Meta-analyses and other reviews of the literature have found a link between gambling expansion and problem gambling, generally finding that greater access is associated with a higher prevalence of problem gambling (Room, Turner, & Ialomiteanu, 1999; Shaffer, Hall, & Vander Bilt, 1999). LaPlante and Shaffer (2007) theorize that the expansion of gambling opportunities can be likened to a disease model in which there is an initial exposure to a disease and eventual adaptation to it. In this scenario, the prevalence of problem gambling (i.e., the disease) will increase over time as the number of gambling

opportunities increases (i.e., the exposure), but the increase will be mediated by a population's increasing resistance to problem gambling behaviour (i.e., adaptation). Replication studies explore whether gambling prevalence has increased in the same jurisdiction, and they serve as an excellent way to test the disease-exposure model. Williams, Volberg, and Stevens (2012) surveyed replication studies over the past 30 years and found that increased gambling opportunities led to an increased standardized rate of problem gambling prevalence. The degree of change varied by country and degree of gambling expansion, but generally followed the hypothesized disease model with increases, plateaus, and decreases in the standardized problem gambling prevalence rates. Theories about population adaptation to gambling exposure have been suggested to involve mechanisms such as increased age, social learning, decreased interest in a novel activity, increased prevention messaging, and treatment availability (LaPlante & Shaffer, 2007; Storer, Abbot, & Stubbs, 2009; Williams et al., 2012).

Correlates of Problem Gambling

Expansion of gambling opportunities means that state and local officials must understand whether certain groups are at greater risk than others for developing problem gambling behaviour. Men typically have higher rates of problem gambling than women do (Shinogle et al., 2011; Spitzer & Carpenter-Palumbo, 2007; Volberg, 2001; Volberg, Nysse-Carris, & Gerstein, 2006), and Blacks have higher rates than other racial groups do (Mancuso, Gilson, & Felver, 2005; Shinogle et al., 2011; Spitzer & Carpenter-Palumbo, 2007; Volberg et al., 2006). Studies have frequently found that persons less than 35 years old have greater odds of having problem gambling behaviour (Emshoff et al., 2007; Volberg, 1997, 2001), and some studies have found that persons between the ages of 30 and 50 (Mancuso et al., 2005) or 50 and over are at greater risk for problem gambling (Ferguson, Frost-Pineda, & Gold, 2002). Separated, divorced, and single persons also are much more likely to be problem gamblers (Mateja, Wilson, & Ableman, 1998; Moore, 2006; Volberg, 2001; Wallisch, 1993). Moreover, problem gambling is more likely among persons who have lower educational attainment, especially those with a high school education or less (Emshoff et al., 2007; Volberg, 1997). Unemployed persons (Volberg, 2001, 2003; Volberg et al., 2006) or part-time employed persons (Mateja et al., 1998; Spitzer & Carpenter-Palumbo, 2007) are also much more likely to be problem gamblers than are fully employed persons.

The prevalence of problem gambling is higher among substance abusers than among the general population (Lorains, Cowlshaw, & Thomas, 2011; Nalpas et al., 2011; Petry, Stinson, & Grant, 2005; Potenza, Steinberg, & Wu, 2005). Studies of persons diagnosed with substance abuse in residential treatment facilities have found problem gambling to range from 10.5% to 14.9% (Toneatto & Brennan, 2002; Toneatto, Ferguson, & Brennan, 2003). In Ohio, the Ohio Substance Abuse Monitoring (OSAM) Network found that 12.1% of persons in treatment for alcohol and other drug problems scored high enough on a standardized assessment instrument, the South Oaks Gambling Screen (SOGS), to qualify as probable pathological gamblers. In addition, the OSAM found that gambling and substance use had a reciprocal relationship; respondents used more alcohol and other drugs

when gambling and gambled more when using alcohol and other drugs (Sherba & Martt, 2013). Research has indicated that alcohol is the most commonly abused substance among problem gamblers (Substance Abuse and Mental Health Services Administration, 2005). However, among those diagnosed with substance use disorders, some studies indicate problem gamblers prefer cannabis (24.1%) and cocaine (11.5%) over alcohol (9.0%; Toneatto & Brennan, 2002).

Psychiatric conditions are also common correlates of problem gambling. Problem gamblers have greater odds of having mood disorders, anxiety disorders, and personality disorders (Cunningham-Williams, Cottler, Compton, & Spitznagel, 1998; Petry et al., 2005; Williams, Lee, & Back, 2013; Wood & Williams, 2009). Although lifetime comorbidity is highest for substance use disorders such as alcohol and nicotine dependence, it is also very high for major depressive disorder and obsessive-compulsive disorder (Petry et al., 2005). Sex-specific differences also occur with psychiatric disorders. Women have shown higher odds of a lifetime problem gambling comorbidity for major depressive episodes and generalized anxiety disorder, along with substance use disorders such as any alcohol dependence and any drug abuse (Petry et al., 2005). Moreover, odds of psychiatric disorders are consistently higher over time for persons who screen positive for problem gambling (Chou & Afifi, 2011).

Problem gambling is also associated with family histories of gambling (Clarke, 2004; Oei & Raylu, 2004). Children of current or former problem gamblers are more likely to be at risk for developing problem gambling behaviours (Wardle et al., 2007). Toneatto and Brennan (2002) have shown that people whose parents, siblings, and friends had a problem gambling diagnosis within the past year scored significantly higher on the SOGS than did those with no family history of gambling. Other studies have examined the broader topic of addiction and found that families with a history of gambling problems are more likely to experience other forms of addiction (Slutske et al., 2000, 2001).

Consequences of Problem Gambling

Problem gambling can have devastating effects upon spouses, children, and extended family members. Research indicates that the majority of persons seeking out treatment for problem gambling are family members, rather than the gamblers themselves. By disclosing a gambling problem, the problem gambler often creates significant emotional stress for the family as the extent of the addiction becomes known. The family may begin to realize the magnitude of the outstanding debts to legitimate and illegitimate sources. As a result, the spouse may experience anger, depression, anxiety, confusion of his or her role within the family, and feelings of self-blame (Dowling, Smith, & Thomas, 2009; McComb, Lee, & Sprenkle, 2009; Wenzel, Oren, & Bakken, 2008). The level of emotional turmoil experienced by the spouse often leads to decreased quality of life and may even lead to suicidal ideation (McComb et al., 2009; Wenzel et al., 2008). All of these stressors can have a detrimental impact upon the marital relationship, which may explain the higher divorce rates among problem gamblers (Black, Shaw, McCormick, & Allen, 2012;

Moore, 2006). Even adult children and extended family members may experience the consequences of the problem gambler's addiction, resulting from requests for money and coverage of debts (Potenza, Fiellin, Heninger, Rounsaville, & Mazure, 2003; Wenzel et al., 2008).

If one views gambling on a continuum in which there are increasing degrees of harmfulness, then a clinical diagnosis of gambling disorder is the most severe consequence of problem gambling. According to the American Psychiatric Association (2013), a diagnosis of gambling disorder may occur if a person has clinically significant distress on a regular basis. Maladaptive behaviour patterns associated with gambling (e.g., lying to cover gambling losses) may impair problem gamblers' work and personal lives (Jazaeri & Habil, 2012; Koo, Rosentraub, & Horn, 2007). They may become restless and irritable during attempts to stop gambling, which often fail. They frequently return to gambling in order to regain lost funds, borrow money from family or friends, and lie about the frequency of gambling. Problem gamblers even lose employment or related opportunities because of their gambling issues at the height of the addiction. Bankruptcy is frequently associated with problem gamblers who have exhausted all of their resources (Boardman & Perry, 2007; Garrett, 2004).

Present Study

Little was known about the problem gambling prevalence in Ohio before the opening of the casinos. Nationally, estimates of the standardized past-year rate of problem gambling average 2.2%, ranging from 0.6% to 8.1% (Williams et al., 2012). The only estimate that could serve as a baseline for Ohio was a study conducted over 30 years ago, which found that 3.4% of Ohioans were likely at risk to become problem gamblers (i.e., had increased odds of problem gambling behaviour) and that 2.5% of Ohioans were problem gamblers (Culleton, 1985). However, this study was significantly limited because modern instruments that evaluate the prevalence of problem gambling had not yet been developed.

A statewide household survey was commissioned by Ohio for Responsible Gambling (ORG) and funded by the Ohio Lottery Commission to better develop an understanding of the prevalence of problem gambling. The goal of this baseline survey was to obtain a prevalence estimate of past-year at-risk and problem gambling behaviours in the state before new gambling venues opened. Additionally, ORG wanted to understand the socio-demographic correlates that may increase the likelihood of problem gambling behaviour. Results will inform the discussion about current gambling problems and enable policy makers to design prevention strategies.

Methods

Participant Recruitment

The Ohio Department of Mental Health and Addiction Services contracted with the Survey Research lab at Kent State University to conduct a landline telephone survey

in 2012 with Ohioans aged 18 and older. Guidelines from the American Association for Public Opinion Research were used to conduct the survey and calculate response rates (American Association for Public Opinion Research, 2015). The survey was administered through a computer-assisted telephone interviewing technique using random-digit dialling. The multi-stage sampling strategy involved collection of data from five regions: a statewide region (approximately 1,200 persons) and four additional areas that were oversampled to develop local prevalence estimates for areas where casinos would operate (i.e., Cuyahoga, Franklin, Hamilton, and Lucas counties; approximately 600 per region). The final sample included 3,623 persons, which was adequate to result in a low margin of error (+ 3%). Landline response rates, the response rate for completed and partial interviews (RR2), were similar for each of the samples (statewide 32%, Cuyahoga 30%, Franklin 32%, Hamilton 30%, and Lucas 30%). Regional oversamples were identified by the phone number's first four numbers because a preponderance of those numbers were located within each region based on both city and zip code boundaries. Geographic screens were then used in the survey to ensure that people were accurately assigned to each region. Kent State University conducted telephone surveys from February through July 2012. Surveys in Cuyahoga and Lucas counties, as well as for the statewide sample, were completed before the opening of the casinos in Cleveland (May 14, 2012) and Toledo (May 29, 2012). Surveys from the Franklin County and Hamilton County subsamples occurred before the opening of casinos in Columbus (October 8, 2012) and Cincinnati (March 4, 2013); however, it is possible that some survey participants travelled to either Cleveland or Toledo in the short window before the end of the survey. This study was approved by the Kent State University Institutional Review Board, protocol #12-021.

Questionnaire

The conceptual framework used to determine the presence of problem gambling follows the Canadian Problem Gambling Index (CPGI; Wynne, 2003). The CPGI is composed of 31 items and 11 demographic questions, which measure gambling involvement (e.g., type and frequency), adverse consequences (e.g., personal and social), and correlates of problem gambling such as family problems and behavioural health (e.g., alcohol/drug use and feeling depressed). The CPGI has questions related to all forms of gambling, including lottery (e.g., Mega Millions, instant win, or scratch tickets), casino (e.g., slot machines and roulette), and other (e.g., raffle or fundraising tickets, and Internet). Survey questions did not differentiate between whether these games were played in state or out of state over the past year; however, responses related to gambling at casinos likely took place out of state because the survey largely took place before the opening of the casinos. The Problem Gambling Severity Index (PGSI) comprises nine of the CPGI's core questions, and these items are used to determine the presence of at-risk and problem gambling behaviour on a continuum of problem gambling severity. Most persons evaluated with the PGSI are not considered to have a gambling problem because they do not score on the instrument (i.e., they have a score of 0). A minority of persons are classified as being at risk, meaning that they have displayed behaviours consistent with problem gambling that may increase their odds of becoming a problem gambler in the future.

For example, a low (1-2) or moderate (3-7) score indicates that persons may experience adverse consequences from gambling, whereas a high score (≥ 8) indicates profound adverse consequences to the individual, network, or community.

Ferris and Wynne (2001) found that the PGSI showed good internal consistency ($\alpha = .84$) and test-retest reliability ($r = .78$) and that it correlated highly with measures of problem gambling such as the *Diagnostic and Statistical Manual of Mental Disorders* (; American Psychiatric Association, 1994; $r = .83$) and the SOGS ($r = .83$; Ferris & Wynne, 2001). Results are also supported by other researchers who have found excellent internal consistency ($\alpha = .84$) and a high correlation with SOGS and *DSM-IV* criteria (McMillen & Wenzel, 2006; Wynne, 2003). Critics of the PGSI have cautioned that the instrument may not follow the public health model of problem gambling that examines the role of harms related to problem gambling (Delfabbro, 2013; McCready & Adlaf, 2006; Svetieva & Walker, 2008). Instead, they suggest that too many items reflect clinical pathological behaviours, which could make it problematic for estimating the prevalence of problem gambling in a non-clinical population. Other instruments have been developed that focus on the public health context, but these instruments also have their criticisms (Delfabbro, 2013; Svetieva & Walker, 2008).

Data Weighting

A common occurrence in many telephone surveys is the overrepresentation of females and older adults and the underrepresentation of minority (non-White) races in the survey samples. As in all surveys, the survey sample in the present study did not perfectly match its corresponding proportion in the population. This sample was also complex because surveys from the state sample could have overlapped with the regional samples. To adjust for these issues, we designed the study to use a post-stratification raking procedure in order to balance results for the target population and to ensure that the results were not biased from the oversampled counties (Battaglia, Izrael, Hoaglin, & Frankel, 2004). The rakes for the combined data set were based on region (five categories), race (three categories), gender (two categories), and age (15 categories). Categories were collapsed when cell sizes were too small (e.g., combining infrequently mentioned races into an “other” category). Demographic data from the 2010 U.S. Census were used for the raking procedure to create the weights.

Data Cleaning

Data cleaning was performed to validate the data set before analysis. A minority of the surveys (116 cases; 3.2%) were excluded from further analysis, resulting in a final sample of 3,507 valid surveys. Case exclusion occurred for various reasons (e.g., data were accidentally collected from states outside Ohio when participants took their phone numbers with them when they moved). Simple data entry errors (e.g., numbers outside of the valid range) were corrected when possible by reviewing the original data or were replaced with a missing value indicator when not possible.

Persons who did not know how to respond to a question or refused to answer a question were not included in analyses. These circumstances were relatively rare (<1%) for most questions; therefore, no attempt was made to impute the data.

Data Analysis

Stata (2013) version 13.1 and SPSS version 22.0 were used for analyses. The multi-stage nature of the sampling design required the correction of standard errors to adjust for design-based effects. Statewide cross-tabulations (e.g., prevalence estimates) performed with Stata used complex survey sample procedures with Taylor series linearization. This technique calculated linearized standard errors that more accurately estimated the variance than did more traditional methods, and it used an *F*-test to examine for statistically significant differences among cells (Stata, 2013). Calculations for the margin of error based on a 95% confidence interval were also generated to take sampling error into account, which may have resulted if a sample was not representative of the true population. PGSI categories had to be collapsed for analyses because some categories had few respondents. The unweighted number of problem gamblers (i.e., ≥ 8 on the PGSI) was very low ($n = 11$); thus, this category was combined with moderate-risk gamblers (i.e., 3-7 on the PGSI; $n = 74$). Persons scoring in the low-risk category on the PGSI (i.e., 1-2; $n = 201$) were combined with non-problem gamblers (i.e., 0 on the PGSI; $n = 3,221$). Therefore, most analyses between non-problem and problem gamblers are between persons scoring relatively low (i.e., 0-2 on the PGSI; $n = 3,422$) and persons scoring at moderate or high levels (i.e., ≥ 3 on the PGSI; $n = 85$) of problem gambling. Cross-tabulations with small cell sizes had higher linearized standard errors and should be interpreted with some degree of caution. Logistic regression was used to examine the odds of being a problem gambler compared with those of being a non-problem gambler given the socio-demographic characteristics and typical correlates of problem gambling. Variables that could potentially confound the analysis (e.g., the interaction of race and education) were investigated during model development, but none of these were statistically significant.

Results

Statewide Prevalence of Gambling Behaviour

Table 1 presents prevalence estimates for gambling behaviours among Ohio adults aged 18 and over in 2012. Nearly 60% of Ohioans, representing an estimated 5 million people, had gambled within the past 12 months. The overall statewide prevalence estimate of problem gambling was relatively low (1.4%; PGSI score ≥ 3); however, regions with casinos under development had higher prevalence rates than did the state as a whole. Regional estimates suggested Franklin and Hamilton counties had the highest prevalence estimates of problem gambling (both 5.0%; PGSI score ≥ 3), whereas Lucas and Cuyahoga counties had the lowest prevalence estimates (3.2% and 2.1%, respectively). Estimates of problem gambling at the statewide and regional levels must be interpreted with some degree of caution

Table 1

Estimated Prevalence of Past-Year Gambling for Non-gamblers and Gamblers, Ohio, 2012

Region	Estimate	Non- gambler	Non-problem gambler ^a	Problem gambler ^b
Statewide <i>N</i> = 3,495	Prevalence (lin. SE) ^c	41.4% (1.9)	57.2% (1.9)	1.4% (0.3)
	Population range	3,328,575–3,962,589	4,719,883–5,353,898	88,058–176,115
Cuyahoga County <i>n</i> = 536	Prevalence (lin. SE)	28.1% (2.3)	69.7% (2.3)	2.1% (0.7)
	Population range	297,793–	813,300–927,162	15,015–48,798
Franklin County <i>n</i> = 571	Prevalence (lin. SE)	37.1% (2.9)	57.9% (3.0)	5.0% (1.8)
	Population range	341,210–465,778	562,183–690,002	25,997–109,404
Hamilton County <i>n</i> = 566	Prevalence (lin. SE)	31.3% (2.4)	63.7% (2.6)	5.0% (1.6)
	Population range	228,862–309,134	499,568–586,672	22,203–79,418
Lucas County <i>n</i> = 548	Prevalence (lin. SE)	30.0% (3.3)	66.8% (3.3)	3.2% (0.9)
	Population range	101,596–155,780	254,413–308,597	7,620–22,859

^a Non-problem gamblers scored 0–2 on the Problem Gambling Severity Index (PGSI).

^b Problem gamblers scored ≥ 3 on the PGSI. ^clin. SE = linearized standard error; row percentages may not total 100 due to rounding error.

because the low number of problem gamblers resulted in relative standard errors that were greater than 25% for that subgroup (statewide 33%, Cuyahoga 53%, Franklin 62%, Hamilton 56%, Lucas 50%). More detailed estimates for the prevalence of at-risk gambling behaviour could be generated only for statewide data because of the small number of persons in each PGSI category; however, some of these estimates must also be interpreted with caution because of the large relative standard errors ($>25\%$) in the moderate-risk and problem gambling subgroups. Data indicate prevalence rates were highest for persons who were at risk for problem gambling rather than for problem gamblers; 4.2% of Ohioans were estimated to be at low risk for problem gambling (PGSI score 1–2) and 1.1% were at moderate risk for problem gambling (PGSI score 3–7), with only 0.4% scoring high enough to be classified as problem gamblers (PGSI score ≥ 8).

Sociodemographic Characteristics of Sample

Table 2 presents the weighted statewide socio-demographics for Ohioans aged 18 and over by gambling status. Results from weighting the data with the statistical raking procedure typically were similar to the unweighted data. In both unweighted and weighted tabulations, a majority of participants were female (62.7% vs. 51.2%,

Table 2
Statewide Socio-demographics by Gambling Status, Ohio, 2012

Socio-demographic characteristic		Unweighted <i>N</i> (weighted %)	Prevalence of gambling, weighted % (lin. SE) ^a		
			Non- gambler	Non- problem gambler ^b	Problem gambler ^c
Gender (<i>N</i> = 3,495)	Men	1,304 (48.8%)	34.5% (2.9)	63.7% (2.9)	1.7% (0.5)
	Women	2,191 (51.2%)	47.9% (2.2)	51.0% (2.1)	1.1% (0.3)
Age (<i>N</i> = 3,495)	18–24	80 (12.5%)	42.7% (7.4)	55.3% (7.4)	2.0% (1.0)
	25–44	740 (32.9%)	39.4% (2.8)	58.9% (2.8)	1.7% (0.6)
	45–64	1,985 (36.2%)	37.1% (1.5)	61.3% (1.5)	1.6% (0.3)
	65+	690 (18.4%)	52.4% (6.5)	47.4% (6.5)	0.2% (0.1)
Race (<i>N</i> = 3,495)	White	2,750 (81.8%)	40.5% (2.1)	58.6% (2.1)	0.9% (0.2)
	Black	478 (12.1%)	47.2% (4.6)	48.1% (4.6)	4.7% (1.5)
	Other ^d	267 (6.1%)	42.0% (6.3)	56.8% (6.4)	1.3% (0.6)
Marital status (<i>N</i> = 3,482)	Married	2,070 (53.7%)	38.5% (2.1)	61.0% (2.1)	0.5% (0.2)
	Living with partner	173 (6.1%)	40.1% (6.5)	58.0% (6.5)	1.9% (1.0)
	Widowed	230 (8.1%)	59.3% (9.7)	40.1% (9.7)	0.6% (0.2)
	Divorced	451 (7.9%)	42.5% (4.6)	55.8% (4.6)	1.7% (0.6)
	Separated	72 (1.7%)	52.3% (8.5)	35.8% (7.7)	11.9% (5.7)
	Never married	486 (22.4%)	40.9% (4.5)	56.3% (4.5)	2.8% (0.9)
	Employed full-time	1,504 (40.3%)	33.4% (2.1)	65.8% (2.1)	0.7% (0.3)
Employment status (<i>N</i> = 3,488)	Employed part-time	351 (11.2%)	44.1% (5.3)	53.5% (5.3)	2.4% (1.3)
	Unemployed, but looking	202 (8.3%)	42.2% (8.9)	53.4% (9.3)	4.5% (2.0)
	Retired	849 (18.7%)	51.4% (5.0)	47.5% (4.9)	1.1% (0.4)
	homemaker	253 (8.0%)	51.2% (5.5)	48.3% (5.5)	0.5% (0.2)
	Other	329 (13.4%)	42.1% (5.5)	56.1% (5.6)	1.8% (0.7)
Education (<i>N</i> = 3,491)	Some high school or less	130 (3.7%)	53.2% (7.2)	37.7% (6.8)	9.1% (3.8)
	High school diploma or equivalent	772 (25.1%)	50.8% (3.9)	47.9% (3.9)	1.3% (0.5)
	Some community college or some technical school	167 (5.0%)	50.8% (7.7)	47.4% (7.6)	1.8% (1.4)
	Completed community college or technical school	246 (6.5%)	32.3% (5.1)	64.4% (5.2)	3.3% (1.7)
	Some university	568 (19.4%)	35.0% (4.3)	64.2% (4.4)	0.8% (0.4)
	Bachelor's degree	939 (25.4%)	40.8% (3.8)	58.3% (3.7)	0.9% (0.4)
	Graduate or professional degree	669 (15.0%)	32.3% (3.0)	67.2% (3.0)	0.5% (0.2)
	Religion (<i>N</i> = 3,425)				
	Protestant	1,040 (27.4%)	45.3% (4.5)	53.7% (4.5)	1.0% (0.3)
	Catholic	955 (24.7%)	32.5% (3.0)	66.3% (3.0)	1.2% (0.4)
	Other ^e	1,078 (36.6%)	44.0% (2.9)	54.4% (2.9)	1.6% (0.5)
	No religion	352 (11.4%)	43.2% (5.0)	54.9% (4.9)	1.9% (0.9)

^a lin. SE = linearized standard error.

^b Non-problem gamblers scored 0–2 on the PGSI.

^c Problem gamblers scored ≥ 3 on the PGSI.

^d Other race includes Asians, Native Hawaiians, Pacific Islanders, Native Americans, multi-racial, and unspecified other.

^e Other religion includes persons of Jewish, Muslim, Eastern tradition, and unspecified other faiths.

respectively) and White (78.7% vs. 81.8%, respectively). Participants were also more likely to be married (59.4% vs. 53.7%, respectively), employed full- or part-time (53.2% vs. 51.5%, respectively), have a high school diploma or greater (96.3% for both groups), and practice some form of religion (89.7% vs. 88.6%, respectively). The largest difference between the unweighted and weighted data was in the age stratification; a majority of participants in the unweighted data were between the ages of 25 and 44 (56.8%), whereas a majority of persons in the weighted data were between the ages of 45 and 64 (36.2%).

Differences Between Gamblers and Non-gamblers

Socio-demographic characteristics differed between non-gamblers and gamblers. Past-year prevalence rates for gambling were higher among men than among women (65.5% vs. 52.2%, respectively), $F(1, 3499) = 13.0, p < .001$. When we examined the prevalence of gambling among the different racial groups, we found that the rates were highest among Whites (59.6%), but that these rates were not significantly different from those of Blacks (52.8%) or other races (58.0%). Likewise, there were no significant differences among gambling prevalence rates when we stratified the data by age group. Nonetheless, the highest prevalence rates were among 45- to 64-year-olds (63.0%) and the lowest were for persons 65 and older (47.7%). Married persons had the highest prevalence rates for gambling behaviour (61.6%), and widowed persons had the lowest (40.7%), but these differences were not statistically significant. Persons employed full-time had significantly higher prevalence rates of problem gambling (66.7%) compared with persons of another employment status (range 48.7%–57.9%), $F(4.42, 15437.76) = 2.8, p < .05$. Gambling prevalence was significantly higher among persons with a graduate or professional degree (67.8%) compared with persons of another educational status (range 46.8%–67.7%), $F(5.46, 19068.73) = 3.6, p < .01$. Prevalence rates for gamblers and non-gamblers did not significantly differ by religion, although there was still an interesting variation: Catholics had the highest prevalence rates for gambling (67.5%) and Protestants had the lowest (54.8%).

Differences Between Non-problem Gamblers and Problem Gamblers

Socio-demographic characteristics also differed between non-problem gamblers and problem gamblers. Among those who gambled, nearly 9.0% of Blacks were problem gamblers, compared to roughly 2.0% of persons identifying as White or Other race were problem gamblers, $F(1.64, 3630.96) = 16.3, p < .001$. In the marital status category, 25% of separated persons and almost 5.0% of never married persons were problem gamblers, $F(4.03, 8915.08) = 14.5, p < .001$. The prevalence of problem gambling also significantly differed by educational level: 19.3% of persons with less than a high school education were problem gamblers, which was on average 13.8 times higher than that of other educational groups (range 1.2%–4.9%), $F(5.42, 12002.04) = 9.1, p < .001$. Under the employment category, nearly 8% of unemployed persons and 4% of persons employed part-time were problem gamblers (range 1.0%–3.0%), $F(3.82, 8452.82) = 4.0, p < .005$. No significant differences were found between non-problem gamblers and problem gamblers by sex, age group, or religion.

Participation in Specific Gambling Activities

Participation in gambling activities differed between non-problem and problem gamblers for some gambling activities (Table 3). Problem gamblers were significantly more likely to participate in the lottery than were non-problem gamblers, $F(1, 2218) = 38.9, p < .001$. Just over 90% of problem gamblers bought lottery tickets, whereas only 63.2% of non-problem gamblers bought lottery tickets, $F(1, 2217) = 27.4, p < .001$. Problem gamblers were also significantly more likely than non-problem gamblers (72.7% vs. 44.3%, respectively) to buy instant win or scratch tickets, $F(1, 2218) = 9.1, p < .01$. Although there was no significant difference between non-problem and problem gamblers when all forms of casino gambling were grouped together, some individual casino activities were more likely to be played by problem gamblers. Problem gamblers were 2.7 times more likely to play card games at casinos than were non-problem gamblers, $F(1, 2218) = 12.9, p < .001$, and they were 3 times more likely to play roulette, $F(1, 2218) = 6.6, p < .05$. Problem gamblers were also more likely to play craps than were non-problem

Table 3

Participation in Gambling by Gambling Type, Ohio, 2012

Classification	Specific gambling type	Level of risk, weighted % (lin. SE) ^a	
		Non-problem gambler ^b <i>n</i> = 2,138	Problem gambler ^c <i>n</i> = 85
Lottery	Lottery tickets (e.g., Mega Millions, PowerBall, Classic Lotto)	63.2 (2.5)	90.8 (3.0)
	Instant win or scratch tickets (e.g., Pick 3, Pick 4, Rolling Cash 5)	44.3 (2.3)	72.7 (8.2)
Casino	Slot machines/ Video lottery terminals (VLTs)	78.7 (3.1)	72.0 (15.6)
	Card games (e.g., poker, blackjack, baccarat)	15.5 (1.6)	41.7 (9.4)
	Roulette	3.0 (0.5)	12.0 (6.3)
	Craps	4.1 (1.0)	16.8 (8.1)
Other	Raffle or fundraising tickets	44.9 (2.3)	47.5 (9.3)
	Horse races	5.0 (0.7)	1.4 (0.8)
	Bingo	6.6 (1.0)	14.3 (4.9)
	Keno	5.4 (1.0)	15.9 (6.5)
	VLTs (other than casinos)	4.5 (1.0)	16.9 (6.9)
	Sports pools or sports lotteries	15.1 (1.4)	15.8 (6.5)
	Cards or board games with family or friends	23.2 (2.0)	38.4 (9.2)
	Games of skill such as pool, bowling, or darts	7.6 (1.3)	16.4 (6.6)
	Arcade or video games	4.2 (1.1)	16.3 (7.7)
	Internet	2.0 (0.7)	8.4 (5.3)
	Sports with a bookie	1.1 (0.6)	7.3 (6.1)
	Stocks, options, or commodity markets	25.6 (2.3)	12.1 (4.5)
	Other	0.1 (0.1)	0.6 (0.6)

^alin. SE = linearized standard error. ^bNon-problem gamblers scored 0–2 on the Problem Gambling Severity Index (PGSI).

^cProblem gamblers scored ≥ 3 on the PGSI.

gamblers, $F(1, 2218) = 7.2, p < .005$. Problem gamblers were not more likely to participate in other forms of gambling when they were grouped together; however, there were significant differences when individual categories were examined. Nearly 15% of problem gamblers but only 6.6% of non-problem gamblers participated in bingo, $F(1, 2218) = 4.1, p < .05$. Almost 16% of problem gamblers played Keno versus 5.4% of non-problem gamblers, $F(1, 2218) = 5.9, p < .05$, and 16.9% of problem gamblers played non-casino VLTs versus 4.5% of non-problem gamblers, $F(1, 2218) = 8.3, p < .005$. Problem gamblers were also 3.9 times more likely than non-problem gamblers to bet on arcade or video games, $F(1, 2218) = 6.6, p < .05$. Gambling on the Internet was also more prevalent among problem gamblers than among non-problem gamblers, $F(1, 2218) = 4.4, p < .05$, as was gambling on sports with a bookie, $F(1, 2218) = 15.6, p < .05$. Non-problem gamblers were more likely than problem gamblers only to gamble at horse racing, $F(1, 2218) = 5.7, p < .01$, and to participate in the stock, options, or commodities markets, $F(1, 2218) = 4.6, p < .05$.

Associations Between Personal/Family History and Problem Gambling

Problem gamblers were more likely to have a family history of gambling problems. In fact, these gamblers were 3.7 times more likely than non-problem gamblers to report ever having a family member with a gambling problem, $F(1, 2173) = 13.5, p < .001$. More problem gamblers than non-problem gamblers also had a family member that had ever had an alcohol or drug problem, $F(1, 2200) = 14.4, p < .001$.

The impulse to engage in potentially harmful behaviours was also higher among problem gamblers than among non-problem gamblers. Nearly 30% of problem gamblers versus 2% of non-problem gamblers said they had the urge to gamble if something painful happened in their lives, $F(1, 2215) = 30.5, p < .001$. Problem gamblers were also over 4 times as likely as non-problem gamblers to have the urge to drink (6.5% vs. 1.4%, respectively), $F(1, 2207) = 20.5, p < .001$, and 6.4 times as likely to use drugs or medication (10.9% vs. 1.7%, respectively) if something painful happened in their lives, $F(1, 2213) = 27.5, p < .001$.

Use of alcohol and other drugs was higher among problem gamblers than among non-problem gamblers. Nearly 7% of problem gamblers said they had used alcohol or other drugs in the past 12 months while gambling, whereas only 1.3% of non-problem gamblers reported the same, $F(1, 2212) = 27.1, p < .001$. Of greatest concern, gambling while intoxicated or high was quite prevalent among this group; almost 12% of problem gamblers but only 1.5% of non-problem gamblers said they had gambled while drunk or high in the past 12 months, $F(1, 2214) = 33.6, p < .001$. Just over 10% of problem gamblers versus 1.8% of non-problem gamblers felt they may have ever had an alcohol or drug problem, $F(1, 2211) = 19.3, p < .001$.

Feelings of depression and related correlates were also significantly higher for problem gamblers than for non-problem gamblers. Nearly 4 times as many problem gamblers said they had been under a doctor's care because of physical or emotional problems brought on by stress within the past 12 months, $F(1, 2209) = 13.7,$

$p < .001$. Feelings of depression were also reportedly much more common in problem gamblers; over 8% of this group but 1.4% of non-problem gamblers said they felt seriously depressed, $F(1, 2211) = 27.7$, $p < .001$. Although more problem gamblers than non-problem gamblers said they had seriously contemplated or attempted suicide because of their gambling behaviours (9.1% vs. 2.4%, respectively), the differences were not statistically significant.

Odds of PGSI Score Based Upon Socio-demographic Characteristics and Gambling Correlates

Table 4 presents the odds of being a problem gambler. Problem gamblers were significantly more likely to be Black (odds ratios [ORs] = 1.25–8.56) and unemployed (ORs = 1.72–15.30) than were non-problem gamblers. The likelihood of being a problem gambler as opposed to being a non-problem gambler generally decreased as

Table 4
Odds of Being a Problem Gambler as Opposed to Being a Non-problem Gambler, Ohio, 2012

Variable	OR	95% CI	lin. SE ^a	<i>t</i>	<i>p</i> -Value
Race (White = Ref.)					
Black	3.26	[1.25, 3.15]	0.58	-0.05	0.959
Employment (Employed full-time = Ref.)					
Employed part-time	1.18	[0.37, 3.75]	0.70	0.28	0.776
Unemployed, but looking	5.13	[1.72, 15.3]	2.86	2.93	0.003**
Retired	1.72	[0.48, 6.15]	1.12	0.84	0.399
Homemaker	0.68	[0.17, 2.80]	0.49	-0.53	0.595
Other	1.89	[0.54, 6.60]	1.20	1.00	0.315
Education (Less than high school = Ref.)					
High school diploma or equivalent	0.14	[0.05, 0.40]	0.08	-3.60	0.000***
Some community college or technical school	0.26	[0.03, 1.98]	0.27	-1.30	0.193
Completed community college or technical school	0.25	[0.06, 1.08]	0.19	-1.86	0.064
Some university	0.58	[0.02, 0.19]	0.04	-4.65	0.000***
Bachelor's degree	0.14	[0.04, 0.55]	0.10	-2.81	0.005**
Graduate or professional degree	0.72	[0.12, 0.29]	0.05	-3.72	0.000***
Played lottery	6.63	[2.15, 20.43]	3.80	3.30	0.001**
Used alcohol or drugs while gambling (No = Ref.)					
Yes	3.80	[1.98, 7.30]	1.27	4.01	0.000***
Family member that has ever had a gambling problem (No = Ref.)					
Yes	2.63	[1.20, 5.74]	1.05	2.42	0.015*
Felt seriously depressed (No = Ref.)					
Yes	4.24	[2.04, 8.81]	1.58	3.88	0.000***
Constant	0.00	[0.00, 0.00]	0.00	-8.20	0.000***

Note. OR = odds ratio; CI = confidence interval; Ref. = reference category.

^alin. SE = linearized standard error; *odds ratio (OR) significantly ($p < .05$) greater among problem gamblers (≥ 3 on the Problem Gambling Severity Index [PGSI]) than among non-problem gamblers (0–2 on PGSI).

** $p < .01$.

*** $p < .001$.

education level increased. Persons with a high school degree or equivalent education or a greater level of educational attainment had significantly lower odds of being a problem gambler. Odds of being a problem gambler were significantly higher than of being a non-problem gambler for persons who used alcohol or drugs while gambling (ORs = 1.98 – 7.30), for persons with a family member that ever had a gambling problem (ORs = 1.20 – 5.74), and for persons who felt seriously depressed (ORs = 2.04 – 8.81).

Discussion

This survey represented the largest effort to date to understand the past-year prevalence of problem gambling in Ohio. An estimated 1.4% of Ohioans scored high enough on the PGSI to be classified as problem gamblers; however, regional estimates from four urban counties were somewhat higher (range 2.1%–5.0%). Ohio's statewide prevalence rate appeared to be significantly lower than the national average standardized rate of problem gambling (Williams et al., 2012). Prevalence rates in Ohio are likely lower than other national or state figures because of the limited availability of legalized gambling at the time of the study.

Since the opening of the casinos, some communities have incorporated an assessment for problem gambling into their community needs assessment through Alcohol and Drug Addiction and Mental Health Services Boards, which are local administrative organizations that guide funding and policy decisions at a county or multi-county level. A landline and cellphone study conducted in Montgomery County found that 3.8% of residents aged 18 and older were at low to moderate risk for developing problem gambling, while only 0.1% of residents scored high enough to be classified as problem gamblers (Stock, 2013). A needs assessment in Stark County also yielded interesting results, with 14.6% of respondents scoring at low risk and 4.1% at moderate risk for problem gambling and 1.5% of respondents scoring as problem gamblers (Alemagno, Oglesby, Shaffer-King, Budnik, & Greer, 2013). Unfortunately, it is unknown whether rates were this high before the opening of the casinos and racinos because no historical baseline data are available for these communities.

Results from this study largely supported the findings from other studies on gambling behaviour. Prevalence rates for problem gambling were highest among Blacks (Mancuso et al., 2005; Shinogle et al., 2011; Spitzer & Carpenter-Palumbo, 2007; Volberg et al., 2006). Separated and never married persons also had much higher rates of problem gambling than did other groups (Mateja et al., 1998; Moore, 2006; Volberg, 2001; Wallisch, 1993). Moreover, associations between employment and problem gambling were found between persons who were either unemployed (Volberg, 2001, 2003; Volberg et al., 2006) or employed only part-time (Mateja et al., 1998; Spitzer & Carpenter-Palumbo, 2007). Persons with less than a high school education also had higher prevalence rates of problem gambling (Emshoff et al., 2007; Volberg, 1997). This study did not confirm findings from other studies that have found an increased risk of problem gambling among various age groups

(Emshoff et al., 2007; Ferguson et al., 2002; Mancuso et al., 2005; Volberg, 1997, 2001), which may be due to the limited opportunities for gambling.

This study supported common findings about the correlates of problem gambling. Problem gamblers were much more likely to have a family history of gambling problems (Clarke, 2004; King, Abrams, & Wilkinson, 2010; Oei & Raylu, 2004; Toneatto & Brennan, 2002). These gamblers were also much more likely to abuse alcohol, drugs, or other medication if something painful happened in their lives. Problem gamblers were even more likely to have used alcohol or other drugs while gambling (El-Guebaly et al., 2006). Like other studies, the present study showed that problem gamblers were more likely than non-problem gamblers to have feelings of depression (Blanco, Myers, & Kendler, 2012; El-Guebaly et al., 2006; Hounslow, Smith, Battersby, & Morefield, 2011).

The exploratory logistic regression model investigating the odds of being classified as a problem gambler was largely supported by the literature. Blacks, persons with less than a high school education, and persons playing the lottery had an increased risk of being a problem gambler as opposed to being a non-problem gambler (Mancuso et al., 2005; Reilly & Guida, 1990; Shinogle et al., 2011; Spitzer & Carpenter-Palumbo, 2007; Volberg & Moore, 1999; Volberg et al., 2006). Problem gamblers were more likely to have been seriously depressed (Blanco et al., 2012; El-Guebaly et al., 2006; Hounslow et al., 2011) and to report a family history of problem gambling (King et al., 2010; Toneatto & Brennan, 2002). Unlike other studies, however, the present study showed that men were not more likely to be problem gamblers (Shinogle et al., 2011; Spitzer & Carpenter-Palumbo, 2007; Volberg, 2001; Volberg et al., 2006).

This study had several important limitations. Most notably, participants had to answer landline telephones, meaning that persons limited to cellphones or to using a cell phone for some calls, persons living in group quarters or regulated environments (e.g., residential treatment and jail facilities), and the homeless would not be represented. The exclusion of cellphones may have artificially lowered the prevalence of at-risk and problem gambling in Ohio. Another limitation was related to the age differences between the recruited sample and the weighted sample. Despite statistical correction for differences, the weighting technique might not have fully accounted for age-related differences in gambling participation and problem gambling prevalence rates (i.e., it may not have been able to entirely correct for differences between persons recruited into the sample and those who were not recruited). Persons with language barriers are another limitation of the study; foreign-language-speaking persons with little knowledge of English would be underrepresented because the survey was not translated into other languages. Roughly 4% of Ohioans are foreign-born and nearly 7% speak a language other than English in the home (U.S. Census Bureau, 2015). Therefore, some of these persons may have opted out of the study based upon a language barrier. Finally, there were too few problem gamblers to separate out each at-risk category along with problem gambling, and so some of the at-risk and problem categories had to be combined for the analyses.

Future gambling studies should work to remedy these limitations in order to present an even more accurate picture of problem gambling within Ohio.

This survey provides a nuanced look at Ohio's need to provide effective prevention of problem gambling, to build capacity so that gambling disorders can be recognized and treated, and to tell the state where it should be focusing future research efforts. Prevention activities should be directed toward groups that are at greatest risk for problem gambling, including African Americans, unemployed and retired persons, unmarried or widowed persons, persons with low educational attainment, and persons with substance use disorders. The higher rate of depression among at-risk and problem gamblers compared with other groups is concerning, and the rates indirectly support the link between suicidal ideation and gambling (Newman & Thompson, 2003; Petry & Kiluk 2002). Clinicians should screen all persons being treated for gambling disorder for depression and refer them to the appropriate treatment centres as needed. The Ohio Department of Mental Health and Addiction Services should also continue to work with other partners to ensure appropriate messaging and outreach activities for the prevention of suicide.

The department and its partners are currently preparing for the 2016 Ohio Gambling Survey, which will provide results in 2017. This replication survey will give Ohio the first set of data for comparison of gambling attitudes and prevalence between 2012 and 2016 after all gambling venues and racinos have been opened throughout the state. Although gambling is not new to Ohio, the new destination venues may have an impact on overall gambling prevalence rates, which will have important implications for prevention and treatment.

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Gambling Behaviour and Motivation in British Older Adult Populations: A Grounded Theoretical Framework

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Abstract

Gambling participation among older adults aged 65 and above has increased in Great Britain. However, there is limited research and therefore understanding about cognitive and behavioural patterns of gambling for this demographic. The objective of this study is to develop a substantive framework that represents the gambling behaviour of older adults in Great Britain, with specific reference to motivational factors affecting behaviour. A systematic grounded theory approach (Strauss & Corbin, 1998) was used to produce an inductive set of theoretical propositions. A stratified sample of 17 British older adults aged 65 years and older, who gambled frequently, was recruited. Theoretical sampling was used to fully develop emerging concepts. Axial and selective coding revealed that gambling was often used as a coping mechanism to alleviate distress from psychological and physical lifestyle changes associated with the aging process. In total, four grounded theoretical propositions emerged that accounted for gambling participation, including facilitation of gambling, psychological stress reduction, physical stress mediation, and satisfaction of stimulation needs. Patterns emerged from the data that suggested unique motivational factors regarding gambling behaviour of older adults in Great Britain in contrast to other adult populations. This is the first study to investigate gambling behaviour in British older adults. New directions for future research are discussed in relation to emergent findings.

Keywords: Older Adulthood, Gambling, Problem Gambling, Grounded Theory

Résumé

Une augmentation de la participation des personnes âgées de 65 ans et plus au jeu a été observée en Grande-Bretagne. Il existe toutefois peu d'études sur le sujet et, par conséquent, on connaît peu les caractéristiques cognitives et comportementales de ce groupe de la population en ce qui a trait au jeu. La présente étude vise à concevoir un important cadre de travail représentant le comportement de jeu des personnes âgées

en G.-B., faisant explicitement référence aux facteurs qui motivent le comportement. On a utilisé la méthode de la théorie ancrée (*systematic grounded theory*) (Strauss & Corbin, 1998) pour produire un ensemble inductif de propositions théoriques. Un échantillon stratifié de 17 Britanniques âgés de 65 ans et plus s'adonnant souvent au jeu a été formé. L'échantillonnage théorique a servi à élaborer de nouveaux concepts. Le codage axial et sélectif des données a révélé que le jeu était souvent employé comme mécanisme d'adaptation pour atténuer la détresse découlant des changements psychologiques et physiques du mode de vie associés au processus de vieillissement. Au total, quatre propositions de théorie ancrée ont émergé pour expliquer la participation au jeu : la facilitation du jeu, la réduction du stress psychologique, la médiation du stress physique et la satisfaction des besoins de stimulation. Les caractéristiques émergeant des données laissent entendre que par rapport à d'autres populations de personnes âgées, il y aurait des facteurs motivationnels uniques au comportement de jeu des personnes âgées en G.-B. Cette étude est la première à se pencher sur le comportement de jeu des personnes âgées britanniques et à discuter des nouvelles orientations à donner aux études futures compte tenu des conclusions qui y sont énoncées.

Introduction

Researchers have proposed that recent widespread deregulation and expansion of the gambling industry, and the subsequent increased gambling visibility in the community, places older adults at increased risk of developing a gambling disorder in comparison to other adult populations (Knutson & Loewenstein, 2005; Zaranek & Lichtenburg, 2008). In Great Britain (GB), gambling participation among older adults, defined in this study as being aged 65 and above, has been increasing recently. British past-year gambling by age estimates identified that gambling participation had increased from 52% in 1999 to 57% in 2007 and had increased to 63% in 2010 in the over-75 age category (Wardle et al., 2011). A similar increase in past-year participation for the 65–74 age category was also observed in the study. Furthermore, gambling for such age groups did not appear to be an occasional act, with the mean number of gambling days for the 65–74 age group being 89.1 and that for the 75 and over category being 81.0. Although problem gambling prevalence is significantly higher across younger adults, 0.4% of past-year British older adult gamblers aged 65 and above have met the criteria for problem gambling (Wardle et al., 2011). It is evident that gambling is a popular leisure activity for many older adults, and participation appears to be on the increase.

Because increased exposure to gambling venues promotes problem gambling (Welte, Wieczorek, Barnes, Tidwell, & Hoffman, 2004), it seems plausible that rates of older adult problem gambling are likely to rise. However, relatively little is understood about British older adult gambling because this is a demographic that is rarely

focused on in the existing research literature. The aim of this study was to develop a substantive framework to understand gambling behaviour and motivation in British older adults. It was relevant to determine whether British gambling motivations differed significantly from other Western populations. Francis, Dowling, Jackson, Christensen, and Wardle (2015) observed that gambling motives appear to differ according to socio-demographic factors, such as sex, age, employment status, and highest education qualification. These findings are consistent with research exploring socio-demographic differences and gambling motives (Dowling, 2013; McGrath, Stewart, Klein & Barrett, 2010).

Milosevic and Ledgerwood (2010) observed that gamblers with higher levels of social motives do not gamble to regulate their emotions; instead, they gamble for social affiliation. These investigators reviewed gambling subtypes from an array of theoretical perspectives (e.g., Moran, 1970) and it emerged that three subtypes were in line with the pathways model (Blaszczynski & Nower, 2002). Furthermore, they identified individuals by type (1) who were likely to report elevated levels of depression and anxiety, many of whom gambled as an avoidance or psychological escape; (2) who had high levels of impulsivity and low tolerance of boredom; and (3) who make significant cognitive errors in their thought processes when gambling.

The current literature has observed that gambling for psychological escape and to manage dysphoric mood is correlated with gambling problems across age categories (Blaszczynski & Nower, 2002; Nower, Derevensky, Blaszczynski, & Gupta, 2004). This finding suggests that older adults are vulnerable to behavioural reinforcement and cognitive distortions and are susceptible to problem gambling if primary motivations to gamble are related to alleviating loneliness and depression.

Across the literature, older adult motivations to gamble appear to be mostly focused on entertainment and leisure; in turn, older adults appear to be particularly vulnerable to gambling problems because of issues such as declining health (Fessler, 1996; Korn & Shaffer, 1999; McNeilly & Burke, 2000). Southwell, Boreham, and Laffan (2008) identified that older adult problem gamblers play electronic gaming machines for escape and to reduce feelings associated with physical pain. Engaging in certain types of gambling activities to escape pain highlights that older adults may be particularly vulnerable because people who predominantly gamble with slot machines develop a pathological profile faster than do gamblers who favour other gambling activities (Breen & Zimmerman, 2002). Therefore, researchers have highlighted that different types of motivations are likely to have an effect on the type of gambling activity that older adults participate in, proposing that different types of older adult gamblers have different experiences associated with their gambling activities (Milosevic & Ledgerwood, 2010).

Identifying cohort preferences for certain types of gambling activity and motivation will help identify the preferences that are more likely associated with gambling problems (Dowling, 2013; Francis et al., 2015). Dixon et al. (2014) observed that certain types of games are more likely to increase problem and pathological

gambling among different types of players. Furthermore, it is appropriate to examine the rise in gambling as a social activity among active older adults. McNeilly and Burke (2002) found that older adults aged 65 and above oriented toward different types of casino gambling as a mainstream social activity.

Using an atheoretical approach and having no set hypotheses is relevant to gaining a British perspective of older adult gambling behaviour because cultural and group differences affect the types of motivation to gamble (C.-K. Lee, Lee, Bernhard, & Yoon, 2006; Neighbors, Lostutter, Crouce, & Larimer, 2002). Medeiros et al. (2015) questioned how and to what extent culture affects individual gambling behaviour and identified that the prevalence and acceptance of gambling across different cultures varies. Therefore, as more information is gained on the gambling behaviour of British older adults, it will be possible to tailor treatment to their specific needs and to inform clinical sectors, resulting in more efficacious treatment approaches.

However, currently there is limited literature available to explore motivation and older adult gambling behaviour in a British context, as this is a demographic that is under-researched in comparison to that of younger gamblers (Subramaniam et al., 2015; Tse, Hong, Wang, & Cunningham-Williams, 2012). Tse et al. (2012) observed from their systematic review that of 75 older adult gambling studies, none had U.K. origins. As a consequence of this paucity of U.K.-based research, it is not yet possible to identify cognitive and behavioural gambling patterns of British older adults with any confidence. The vast majority of research available is representative of North American populations (Tse et al., 2012) and it would not be prudent to assume that the findings can be generalized to British populations, given the cultural variation between locations. As a result, there is a lack of understanding of the key variables and relationships to observe and measure with reference to researching and understanding older adult gambling within GB. Increased accessibility to and availability of different types of gambling opportunities in GB through the passing of The Gambling Act 2005 suggests there is a need to understand the different motivational dimensions of British older adult gambling behaviour.

Binde (2009) argued that understanding motivations for gambling is critical to research that aims to uncover determinants of gambling behaviour. Fundamentally, exploring British older adult motivations to gamble from the existing international theoretical literature is problematic. Although similarities may be shown between types of gambling behaviours, it is relevant to explore whether British older adults show different motivations not currently identified in the international literature on the basis of cultural differences. Chen, Shoemaker, and Zemke (2013) observed that motivations are not generalizable across different types of games and so acquiring knowledge surrounding all aspects of British older adult gambling behaviour is important, especially preferences for type of gambling activity. Acquiring knowledge that effectively increases motivation to gamble will therefore help provide direction for strategies to minimize harm in British older adult gambling populations. Because, to date, unique problem gambling vulnerabilities in older adult populations may not have been identified (Nower & Blaszczynski, 2008), a first step is to identify

behavioural differences, which is challenging given that older adult gambling research is relatively scarce (Lister & Nower, 2013), specifically within a British context.

The United Kingdom has a long modern history of gambling and it is legalized throughout the country (Abarbanel, 2014). Although much older adult gambling behaviour has been collected from Western populations (McNeilly & Burke, 2002; Milosevic & Ledgerwood, 2010), findings may differ because of cultural and regulatory contexts (Abarbanel, 2014). Therefore, older adult gambling is cited from countries that have differences in cultural and social backgrounds, including distinct legal statuses of gambling. These contributing factors highlight variations in gambling behaviour that potentially affects gambling attitudes and produces cultural-specific behaviour (Orford, Griffiths, Wardle, Sproston, & Erens, 2009).

Studies have shown that gambling motivations are specific to age and are based upon life experiences, values, and attitudes shared across generations (Alberghetti & Collins, 2015). With different types of gambling opportunities in Britain, it is relevant to analyze the different motivational dimensions of gambling behaviour in this demographic. For example, older adults are likely to report a preference for non-strategic forms of gambling such as lotteries and electronic gaming machines (Grant, Kim, Odlaug, Buchanan, & Potenza, 2009; Nower & Blaszczynski, 2008; Preston, Shapiro, & Keene, 2007; Wiebe & Cox, 2005).

Different age groups of gamblers display different motivations to gamble; for example, younger gamblers differed from older gamblers in reporting that “winning money” was the primary motivation for continued play (Desai, Maciejewski, Dausey, Caldarone, & Potenza, 2004; Grant, Kim, & Brown, 2001). Alternatively, older adults appeared to gamble primarily to combat social isolation and escape boredom (Clarke & Clarkson, 2008), combat loneliness, forget about problems and bereavement (Martin, Lichtenberg, & Templin, 2011), relieve tension (Clarke, 2008), and cope with depression (McNeilly & Burke, 2002). Furthermore, coping and enhancement motives to gamble are associated with psychological drives such as increasing low mood, as well as with an increased number of gambling activities and the severity of problem gambling (H. Lee, Chae, Lee, & Kim, 2007; McGrath et al., 2010; Stewart & Zack, 2008; Stewart, Zack, Collins, & Klein, 2008). Some older adult gamblers will become dependent or experience negative consequences, developing a problematic orientation toward gambling, whereas others will not.

Older Adult Gambling and Problem Gambling Behaviour

Some researchers have proposed that current national studies demonstrate sampling bias toward younger aged gamblers within non-representative populations and that there are insufficient samples to examine problem gambling in older adults (Subramaniam et al., 2015). Thus, evaluating current international and British prevalence rates of older adult problem gambling behaviour may not be an accurate representation and should be viewed with caution. According to the 2010 British

Gambling Prevalence Survey, no occurrences of problem gambling were detected for those over the age of 75 years in the general population (Wardle et al., 2011). No U.K. surveys have been done that allow the direct examination of trends in U.K. older adult gambling and problem gambling behaviour.

The main objectives of the present study were to identify and understand antecedents and consequences of gambling in terms of motivation and reward for participation. It is widely accepted that older adults are highly under-represented in the gambling literature, and this is particularly the case for disordered gambling behaviour (Pilver, Libby, Hoff, & Potenza, 2013; Southwell et al., 2008; Tirachaimongkol, Jackson, & Tomnay, 2010). Older adults are often integrated within the generic adult category in prevalence studies (Productivity Commission, 1999), which is problematic because it is evident that there can be unique problem gambling vulnerabilities in older adult populations (Grant et al., 2009; Nower & Blaszczynski, 2008; Piertzak, Morasco, Blanco, Grant, & Petry, 2007; Pilver et al., 2013).

Research focusing on older adult-specific vulnerabilities is likely to be integral to improving clinical outcomes in older adult problem gamblers (Medeiros et al., 2015). Gambling and problem gambling have different representations across different cultures because of cultural variation in factors such as social tolerance and regulatory structures (Medeiros et al., 2015; Raylu & Oei, 2004). Although several research studies have been performed on older adult gambling and problem gambling, there is a distinct paucity of British research on older adult gambling.

Given that Petry (2002) identified age as an important demographic factor in defining gambling behaviour, the need to conduct studies on older adult gambling behaviour in GB is highly relevant. By conducting research within specified age categories, such as older adults, it may be possible to make progressive steps toward understanding specific risk factors and vulnerabilities for gambling, and perhaps even problem gambling, for each demographic. For example, a critical element is the development of problem gambling measurement tools that are sufficiently sensitive to identify problem gambling patterns specific to the older adult demographic.

Wiebe and Cox (2005) argued that current gambling assessment tools have questionable validity for use with older adults. Clearly, the first step in the process of developing subpopulation-specific measurement scales for problem gambling is to develop a detailed understanding of the relevant gambling behavioural and cognitive patterns. Despite a handful of existing studies indicating variance in motivation for gambling across specific age categories, the variables included within such studies may not be suitably comprehensive to cover all relevant motivational and reward factors for older adult gambling in GB. In response to this knowledge gap, further inductive research is required as an initial step in identifying relevant variables, and potential risk factors, for older adult gambling within GB; otherwise, there is a risk of missing integral factors. The present study therefore aims to provide a substantive theoretical framework of older adult gambling behavioural and cognitive patterns,

through systematic grounded theory (Strauss & Corbin, 1998), to provide direction and impetus for future large-scale quantitative designs.

Methods

Design

Consistent with the systematic grounded theory (Strauss & Corbin, 1998) method, an “all is data” approach was used. Data collection consisted primarily of in-depth interviews of older adults who gambled regularly. Data collection and analysis began without a predetermined sample quantity; rather, the objective was to continue to collect and analyze data until theoretical saturation was observed after intermittent periods of theoretical sampling. After open, axial, and selective coding were completed, emergent theoretical propositions were drawn and are presented herein.

Procedure

Recruitment strategies. A directory of potential U.K. older adult community groups was identified, and recruitment involved accessing different types of social environments and recreational groups targeted toward these communities. Contact was made with community gatekeepers, who in turn introduced the research study aims to the community members. Study details were disseminated to the groups via PowerPoint presentations and by approaching small groups within the venue. When interest was shown in participating in the study, participants were fully briefed about what their responsibility in the study would be and their ethical rights as participants. It was clearly explained that participants would be asked to talk about their gambling behaviour and experience of gambling. Barriers to recruitment of older adults as participants can often be related to significant health disorders and problems associated with trust and understanding (Harris & Dyson, 2001; Uman & Urman, 1990). In response to this, the research team was actively attuned to the physical, mental, and psychosocial characteristics of potential participants, with specific consideration given to the individual’s capacity to provide fully informed consent. Initially, a diverse sample of 14 older adult female gamblers agreed to participate in the study.

The sample was geographically varied, covering rural and urban locations, coastal regions, and other tourist areas where gambling availability may be higher in comparison to rural villages and towns. A flexible approach was used to cover a broad spectrum of older adults in GB, including a range of cultures and socio-economic communities within a variety of commercial and social gambling environments.

Theoretical sampling. Theoretical sampling, directed by evolving theory rather than by predetermined population dimensions, is a pivotal strategy in grounded theory methodology (Charmaz, 2000). Put simply, sampling continued throughout the analytical process as the researcher attempted to substantiate emerging concepts

by seeking further related data from new participants that were most likely to provide insight into concepts earmarked for further exploration. In the current study, we identified that male gambling experiences were required to provide further information on categories that appeared central to the emerging theory. As a result, three male participants were recruited after the initial phase of data analysis was completed. The mean age of participants was 76.82 years ($SD = 6.32$); please see Table 1 for further details.

Data Collection and Analysis

In line with criteria included in “Consolidated Criteria for Reporting Qualitative Research,” a 32-item checklist (Tong, Sainsbury, & Craig, 2007) that requires the personal characteristics of the researcher to be revealed, a female PhD student who had previous qualitative experience in older adult research conducted the interviews and is the lead author. The researcher had no previously established relationship with participants other than introductions at the recruitment site. Therefore, no personal relationships were formed and there was no participant knowledge of the interviewer.

All participants were interviewed within their own home in order to minimize inconvenience; this was particularly important because some participants experienced mobility limitations. Data were collected through in-depth, open-ended, semi-structured interviews, the objective being to record and understand the gambling motivations and behavioural processes of the participants. Field notes were made during and after the interview in the format of paper copies and notes.

Table 1
Descriptive Information of Participants

Participant	Age	Gambling activities
Kenneth	77	Lottery and bingo
Betty	76	Bingo and lottery
Gwen	82	Bingo and slots
Donald	79	Sports betting
Janice	70	Bingo and lottery
Albert	82	Bingo and lottery
Barbara	84	Bingo, slots, and lottery
Doreen	74	Bingo, lottery, slots, and scratch cards
Joyce	70	Bingo and lottery
Kathy	73	Bingo and lottery
Elizabeth	76	Bingo, slots, and lottery
Christine	69	Bingo and lottery
Monica	74	Bingo
Debra	78	Bingo
Harriet	71	Bingo, slots, and lottery
Brenda	82	Bingo
Eileen	75	Bingo and lottery

Initial interviews had an approximate duration of between 90 and 120 min and were audio recorded and transcribed verbatim. The interview schedule consisted of prompts to encourage participants to talk about their gambling experiences and opportunities to gamble, for instance, “I am interested in your local surroundings. Can you tell me a little about any gambling opportunities you have nearby?” Questions also focused on the participants’ physical and psychological health, including mood and physical mobility, for instance, “Please could you tell me a little about your mobility?” and “How would you describe your well-being, in terms of mood?”

Where necessary, follow-up interviews were engaged in to enable further expansion and comprehension of emergent categories; however, not all transcripts were returned to participants for comment and corrections because some of them may have found this process complex from a cognitive perspective. No software was used in the analysis; therefore, data were organized in a pen-and-paper format.

Analysis included open coding, axial coding, and selective coding. Through constant comparison of the data, categories and themes emerged, and ultimately relationships between emergent categories were investigated. Analysis commenced with open coding, which generated codes to catalogue behaviours observed within the data. After open coding, axial coding commenced, which involved revisiting codes and data in order to develop additional categories through the process of constant comparison.

Constant comparison consists of identifying principles and structural features of the behavioural and cognitive processes related to the phenomenon under investigation (Glaser & Strauss, 1967). This stage allowed for relationships between categories to be discovered and explored, therefore enabling a more cohesive and comprehensible understanding of the emergent patterns.

Finally, as theoretical saturation was achieved, the most clearly defined theoretical propositions were identified as the foundations of the grounded theoretical framework to provide a substantive skeletal understanding of older adult gambling behaviour and motivation in GB. For a full review of the method, see Strauss and Corbin (1998). In order to assess the credibility of analysis, multiple credibility checks were performed during the analytical process (Morrow, 2005).

Before the study commenced, as a mechanism for effective reflexivity, both authors identified their pre-existing biases and expectations and remained conscious of such biases during the analytical stage (Ellis & Chen, 2013). In terms of personal reflexivity, the first author has recent research experience in gerontological clinical health and through this research has observed patterns of gambling, frequent or otherwise, and poor physical and psychological health. The second author, an experienced problem gambling researcher, acknowledged being familiar with existing research into problem gambling and older populations. Both researchers were vigilant during data collection to ensure that the participants endorsed the analyst’s

summary of the data at the end of interview as a true representation of the data that they provided. Finally, the field notes, memo cards, and final theoretical propositions of the first author were evaluated by the second author to observe whether they were representative of the data transcripts.

Theoretical Findings

Grounded Theoretical Framework of Older Adult Gambling in GB

The core concept of the emergent theory presented in Table 2 proposes that British older adults participate in gambling as a mechanism to alleviate distress experienced from eight psychological and physical lifestyle changes associated with the aging process. Table 2 identifies the gambling motivations of this population to include satisfaction of the needs to be cognitively and emotionally stimulated, as well as the need to escape, albeit temporarily, age-related psychological and physical stress and discomfort. Furthermore, participants repeatedly observed that gambling environments were highly accessible and welcoming social areas that provided feelings of well-being through familiarity and the perceived safety that they experienced. Essentially, gambling for this population was presented as a coping mechanism for social events and processes commonly associated with older adulthood, including bereavement, loneliness, retirement, and physical deterioration. Positive social, cognitive, and emotional rewards, such as heightened arousal, socialization, and mental stimulation, for example, were also integral to gambling motivation. After theoretical saturation was achieved, four theoretical propositions emerged from this explorative first study that accounts for gambling motivation for older adults in Britain. The emergent theoretical propositions present a framework of behavioural processes, some original and unanticipated, to investigate in future large-scale quantitative research studies.

Table 2

Emergent Categories From Selective Coding: Core Motivation and Experience of Gambling for Older Adults in Britain

Category	Motivation and experience
Facilitation of gambling	High prevalence of opportunities Highly accessible for elderly
Psychological stress reduction	Reduces social isolation Reduces negative affect associated with retirement and bereavement
Physical stress mediation	Temporary escape from age-related physical pain or debilitation Establishing autonomy
Satisfaction of stimulation needs	Opportunity to escape perceived monotony of older adulthood Source of cognitive and emotional stimulation

Theoretical Proposition 1. Gambling has limited deterrents to participation because of high accessibility and availability in comparison to alternative leisure activities.

Ease of access and availability appeared to be a central reason for British older adults to prefer to gamble in comparison to other potential leisure and social activities. Older adults professed to gamble affordably and with relative ease through a range of accessible mediums, including television, Internet, local shops, newspapers, community and church halls, public houses, and commercial gambling venues, including betting shops, adult gaming centres, and bingo halls, all within close proximity to their home. Older adults with compromised mobility had plentiful opportunity to gamble within close proximity of their homes, and when this was not the case, participants were able to obtain transportation to these locations from peers or family with relative ease. Ultimately, because gambling was highly prevalent within their immediate environment and local community, participants were reliably able to access gambling with minimal difficulty. In contrast, when asked about other social activities that they enjoyed, perhaps even more so than gambling, participants often stated that such activities, for example, coarse fishing or ballroom dancing, were not a realistic option because of their physical limitations or lack of opportunities in their local environment. This concept is illuminated succinctly in Extract 1:

“It’s everywhere you look and everywhere you listen. It’s fully available to everybody.” (Kenneth, 77)

Conversely, gambling was presented as an activity in which physical immobility and degeneration did not impact on one’s capacity to engage in it or enjoy it, as demonstrated in Extract 2:

“I mean we are really alert, [husband]. There is a lot of people that just have to sit around [limited mobility], like my friend, can’t read, she’s going blind, she can’t listen to tapes anymore she is going deaf, I will introduce you to her today the lady I sit beside. I play her bingo for her and I keep knocking her and saying you want two, you want one, you want seven.” (Elizabeth, 76)

Gambling was perceived as a mechanism to help oneself and one’s peers to combat physical degeneration, and playing bingo was perceived as a type of gambling activity to help participants have some quality of life in the face of age-related physical frailty (Rockwood et al., 2005). This perception was prominent in bingo, suggesting that certain types of gambling activities facilitate older adults in different ways. In this example, bingo offered physical stress mediation, whereas games such as playing the lottery and scratch cards were not cited in relation to offering the same rewards.

Ostir, Ottenbacher, and Markides (2004) reported that high positive affect significantly lowered the risk of physical frailty. In line with these findings, patterns emerged from the data suggesting positive health correlates of recreational gambling among older

adults. Positive affect associated with gambling, including social interaction, may be protective against functional and physical decline associated with the aging process. Petry (2002) highlighted that, in contrast, problem gambling among older adults may be a cause for concern, given the putative association between gambling, medical problems, and psychiatric problems.

Theoretical Proposition 2. Gambling provides temporary escape from psychological distress associated with the aging process with specific reference to loneliness, bereavement, and retirement.

All participants made reference to gambling as a temporary escape from psychological stress through a process of mood modification. Participants outlined that engaging in gambling, and being in the gambling venue, alleviated tension and negative affect by creating pleasure and social stimulation. The objective of winning money was relegated in importance in terms of the hierarchy of needs satisfied by gambling. The overwhelming motivation observed for gambling related to the pleasurable mood states derived from an opportunity to meet and interact with peers inside the gambling venue. It was observed that when among friends and interacting with them within the gambling environment, the participants were distracted from stress that they professed they were experiencing. Extract 3 provides a detailed illustration of the process:

“It’s an escapism really. If you are a lonely person, it is an escapism. You go down the bookies [betting shop] have a chat, have a look at the horses and sit there and study them. Sit there and 10 watch them if you want because they have all the races on their little screens. It is escapism if you are old but I don’t think it would make you a gambler, a heavy gambler.” (Donald, age 79)

Achieving mood modification through social interaction was a powerful positive reinforcement to continue to gamble for many participants. Many of them reported experiencing loneliness and tension in relation to various social processes related to older adulthood, such as forced retirement and interacting with family less frequently than desired. Fundamentally, it appears that a result of various social processes related to aging is that one’s social network, and therefore one’s social support, deteriorates. For the participants, gambling acts not only as a distraction from perceived stress, but also a channel for much valued and needed social interaction. This absence of alternative social and leisure activities for older adults is concisely summarized in Extract 4:

“Going out to bingo was the thing that saved my life, I will tell you, because I have got nothing else. I didn’t go anywhere else.” (Barbara, age 84)

Theoretical Proposition 3. Gambling can provide distraction from physical pain and negative affect associated with age-related physical deterioration.

Physical pain and debilitation associated with age-related degeneration, including visual impairment, ability to care for oneself independently, effects of surgical

procedures, and symptoms associated with physical frailty (e.g., feeling slowed down and pain-related disease) emerged during axial and selective coding. Gambling appeared to serve two roles in this respect: enabling reinforcement of autonomy and self-determination, as well as providing respite from physical discomfort. For many participants, gambling, as a leisure activity, provided a personal goal for individuals to attempt to accomplish in the face of debilitation and restricted mobility.

Being able to attend a gambling venue provided an opportunity for older adults to demonstrate their autonomy and independence, and this, in turn, stimulated positive self-evaluations and enhanced self-esteem, as demonstrated in Extract 5:

“[bingo] It makes you feel you know sort of wanted if you know what I mean. I mean if you’re in the house.” (Harriet 71)

In addition, because the structural characteristics of gambling activities often stimulate the experience of dissociative states by narrowing attention and reducing self-awareness (Diskin & Hodges, 1999; Powell, Hardoon, Derevensky, & Gupta, 1999), gambling appeared to provide analgesic relief to older adults who are experiencing pain and discomfort caused by common age-related physical disorders such as arthritis. Put simply, when older adults are being entertained and stimulated by gambling, and by the associated social interaction, they are distracted from chronic conditions that produce pain and negative affect in response to the pain. Doreen describes these processes effectively in Extract 6:

“I walk with a stick now my legs don’t want to know. And as I say I get up there and get back [from bingo venue]. I am determined to keep trying to walk even though it does hurt. I could spend ages on that machine [gambling machine]. I quite enjoy it; you know? Sort of just everything around me doesn’t exist, you know?” (Doreen, age 74)

Theoretical Proposition 4. Gambling can satisfy unmet psychological needs for pleasurable arousal and cognitive stimulation.

It was clear from the data that the participants in this study experienced little stimulation within their lifestyles. Participants frequently stated that their lifestyles were monotonous and devoid of regular cognitive stimulation and hedonistic pleasure. Older adults identified that since retirement, and the subsequent drifting away of their immediate family, there was a vacuum of pleasure, excitement, and stimulation in their lives. Participants perceived that they had little opportunity to engage in numerous and perhaps more challenging leisure activities because of either geographical or physical constraints.

Older adults in the present study identified that regularly participating in gambling was effectively satisfying their psychological needs for excitement, as well as to be challenged and stimulated cognitively, without being restricted by their physical and mobility debilitations. It was evident that participants were open to alternative forms

of leisure rather than gambling, but the majority felt that there were no leisure activities that were locally accessible that could match the excitement and stimulation they received when gambling.

Elizabeth describes this process in Extract 6:

“I do get the adrenalin lifted when I am waiting for a number. It is exciting. It’s a lot of fun and it’s lovely to see old people winning. I say old people being so young myself, but you see no one from one Friday to the next Friday, so this gambling is, is laughter and fun and friendships it’s, it’s wonderful for us all.” (Elizabeth, age 76)

Discussion

The aim of this study was to produce a substantive representation of behavioural and cognitive patterns of older adult gambling in GB in order to provide a foundational platform to inform future empirical research about the key variables to observe for this specific subpopulation. It was necessary to conduct an inductive investigation of older adult gambling patterns and motivations, devoid of any predetermined assumptions, because there is an absence of understanding of British older adult gambling and of age-specific vulnerabilities that may be fundamental to developing effective problem gambling treatments for this group (Medeiros et al., 2015). It is evident from the grounded theory that British older adults may perceive gambling participation as a mechanism to satisfy several psychological needs that are otherwise going unfulfilled as they develop into older adulthood. For the participants, as a result of getting older, much of their social structures were transformed significantly in response to retiring from employment, changes in income, and limitations in physical mobility. For the most part, such changes were perceived negatively by the participants and proposed as the source of life dissatisfaction. For all of the participants, gambling provided a valuable opportunity to satisfy social needs alongside psychological needs, such as the need to demonstrate autonomy in the face of increased restrictions, at least perceptually, on one’s lifestyle in older adulthood. It clearly emerged from the data that gambling to win money was not a strong motivating factor for this population. Gambling was reported to largely be an available and efficient mechanism to satisfy currently unmet needs and to fill the social vacuum that many participants experienced as a result of retirement or increasing physical limitations.

Current findings appear to be similar to prior theory. The emergent categories of physical and psychological stress reduction are similar to coping motives through negative reinforcement referred to as the behaviourally conditioned gambler, a subgroup vulnerable to making significant cognitive errors in judgment (Blaszczynski & Nower 2002; Milosevic & Ledgerwood, 2010).

Furthermore, in line with the findings of Milosevic and Ledgerwood (2010), who inventoried gambling subtypes over the past 30 years, in the present results three subtypes emerged that are consistent with the pathways model (Blaszczynski &

Nower, 2002). Emergent findings from this study are characterized by depression and anxiety; therefore, gambling for older adults as an escape and avoidance response corresponds to the emotionally vulnerable gambler described by Blaszczynski and Nower (2002). The second subtype of disordered gambler identified by Milosevic and Ledgerwood (2010) is characterized by high levels of impulsivity and gambling to stimulate the central nervous system, described as “sensation seeking behaviours.” Theoretical Proposition 4, satisfaction of stimulation needs, identified that gambling can satisfy unmet psychological needs for pleasurable arousal and cognitive stimulation.

However, this study uncovered unique findings that are not consistent with the existing literature on gambling subtypes (Milosevic & Ledgerwood, 2010). We observed that two components—temporary escape from physical pain and/or debilitation and ease of accessibility to gambling venues for persons with physical infirmities—are distinct and highlight core features in older adult gambling motivation. Specifically, unique problem gambling vulnerabilities in older adult populations may not be currently identified (Nower & Blaszczynski, 2008).

We propose that subtyping may not represent distinct profiles of older adult gamblers; however, defining the features of a subtype may inform about specific motivations to gamble. Fundamentally, subtyping may help identify other factors associated with older adult disordered gambling, such as types of associated psychopathology and physical and psychological limitations. Furthermore, a recent review of research into motivational functions of gambling has identified gambling to escape negative contingencies, rather than for positive benefits such as monetary gain, as a primary risk factor for problem gambling (Cookman & Weatherly, 2015).

A strong category to emerge from the analysis was that gambling environments were one of the few social environments available to older adults within their local area. This is of crucial importance to this specific population, as they reported having difficulty using public transport and limited access to private transport. Furthermore, participants argued that gambling environments provided a safe social space to interact with their peers that was affordable on a limited fixed income. It appeared from the data that gambling itself was largely secondary to social interaction, and it could be interpreted that the participants would have been equally satisfied to participate in alternative social activities, if they were affordable and as available in their local environment. Given that the participants in the current study did not disclose any information regarding gambling-related harm, it is tempting to conclude that gambling acts a relatively harmless source of leisure and needs satisfaction for British older adults. However, it is possible that repeatedly participating in gambling behaviour as a coping mechanism for age-related negative experiences may result in an increased risk for older adults in GB to develop a gambling disorder.

The limitations of the current study are similar to those of all grounded theory research in which emphasis is placed on identifying participants to best illuminate the phenomenon under observation (Glaser & Strauss, 1967). The sample used cannot be

considered as representative of the target population, and therefore caution must be used when applying the findings at this stage. The sample was self-selected, meaning that the older adults who participated were motivated to participate, and therefore it is probable that the sample is not representative of older adults who did not want to openly discuss their gambling behaviour and attitudes. It is therefore essential to conduct a further study with a large, representative sample to determine the extent to which the processes observed in the current study reflect that of the wider population.

Implications

The value of the current study is the direction provided for a future research program that will empirically investigate older adult gambling behaviour in GB. Clearly, the current study is highly explorative; however, it was a necessary first step to an understanding of the gambling behaviour and age-specific vulnerabilities and risk factors in the development of disordered gambling for this population. Rather than assuming older adult gambling motivations and patterns reflect those of general adult populations, this study has provided a framework, grounded in data, that identifies the processes to empirically investigate.

Recommendation 1. As the propositions presented with this grounded theory are explorative and, scientifically speaking, hypothetical at this stage, we recommend that future studies explore whether the behavioural processes and motivations observed within the current study are representative of the wider population of British older adult gamblers. A survey of a large representative sample of British older adults is required to measure the relationship between gambling behaviour, gambling motivation, gambling availability, age-related mobility restrictions, and psychological needs satisfaction through gambling (social and cognitive needs).

Recommendation 2. Given that escape motivation is a prominent risk factor for the development and maintenance of problem gambling (Cookman & Weatherly, 2015), it would be pertinent to empirically investigate the predictive relationship between gambling motivations of escape and needs satisfaction and problem gambling in a representative sample of older adult gamblers in GB.

Fundamentally, by engaging in theoretically driven empirical research into older adult gambling and problem gambling in GB, researchers can begin to develop an understanding of the specific vulnerabilities of this population. This, in turn, will inform future research into specific prevention, screening, and intervention strategies for older adults.

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Perceptions of Gambling in Tamil and Chinese Communities in Australia: The Role of Saving Face in Perpetuating Gambling Stigma and Hindering Help

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Abstract

Despite Australia being a multicultural country, there is limited evidence regarding ethnic perspectives about gambling, problem gambling, and associated help seeking. The aim of this paper is to examine the role and nature of stigma in relation to gambling, in particular its association with the concept of saving face. Interview data were thematically analysed from a study investigating the attitudes and experiences of gambling among ethnic minority communities (Tamil and Chinese) in Melbourne, Victoria. By using two well-established frameworks for understanding stigma, we examine the extent to which gambling is stigmatized within these two communities. The desire to save face (a form of stigma management) significantly influences what is said about gambling and the reluctance of individuals to seek help should it become problematic. Thresholds for stigmatized behaviour appear to differ between the communities studied, as well as from what is known about the Anglo-Celtic majority. Understanding this heterogeneity may be important for informing more effective, tailored interventions.

Keywords: stigma, saving face, culture, ethnicity, qualitative, migration

Résumé

Bien que l'Australie soit un pays multiculturel, il existe peu de données probantes sur les perspectives ethniques du jeu, le jeu problématique et la demande d'aide connexe. L'objectif du présent article est d'examiner le rôle et la nature du stigmate associé au jeu, en particulier son lien avec le concept de sauver la face. Les données d'entrevues réalisées dans le cadre d'une étude sur les attitudes et les expériences de jeu de membres de communautés ethniques minoritaires (tamiles et chinoises) à Melbourne, en Australie, ont été analysées par thème. À l'aide de deux cadres de travail reconnus

pour la compréhension du stigmat, nous avons examiné la mesure dans laquelle le jeu est stigmatisé dans ces deux communautés. Le désir de sauver la face (qui est une forme de gestion du stigmat) a une grande incidence sur ce qui est dit sur le jeu et sur la réticence à demander de l'aide lorsque le jeu devient problématique. Le seuil de stigmatisation du comportement semble être différent dans les deux communautés étudiées, ainsi que de ce que l'on sait du stigmat dans la communauté majoritaire anglo-celte. Comprendre cette hétérogénéité pourrait aider à élaborer des interventions personnalisées plus efficaces.

Introduction

Gambling and Problem Gambling in the Community

Gambling is a common pastime enjoyed in Australia, involving the placing of a wager or bet in the form of money or something of value on the outcome of an uncertain event. The outcome may be based on elements of skill or chance, or a mixture of the two. Approximately 70% of Australians engage in some kind of gambling activity at least once a year (Productivity Commission, 2010). Problem gambling is defined as gambling that is characterized by difficulties in limiting money and/or time spent on gambling, which leads to adverse consequences for the gambler, for others, or for the community (Problem Gambling Research and Treatment Centre, 2011). Although rates of problem gambling vary across geographical locations, in Australia the prevalence is approximately 1.4% to 2.1% of the overall population (Productivity Commission, 2010). Internationally, problem gambling prevalence ranges from approximately 0.15% to 0.2% in Norway (Gotestam & Johansson, 2003; Lund & Nordlund, 2003) to 0.9% in Britain (Wardle et al., 2011) to 5.3% in Hong Kong (Hong Kong Polytechnic University, 2005).

Although many countries have invested in quantitative studies that examine the prevalence of gambling and problem gambling, there is little focus on ethnic minority communities in these studies. A number of smaller studies, however, have attempted to examine the prevalence within specific ethnic minority communities. These studies indicate that overall, the prevalence of gambling is lower; however, it fluctuates depending on the specific community and the type of gambling (Tse, Wong, & Kim, 2004; Tse, Yu, Rossen, & Wang, 2010; Victorian Casino and Gaming Authority, 2000).

The Chinese-speaking community in particular has been the focus of some studies within countries such as Australia and New Zealand (Blaszczynski, Huynh, Dumlao, & Farrell, 1998; Oei & Raylu, 2007; Tse et al., 2004; Victorian Casino and Gaming Authority, 2000). These studies have indicated that Chinese-speaking individuals exhibit an elevated prevalence of problem gambling, ranging from 2.1% (Raylu & Oei, 2004) to 10.7% (Victorian Casino and Gaming Authority, 2000).

Furthermore, Blaszczynski and colleagues (1998) found that approximately 20% of their participants indicated that they had a family member who, they believed, had a problem with gambling, suggesting that these estimates may be conservative.

Two studies have indicated that Australian Chinese are less likely to disclose gambling behaviour than their Anglo-Australian counterparts (Blaszczynski et al., 1998; Oei & Raylu, 2010). Overall, these findings suggest that Chinese individuals are not only more likely to gamble, but they are less likely to admit to gambling behaviour (leading to under-reporting of gambling). They may also be more likely to develop a gambling problem than others in the general population.

It has been suggested that a number of circumstances and pre-existing vulnerabilities place migrants from ethnic minority backgrounds, compared with the majority ethnic population (in this case Anglo-Celtic), at increased risk of problems such as gambling-related harm. The harms that can be experienced by problematic gambling behaviour are varied and diverse, and include psychological, financial, and relational harms. Factors such as migration adjustment stress, low socio-economic status, different cultural beliefs and attitudes, low education, and lack of alternative leisure options may put migrants from ethnic minority backgrounds at greater risk of developing a problem with gambling (Ohtsuka & Duong, 2010). It is the different cultural beliefs and attitudes that people from ethnic minority communities hold about gambling that is the focus of this article, in particular the nature of the stigma and its impact on talking about gambling and help seeking.

Stigma

The examination of stigma and discrimination has received much research attention since Goffman's (1963) ground-breaking work, *Stigma: Notes on the Management of a Spoiled Identity*, in which he first defined the term. Goffman defined stigma as "an attribute that is deeply discrediting" that reduces an individual "from a whole and usual person, to a tainted discounted one" (Goffman, 1963, p. 3). On the basis of these blemishes, it is believed that the person in question is "not quite human," and an ideology is constructed that explains the attribute and attaches a range of deficiencies to the stigma that has been presented (Goffman, 1963, p. 6). However, a number of other theorists have built upon the foundation that Goffman created. The definition put forth by Link and Phelan, for example, is that "stigma exists when elements of labelling, stereotyping, separation, status loss, and discrimination occur together in a power situation which allows them" (Link & Phelan, 2001, p. 377). This definition of stigma builds on the definition provided by Goffman in that it acknowledges the role of power and status within the process of stigmatization and discrimination.

Jones and colleagues (1984) delineated six dimensions of stigma that are important in its development and execution. By defining those characteristics that affect whether an individual trait is destined to become a stigma, they expanded on the categorizations made by Goffman. Those six dimensions included concealability (the extent

to which the condition is visible and the control over disclosure), course (the pattern of change over time and most likely ultimate outcome), disruptiveness (the extent to which it affects day-to-day interaction, interpersonal relationships, and communication), aesthetic qualities (how it affects outward appearance), origin (the circumstances under which the condition originates and who is deemed responsible), and peril (the danger that the condition poses to others).

Being identified as a problem gambler brings with it a stigmatized identity (Horch & Hodgins, 2008). The bestowment of this identity taints and discredits individuals and places them in an inferior position of power in comparison to those around them. Individuals with a gambling problem often conceal their situation from family and community. Often this concealment results in individuals having to deal with difficult financial situations on their own, but it also threatens the quality of their relationships with others. Problem gambling can disrupt day-to-day interactions in a significant manner, but it does not necessarily affect outward appearances. Additionally, individuals tend to be blamed for their gambling problems (because of lack of control). Problem gamblers therefore have the potential to profoundly affect the quality of life of others in a negative manner in both emotional and monetary matters. It must also be noted that in some cultures, it may not just be problem gamblers who experience stigma: Any participation in gambling may taint and discredit an identity.

Cultural Factors and Stigma

Stigma is a phenomenon that occurs across cultures and is a shared experience of all societies (Link, Yang, Phelan, & Collins, 2004). However, even when the stigmatized identity is similar (e.g., illness, disability), different cultures differ in their meanings, practices, and outcomes of stigma (Yang et al., 2007). Therefore, the study of socio-cultural context is important in understanding the origins, meanings, and consequences of stigma (Ng, 1997). Perception, experience, recognition, labelling, classification, and amelioration of stigma must be understood in relation to the influence of culture (Ng, 1997).

This is especially true when examining and comparing patterns of help seeking for problem gambling in specific cultural communities living in countries such as Australia, China, Sri Lanka, and India. Although stigmatization of a problem gambler in Australia may affect family and close friends in a negative way, in collectivistic cultures (i.e., where interdependence of humans, not individualism, underpins a societal system) such as those found in Asia, association with one who has found him- or herself to inhabit a stigmatized identity threatens to break social connections, taints an entire network, and threatens not only the social opportunities of the network, but material opportunities as well (Yang et al., 2007).

Face is an important concept referred to in Asian societies. Simply put, it represents one's moral status within the community. As Yang and colleagues (2007) state:

One “has” face, “receives” face, and “gives” face to respected others. When Chinese experience loss of face, they quite literally report the experience of

humiliation and an inability to face others, as a physical crumbling of facial expression, a way of being faceless. Here, stigma is not just a discursive or interpretive process but a fully embodied, physical, and affective process that takes place in the posture, positioning, and sociality of the sufferer. (p. 1530)

Face is an important concept in understanding stigma within Asian cultures and is also a key component in understanding help-seeking behaviours related to problem gambling within these communities. Face is generally considered to be the cultivation of a positive sense of self-worth in the context of social networks and personal relationships (Juan Li & Chenting, 2007). Within the context of ethnic minority communities, keeping face (or maintaining a positive sense of perceived self-worth) affects the family as a whole and significantly influences social, financial, and other opportunities for success—for both the individual and the family (Tan-Quigley, McMillen, & Woolley, 1998; Tse et al., 2004; Yang & Kleinman, 2008). As an example of the ramifications of maintaining or keeping face, the literature suggests that the under-reporting of problematic gambling within Chinese communities may be attributed to individual and family fears of “losing face” and thus being stigmatized or discriminated against (Loo, Raylu, & Oei, 2008; Tse et al., 2010).

Stigma as a Barrier to Help Seeking

A number of barriers have been identified in relation to help seeking for individuals who have gambling problems. A recent review of 19 studies from primarily Western countries (e.g., Australia, Canada, Germany) conducted by Suurvali, Cordingley, Hodgins, and Cunningham (2009) found that the most commonly identified barriers to help seeking for these populations included a desire and/or belief in their ability to deal with the problem on their own; an unwillingness to admit their gambling problem or minimization of it; and the stigma, shame, secrecy, pride, and embarrassment associated with problem gambling and help seeking in general. The authors do not state how they categorized the barriers, which appear to be intricately interconnected and with a considerable degree of overlap. In this instance, we argue that it is the issue of stigma that underpins all of these commonly identified barriers for seeking help.

Research indicates that most individuals from ethnic minority communities who seek treatment for problem gambling report shame and guilt, which in turn acts as a barrier to seeking out either informal or formal help (Hing, Nuske, & Gainsbury, 2011; Raylu & Oei, 2004; Tan-Quigley et al., 1998). Generally, only 1 in 10 people with gambling problems seek treatment (Cunningham, 2005). This statistic remains stable despite the demonstrated efficacy of treatment for people with gambling problems (Problem Gambling Research and Treatment Centre, 2011). Although problem gamblers face many barriers when seeking help and treatment, stigma is consistently reported as one of the most important barriers in precluding individuals from seeking help (Cooper, 2001; Horch & Hodgins, 2008), and this fact is no less true for individuals from ethnic minority backgrounds (Fong & Tsuang, 2007; Multicultural Gambler’s Help Program, 2011). Moreover, given the evidence to

indicate higher rates of gambling participation and problematic gambling in some ethnic minority communities, as well as anecdotally reported low representation in gambling support services, it appears that the nature and negative consequences of gambling stigma may be somewhat more profound. Further, although there is limited research about gambling in ethnic minority communities, certain communities are more likely to be the focus of this research than others (e.g., Chinese and Vietnamese).

The aim of this paper is to examine the role and nature of stigma in relation to gambling and its association with the concept of saving face within a multicultural context. Data are drawn from a study investigating the attitudes and experiences of gambling among two ethnic minority communities in Melbourne, Victoria. By better understanding gambling stigma and the associated barriers to seeking help, this study has the potential to inform more effective strategies to minimize the risk of gambling-related harm within Australia's culturally diverse society.

Method

Design and Procedure

This community-based exploratory study comprised a two-stage qualitative research design using semi-structured interviews. An expert advisory panel was established consisting of key stakeholders who provided ongoing advice and assistance to the research team with regard to identifying the specific cultural groups to be included in the investigation; identification and recruitment of participants; and assistance with the development of research questions, interpretation, and dissemination of the study findings. The panel met approximately every 3 months over the course of the study. Panel members were also available for informal discussions as necessary.

The Tamil-speaking and Chinese-speaking communities (herein referred to as Tamil and Chinese, respectively) were chosen as the focus for this study. The Chinese community was deemed appropriate because of the strong anecdotal and emerging evidence that members of the Chinese community regularly engage in gambling. A range of Chinese-specific gambling support services are available in Metropolitan Melbourne. In addition, the Chinese community was selected because it is a well-established community, with a Chinese presence in Australia since the 1800s. The Tamil community was included in this study for precisely the opposite reason, as there was neither anecdotal nor research evidence about the prevalence of gambling or problem gambling in this relatively recently arrived community.

The aim of this study was to explore community beliefs about gambling, but not gambling behaviour itself. For this reason, we did not seek to explicitly recruit gamblers, although we expected there to be a few gamblers in our sample. Furthermore, our expert panel cautioned against explicit recruitment of gamblers, as this may serve to deter participation.

Stage 1. The first stage of the research involved interviews with 18 key informants, including service providers and community leaders from the selected communities (Chinese and Tamil). The data collected within Stage 1 informed the Stage 2 interviews through appropriate refinement of the interview schedule and potential recruitment strategies within the two communities.

Stage 2. The second stage involved individual interviews and a focus group with 36 individuals from the Chinese ($n = 25$) and Tamil ($n = 11$) communities. The majority of interviews were conducted in English. An accredited interpreter was available to all participants, but only used in two individual interviews and the focus group. The focus group comprised nine men and women from a Chinese background.

The interview schedules for both stages comprised the same general structure, covering the following topic areas: cultural meanings, norms, and practices related to gambling; impact of migration; and factors influencing access to services.

Purposeful sampling was used within this study; that is, information-rich participants were intentionally selected on the basis of the needs of the study (Patton, 1990). Key informants previously known to the research team, along with the advisory panel members, were identified and invited to take part in the research. From there, a snowball recruitment strategy was used to identify further potential participants (both key informants and community members), whereby participants were asked if they knew others who may be interested in sharing their opinion or experience about gambling in their community. In addition, community members were recruited by using online advertising websites (i.e., Gumtree). Summaries were written after each interview and regular discussions took place among the research team as the recruitment process continued. This research strategy highlighted any gaps or omissions of relevant participants, and the recruitment process was adjusted accordingly. An effort was made to ensure that participants, particularly community members, ranged on a variety of key characteristics, (e.g., age, sex, geographical location). This was done by regularly reviewing our participant profile and actively recruiting participants with characteristics that were not yet represented.

Explanatory statements and consent forms were provided to participants and written consent received before interviews took place. Community members were offered the option to receive their explanatory statement and consent form in English, Chinese (Mandarin), or Tamil. Chinese (Cantonese) speakers were provided with the opportunity to have the consent explained in their language if required. All individual interviews and the focus group were audio-recorded, the majority of which was fully transcribed by a professional transcription service. Transcription ceased when it was ascertained by the research team that conceptual saturation had been reached in the transcribed interviews. All recorded interviews were available for reference during the process of data analysis. If the interview was conducted in Chinese, it was first transcribed in that language and then translated into English by using an accredited translation service.

The topic of gambling can be a sensitive one, and recruitment was designed to ensure that each participant felt comfortable engaging in the research. This meant giving participants the option of taking part in an individual interview or a focus group. There was only one instance in which a group of Chinese people chose to take part together, and this group was facilitated by an experienced member of the research team in the presence of an interpreter. Particular attention was given to ensuring that participants felt safe to talk, and detailed field notes were made to inform the analysis, specifically about the potential influence of the group context on the discussion.

Prior to the interview, each participant also completed a short demographic information questionnaire to facilitate basic profiling of participants. Community members were also asked whether they “engaged in gaming or gambling activities.”

Ethics approval was received by the Department of Justice Human Research Ethics Committee (CF/12/5528) and the Monash University Human Research Ethics Committee (CF12/1464 – 2012000782).

Thematic analysis, as informed by Braun and Clarke (2006), was used as the analytic tool for this study. Thematic analysis is a “method for identifying, analysing and reporting patterns (themes) within data” in order to find “repeated patterns of meaning” (Braun & Clarke, 2006, pp. 79, 86). The six phases of thematic analysis used within this project were those presented by Braun and Clarke (2006): (1) familiarization, (2) generation of initial codes, (3) searching, (4) review, and (5) definition/naming of themes, followed by (6) report production. These phases were undertaken in a reciprocal manner, and the research team moved back and forth between the first six phases as necessary.

As the first stage of data analysis, the research team familiarized themselves with the interview transcripts, followed by the process of generating preliminary codes and themes. Following completion of this first analytical stage, further reading and re-reading of the data was undertaken to review the initial codes, which were then collapsed into key themes with distinctive labels or definitions assigned to each. This process of data analysis was not a linear process and involved ongoing discussion between members of the research team and with the advisory panel when appropriate. The transcript of the focus group was analysed separately, with the findings compared and contrasted with the themes emerging from the individual interviews.

A key theme to emerge from the thematic data analysis was help seeking, specifically, the factors that hinder people from ethnic minority backgrounds from seeking help for a problem. The stigma associated with gambling, and the pervasive desire to save face, appeared to underlie a reluctance to seek help. It was this theme that provided the focus for this paper.

All participant information was analysed with SPSS (Version 20), and all qualitative interview data were managed and analysed with NVivo (2011). In the presentation of the findings, participants are identifiable to the extent that enough information is provided to contextualize their comments without revealing the identity of participants. Thus, comments

are attributed to either a key informant (KI) or a community member (CM), and their gender, ethnicity, and role are identified as appropriate.

Participant Profile

Eighteen key informants took part in the first stage of the study. Key informants were between 24 and 72 years of age ($M = 46.5$, $SD = 16.37$), and almost two thirds were female. Collectively, 11 languages other than English were spoken by key informants, the most common being the Cantonese and Mandarin dialects of Chinese. This was followed by key informants who spoke Tamil. Three quarters of key informants were born outside Australia, with over half originating from East and South-East Asian countries (China, Hong Kong, and Malaysia). The remaining participants were from Southern Asia (Sri Lanka and India) and Northern and Southern Europe (Ireland and Croatia). Key informants had been in Australia for 22.5 years on average ($SD = 12.09$, range: 4–43).

Key informants worked professionally with ethnic and multicultural communities in general, or specifically with the Chinese or Tamil communities. The most common core activities of the key informants' organizations included service delivery (47.8%), advocacy (21.7%), education (13.0%), and policy development (4.3%). Almost half of the participants considered themselves to have multicultural expertise (and worked with a range of ethnic minority communities, 44.4%), followed by a third who had expertise predominantly with the Chinese community (33.3%) and a fifth who had expertise with the Tamil community (22.2%). Key informants had worked or had been involved in the ethnic and multicultural sector for an average of 11.4 years ($SD = 10.26$, range: 0.3–38), with almost four fifths working in the sector for less than 20 years.

Thirty-six community members (25 Chinese, 11 Tamil) took part in the second stage of the study. Community members were primarily between 18 and 85 years of age ($M = 44.8$, $SD = 20.8$), with just over half of the participants being male. Almost half of community members had achieved tertiary education. Nearly half of the participants were married, a third were single or had never married, and about half had children. In general, when compared with the Chinese sample, the Tamil community members were more likely to be male, tertiary educated, and living in a more socio-economically advantaged urban area.

On average, participants had been living in Australia for just under 20 years ($M = 18.7$, $SD = 15.29$), with just over a third of the participants living in Australia for less than a decade ($n = 21$, 38.9%) and almost a quarter for 20 to 30 years ($n = 13$, 24.1%). Almost half of the participants were born in Eastern Asia (comprising China and Hong Kong, $n = 26$, 48.1%), followed by those born in Southern Asia (comprising Sri Lanka and India, $n = 14$, 25.9%).¹

¹Geographical classifications were drawn from those presented by the United Nations (United Nations, 2011).

Unsurprisingly, the most common languages spoken were Chinese (primarily Cantonese, $n = 25$, 19.1%, and Mandarin, $n = 23$, 17.5%), followed by Tamil ($n = 15$, 11.5%). However, key informants and community members spoke 11 other languages and dialects, highlighting the diversity in our sample.

The majority of community members migrated from Eastern (China or Hong Kong; $n = 16$, 44.4%), South-Eastern (Malaysia, Singapore, or Vietnam, $n = 7$, 19.4%), or Southern Asia (Sri Lanka or India, $n = 4$, 11.1%). Similarly, the majority of community members were born in Eastern (China or Hong Kong, $n = 20$, 55.6%), Southern (India or Sri Lanka, $n = 10$, 27.8%), or South-Eastern (Malaysia, $n = 4$, 11.0%) Asia. It must be noted, however, that individuals who originated from countries such as Hong Kong, Malaysia, and Singapore were from both the Chinese and Tamil communities, as reflected in the different distributions between migration and birth countries. Over half of the community members had spent less than 10 years in Australia; however, a significant portion (38.9%) had spent 20 years or more in this country. A third of participants arrived alone, closely followed by those who arrived with their family. Two fifths of participants came to study, followed by one fifth who came for employment.

Of the 36 community members, one Tamil and eight Chinese participants reported engaging in gaming or gambling activities prior to their interview. Following the interviews, a further six participants (three Tamil and three Chinese) spoke about engaging in various gambling activities. It was not clear why these participants did not disclose their gambling activity in the survey. It could have been because of a sense of denial or shame, because of a different understanding of the term “gambling,” or because that they had misunderstood the question.

Results/Findings

To provide context for discussing the concept of saving face in relation to gambling and help seeking, we must first describe the general attitudes towards gambling in the two communities studied. For the Chinese, gambling was perceived to be part of the culture; “gambling culture is in the blood” (KI, male, Chinese). Thus, gambling was on the whole perceived to be acceptable in the Chinese community. However, problematic gambling was not acceptable: “It’s okay to gamble but if you have a problem in gambling, it’s a taboo” (KI, female, Chinese, consultant). For the Tamil community, gambling of any sort was perceived to be “bad” and not acceptable: “If you bet money then you’re gambling ... gambling is a sin ... you’re not expected to gamble” (CM, male, Tamil). Although the researchers acknowledge that individual participant perspectives were diverse, the views described above were the commonly held cultural perspectives about gambling in the two communities studied, and it was these perspectives that determined the point at which an individual was likely to be discredited by their community in relation to their gambling behaviour.

Saving Face

The concept of “saving face” was a term commonly used in participants’ narratives when talking about the Tamil and Chinese communities. Saving face was described as being about maintaining respect from others. Those individuals who wished to save face tended to keep information hidden and private that may be perceived as negative or that may reflect poorly on the individual or family.

There’s a lot of looking good amongst [Tamil] community members and not showing up the fact that there might be problem sons or family problems, so there’s a lot of saving face and keeping up good appearances in their community. (KI, female, general, community peak body²)

Because of the ego there, he [problem gambler] doesn’t really want anyone to know that he’s going down.... That’s right [saving face is] a very strong thing in Chinese communities, and he was the eldest brother in the family as well—the eldest son. So that’s where the “I have to save my face” concept come from ... in Chinese it’s not really good to talk about this thing in the open so maybe that’s why it’s all pent up. (CM, female, Chinese)

For the Chinese and Tamil communities, in relation to gambling, loss of face was described as occurring at different levels of gambling engagement. For Tamil individuals, the majority of participants indicated that to engage in any gambling practice would result in a loss of face. For the Chinese participants, it was the engagement in problematic gambling behaviours that was perceived as being shameful and discreditable.

A stigma, yes. So if you’re gambling, smoking and drinking in our culture, it’s bad things. (KI, male, Tamil, community leader)

If they lost a lot of money, that’s right, that means they’re a failure [they’ve lost face]. They’re a failure. Yes. As I said, we have seen a couple of suicides and a lot have split up and a number of domestic violence with that. (KI, female, Chinese, peak body and service provider)

Furthermore, participants described how for individuals within collectivist societies, such as the Tamil and Chinese communities, if one family member loses face it was considered to reflect poorly on the entire family. It was the strong belief of both key informants and community members that the discovery of gambling engagement (for those from Tamil backgrounds) and problem gambling (for those from Chinese backgrounds) would result in a loss of face for the whole family.

It certainly impact the reputation of the whole family, that is the case. It is—it is somehow a reflection of the way how you how the parents educate him. People not just blame him, sometimes also blame the parents. (CM, male, Chinese)

²A peak body is an organization that represents the interests of an entire industrial sector or community, often incorporating other organizations in that area.

They probably don't even want to tell their family because it's kind of a shame on the family as well. (KI, female, Chinese, consultant)

Confidentiality is a very important thing. And it's quite humorous when I think about the reasons because, you know, for example if let's say I know this—this family that's, you know, the father is a gambler so there wouldn't be much of a connection because let's say if I know the father, I wouldn't go and ask for his daughter for marriage ... a lot of places there are still arranged marriage. (CM, male Tamil)

This last comment illustrates one of the strong motivators for saving face. If the community finds out about the disreputable behaviour of a person, it can impact on the reputation and prospects of every family member. The Tamil participant's comment above also highlights how certain cultural practices and traditions (e.g., arranged marriages) can compound the desire to keep quiet about negative behaviours on the part of individuals. Consequently, in order to save face, people do not talk openly about issues, and there is a silence or a filtered account of the truth, as described in the following reflection about Tamil international students:

I think keeping face and reputation and being obedient or not wasting their parents money is another thing that motivates them to be really quiet about it [problems], so they may tell some friends but even then lots of things would be left out. (KI, female, general, counsellor)

There was also an instance recounted by the same counsellor whereby students who are not familiar with gambling get involved with student poker groups and use their credit cards. Having lost, they “sort of lose face and want to go back again and try and win their money back” (KI, female, general, counsellor). Hence, they may end up gambling and spending more in an attempt to regain their perceived worth, and essentially their “face.” It was clear from participants' accounts that losing face was not related to losing or failing at the gambling activity per se, but rather about losing control. Furthermore, for the Chinese community, winning was perceived as “lucky,” which is a good thing in Chinese society; hence, there was no stigma attached to non-problematic gambling.

There was also evidence to indicate that once an individual becomes desperate, the desire to save face is overthrown by the need to survive. A key informant spoke of a known problem gambler going around asking for money: “They don't mind to lose their face.... They don't mind because they need the money” (KI, female, community organization). This illustrates that there may be a point at which an individual has resigned themselves to having lost face and perhaps feels that there is nothing more to lose.

Saving Face as a Barrier to Seeking Help

The strong desire to save face was intricately connected to the reluctance to seek help, both informally and via formal services. The difficulty of encouraging individuals in

tight-knit communities to seek assistance was clearly an issue of concern, as described by the following participants from both the Tamil and Chinese communities:

... even though you know there are these people who have ... gambling problems, you still can't get the first-hand information and it's so hard to get other people to tell that person to seek help ... it's actually really annoying because you know—you know they're there, you want to do something about it but you can't.... Because if you do, they'll probably run. (KI, female, Chinese, consultant)

... we had a man and the wife he [sic] was assaulted—it's a typical example how gambling—but no-one knows about this. No-one will tell you. Even if you go and tell them the wife will not tell what the husband is doing. That is our culture.... Now suppose if my wife goes against me, she would not be respected by the—by our relations. It's like more or less she'll be excommunicated from our society. (KI, male, Tamil, community leader)

Participants also confirmed that it was common for individuals to deal with a problem as a family or within the community, as opposed to seeking formal professional help. One reason for this was the desire of individuals to save their loss of face by not allowing their problem to become common knowledge in the wider community, as illustrated by the following service provider:

I think [ethnic minority communities] also tried to deal with it...within the family, because of that shame factor, so it'd be kept within the family, and then it might go in to a trusted person in the community, so we hear that often, there might be a community leader who is the person who approaches, so sometimes, it tends to stay within the family, or within the community. (KI, female, general, service provider)

Lack of trust and a lack of awareness and understanding about services and the service system were critical factors in understanding why people were reluctant to seek assistance for problems. This was particularly the case for new arrivals who were likely to only trust family members:

Because of that shame and stigma, problems [within ethnic minority communities] do tend to be kept within the family or within the community, and often, the community is the one that's trusted, especially with the newly arrived communities. That's their traditional way of working through problems. That's the model in a sense, and they're not familiar with the concept of counselling, they're not familiar with service systems, how to navigate them, and how to access help. (KI, female, general, service provider)

Furthermore, depending on the country of origin, the concept of “confidentiality” may not be well understood, and therefore formal help seeking may not be undertaken because of the fear of losing face in the community through lack of confidentiality from health care professionals. Specifically, if people do not understand that what they say will remain confidential, then it may hinder them from seeking help.

It could be that they bring that culture [home country culture that does not practise confidentiality] with them here and they think, “What I do is not going to be confidential and so I’ll just keep quiet.” (CM, female, Tamil, service provider)

In some instances, it was suggested that migrants may be more comfortable seeking informal help from those within their own community (e.g., community leaders), rather than seeking assistance beyond their community to use the services of other professionals. The reverse was true in other cases. For example, some participants described individuals preferring to go outside their communities in order to protect their privacy.

First of all, some of them would like to come and see the person who speaks their language.... Some of them they want—they get away from their own community people. (KI, male, Tamil, service provider)

They will go to Gambling Anonymous or somebody external but, that is if they recognize that there is a problem but I don’t think they will go within the community to discuss, yeah.... I think it’s a confidentiality issue.... Look I can’t say for sure that that would happen in a, you know, medical—in the medical field, but in another field if it could be, you know—because it’s a small community, there is a chance that it could get out. Exactly, just to eliminate the risk. (CM, male, Tamil)

In summary, the importance of trust was vital in order to minimize the potential to lose face within the community. Who people believed they could trust determined who they did and did not approach for assistance—and often it was family and close community members, more so than formal service providers.

Not Seeking Formal Assistance Until There Is a Crisis

Problem gambling and other mental health issues were perceived by people from both Chinese and Tamil communities as bringing shame, not only on the individual, but also on the family. It was this sense of shame that appeared to be a driving force behind the reluctance to seek formal assistance until a crisis had occurred. This view about not seeking help until the last critical moment was related not only to the reluctance of individuals to seek professional help in general, but also as a response to the shame and stigma associated with problem gambling specifically.

So when it reaches a crisis point, that’s when we [multicultural service provider] generally tend to get involved, so they’re in severe financial difficulties, or there might be mental health issues, or they’re suicidal, or something like that, so really at that crisis point. (KI, female, general, service provider)

I’m not quite sure about that because, because I have not had any personal interaction with such people. But what I would like to say is that they might seek help at the eleventh hour. Or even when things have gone so bad that they might want to seek help. (CM, male, Tamil)

Moreover, it was often not the individual in crisis who sought support from formal services, but rather friends or family members who sought professional assistance on behalf of their loved ones.

They call us or ask for Gambler's Help to help them. But not every one of them, not everyone because they feel that is loss of face unless they think I have nowhere to go. I think the carers or the family ask for help more than the gamblers themselves. (KI, female, Chinese, service provider)

The tendency to not seek help until a crisis was noted as problematic, making it difficult for service providers to effectively address problems in a timely manner.

[Gambling problems are] kept very secret, and there's a lot of shame around it, so the disclosure becomes very problematic, and it's very difficult for services to pick up on it, and to address it. (KI, female, general, service provider)

Because saving face is such an important factor in the process of seeking help, participants acknowledged that it is a key factor for consideration in the delivery of support services.

There's a lot of sort of face saving in terms of seeking help, people getting help and then, yeah, the strategy, the helping strategy was all about saving face so that the person who you were helping, you know, maintained their dignity. (KI, female, general, peak body)

The importance of maintaining dignity was emphasized by another key informant when she described the worry people feel if they do not respond to treatment. She said that people worry that if they cannot change their gambling behaviour, they will lose face. Thus, in addition to the problematic gambling that is shameful, if they have failed to respond to treatment, it also reflects badly on them: "They are a failure, they're not able to control themselves" (KI, female, Chinese, community leader).

When individuals did seek professional advice and assistance, often they would present initially with (in their view) a more acceptable, less stigmatizing issue (e.g., financial difficulties). In this service environment, gambling issues often surfaced, providing the opportunity for the individual to be referred to an appropriate service provider.

Experience shows that sometimes that the students will self-disclose to counsellors or otherwise students may come and seek financial assistance from [Student Services] and through discussions about what we can do in terms of loans and grants and things some students might disclose about gambling behaviour. But often the sense is that we don't have a real understanding of the extent of the problem, if it is a problem. (KI, female, general, service provider)

The role of self-exclusion as a way to address gambling problems for people from ethnic minority backgrounds was also raised by a counsellor. Self-exclusion in

Australian venues involves photographs being taken of gamblers who wish to remove themselves from the venue, which are then displayed in staff areas to ensure that all staff are aware that these individuals wish to not gamble any more. For ethnic minority individuals, the fact that their faces would be photographed and kept at venues was noted to be a huge obstacle for clients, despite explaining the confidential nature of the process to them. Thus, in this instance, the barrier was that their faces would be revealed.

Discussion

This study found that, for both Tamil and Chinese individuals, the threat of losing face (and the associated sense of self-worth, respect, and status) was a significant issue. Losing face had serious implications not only for the individual, but also for the broader family and community, which made the prospect appear more threatening. The threat of losing face underpinned the numerous strategies used to avoid being identified as a (problem) gambler. Although we acknowledge that there was heterogeneity within the sample, the findings are indicative of deeply established community and cultural beliefs.

When considering the findings in light of Link and Phelan's (2001) conceptualization of the process of stigma, we can further understand the stigma of gambling in relation to Tamil and Chinese immigrants, as well as how it relates to the broader Australian community. As previously stated, Link and Phelan's (2001) four stages of the process of stigma are (1) stereotyping, (2) labelling, (3) separation, and (4) the experience of status loss and discrimination (Figure 1).

For Chinese individuals, the point of difference is that an individual has lost control of their gambling behaviour, while for those from the Tamil community, it is the engagement in gambling itself that will most likely set them apart. The labelling that takes place is also different, as those from Chinese communities label only those who have a problem with gambling as gamblers. In contrast, the Tamil community labels any individual who engages in gambling behaviour as a gambler and those who have lost control as a problem gambler. It is this threshold of "too much" or "out of control," that distinguishes the difference between communities. In relation to the separation of "us" and "them," for those from Chinese and Tamil communities, this separation involves entire families, as opposed to the individualistic separation that occurs within the broader Australian community. Furthermore, the experience of status loss and discrimination experienced by Chinese and Tamil communities is potentially more acute, as it affects the family as a whole.

In the interpretation of our data, Jones and colleagues (1984) provide a useful framework for understanding aspects of stigma and the stigmatized. As outlined previously, Jones and colleagues identified six dimensions of stigma (concealability, course, disruptiveness, aesthetic qualities, origin, and peril). In relation to our data, these six dimensions can be interpreted as follows. The stigmatized identity of a (problem) gambler is one that is highly concealable. In order to maintain this

	Tamils	Chinese
Status Loss & Discrimination	Status loss and discrimination affects the whole family, as well as the individual	
Separation	Entire families can be separated, not just an individual	
Labelling	People are labelled as gamblers if they place a bet or a wager with money	People are labelled as gamblers if they have a problem with gambling
Stereotyping	Anyone who engages in problematic gambling is different	Anyone who engages in gambling is different

Figure 1. The process of stigma (Link & Phelan, 2001) in Tamil and Chinese communities.

concealed identity, individuals engage in many strategies to manage the stigma that they experience and to save face. Examples of these management strategies within the current study include attempting to deal with the issue within the family and not telling anyone until a crisis occurs. Furthermore, preoccupation with confidentiality and discretion are strategies to ensure that the individual and the family do not lose face. The course of (problem) gambling over time was not explicitly described, and there was no indication that participants believed, for example, that problem gamblers could not recover or that gamblers always turned into problematic gamblers. In relation to disruptiveness, there is some evidence within our data set that (problem) gambling disrupts interpersonal relationships and results in negative ramifications such as domestic violence, alcohol and drug abuse, and financial issues. Although the dimension of aesthetic qualities is not relevant when discussing gambling in this context, the origin of (problem) gambling is more often than not attributed to individual (as opposed to medical or societal) factors within the two communities examined here. This is in contrast to the medical model that has been fostered within the Australian context. Finally, the dimension of peril is highly pertinent within the communities examined within this study, as issues such as loss of money and social standing are experienced throughout the entire family network, as opposed to the more individualistic ramifications that are experienced within the context of Australian society. Moreover, a greater sense of peril may have further ramifications, such as the negative mental health associated with the shame of losing face for the entire family.

The threshold for stigmatization appeared to be different in each community and determined by community and cultural beliefs. When gambling was perceived to be problematic, the stigmatization and threat to face was responsible for widespread

reluctance to seek help and to instead deal with issues within the family. Furthermore, the acquisition of professional help was often put off because of the threat to individual and family face until a crisis was imminent. Thus, it appears that the issue of stigma and face are highly salient issues to address in order to assist individuals who have developed a gambling problem.

Help seeking was considered taboo in the Tamil and, to a lesser extent, the Chinese communities. This was not limited to psychological help, but to other forms of assistance as well. The issues of stigma and saving face—as previously indicated—were prominent in participants’ narratives in relation to gambling problems, but also in relation to help seeking. As a result, participants often indicated that close friends and family members would be the first port of call for help and assistance. Participants often described, however, that this help would often be financial or practical in nature, without acknowledging or addressing problem gambling itself or any underlying issues.

This lack of engagement with psychological services may have many contributing factors, but can be traced to the fact that in some cultures, including Tamil and Chinese cultures, seeking help outside the family is seen as culturally inappropriate. However, it may also be the case that the concept of “counselling” as it operates within the Australian context may be poorly understood and recognized. It is possible that targeting marketing and information dissemination strategies at families within this cultural context may provide additional support for (problem) gamblers. Within this context, these findings can be interpreted as the family being both a problem (trying to deal with the issue on their own) and a solution (instigating help) for those with (problem) gambling issues.

This study has confirmed existing evidence that problem gambling is stigmatized (Horch & Hodgins, 2008), regardless of cultural background. Moreover, because of the weight of this stigma, people with gambling problems are not accessing the help they need in a quest to save face. This study highlighted how problem gambling is seen as a fault of the individual and that problem gamblers are perceived as not having enough willpower or control. Perhaps greater community education about the role of society and the environment in the origin of problem gambling would serve to lessen the stigma and consequently increase the likelihood that people will seek help when they need it.

A number of implications can be drawn from the findings of this study. In the first instance, these findings may inform not only strategies to increase help seeking among these (and other ethnic minority) communities, but may also assist in informing the kinds of information that are passed on to migrants when they arrive in Australia and the kinds of marketing conducted around help services. In addition, more culturally appropriate, responsive, and sensitive services may assist individuals to seek help, not only for gambling, but also for other issues. This would include raising awareness of primary health care workers and mental health professionals about the likelihood of people (particularly from ethnic minority backgrounds) concealing a gambling problem and presenting with other issues.

Available evidence indicates that problematic gambling is more prominent in people from Chinese and Anglo-Celtic backgrounds, as compared with the Tamil community, for example (Raylu & Oei, 2004; Tse et al., 2010; Victorian Casino and Gaming Authority, 2000). This may relate to societal attitudes about the acceptability of gambling (Loo et al., 2008; Raylu & Oei, 2004). The fact that gambling is not generally accepted in the Tamil community may serve as a protective factor against gambling-related harm, specifically by hindering individuals from behaving in ways deemed undesirable by their culture and customs. This suggests that there are potential benefits in gambling being stigmatized by the community. However, it is likely that interventions to decrease the acceptability of gambling would be thwarted in current Australian society, given the vested interests of the gaming industry and the associated power and wealth.

The variability of the sample, which focused on only two cultural groups, limits the generalizability of the findings. Other subsections of these communities, and indeed other ethnic minority groups, may perceive gambling and problem gambling in different ways. There is a fairly large scope for future research to be undertaken, not only in the gambling area in general, but particularly in gambling in ethnic minority communities. Studies examining a wider sample of different ethnic minority communities are needed, as are studies that include a higher proportion of (problem) gamblers. The difficulties in recruiting participants, particularly from the Tamil community, raise concerns about whether the needs of such communities are being overlooked, not only for those with gambling problems, but also for those with other mental health issues.

Conclusion

The concept of face is an important one within both Chinese and Tamil communities, and it affects not only the individual in question, but also the individual's family and community. Depending on the community and the associated social norms, particular behaviours will cause a loss of face in one community and not in others. In the current study, this meant any form of gambling for the Tamil community, but only problematic gambling in the Chinese community. Individuals within Chinese and Tamil communities were found to prefer to keep problems that threatened their loss of face to themselves, or at least within their own family and community. Individuals may be more likely to seek assistance from individuals who speak their primary language and understand their cultural background. A lack of understanding about Western counselling as opposed to other types of help seeking (e.g., for financial assistance) can create barriers for those who need assistance. Awareness about the high priority placed by individuals on issues of maintaining confidentiality within formal services is another important element that must be addressed so that those individuals who seek help can be confident in their professional service providers. Furthermore, it is important that services and practitioners understand that the issue of stigma and face are central to the process of help seeking and the provision of help services for communities such as the Tamil- and Chinese-speaking communities. The development of community education and assistance,

in collaboration with ethnic minority communities, may be pertinent in order to ensure that these services are culturally appropriate.

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Special Issue: 2015 *JGI* scholar's award

Eye on the Prize: High-Risk Gamblers Show Sustained Selective Attention to Gambling Cues

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Abstract

Disordered gambling is characterized by persistent and problematic gambling, leading to impairment or distress, which may be exacerbated by vigilance to gambling cues in the environment. Yet, questions regarding the specific attentional biases present in gamblers remain unresolved. In the current study, we used a rapid serial visual presentation paradigm to examine attentional orienting and maintenance/disengagement for gambling stimuli, relative to emotional and neutral stimuli, in high- and low-risk gamblers ($N = 57$). High-risk gamblers showed attentional biases for gambling stimuli, relative to other distractors, and these biases were observed at the level of attentional maintenance/disengagement. Low-risk gamblers showed some evidence of non-specific attentional biases (to negative and gambling pictures). Low-risk, but not high-risk, gamblers demonstrated sustained biases for negative items and facilitated disengagement from positive items. Findings highlight differences in attentional processes between high- and low-risk gamblers and point to sustained biases as worthy targets for clinical interventions. Future work should assess the malleability of gambling biases in high-risk gamblers and determine whether altering attention to gambling items influences gambling behaviour.

Keywords: attentional bias, gambling

Résumé

Le jeu compulsif est caractérisé par des comportements liés au jeu qui sont problématiques et persistants, et qui entraînent une détresse ou une incapacité à fonctionner pouvant être exacerbées par l'attention accordée aux signaux associés au jeu dans

l'environnement. Pourtant, les questions relatives à la présence d'un biais attentionnel spécifique chez les joueurs demeurent sans réponses. La présente étude a utilisé un modèle de présentation visuelle sérielle rapide (Rapid Serial Visual Presentation [RSVP]) afin d'examiner l'orientation de l'attention et le maintien ou le décrochage de celle-ci en présence de stimuli liés au jeu par rapport à des stimuli neutres et chargés émotionnellement chez des joueurs à faible risque et à haut risque ($N = 57$). Un biais attentionnel pour les stimuli liés au jeu pouvant aller jusqu'au maintien ou au décrochage de l'attention a été observé chez les joueurs à haut risque, par rapport aux autres éléments de distraction. Les données sur les joueurs à faible risque indiquent quant à elles la présence d'un biais attentionnel non spécifique (pour les images de jeu et négatives). Un biais attentionnel soutenu pour les éléments négatifs facilitant le décrochage de l'attention à des éléments positifs a été observé chez les joueurs à faible risque, mais non chez ceux à haut risque. Les résultats de l'étude mettent d'une part en évidence les différences entre le processus attentionnel des joueurs à haut risque et celui des joueurs à faible risque, et indiquent d'autre part que les biais attentionnels soutenus peuvent constituer les cibles d'intervention cliniques efficaces. Une prochaine étude devra évaluer la malléabilité du biais attentionnel pour le jeu des joueurs à haut risque et déterminer si une modification de l'attention accordée aux éléments liés au jeu peut influencer les comportements associés au jeu.

Introduction

Disordered gambling is now recognized as a behavioural addiction in the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; American Psychiatric Association, 2013), and it shares many diagnostic criteria with substance use disorders. Gambling and substance use disorders may also share similar etiological processes. One such process may be an attentional bias, or enhanced processing of addiction-relevant or addiction-related cues. Using various attentional and electrophysiological measures, researchers have found that heavy drinkers, smokers, and other substance abusers demonstrate attentional biases for cues that they associate with their substance of abuse (Littel, Euser, Munafò, & Franken, 2012; Robbins & Ehrman, 2004, for reviews). Such biases are important topics of investigation considering the role they may play in the development and maintenance of substance use disorders (Field & Cox, 2008; Franken, Kroon, Wiers, & Jansen, 2000). For instance, a major meta-analysis by Field, Munafò, and Franken (2009) found that attentional bias for substance-related cues was associated with self-reported craving across substances. Relatedly, biases for alcohol cues have been associated with relapse following treatment in alcohol-dependent adults (Garland, Franken, & Howard, 2012).

Just as attentional biases have been studied in substance use disorders, research on attentional biases in gamblers has progressed in recent years (Zack & Poulos, 2006). Still, important questions remain unresolved. Boyer and Dickerson (2003) examined

attentional biases on a modified Stroop colour-naming task, comparing gamblers with high and low control over gambling on the basis of their scores on the Scale of Gambling Choices (Baron, Dickerson, & Blaszczynski, 1995). Low control gamblers displayed longer colour-naming times (i.e., attentional interference) for gambling-related words than they did for other word types (drug-related; neutral)—an effect that was not seen in the high control group. A similar study (McCusker & Gettings, 1997) examined Stroop colour-naming times for gambling, drug, and neutral words in self-identified compulsive gamblers and their spouses (who acted as a control group), exposing gambling-specific attentional biases in the compulsive gamblers. Although these studies provide insight into attentional biases in problem gamblers, they used word colour-naming times as the outcome. This may be problematic since stimulus effects on attentional processes may be confounded with effects on higher order semantic processes (Compton et al., 2003). To address this limitation, Molde et al. (2010) used a pictorial Stroop and again revealed attentional biases for gambling stimuli in slot machine gamblers with a diagnosis of pathological gambling relative to individuals with no history of gambling problems.

Much of the knowledge on the nature and function of attentional biases among pathological gamblers has been based on research with the Stroop. However, Stroop tasks are limited in that they often tap into reading, lexical decision, and colour-naming processes in addition to, or instead of, selective attention (Algom, Chajut, & Lev, 2004). Others argue that Stroop tasks can capture global biases for gambling stimuli, but do not differentiate between orienting (i.e., initial directing of attention) and later maintenance/disengagement (i.e., sustained allocation of attention and [in] ability to redirect attention; Fox, Russo, Bowles, & Dutton, 2001). In contrast, in visual dot probe tasks, transient and more sustained biases can be discerned if cue durations are manipulated appropriately. Using a visual probe task, Vizcaino et al. (2013) found that gamblers who met criteria for pathological gambling on the National Opinion Research Center DSM-IV Screen for Gambling Problems responded more quickly to dots cued by gambling-related stimuli than they did to non-gambling cues at exposure times that were indicative of a preferential attentional maintenance for gambling items. No differences in response times to gambling and non-gambling cued targets were seen in the control group of healthy volunteers. These findings mirror research on gamblers' Stroop performance, but with the added benefit of identifying the type of bias (i.e., attentional maintenance to gambling cues). However, dot probe tasks carry their own limitations, such as low internal reliability and poor short-term test-retest reliability (Schmukle, 2005). Furthermore, visual probe tasks assess attentional biases in terms of facilitated responding to cued locations, as opposed to impaired responding on other tasks following gambling-cue exposure; the latter may be more representative of the distracting, attention-consuming nature of gambling cues in real-world settings.

Other tasks have also been used to overcome the limitations of the Stroop. For example, Brevers, Cleeremans, Bechara et al. (2011) examined attentional bias for gambling and neutral stimuli in problem gamblers (from scores on the South Oaks Gambling Screen [SOGS]; Lesieur & Blume, 1987) and in non-problem

gamblers using the flicker paradigm, in which two images were repeatedly flashed on the screen and participants had to report a single difference (gambling or non-gambling item) between pictures. Using eye-tracking and response latencies, the authors found speeded orienting to and impaired disengagement from gambling items in the problem group relative to the non-problem group. This study is valuable in that it delineates the attentional processes involved in the problem gamblers' bias. However, interpretations are limited by the restricted set of comparison stimuli and by the task of attending to items, rather than ignoring them. The latter might be more representative of strategies used to avoid gambling triggers in the real world.

One measure that has the potential to assess the distracting value of gambling-pertinent stimuli, while also distinguishing between types of attentional biases, is the rapid serial visual presentation (RSVP) paradigm. Brevers, Cleeremans, Tibboel et al. (2011) had problem gambler and control participants view gambling and neutral target words that were embedded in a rapid stream of distractor words in an RSVP task. At the end of each trial, gamblers were required to report the target words that appeared among distractors. Problem gamblers were more accurate in reporting gambling targets than in reporting neutral targets, indicating enhanced processing of gambling stimuli in those experiencing gambling problems. Performance for gambling and neutral targets was not significantly different in controls. Although Brevers, Cleeremans, Tibboel et al. provided insight into the attentional biases of problem gamblers, stimulus sets were limited to gambling and neutral items. Delineation of the relative magnitude of gambling biases requires additional categories of comparison stimuli. In addition, Brevers, Cleeremans, Tibboel et al. (2011) applied gambling words as targets, as opposed to pictorial distractors, once more limiting the ability to interpret findings in terms of the attentionally distracting nature of gambling cues.

Together, the aforementioned studies help elucidate gambling-related attentional biases that distinguish problem and non-problem gamblers.¹ However, there remains a need for further work to pinpoint the attentional processes involved in these biases and to establish whether such biases exceed those typically displayed for emotional cues. To address these limitations of previous research, we assessed attentional biases in high- versus low-risk gamblers on a cognitive task that operationalizes components of attention (orienting vs. disengagement), using neutral pictures as a baseline, as well as benchmark “distractors” (i.e., emotional pictures) and gambling pictures. Emotional stimuli preferentially capture and hold attention, relative to neutral items, making positive and negative emotional pictures appropriate comparison distractors (Most, Chun, Widders, & Zald, 2005; Vuilleumier, 2005). Moreover, including emotional items as distractors addresses the question of whether high-risk gamblers have a general bias to attend to emotionally salient stimuli (including gambling-relevant cues), or a selective attentional bias for gambling cues (per Bauer & Cox, 1998; Robbins & Ehrman, 2004). More precisely, in the current study, high- and low-risk

¹Cross-study comparisons may be limited by the varied nature of study groups in studies on attentional biases in problem gamblers and controls.

gamblers completed the RSVP task (Most et al., 2005; Olatunji, Ciesielski, & Zald, 2011), in which rotated targets were presented at either 200-ms or 800-ms lags following distractors, permitting an assessment of attentional orienting (200-ms lag) and disengagement (800-ms lag). To elaborate, performance on the short-lag trials reflects the level of initial attentional allocation to the distractor (orienting bias). If participants categorize the target inaccurately, presumably their attention was devoted to early processing of the distractor. Performance on the long-lag trials reflects the amount of sustained attentional engagement (or, conversely, disengagement) with the distractor. If participants categorize the target inaccurately, presumably their attentional resources were not recovered to attend to the target.

High-risk gamblers were expected to show attentional biases for gambling stimuli, relative to all other stimuli, including emotional stimuli, on the basis of attentional bias research in substance (ab)users (e.g., Bauer & Cox, 1998; Lubman, Allen, Peters, & Deakin, 2008; Robbins & Ehrman, 2004). Gambling-specific biases were not anticipated in low-risk gamblers. From prior research with other clinical populations, biases were predicted to be most prominent at the level of attentional maintenance/disengagement effects (i.e., at the 800-ms lag; Koster, De Raedt, Goeleven, Franck, & Crombez, 2005; Olatunji et al., 2011; Vizcaino et al., 2013). Moreover, sustained, as opposed to initial, biases to gambling stimuli were expected to characterize high-risk gamblers given that attentional maintenance of gambling cues should theoretically be more problematic than transient bias, in which attentional resources are quickly recovered. In both groups, biases for emotional stimuli (in particular, negative stimuli; Vuilleumier, 2005) were expected to occur relative to neutral stimuli.

Method

Participants

Participants were 57 regular gamblers (35 males and 22 females) from 19 to 80 years of age ($M = 45.19$, $SD = 19.24$). Sixty-one percent of participants were White, 14% were Native Canadian/First Nations, 8% were Black, 5% were South Asian, and the remainder identified as other. The majority (62%) of participants indicated having an annual personal income of less than \$40,000 Cdn. Participants were recruited to fill two groups: a high-risk group and a low-risk control group. Twenty-six participants were included in the low-risk gambling group (on the basis of Problem Gambling Severity Index scores indicating non-problem/low-risk gambling), and the remainder ($n = 31$) were included in the high-risk gambling group (on the basis of Problem Gambling Severity Index scores signifying moderate risk to problem gambling). Participants were recruited from the undergraduate student body at two Canadian universities, as well as from the surrounding communities. Inclusion criteria consisted of having gambled at least three times in the last 2 months in a casino, by using electronic gambling machines (EGMs), or by using online gambling (Yi, Stewart, Collins, & Stewart, 2015); being 19 years of age or older; and speaking English as a native language. Individuals were excluded if they were attempting to quit gambling or were receiving treatment for problem gambling. Participants were screened over

Table 1

Group Distributions for Study Site and Sex, and Means and Standard Deviations for Gambling Severity, Gambling Frequency, and Age of Participants in High- and Low-Risk Gambling Groups

Demographics and gambling statistics	High risk (<i>SD</i>)	Low risk (<i>SD</i>)
Age	42.74 years (19.29)	48.12 years (19.14)
CPGI (gambling severity)	7.45 (4.26)	1.04 (0.82)
Gambling frequency ^a	10.21 (9.24)	5.48 (5.87)
Sex	10 females, 21 males	12 females, 14 males
Study site	18 Site 1, 13 Site 2	11 Site 1, 15 Site 2

Note. CPGI = Canadian Problem Gambling Index. There were no significant group differences in age, sex, or study site recruitment (all $ps > .20$). Participants in the high-risk group gambled significantly more frequently than did those in the low-risk group ($p = .04$). Gambling severity scores were significantly higher in the high-risk group than they were in the low-risk group ($p = .001$).

^a Number of times gambled in last 2 months.

the telephone to ensure eligibility. See Table 1 for demographic information and gambling descriptive statistics (frequency and severity) for participants in the high- and low-risk groups.

Procedure

After providing informed consent, participants completed several self-report and cognitive measures, only two of which are relevant to the current study and are described herein. Upon study completion, participants were debriefed and provided with \$20 as compensation. All participants were provided with contact information for the local addictions services and the problem gambling helpline.

Measures

Canadian Problem Gambling Index (CPGI). The nine-item Problem Gambling Severity Index (PGSI) scale of the CPGI (Ferris & Wynne, 2001) was used to assess the presence and severity of problem gambling. Participants rate the frequency at which they have engaged in the behaviour or experienced the given consequence in the last 12 months on a scale from 0 (*never*) to 3 (*almost always*). The PGSI shows good validity (i.e., content, construct, and criterion-related), good internal consistency ($\alpha = .84$), and adequate test-retest reliability at intervals of 3 to 4 weeks ($r = .78$; Ferris & Wynne, 2001). Participants who met criteria for non-problem or low-risk gambling (PGSI total scores = 0 to 2) were included in the low-risk group ($M = 1.04$, $SD = .82$), whereas those meeting criteria for moderate risk to problem gambling (PGSI = 3+) were included in the high-risk group ($M = 7.45$, $SD = 4.26$) to match the two-group design of previous attentional bias research (Baron et al., 1995; McCusker & Gettings, 1997). Adjacent risk groups were combined on the basis of previous research by using the PGSI (Ellery, 2008) and other measures of gambling severity (i.e., SOGS; Brevers, Cleeremans, Tibboel et al., 2011).

Rapid serial visual presentation (RSVP) task. This task was based on the standard attentional blink paradigm (Most et al., 2005) and was used to assess attentional biases for gambling-related stimuli. Participants searched for target items (horizontally rotated landscapes) within a rapid series of pictures, which they had to identify as being rotated or upright and as being rotated to the left or to the right (when rotated). Most of the targets (96%) were rotated. Distractor pictures preceded the rotated targets by either 200 or 800 ms and fell into the following categories: (a) gambling, (b) neutral, (c) negative, and (d) positive. See Appendix A for examples of each category of distractor. Emotional pictures (in particular, negative) were selected to provide a distracting benchmark against which gambling distractor trials could be compared (Vuilleumier, 2005). In addition, because the distracting effects of these images are generalizable (i.e., not gambling specific), they provided a reference point to establish the magnitude and specificity of biases for gambling stimuli. The neutral pictures provided a baseline comparison. Fillers (upright landscapes), distractors (gambling, neutral, negative, and positive pictures), and targets (rotated landscapes) were each presented for 100 ms. Each trial included 17 images, including one distractor, one target, and 15 fillers. At the end of each trial, participants were asked to indicate, by key press, if they saw a rotated image (yes, no) and, if yes, which direction it was rotated (right, left). Participants were told that the accuracy of their responses would be recorded. Participants completed 16 practice trials and 168 randomized test trials (42 for each category of distractor). See Appendix B for an example of trial events. This protocol is similar to that of Olatunji et al. (2011). The RSVP paradigm was programmed and presented by using Direct RT software (Empirisoft Corporation, NY). Split-half reliabilities comparing first and second halves for the 200- and 800-ms lag trials were .69 and .78 for positive distractor trials, .88 and .80 for negative distractor trials, .84 and .82 for neutral distractor trials, and .78 and .88 for gambling distractor trials, indicating acceptable to good internal consistency for the task.²

Neutral, negative, and positive pictures for the RSVP task were selected from the International Affective Pictures System (IAPS; Lang, Bradley, & Cuthbert, 2005). Normative data for picture ratings were gathered by Lang et al. and can be accessed through the IAPS. Specifically, valence ratings range from 1 (*unpleasant*) to 9 (*pleasant*) and arousal ratings range from 1 (*relaxing/unarousing*) to 9 (*arousing*). The mean IAPS valence ratings for the 42 negative, neutral, and positive pictures included as distractors in the RSVP task were 3.03 (0.81), 5.02 (0.33), and 7.29 (0.63), respectively. Arousal ratings were 5.77 (0.77), 3.08 (0.66), and 4.82 (0.74) for negative, neutral, and positive pictures, respectively. In addition to recording ratings from the IAPS manual, we also collected ratings for each of these images from our sample of gamblers, using an adapted (5-point) self-assessment manikin (Lang et al., 2005). Mean valence ratings for negative, neutral, and positive pictures were 2.10 (.71), 3.16 (.62), and 4.16 (.72), respectively, and corresponding arousal ratings were 2.62 (1.07), 1.65 (.58), and 2.32 (.91), respectively.

²Accuracy was used, as opposed to response times, as participants were instructed to respond accurately, but were not given instructions regarding response speeds. In addition, there is some concern that response time data, in general, are not as useful as accuracy in measuring attention (Armstrong & Olatunji, 2012).

Gambling pictures were collected from publicly available sources and consisted of scenes from casinos, card games, EGMs, and generic online gambling screens. Participants also provided ratings for each of the gambling images ($M_{\text{Valence}} = 4.06$, $SD_{\text{Valence}} = .78$; $M_{\text{Arousal}} = 2.46$, $SD_{\text{Arousal}} = 1.18$) at the same time that they rated the other stimuli. A 2 (group) by 4 (distractor type) mixed measures analysis of variance (ANOVA) revealed no main effect of group on valence ratings ($p = .97$) and no group by distractor type interaction ($p = .75$). Likewise, overall arousal ratings did not differ by group ($p = .35$), and no group by distractor interaction was observed ($p = .58$). However, there were main effects of distractor type.³

Data Analysis

Mixed measures ANOVAs were conducted, with distractor type (negative, neutral, positive, gambling) and lag (200 ms, 800 ms) as the within-subjects variables and problem gambling group (high-risk, low-risk) as the between-subjects variable. Separate ANOVAs were conducted for two different dependent measures: accuracy and disengagement efficiency. Trials in which participants responded correctly to both the detection (yes/no) and direction (right/left) questions were deemed accurate and awarded a score of 1. Otherwise, trials were scored as inaccurate (0). Mean accuracy (ranging from 0 to 1) was tabulated for the various combinations of distractor type (i.e., gambling, positive, negative, control) and time lag (i.e., 200 vs. 800 ms). Disengagement efficiency scores were computed by subtracting accuracy on 200-ms lag trials from accuracy on 800-ms lag trials, which provided a measure of disengagement and accounted for initial orienting (per Olatunji et al., 2011). Complete RSVP task data were available for all participants.

Results

Accuracy

A 4 (distractor type) by 2 (time lag) by 2 (risk group) mixed measures ANOVA on accuracy revealed a significant main effect of distractor type, $F(3, 165) = 13.87$, Mean Squared Error (MSE) = .01, $p = .001$, partial $\eta^2 = .20$. Overall, target responses were most accurate when they were preceded by positive distractors ($M = .56$, $SD = .25$), compared with any other distractor type ($M_{\text{negative}} = .49$, $SD_{\text{negative}} = .22$, $M_{\text{neutral}} = .50$, $SD_{\text{neutral}} = .23$, $M_{\text{gambling}} = .48$, $SD_{\text{gambling}} = .21$), $p = .001$ for all comparisons. There were no differences between neutral, negative, and gambling distractor trials (all $ps > .10$). A significant main effect of time lag also emerged, $F(1, 55) = 73.32$, MSE = .04, $p = .001$, partial $\eta^2 = .57$. As in previous work

³Pairwise comparisons revealed that positive and gambling pictures were rated as most positive (all $ps < .001$), and negative pictures were rated as most negative (all $ps < .001$). There were no differences between positive and gambling valence ratings ($p = .37$). Negative pictures were more arousing than positive or neutral pictures ($ps < .05$), but were not more arousing than gambling pictures ($p = .31$). Gambling pictures were more arousing than neutral pictures ($p = .001$), but were not more arousing than positive pictures ($p = .21$). High- and low-risk gamblers' valence and arousal ratings were not significantly different for any of the distractor types (all $ps > .10$).

(Olatunji et al., 2011), we observed higher accuracy for targets appearing 800 ms after distractors ($M = .59$, $SD = .27$) than for targets appearing 200 ms after distractors ($M = .42$, $SD = .18$). There was also a significant distractor by lag interaction, $F(3, 165) = 7.25$, $MSE = .01$, $p = .001$, partial $\eta^2 = .12$, subsumed within a marginal distractor by lag by risk group interaction, $F(3, 165) = 2.51$, $MSE = .01$, $p = .06$, partial $\eta^2 = .04$.⁴

This three-way interaction was followed up with a set of 4 (distractor type) by 2 (time lag) repeated measures ANOVAs for high- and low-risk gamblers separately. A significant two-way interaction between distractor type and lag was observed for both high- and low-risk gamblers (both $ps < .01$); thus, separate one-way repeated measures ANOVAs (with distractor type as the within-subjects variable) were conducted for the 200-ms and 800-ms lag trials for each group. At the 200-ms lag, no significant distractor type effects were observed for either high- or low-risk gamblers. However, at the 800-ms lag, accuracy was significantly affected by distractor type for both risk groups (both $ps < .001$). For high-risk gamblers, 800-ms lag target decisions were most accurate following positive distractors (relative to all other distractors, $ps \leq .05$), and target decisions following gambling distractors were least accurate (compared with all other distractors, $ps \leq .001$). There was no difference in accuracy between neutral and negative trial targets. Low-risk gamblers were most accurate in responding to 800-ms lag targets following positive distractors (compared with all other distractor types, $ps < .01$). Accuracy for targets following negative and gambling distractors was equally poor and was significantly worse than for neutral or positive distractor trial targets ($ps < .05$). See Figure 1.

To determine whether accuracies were significantly different from chance for each gambler group, we conducted one-sample t tests, comparing accuracy for each trial type to chance accuracy (50%) for low- and high-risk gamblers separately. Accuracy for 200-ms lag targets was not significantly above chance for any distractor type for either low- or high-risk gamblers. For low-risk gamblers, 800-ms lag accuracy on positive trials was significantly above chance ($p = .004$), accuracy on neutral trials was marginally above chance ($p = .07$), and negative and gambling trial accuracies were at chance levels ($ps > .30$). For high-risk gamblers, only gambling trial accuracy was so low as to be comparable to chance performance ($p = .65$) on the 800-ms lag trials. Positive trials were significantly above chance ($p < .02$) and neutral and negative trials were marginally above chance ($ps \leq .08$). These findings mirror those of the absolute accuracy scores presented earlier.

Disengagement Efficiency Scores

A 4 (distractor type) by 2 (risk group) mixed measures ANOVA on disengagement efficiency scores exposed a significant main effect of distractor type, $F(3, 165) = 7.25$,

⁴Relaxing alpha is acceptable when an interaction is predicted a priori and the pattern of means is consistent with predictions, given the increased power required to detect interactions relative to main effects (Winer, 1971).

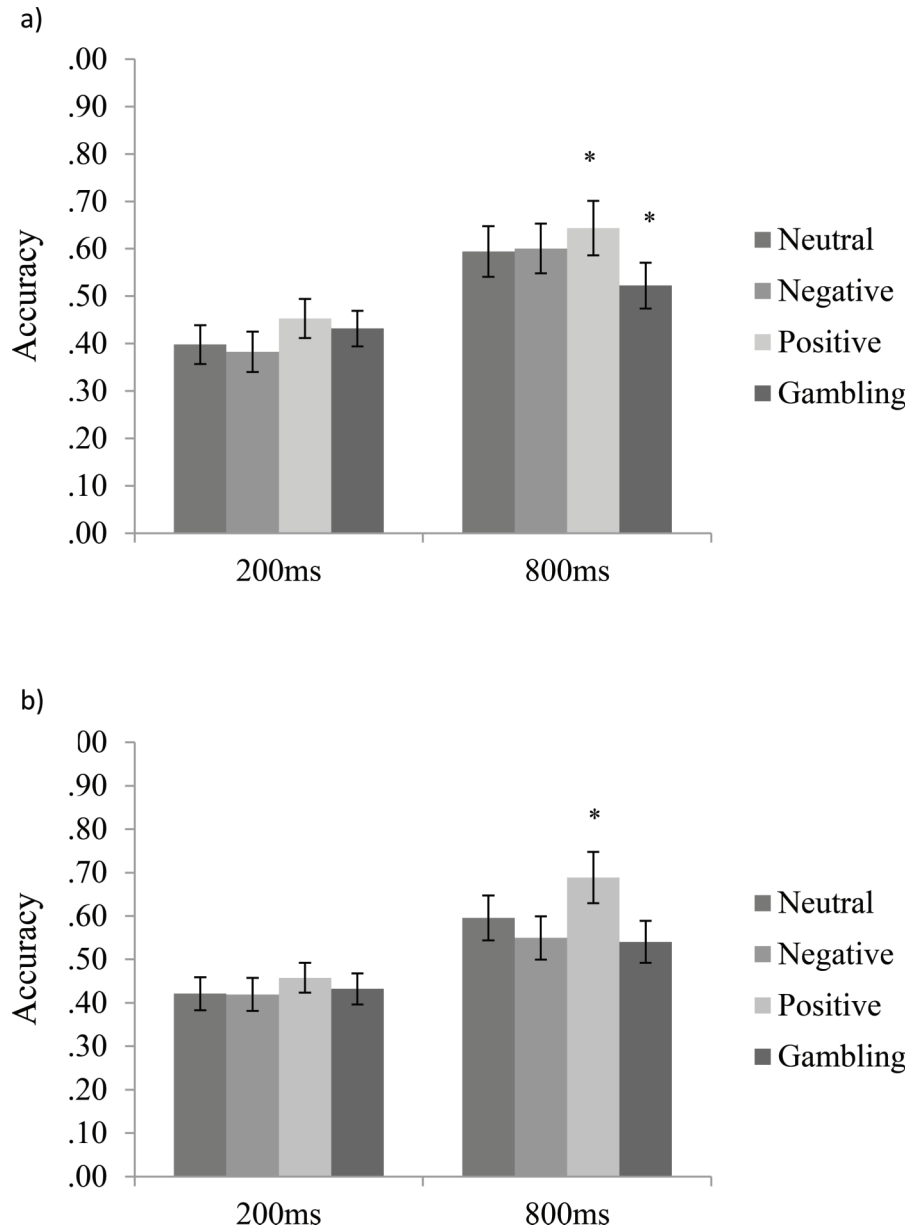


Figure 1. Accuracy scores for targets appearing after neutral, negative, positive, and gambling distractors at 200-ms and 800-ms time lags for (a) high-risk and (b) low-risk gamblers. No distractor type differences were observed at 200 ms for either risk group. At 800 ms, high-risk gamblers' target decisions were most accurate following positive distractors and were least accurate following gambling distractors. Low-risk gamblers were most accurate for targets following positive distractors. Accuracy for targets following negative and gambling distractors was significantly worse than for neutral or positive distractor trial targets.

MSE = .02, $p = .001$, partial $\eta^2 = .12$, as well as a marginal distractor by group interaction, $F(3, 165) = 2.51$, MSE = .02, $p = .06$, partial $\eta^2 = .04$ (see Footnote 2). The interaction was decomposed by conducting separate one-way repeated measures

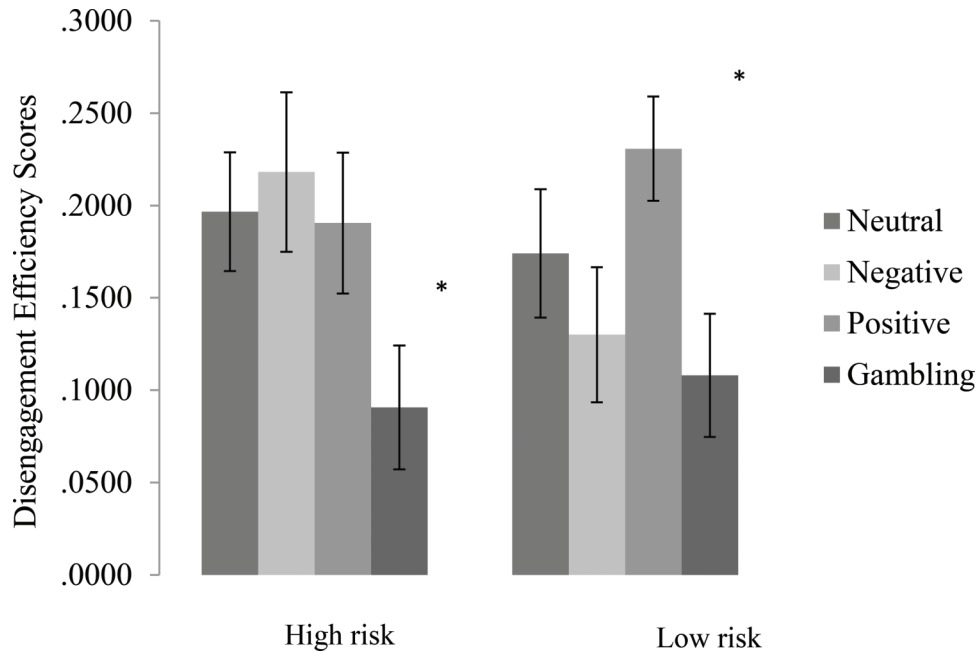


Figure 2. Disengagement efficiency scores (800ms lag accuracy subtract 200 ms lag accuracy) for high- and low-risk gamblers for all distractor types. High-risk gamblers showed poorer disengagement from gambling distractors than they did from all other distractors. Low-risk gamblers showed better disengagement from positive distractors than they did from all other distractors. No other significant differences were observed.

(distractor type) ANOVAs for high- and low-risk groups. For high-risk gamblers, there was a significant effect of distractor type, $p = .001$, with the poorest disengagement scores corresponding to gambling distractors, compared with all other distractor types (all $ps < .05$). No other significant differences were observed. A significant effect of distractor type was also observed among the low-risk gamblers, $p = .01$, revealing superior disengagement for positive distractors ($ps < .01$ for comparisons with negative and gambling distractors, $p = .07$ for positive-neutral comparison). See Figure 2.⁵

Discussion

The current study examined attentional biases for gambling stimuli, relative to emotional and neutral stimuli, in high-risk and low-risk gamblers. To do so, we used an RSVP paradigm, which decomposes different components of attention, namely, attentional orienting and maintenance/disengagement, by using different time lags between distractors and targets. As hypothesized, high-risk gamblers showed the poorest accuracy for targets that were preceded by gambling distractors compared

⁵Although accuracy scores for the longer time lags and disengagement efficiency scores were correlated, they were not redundant. Correlations for accuracy at 800-ms lags and disengagement efficiency scores were .63, .65, .66, and .78 for negative, gambling, neutral, and positive trials, respectively.

with all other distractor types, and this effect was observed only at the longer time lags between distractors and targets (i.e., 800 ms). In fact, the accuracy for targets following gambling distractors on 800-ms lag trials was comparable to chance performance for high-risk gamblers, whereas performance was above chance for targets following the other distractor types. This finding suggests that high-risk gamblers were biased to maintain attention when presented with a gambling distractor and had difficulties disengaging from these items. This interpretation was also supported by the disengagement efficiency score results, whereby high-risk gamblers exhibited the poorest disengagement for gambling distractors, after accounting for initial orienting, relative to all other distractor types, suggesting that gambling pictures were uniquely captivating for this group.

By contrast, low-risk gamblers were equally inaccurate in responding to targets preceded by negative and gambling distractors at the 800-ms time lag (relative to positive and neutral distractors). Indeed, accuracy for targets preceded by both negative and gambling distractors was at chance-level performance. Furthermore, after accounting for initial orienting responses, we found that low-risk gamblers disengaged from gambling items as easily as they did from neutral and negative distractor types. Although high-risk gamblers exhibited a bias for maintaining attention on gambling stimuli that was specific (only for gambling distractors) and robust (detected across both measures of attentional disengagement), low-risk gamblers showed some preferential maintenance of attention to both negative and gambling items, but this maintenance of attention disappeared when initial orienting responses were taken into account.

Our finding that high-risk gamblers exhibit gambling-specific attentional biases corroborates previous work (Boyer & Dickerson, 2003; McCusker & Gettings, 1997; Vizcaino et al., 2013). In addition, it builds on prior work by pinpointing the attentional component involved in these biases (i.e., sustained attention rather than initial orienting) and by measuring the extent of these biases relative to established emotional distractors. Content-specific maintenance biases, such as those observed for gambling cues in our high-risk gambler group, have been found in other clinical phenomena (e.g., dysphoria, obsessive-compulsive disorder) for stimuli relevant to those particular conditions (Koster et al., 2005; Olatunji et al., 2011). It makes sense that clinically meaningful biases be tied to later stages of processing, as earlier attentional biases are more fleeting and may have less enduring consequences. However, unlike the case in previous work (Baron et al., 1995; McCusker & Gettings, 1997; Molde et al., 2010; Vizcaino et al., 2013), there was some evidence of a (non-specific) gambling bias, analogous to biases for negative distractors, in our low-risk gambler group. One reason we detected such a bias, where others have not, may be that we included both non-problem and low-risk gamblers as our control group, whereas others have used non-gamblers, non-problem gamblers, or a mixture of both (Baron et al., 1995; Brevers, Cleeremans, Tibboel et al., 2011; McCusker & Gettings, 1997; Molde et al., 2010; Vizcaino et al., 2013).

As noted, low-risk gamblers displayed attentional biases for negative and gambling stimuli, whereas biases were specific to gambling items in high-risk

gamblers.⁶ This absence of a bias for negative items in the high-risk group is interesting, as biases for negative items are reported in the general population and have been discussed in terms of evolutionary adaptability (Bradley, Codispoti, Cuthbert, & Lang, 2001). One possibility is that as an addictive behaviour becomes more problematic, stimuli that are not related to that behaviour lose salience. For instance, neurophysiological work shows that opiate users have stronger P300 responses to drug-related stimuli than to affective or neutral stimuli and lack the typical enhancement of event-related potentials for non-drug affective stimuli (Lubman et al., 2008). Neurobiological models of addiction also suggest that as individuals increase their involvement with addictive behaviours and substances, neural systems involved in processing natural rewards and threats become dysregulated (Koob et al., 2004).

Evidence for altered reward processing in the high-risk gambler group also comes from group differences in positive distractor effects. In both high- and low-risk groups, there was a facilitative effect of positive stimuli on disengagement, although this was more consistently observed across measures in low-risk gamblers. Accuracy was highest for targets that were preceded by positive distractors in low- and high-risk gamblers, at least at the 800-ms time lag. However, only the low-risk group demonstrated speeded disengagement from positive distractors according to the disengagement efficiency score results. Previous research has found that positive mood promotes certain cognitive functions (Dreisbach & Goschke, 2004; Rowe, Hirsh, & Anderson, 2007), and so perhaps processing of positive cues had similar effects on target responses for low-risk gamblers. It is unclear why the high-risk group did not show this same facilitated disengagement. As noted, one possibility is that positive affective stimuli lose their ability to alter attentional processes for individuals with addiction problems because of deviations in the brain's reward circuits (Koob et al., 2004).

The present study has several important implications for better understanding the nature and treatment of problem gambling. First, prolonged gambling-specific biases in the high-risk gamblers suggest the possibility that sustained attention to gambling cues might be involved in the etiology or maintenance of problem gambling. As attention is a limited resource (Kastner & Ungerleider, 2001), if high-risk gamblers maintain their attention to gambling cues in their environments, they may have few attentional resources free to apply adaptive cognitive or behavioural strategies when they are most needed (e.g., when encountering gambling-salient cues during a quit attempt). In contrast, if we had seen biases at the level of initial orienting responses, this would suggest that gamblers preferentially orient to gambling cues in their environments, but recover attentional resources quickly. Thus, sustained attentional biases would be more problematic in real-world settings. Prolonged gambling-specific biases might represent noteworthy targets for clinical intervention. Clinical studies could also investigate whether reducing sustained attention to gambling cues

⁶These differences in pattern of attentional biases across gambler groups cannot be explained by differences in valence and arousal ratings for the different classes of distractors, as high- and low-risk gamblers' ratings of negative and gambling pictures were not significantly different.

in high-risk gamblers is accompanied by changes in gambling behaviour. Clinical studies with alcohol-dependent patients suggest that addiction-related attentional biases can be modified and that attentional bias modification affects alcohol treatment success (Schoenmakers et al., 2010). Future work is warranted to assess the malleability of gambling biases in high-risk gamblers.

Several potential limitations of the study should be considered. First, the high- and low-risk groups were aggregates of moderate-risk and problem gamblers and of low-risk and non-problem gamblers, respectively. Therefore, we cannot say whether the specificity of the bias for gambling stimuli, in the absence of a bias for negative stimuli, is particular to problem gamblers or is also seen in moderate-risk gamblers. A related study limitation is that we did not include a non-gambler control group. Future research should incorporate non-gamblers to determine whether the bias for both negative and gambling items is specific to low-risk gamblers or appears in the general population. We also need to consider whether the RSVP task is a pure measure of attentional bias, or whether confounding processes (i.e., learning) are at play. It is conceivable that gambling distractor effects in high-risk gamblers emerged because of gambling distractor effects on cross-trial learning rather than because of attention. However, if this were the case, we would expect to see poor split-half reliabilities for the gambling trials; instead, we observed that the split-half reliabilities were satisfactory to high for all trial types. In terms of the selected distractors, the negative stimuli were more arousing than the positive stimuli, which may have contributed to the low-risk gamblers' bias for negative distractors. This is a common problem that arises in research with emotional stimuli, as it is difficult to balance positive and negative stimuli on arousal ratings (Greenwald, Cook, & Lang, 1989). Another limitation was our failure to include a set of non-gambling addiction-relevant distractors (e.g., alcohol); therefore, we cannot conclude whether biases in the high-risk gambling group are specific to gambling cues or occur for addiction-relevant cues more generally. On a similar note, high-risk gambling and heavy alcohol use often co-occur (Grant, Kushner, & Kim, 2002), and so it would have been informative to have data on participants' drinking habits to determine whether history of alcohol use contributed to group differences in task performance. However, considering that group effects emerged only for specific trial types, and not at the level of overall task performance, it appears that there was no general impairment in performance in the high-risk gamblers.

In summary, high-risk gamblers showed sustained attentional biases to gambling-specific distractors. Low-risk gamblers showed some evidence of non-specific attentional biases (for negative and gambling pictures), as well as facilitated disengagement following positive pictures. These findings highlight differences in attentional processes between high- and low-risk gamblers and suggest that sustained attentional biases might be worthy targets for clinical interventions.

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Appendix A



Figure A1. Examples of pictures from publicly accessible sources, which resemble International Affective Pictures System (IAPS) pictures. Copyright restrictions prevented inclusion of images from the IAPS manual.

Appendix B

Figure B1. Series of trial events for last elements of a 200-ms lag trial, beginning with a gambling distractor, followed by a filler image, a rotated target, and response prompts.

Special Issue: *JGI* Scholar's Award, Category B

The Role of Memory Associations in Excessive and Problem Gambling

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Abstract

Outcome expectancies (OEs), or beliefs about the consequences of engaging in a particular behaviour, are important predictors of addictive behaviours. In Study 1 of the present work, we assessed whether memory associations between gambling and positive outcomes are related to excessive and problem gambling. The Gambling Behaviour Outcome Association Task (G-BOAT) was administered to a sample of 96 community-recruited gamblers. On the G-BOAT, participants responded to a list of positive outcome phrases with the first two behaviours that came to mind. Those with more problematic gambling (as measured on the Problem Gambling Severity Index) and greater gambling involvement (as measured by time and money spent gambling on the Gambling Timeline Followback) responded to positive outcome phrases on the G-BOAT with more gambling-related responses. In Study 2, we administered G-BOAT to a community-recruited sample of 61 gamblers, who also completed a computerized reaction time measure of implicit gambling OEs, an explicit self-report measure of gambling OEs, and a measure of gambling frequency. Consistent with Strack and Deutch's (2004) reflective-impulsive model, memory associations on the G-BOAT and positive OE scores on the explicit Gambling Expectancy Questionnaire each predicted unique variance in frequency of gambling behaviour. These studies are among the first to demonstrate the important role of memory associations in excessive and problem gambling.

Keywords: gambling, outcome expectancies, implicit cognitions, explicit cognitions

Résumé

Les résultats escomptés (RE), c'est-à-dire la croyance dans les conséquences d'un comportement donné, constituent une importante variable explicative des comportements liés à la dépendance. L'étude 1 a évalué si des associations mémorielles entre le jeu et des résultats positifs sont reliées aux problèmes de jeu compulsif. La tâche d'association de résultats découlant de comportements liés au jeu (Gambling Behaviour Outcome Association Task [G-BOAT]) a été administrée à un échantillon de 96 joueurs recrutés au sein de la collectivité. Dans le cadre de la G-BOAT, une liste de locutions exprimant un résultat positif était présentée aux participants et ceux-ci devaient répondre en indiquant pour chacune des locutions les deux premiers comportements qui leur venaient à l'esprit. Ceux qui présentaient un problème de jeu plus grave (selon l'indice de jeu problématique) et qui s'adonnaient davantage au jeu (selon le suivi du temps passé à jouer et de l'argent dépensé effectué à l'aide de l'outil Gambling Timeline Followback) ont donné des réponses liées au jeu plus fréquemment que les autres. Dans le cadre de l'étude 2, la G-BOAT a été administrée à un échantillon de 61 joueurs recrutés au sein de la collectivité. Ceux-ci ont en outre fait l'objet d'une mesure informatisée du temps de réponse (TR) pour les RE liés au jeu implicites, d'une autoévaluation des RE liés au jeu explicites et d'une mesure de la fréquence des comportements liés au jeu. Conformément au modèle de réflexion et impulsion de Strack et Deutch (2004), les associations mémorielles obtenues dans le cadre de la G-BOAT et les résultats relatifs aux RE positifs obtenus dans le cadre du questionnaire sur les attentes quant au jeu ont dans les deux cas permis de prévoir une variance unique concernant la fréquence des comportements liés au jeu. Ces études fournissent ainsi un premier ensemble de données probantes relativement à l'importance des associations mémorielles dans l'apparition des problèmes de jeu compulsif.

General Introduction

Outcome expectancies (OEs) are the beliefs an individual holds about the consequences of engaging in a particular behaviour (Leigh, 1989). These OEs can be either positive or negative. For example, a gambler might believe that engaging in gambling will result in feelings of excitement (a positive OE) or that gambling behaviour will lead to feelings of shame (a negative OE). OEs have been frequently studied in relation to a variety of forms of substance misuse. In alcohol research, OEs have been found to contribute to alcohol use, drunkenness, and binge drinking (Dieterich, Stanley, Swaim, & Beauvais, 2013). Positive OEs have a larger impact on hazardous alcohol use than do negative OEs and have a causal role in predicting drinking (i.e., Zamboanga, Horton, Leikowski, & Wang, 2006). Such findings

regarding the importance of OEs in the substance abuse field have led researchers to suggest that OEs may also be important in understanding gambling behaviour (Stewart, Yi, & Stewart, 2014), given the similarities between substance abuse and problem gambling as addictive behaviours (American Psychiatric Association, 2013; Potenza, 2006).

In gambling research, OEs have been measured both directly and indirectly with explicit and implicit cognitive tasks, respectively. In assessing explicit cognitions, individuals are asked to directly introspect about causes or correlates of their behaviour. These types of assessments often involve self-report measures of beliefs, attitudes, and expectancies and are believed to accurately reflect cognitive processes that may govern behaviour. However, given that individuals may take time to consciously and deliberately reflect on their behaviour, it is possible to control or filter responses (Latu et al., 2011; Renner, Gula, Wertz, & Fritzsche, 2014). In contrast, implicit measures tap into thoughts or cognitive processes that do not require an individual's conscious awareness (DeHouwer, 2006). These measures of cognition tap into automatically activated cognitive processes influenced by past experience through means that circumvent conscious deliberation. Hence, implicit measures involve indirect assessments of behaviour that assess relatively non-reflective cognitive processes revealed when an individual applies previously acquired knowledge without awareness. It may be useful to assess both explicit and implicit cognitions, given their theoretical independence.

As outlined in the reflective-impulsive model of Strack and Deutsch (2004), behaviour is controlled by distinct, but interacting, systems: the reflective system and the impulsive system. The reflective system involves conscious decision processes assessed with explicit measures, whereas the impulsive system involves more unconscious associative processes assessed with implicit measures. Both of these cognitive processes are said to independently affect behaviour (Strack & Deutsch, 2004).

To tap into the impulsive system and index associative processes, in the current set of studies, we used an OE measure from the substance use literature and adapted it for use with gamblers, the Gambling Behaviour Outcome Association Task (G-BOAT). The original BOAT was developed for alcohol research: Stacy, Leigh, and Weingardt (1994) theorized that repeated pairings of alcohol use behaviour with positive outcomes lead to those associations being more readily accessible in memory. Consistent with this prediction, Stacy and colleagues (1994) showed that more alcohol-related responses generated on the BOAT were associated with greater self-reported alcohol use. This finding was replicated and extended in a prospective study, with more alcohol-related responses on the BOAT predicting future alcohol use (Stacy, 1997).

Consistent with the original alcohol BOAT, participants completing the G-BOAT are instructed to read outcome phrases (some potentially associated with gambling) and respond quickly with the first behaviours or actions that come to mind. No mention of the target behaviour appears in the instructions. Thus, the task allows for

free competition among behavioural associates of the ambiguous outcomes presented. Any outcome that has previously been associated with a behaviour (e.g., having fun while gambling) is expected to elicit a related response from memory. These associations may be activated by the presentation of an expected outcome, even without the individual's conscious awareness of this association. If an individual repeatedly achieves a given outcome by engaging in a particular behaviour, then the memory association between the behaviour and the outcome is strengthened and should become highly accessible. Memory associations are established and strengthened through repetitive experiences with a target behaviour (Stacy, 1995, 1997), and the strength of established associations between a behaviour (e.g., gambling) and its outcomes determines whether a gambling-consistent cognitive state is easily activated (Stacy, 1995, 1997). After gambling-consistent associations are established, desiring a particular outcome (e.g., having fun) may automatically activate thoughts about gambling behaviour and elicit associated patterns of behaviour.

The G-BOAT requires automatic thought by requesting immediate associations (much like Jung's free-association procedure; Jung & Von Franz, 1964). The task is an indirect measure of behaviour-specific associations, tapping into associations between possible behavioural outcomes and a target behaviour—in this case, between gambling behaviour and positive outcomes (i.e., how readily gambling behaviours come to mind when presented with a potential gambling-related outcome).

In the present project, the G-BOAT was used in a set of two studies that are among the first to investigate the role of memory associations in excessive and problematic gambling. In Study 1, we investigated relations between (a) memory associations between gambling and gambling-related outcomes on the G-BOAT and (b) time and money spent gambling, as well as gambling problems. In Study 2, we determined whether the G-BOAT explained unique variance in gambling frequency, after we accounted for variance explained by an explicit self-report measure of gambling OEs. We also calculated variance in gambling frequency that was jointly contributed by G-BOAT and explicit gambling OE measures, thereby demonstrating the shared and distinct predictive utility of automatic memory associations and explicit OEs. As a secondary aim in Study 2, we examined the correlation between G-BOAT scores and reaction times (RTs) on another implicit measure of gambling OEs (the Affective Priming Task), as well as the explicit self-report measure of gambling OEs.

Study 1

Versions of the BOAT have been previously used to study the role of memory associations in substance use. For example, Stacy et al. (1994) showed that alcohol-related BOAT responses were associated with alcohol use, with the number of alcohol-related responses generated on the BOAT showing a positive correlation with frequency of self-reported alcohol use. A version of the BOAT was also developed for use in marijuana research (i.e., the M-BOAT). Responses on the M-BOAT were found to be a strong, independent predictor of marijuana use (Ames et al., 2007). Because the BOAT and M-BOAT have been established for use in the

study of alcohol and marijuana use, respectively, which share similarities with other addictive behaviours, such as gambling, it is important to consider the usefulness of the BOAT in gambling research. With more comprehensive measures of gambling OEs, including memory association tasks, researchers stand to learn more about the cognitive processes involved in problem gambling.

The current study examined how memory associations between outcomes and gambling, as reflected by self-generated gambling-related responses on the G-BOAT implicit task, correlate with excessive and problem gambling. Specifically, positive correlations were expected between both time and money spent gambling and gambling-related G-BOAT responses. Similarly, a positive correlation was expected to exist between problem gambling severity on the Problem Gambling Severity Index (PGSI) and gambling-related G-BOAT responses.

Method

Participants. Ninety-six gamblers (66 men and 30 women) were recruited from the community via posters, newspaper advertisements, and local classified websites. Participant ages ranged from 19 to 71 years ($M = 29.6$; $SD = 12.1$). Participants must have engaged in any of the following at least once over the past 90 days: online gambling, casino gambling, casino games outside of a casino, electronic gambling machines, horse betting, or dice games for money. Participants' first language had to be English given the verbal nature of the G-BOAT, and those who were actively trying to quit gambling were excluded from the study (to prevent an inadvertent precipitation of relapse; Binde, 2009). Eligibility was confirmed via phone screening. The data for only 95 participants (65 men, 30 women; mean age = 29.7 years) were included in the present study because one participant did not provide full data on all measures. These participants were part of a larger study concerning the effects of gambling advertisements on gambling expectancies (Stewart, Yi, Ellery, & Stewart, 2016). All data presented in the current study were collected from participants prior to exposure to any gambling advertisements. Participants in the current study were aware they were participating in a gambling study, which was necessary, as we were interested in recruiting gamblers and for ethical reasons wished to avoid deception or misdirection.

According to PGSI scores, the sample consisted of 11 non-problem gamblers, 27 low-risk gamblers, 39 moderate-risk gamblers, and 19 high-risk or problem gamblers. PGSI scores ranged from 0 to 21 and the average score was in the moderate-risk range (see Table 1).

Procedure. At the time of recruitment, participants completed the PGSI and screening for study eligibility. Those participants who met the eligibility requirements came into the lab for a testing session. First, they provided written informed consent and then they completed the G-BOAT, followed by the Gambling Timeline Followback (G-TLFB). Participants completed a number of other tasks during this

Table 1

Correlations and Descriptive Statistics for G-BOAT, PGSI, Money Spent Gambling in Last 90 Days (G-TLFB-Money), and Time Spent Gambling in Last 90 Days (G-TLFB-Time) (Study 1)

	G-BOAT	PGSI	G-TLFB-Money	G-TLFB-Time
G-BOAT	-			
PGSI	.507**	-		
G-TLFB-Money	.353**	.339**	-	
G-TLFB-Time	.363**	.671**	.255*	-
Mean (SD)	1.21 (1.80)	4.73 (4.57)	\$349.27 (609.30)	1,197.18 min (2910.58)

Note. G-BOAT= Gambling Behaviour Outcome Association Task; PGSI= Problem Gambling Severity Index from the Canadian Problem Gambling Index (Ferris & Wynne, 2001); G-TLFB-Money = Gambling Timeline Followback - money dimension (Weinstock et al., 2004); G-TLFB-Time = Gambling Timeline Followback - time dimension (Weinstock et al., 2004).

* $p < .05$. ** $p < .01$.

lab session, but only those tasks that are relevant to the current study are reported. Participants were compensated \$30 for their time and effort.

Materials

Gambling Behaviour Outcome Association Task (G-BOAT). Participants were given the 21-item pencil-and-paper word association task containing 10 phrases denoting outcomes potentially associated with gambling-related behaviour, interspersed with 11 control outcome phrases unlikely to be associated with gambling. Instructions provided to the participants were as follows: “Please write the first and second action or behaviour that each phrase makes you think of. Each response should be honest and immediate.” The 10 potentially gambling-related outcome phrases include items such as “I feel relaxed” or “I have fun,” and the neutral phrases included items such as “Pleasing relatives” or “Gaining intelligence.” Two research assistants independently scored whether the responses to the 10 items of interest were gambling-related (1) or not (0) across all participants. Any outcome phrases left blank were scored as non-gambling responses; blanks were infrequent (1.2%). As each gambling-related response was given a point, the possible range of scores on the task was 0–20. Values for skewness and kurtosis were 1.83 and 3.11, respectively, indicating that G-BOAT scores were approximately normally distributed, but with a slight positive skew. As such, we present analyses using the G-BOAT scored both continuously and dichotomously (i.e., 1 for any gambling responses vs. 0 for no gambling responses on the G-BOAT).

Problem Gambling Severity Index (PGSI). The PGSI is part of the Canadian Problem Gambling Index, which measures both problem gambling behaviour and the consequences of that behaviour (Ferris & Wynne, 2001). Participants were requested to respond, using a scale of 0 (*never*) to 3 (*always*), regarding how often a given behaviour or consequence had happened with respect to their gambling in the last 12 months. Total scores across this nine-item index can be used to place gamblers

into different categories of problem gambling severity: non-problem gambler (score of 0), low-risk gambler (score of 1–2), moderate-risk gambler (score of 3–7), or high-risk gambler (score of 8 or more). Scores can also be treated continuously, as they were in the present study, to assess the severity of gambling problems. This measure has shown good internal consistency ($\alpha = .84$) and adequate test-retest reliability ($r = .78$) in prior work (Wynne, 2003). In the present sample, the internal consistency for the PGSI was good at $\alpha = .86$.

Gambling Timeline Followback (G-TLFB). The G-TLFB method uses a calendar to retrospectively record frequency and intensity of the target behaviour along multiple dimensions (Weinstock, Whelan, & Meyers, 2004). The calendar is used to elicit specific memory cues (e.g., special events) to help anchor participants' retrospective accounts of their target behaviour. Use of this method originated in alcohol research (Sobell, Maisto, Sobell, & Cooper, 1979) and its validity has been established through many subsequent studies with alcohol and other addictive substances (e.g., Brandon, Copeland, & Saper, 1997; Carey & Maisto, 1987; Dawes, Frank, & Rost, 1993; Hersh, Mulgrew, Van Kirk, & Kranzler, 1999).

The G-TLFB assesses gambling behaviour across several dimensions, including time and money spent gambling. Participants in the current study were given a calendar to retrospectively record their gambling behaviour over the past 90 days. Weinstock and colleagues (2004) examined the use of the G-TLFB method in young gamblers ($M\ age = 21.5$ years) and found that it demonstrated good concurrent validity with gambling screening measures, including the Massachusetts Gambling Screen (Shaffer, LaBrie, Scanlan, & Cummings, 1994) and the South Oaks Gambling Screen (Lesieur & Blume, 1987). The same G-TLFB was used in the current study to examine two dimensions of gambling: time spent gambling, in minutes, and money spent gambling, in dollars. These two indices were selected because previous gambling research has found positive OEs to correlate with time and money spent gambling (Stewart, Stewart, Yi, & Ellery, 2015).

Results

First, the reliability of the G-BOAT scores across two raters was examined. To examine the degree of agreement of overall scores, we used Pearson correlations of each rater's total scores. To examine agreement at the item level, we used the kappa coefficient. Inter-rater reliability for the G-BOAT was high for both indices ($r = .97$, $\kappa = 0.89$), indicating that raters showed strong agreement at both the total score and individual item levels. Because of the high inter-rater agreement, the following primary analyses were conducted using only the first rater's coding. The same significant correlations emerged when we used the second rater's scores in analyses.

Pearson correlational analyses were conducted to examine any relationships between the G-BOAT and the two criterion measures (PGSI and G-TLFB). Significant positive relationships were found between the G-BOAT and PGSI, as well as between the G-BOAT and both time and money spent gambling, as measured on the G-TLFB.

However, given that over half (54.6%) of the participants did not provide a gambling-related response, we performed supplemental sensitivity analyses to test the robustness of our original analyses, using point biserial correlations with G-BOAT scores as a dichotomous variable. The pattern and significance of the correlational results remained the same when a dichotomous variable was used to indicate “no” or “one or more” gambling-related responses on the G-BOAT, as reported above with the use of a continuous variable and Pearson correlational analyses (see Table 1).

Discussion

The primary aim of Study 1 was to investigate memory associations between gambling behaviour and positive outcomes using the G-BOAT and to examine whether such memory associations are related to gambling involvement and gambling problems. This adapted indirect measure of memory associations showed a high inter-rater reliability across two indices, suggesting it can be scored reliably at the level of the individual item and the total score. Moreover, the expected positive correlation between G-BOAT and PGSI scores implies participants with more problematic gambling (as indicated by higher PGSI scores) were more likely to generate gambling-related behavioural responses when positive outcomes were presented. Similarly, and as expected, those participants who showed more involvement in gambling (indicated by the time and money spent indices from the G-TLFB) were also more likely to generate more gambling-related behavioural responses to the ambiguous outcome phrases on the G-BOAT. This finding suggests that those who are more involved in gambling have more implicit memory associations between gambling and positive outcomes. This could be because greater gambling involvement provides more learning opportunities to form stronger associations between gambling and positive outcomes and/or because stronger automatic memory associations promote greater gambling involvement.

Of note is that a large number of participants did not provide any gambling-related responses. This was likely because the participants were not necessarily regular gamblers but had simply performed a gambling-related behaviour in the past 3 months. Because the G-BOAT does not identify a target behaviour, it can result in low-frequency responses generated in response to stimuli, since any associate of the presented outcome can be generated, thus allowing free competition among learned associates to various ambiguous outcomes. This is unlike implicit RT tasks that tend to assess relative associations and provide specific categories and exemplars chosen for the task. On the G-BOAT, as gambling behaviour increases, it is expected that more gambling-related responses will be generated.

The G-BOAT and other implicit measures are useful additions to the gambling research field, given the potential problems with social desirability on explicit tasks when assessing behaviour (Ladouceur et al., 2000). An advantage to the use of the G-BOAT is that it is time efficient, cost-effective, and easily administered and it scored in comparison to some existing implicit RT measures of gambling OEs (Stacy et al., 1994). Use of various implicit measures in conjunction with explicit tasks

allows for assessment of both reflective and impulsive systems with respect to gambling behaviour (Stewart et al., 2014), a focus of Study 2.

Study 2

Study 2 served to further examine the utility of memory associations in gambling research by examining the relations of responses on the G-BOAT with other established measures of gambling OEs. Specifically, we examined the correlations of the G-BOAT with the Gambling Expectancy Questionnaire (GEQ; a self-report questionnaire established as an explicit gambling OE measure; Gillespie, Derevensky, & Gupta, 2007b) and the Affective Priming Task (an implicit computerized RT task; Fazio, Sanbonmatsu, Powell, & Kardes, 1986). In addition, we investigated whether the G-BOAT memory association task explained unique variance in gambling frequency, after we accounted for variance explained by an explicit self-report measure of gambling OEs. Finally, in Study 2 we recruited individuals with more gambling experience in order to evaluate the influence of greater gambling involvement on behavioural responses generated on the G-BOAT.

The GEQ is a commonly used explicit measure stemming from methods for measuring expectancies in alcohol use. Developed by Gillespie, Derevensky, and Gupta (2007a), this 23-item questionnaire focuses on consciously expected positive and negative outcomes from gambling, measured across five scales. The GEQ has been shown to be valid in predicting problem gambling, with problem gamblers scoring higher than non-problem gamblers on both positive and negative OEs (Gillespie et al., 2007b).

In addition to assessing implicit cognitions through memory association tasks such as the BOAT, one can use computerized RT measures as alternative indirect measures of these automatic associations. For example, these associations can be measured through an Affective Priming Task (Fazio et al., 1986), which is an RT task measuring the time it takes to respond to positive or negative adjectives that are preceded by primes. The speed at which the positive evaluation of gambling is called upon from memory is reflected in the latency to categorize positive adjectives that are preceded by gambling primes (Fazio et al., 1986). Comparable implicit affective tasks have been applied in the gambling literature, whereby positive or neutral, or negative or neutral, attribute words were intermixed with gambling pictures and participants were required to rapidly identify the type of word (Brevers et al., 2013). In the current study, we used a version of Fazio et al.'s task, modified by Stewart et al. (2014), to measure RT latencies to respond to gambling-relevant outcomes preceded by gambling and non-gambling pictures. Although both negative and positive OEs were presented, the current study's analyses focused on RTs to categorize positive OEs, as these were the type of OEs examined in the G-BOAT. Stewart and colleagues (2015) demonstrated the validity of the Affective Priming Task in predicting gambling behaviour, as measured by self-reported gambling.

We predicted that the G-BOAT would show convergent validity with both the GEQ and the Affective Priming Task. We were also able to examine the discriminant

validity of the G-BOAT by determining whether it correlated specifically with gambling trial RTs of the Affective Priming Task, and not with non-gambling (control) trial RTs. In line with Strack and Deutsch's (2004) reflective-impulsive model of behaviour, which suggests that implicit and explicit cognitions independently affect behaviour, we hypothesized that implicit (G-BOAT) memory associations and explicit (GEQ) measures would uniquely predict gambling frequency, thus reflecting the incremental validity of automatic memory associations.

Method

Participants. Sixty-one adult regular gamblers were recruited from two universities and the community at large. The sample of participants was predominantly male (37 males, 24 females) with an average age of 46.36 years ($SD = 19.56$) and a range of 19–80 years. The average gambling severity of the participants was moderate, as measured by the PGSI ($M = 4.46$, $SD = 4.48$).

To be eligible, participants had to be regular gamblers (i.e., have gambled a minimum of three times in the 2 months prior to the study at a casino, online, or on electronic gambling machines), be at least 19 years of age, speak English as their first language, and not be actively trying to quit gambling. Participants were recruited via advertisements posted around the universities, on SONA (a university website listing current psychological research studies), on classified websites (e.g., Kijiji), and on social networking websites (e.g., Facebook). Participants were part of a larger study examining the effects of lab context on gambling behaviour and OEs (Hudson, Gough, Yi, & Stewart, 2016).¹ As in Study 1, participants were aware they were participating in a study on gambling.

Procedure. After eligibility was determined by phone screenings, participants were scheduled to come to the lab for a testing session. Upon arrival, written informed consent was obtained. The tasks of interest were then completed in the following order: the Affective Priming Task, GEQ, and G-BOAT. After completing these tasks, participants completed the PGSI for sample description purposes. Participants completed a number of other tasks during this lab session, but only those tasks that are relevant to the current study are reported here. Participants were compensated \$20 or 1.5 credit hours toward an eligible class (only for students at the university where the study was conducted).

Measures

Gambling Frequency. As part of the eligibility screening, participants had to indicate how often they gambled in the past 2 months. This was also used as a measure of gambling frequency in analyses.

¹Participants in both lab environments responded similarly on all measures presented in the current study and thus results were collapsed across lab contexts.

Behaviour Outcome Association Task. Participants completed the G-BOAT as in Study 1. Once again, two independent raters scored the task, blind to each other's scores. Only the first rater's scores were used in analyses. Similar findings were observed when analyses were conducted by using the second rater's data.² Values for skewness and kurtosis were 2.02 and 4.28, respectively, indicating that G-BOAT scores were slightly positively skewed. As such, we conducted analyses with dichotomous G-BOAT scores (1 for any gambling responses vs. 0 for no gambling responses on the G-BOAT), as well as with the more traditional continuous BOAT score.

Gambling Expectancy Questionnaire (GEQ). Participants completed the 23-item explicit GEQ (Gillespie et al., 2007a). This is a pencil-and-paper task in which participants are asked to rate on a scale of 1 (*no chance*) to 7 (*certain to happen*) their belief as to how likely the stated outcome is to happen as a consequence of gambling. Items include, for example, "I get rich" or "I feel excited." The five scales of the GEQ represent both positive (enjoyment/arousal, self-enhancement, and money) and negative (over-involvement and emotional impact) gambling OEs (Gillespie et al., 2007a). Each participant was given a total score for an overall higher order positive subscale of the GEQ, calculated by summing across the three positive subscales (see Stewart et al., 2015). This higher order subscale showed good internal reliability in the present study ($\alpha = .86$). Only the positive subscale score was used in the current study, as we were interested in examining convergence with the G-BOAT.

Affective Priming Task. Participants completed this task on the computer, where they viewed a prime picture (gambling or non-gambling-related) for 200 ms, followed by a blank screen for 100 ms and then an OE target word (positive or negative), and were required to respond to the target word with a key press. If the word was positive, half the participants were instructed to respond by clicking the "Z" key, and for negative words, the "/" key. The other half of the participants had these keys reversed to control for any right-hand dominance. The RT latency between the time the target word was presented and the key was pressed was the measure of interest here. The positive and negative gambling OE target words used in the task were selected from a review of self-report measures on gambling OEs (Stewart et al., 2014), including words such as "fun" and "winning." Only trials involving positive OE target words were included in the analyses, as we were interested in examining correlations with the G-BOAT, which assessed only positive OEs. The Affective Priming Task has been shown to have good validity and good internal consistency, with split-half reliabilities that are satisfactory to high (Hudson et al., 2016; Stewart et al., 2015).

Results

To examine convergence between responses generated on the G-BOAT and the other two gambling OE measures used in the study (GEQ and Affective Priming Task), we conducted Pearson correlational analyses. Two research assistants independently

²Findings remained the same when analyses were conducted by using the second rater's data, although the correlation between the G-BOAT and RT measure became marginally significant ($p = .08$).

Table 2

Correlations and Descriptive Statistics for the G-BOAT, GEQ, and Affective Priming Task (Study 2)

	G-BOAT	GEQ	Priming task (gambling)	Priming task (non-gambling)
G-BOAT	-			
GEQ	.38**	-		
Priming task (gambling)	-.29*	-.25	-	
Priming task (non-gambling)	-.22	-.19	.87**	-
Mean (SD)	1.65 (2.17)	3.98 (.75)	1,049.47 ms (400.14)	1,027.78 ms (345.03)

Note. G-BOAT = Gambling Behaviour Outcome Association Task; GEQ = Gambling Expectancy Questionnaire (Gillespie et al., 2007a). Priming task (gambling) = reaction times (RTs) for positive outcome words on gambling-primed trials. Priming task (non-gambling) = RTs for positive outcome words on non-gambling-primed trials.

* $p < .05$. ** $p < .01$.

scored participants' responses on the G-BOAT, rating whether the response was gambling related or not, providing a summed continuous gambling score for each participant with a possible range of 0–20. Since 37.1% of participants did not respond to any of the G-BOAT phrases with a gambling-related response, supplemental analyses were conducted by using a dichotomous variable approach (1 for any gambling responses vs. 0 for no gambling responses on the G-BOAT). The results were identical in pattern and significance to those obtained by using the analyses of continuous variables, except in one case, which is noted below.

Further, given the high inter-rater reliability ($r = .96$ and $\kappa = 0.88$), subsequent analyses were completed with the first rater's responses only. Any outcome phrases left blank were scored as a non-gambling response; blanks were infrequent. Less than 1% of spaces for the G-Boat were left blank.

A significant negative correlation was found between the G-BOAT and RTs to the gambling-primed positive trials on the Affective Priming Task (Table 2). Moreover, this relationship to the G-BOAT was specific to the gambling-primed trials, as there was no significant correlation between G-BOAT scores and RTs to the non-gambling primed trials on the Affective Priming Task (Table 2). A positive correlation of similar magnitude was also found between the G-BOAT and the higher order positive subscale of the explicit measure, the GEQ (see Table 2). Thus, as predicted, the G-BOAT showed convergence with two established measures of gambling OEs. However, the significant negative correlation between the G-BOAT and the Affective Priming Task gambling-primed trials did not persist when we used the dichotomously scored G-BOAT.

To examine the incremental contributions of the G-BOAT and the self-report measure of positive gambling OEs in predicting gambling frequency, we conducted two separate hierarchical regressions. In the first model, the GEQ was entered in the first step and the G-BOAT was entered in the second step, with self-reported gambling frequency as the dependent variable. In the second model, the G-BOAT

was entered in the first step and the GEQ was entered in the second step, with self-reported gambling frequency as the dependent variable. In the first model, after we controlled for the GEQ, the G-BOAT remained a significant unique predictor of gambling frequency ($\Delta R^2 = .13, p < .01$). In the second model, after we controlled for the G-BOAT, the GEQ remained a significant unique predictor of gambling frequency ($\Delta R^2 = .06, p = .04$). Together, the GEQ and G-BOAT accounted for 29% of the variance in gambling frequency (cumulative $R^2 = .29$), with 45% of that explained variance being uniquely contributed by the G-BOAT, 21% being uniquely contributed by the GEQ, and the remainder (34% of the variance) being shared between the G-BOAT and the GEQ (Figure 1).

To determine whether the tendency to make a gambling response (y/n) on the G-BOAT varied across the two studies (which used gamblers with differing levels of involvement), we conducted a chi-square test. Results revealed that significantly more participants gave at least one gambling response on the G-BOAT in Study 2 than in Study 1 ($\chi^2 = 6.52, p = .011$). This may reflect a tendency to associate gambling behaviours with the positive cues for gamblers who show greater gambling involvement, given that inclusion criteria entailed more frequent gambling in Study 2 than in Study 1.

Discussion

The purpose of this study was to examine distinct and overlapping contributions of implicit and explicit measures of positive gambling OEs in predicting frequency of gambling activities. We also determined whether the G-BOAT showed convergence with established gambling OE measures. Results indicated that the G-BOAT showed significant correlations with both the explicit and implicit tasks used in the study. These results imply that those participants who immediately responded to positive outcome phrases with gambling-related behaviours on the G-BOAT also tend to self-report more positive OEs on the GEQ. Similarly, those who responded with more gambling-related behaviour on the G-BOAT also displayed faster RTs to gambling-primed positive words on the Affective Priming Task. It is noteworthy, however, that the correlation between the G-BOAT and Affective Priming Task did not remain statistically significant when we used the second rater's data, or when we used a dichotomous G-BOAT variable. The failure of this relation to hold up to sensitivity tests may reflect different aspects of automatic memory associations assessed by the two tasks (Ames et al., 2007).

These results further support the use of the G-BOAT within gambling research, as these correlations generally show this task to have convergent validity with other established gambling OE measures. With regard to the nature of the G-BOAT, findings suggest it contains elements of both implicit and explicit tasks. The G-BOAT was designed as an implicit task because it requires quick, automatic thought. However, in this study, the G-BOAT also required written responses and had no imposed time limit, thus allowing for potential deliberation, which may explain the contribution of explicit processes to the task. The G-BOAT also appears to have discriminant validity, based on our finding that G-BOAT responses were associated with latencies to respond on gambling-primed trials of the Affective

Priming Task, but not with non-gambling (control) primed trial RTs. However, we were unable to show that the relation with the gambling-primed trial RTs was significantly stronger than the relation with the non-gambling-primed trial RTs.

The finding that the G-BOAT contributed unique variance in predicting gambling frequency, as well as variance that was shared between the G-BOAT and the GEQ, highlights the importance of using both measures in assessing OEs in gambling. These findings also speak to the incremental validity of the G-BOAT in that memory associations were found to predict gambling frequency over and above the prediction by self-reported positive OEs on the GEQ alone. In terms of clinical implications, these results illustrate the potential need to target both implicit and explicit gambling OEs in treating excessive gambling.

General Discussion

These two studies suggest that automatic memory associations are important to consider in gambling research because they may lead to or affect gambling behaviour, potentially increasing the likelihood of excessive and problem gambling (Stewart et al., 2015). Furthermore, automatic memory associations as assessed with the G-BOAT added unique and shared variance with an existing self-report measure of positive gambling OEs when predicting gambling frequency. Our results support the notion that explicit and implicit measures tap different cognitive systems and both are crucial to include in examining gambling OEs.

In Study 1, we adapted the G-BOAT from a measure that was previously used in alcohol and substance use research to one that was specific to gambling, and we tested how gambling responses on the G-BOAT are associated with excessive and problem gambling in a sample of community-recruited gamblers. Greater gambling responses on the G-BOAT were associated with greater gambling involvement and more gambling-related problems, as measured by the G-TLFB and PGSI, respectively. Study 2 demonstrated that the G-BOAT correlates significantly with two established measures of gambling OEs (i.e., the GEQ and the Affective Priming Task), and that automatic memory associations on the G-BOAT uniquely predict variance in gambling frequency, above and beyond that accounted for by self-reported OEs. Both studies established strong inter-rater reliability for the G-BOAT across two raters at both the individual item and the total score level.

It is important to take into consideration some limitations of these studies for future research. RT tasks may be less subject to social desirability bias, since the G-BOAT requires verbalization or self-generation of an action or behaviour, and it is therefore possible that some individuals may filter or block associative responses by writing down something other than the first behaviour or action, as instructed. However, the instructions ask participants to provide an immediate response, and those with strong associations between gambling and associated outcomes are more likely to write down a gambling-related response if the behaviour is highly accessible in memory. Furthermore, with open-ended association tasks such as the G-BOAT, the

strength of associations can be evaluated. Since the task does not provide a target behaviour, any associate of any behaviour can be generated in response to ambiguous outcomes based on accessibility of associations in memory (Stacy et al., 1994), something that RT tasks cannot do directly. Rather, RT tasks infer strength of associations through speed of activation of the outcome following presentation of the behaviour or vice versa. Further, RT tasks tend to constrain association categories or limit the possible connections among potential associates; that is, there is no generation of associates, only reaction to the associates provided that may or may not be meaningful to the individual. Another potential limitation is that it is possible that participants were primed to respond to the G-BOAT outcomes with gambling-related responses, given their awareness that they were participating in a study on gambling involvement. However, this provision of information was necessary in order to recruit participants who met gambling inclusion criteria, as well as to avoid misdirection or deception. Furthermore, the low gambling response rate on the G-BOAT suggests that this was likely not an issue.

It is also possible that G-BOAT statements could be processed as antecedents to gambling behaviours rather than outcomes (e.g., “when I am making money, I will gamble” rather than “when I gamble, I will be making money”). This limitation is inherent in other implicit measures of OEs as well. Priming effects on the G-BOAT may have been at play, as both studies were part of larger gambling studies, though care was taken to present the G-BOAT before the G-TLFB and on a different occasion from the PGSI in Study 1. Additionally, if priming effects were present, we would expect to see higher mean levels of gambling responses on the G-BOAT in Study 2. In contrast, gambling responses occurred in relatively low frequency on the G-BOAT in both studies. Even with this low rate of gambling responses, G-BOAT responses were predictive of important outcomes. Future work could examine whether gambling response rates are higher on this measure in a clinical sample of problem gamblers.

Future research might also consider imposing time limits for responding to the outcome phrases on the G-BOAT to ensure greater automaticity of responses. This could help better establish the G-BOAT as an implicit task (Palfai & Wood, 2001; Stacy, 1997; Stacy et al., 1994). In fact, minimizing time to respond is consistent with the use of this task in the study of alcohol and marijuana use behaviours (e.g., Ames et al., 2007). Creating a computerized version of the G-BOAT would be ideal for setting time constraints (e.g., Ames, Grenard, & Stacy, 2013; Grenard, Ames, & Stacy, 2013). Future gambling research might look at how gambling cue exposure affects the generation of gambling responses on the G-BOAT (see Stewart et al., 2014, for a relevant design) and might examine the G-BOAT’s psychometric properties in a clinical sample.

To advance understanding of gambling behaviour, it is important to use a variety of methods to tap into both deliberate/reflective and automatic cognitive processes when conducting gambling research. Indeed, Study 2’s finding that the G-BOAT and GEQ contributed shared *and unique* variance in explaining gambling frequency

speaks to the importance of including both types of measures in assessing OEs. Further, in supplemental sensitivity analyses, it was shown that the G-BOAT and the Affective Priming Task were non-redundant. This finding further points to the strength of the use of multiple methods for assessing cognitive processes. Both the G-BOAT and computerized RT tasks provide different methods of tapping various aspects of associations in memory (Ames et al., 2007).

By using both explicit and implicit measures, one can assess gambling OEs more broadly, as explicit and implicit cognitions have been shown to be acquired differently, to guide behaviour differently, and to express themselves differently physiologically (McLelland, Koestner, & Weinberger, 1989). Stewart et al. (2015) found the Affective Priming Task and the GEQ contributed both unique and shared variance in predicting gambling behaviour, as measured by the G-TLFB. Our results build on this work by demonstrating similar findings with an alternative implicit measure of gambling OEs. The promising results seen here with the G-BOAT suggest that future research should adapt other implicit association measures from the alcohol and drug use literature, such as Stacy's (1995) ambiguous cueing memory association task, for potential use in further examining the role of automatic memory associations in problematic gambling.

Although the present research evaluated the additive, independent, predictive effects of explicit and implicit cognitions with respect to gambling, current research in other addictive behaviours has shown interactive or dual-process effects by using several methods (e.g., Ames et al., 2013; Grenard et al., 2008, 2013; Houben & Wiers, 2009; Thush et al., 2008). In a dual-process approach, decisions to engage in a particular behaviour are believed to result from an interaction between impulsive/associative and reflective/control systems. In a commonly studied form, this interaction suggests that the reflective system may dampen or block effects of implicit associations on behaviour. Dual-process interaction and longitudinal research are needed to further the understanding of gambling behaviour.

In sum, with sound measures of OEs in place such as the GEQ, the Affective Priming Task, and now the G-BOAT, researchers will be able to learn more about gambling behaviour and ultimately use that information for problem gambling treatment and prevention. In the clinical setting, methods are used that target both implicit and explicit gambling OEs. Alcohol research has shown that altering these expectations leads to successful reduction in drinking (Darkes & Goldman, 1993; Houben, Havermans, & Wiers, 2010; Wiers, Van de Luitfaarden, van den Wildenberg, & Smulders, 2005). Methods aimed at reducing positive gambling OEs—both explicit OEs and automatic memory associations—may help in the treatment of problem gambling.

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Moderate-Risk and Problem Slot Machine Gamblers: A Typology of Gambling-Related Cognitions

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Abstract

Cognitive distortions are said to play a key role in the development and maintenance of problem gambling, as well as in its treatment. Toneatto's (1999, 2002) typology of gambling distortions provides a useful conceptualization of gambling-related cognitions, although game-type specification is absent from his analysis. Toneatto's categorization was used in the present study to organize the beliefs of 43 slot machine gamblers experiencing either moderate-risk or problem gambling, recruited and interviewed in Toronto, Canada. The typology captured many of the gambling-related cognitions, although specific beliefs held by this sample of slot machine gamblers required revision of the original typology. This study provides unique insight into the cognitive structure of these beliefs, as described by gamblers, and their frequency count, suggesting that game type is an important factor when identifying and describing gambling-specific cognitive distortions.

Keywords: gambling subtypes, cognitive distortions, qualitative methods, irrational beliefs, slot machine gambling

Résumé

Les distorsions cognitives joueraient un rôle dans l'apparition et le maintien des problèmes de jeu, ainsi que dans leur traitement (Cunningham, Hodgins et Toneatto, 2014; Cunningham, Hodgins, Toneatto et Murphy, 2012; Fortune et Goodie, 2012). La typologie des distorsions cognitives liées au jeu de Toneatto (1999, 2002) est à ce titre un outil utile pour conceptualiser les processus cognitifs des joueurs, bien que l'analyse ne précise pas les types de jeux de hasard en cause (Milosevic et Ledgerwood, 2010). Le présent article cherche à organiser à l'aide des catégories de Toneatto (1999, 2002) les croyances de 43 utilisateurs d'appareils à sous présentant un risque moyen ou problématique, recrutés et interviewés à Toronto (Canada). En conclusion, cette typologie permet de rendre compte de nombreux processus cognitifs liés au jeu, bien que certaines des croyances propres à cet échantillon de joueurs utilisant

des appareils à sous aient nécessité une révision des catégories initiales. Fournissant un aperçu unique de la structure cognitive associée à ces croyances, telles qu'elles ont été décrites par les joueurs et selon leur nombre d'occurrences, cette étude donne à penser que le type de jeu de hasard en cause constitue un facteur important pour cerner et décrire les distorsions cognitives rattachées au jeu.

Introduction

It is well documented that gamblers' maintain erroneous beliefs¹ that assume causal explanations in games of chance (Fortune & Goodie, 2012; Goodie & Fortune, 2013). Such beliefs are also said to be more pronounced in problem versus social gamblers (Joukhador, Blaszczynski, & MacCallum, 2004). The importance of these beliefs in understanding gambling behaviour is well demonstrated by the wealth of research on them and by the published instruments used to measure distortions in gamblers (Goodie & Fortune, 2013). A growing area of interest in the gambling literature is specification by gambling subtype, including by game type (Raylu & Oei, 2002; Toneatto & Millar, 2004; Toneatto, Turner, Zack, Farvolden, & Bagby, 2007). Important game type differences in cognitive biases have been alluded to (Czerny, Koenig, & Turner, 2008), although little research has focused on this area. Myrseth, Brunborg, and Eidem's (2010) study is one exception, in which the authors found that the illusion of control was more pronounced for individuals favouring games of skill versus games of chance.

The most detailed account of gambling-related cognitions (Toneatto, 1999, 2002) lists and describes an array of cognitive distortions known to occur in heavy gamblers. This typology provides a necessary conceptualization of gambling cognitions, but its construction relies on data from a range of studies with heterogeneous samples, including studies without subtype specification and samples of recreational gamblers who are not experiencing gambling problems (Toneatto, 1999). A fuller understanding of these beliefs is particularly important in light of research that suggests cognitive distortions play a role in the conduct and development of pathological gambling (Cunningham, Hodgins, & Toneatto, 2014; Goodie & Fortune, 2013). Thus, researchers describe therapies that emphasize correction of disordered thinking as having good promise (Fortune & Goodie, 2012).

This study frames the analysis of 43 in-depth interviews in a sample of moderate-risk and problem slot machine gamblers by using Toneatto's (2002) conceptualization to assess belief types.

¹Irrational/erroneous beliefs and cognitive distortions/biases are used interchangeably throughout.

Literature Review

Cognitive distortions, or beliefs and practices held and used by gamblers to help determine or procure a gambling outcome, are reported to play a fundamental role in the maintenance and development of gambling problems (Cunningham et al., 2014; Fortune & Goodie, 2012; Toneatto & Millar, 2004). Research on problem versus social gamblers demonstrates the greater likelihood of those experiencing problem gambling endorsing such beliefs (Joukhaider et al., 2004; Myrseth et al., 2010). As the frequency of gambling progresses, biased and distorted cognitive schemas appear and shape beliefs about attribution, personal skill, control over outcome, biased evaluations, and erroneous perceptions, including superstitious thinking (Ladouceur & Walker, 1996; Toneatto, 1999, 2002). How these beliefs influence behaviour is not clear, the most conclusive finding being that cognitive schemas appear to be a precursor to problem gambling behaviour (Goodie & Fortune, 2013; Ledgerwood & Petry, 2010).

Gamblers' core cognitive distortion lies in the belief that they can predict or control gambling outcomes. Cognitive therapy (CT) is applied to help correct such beliefs (Toneatto, 2002). Smith, Battersby, Harvey, Pols, and Ladouceur (2015) conducted a randomized controlled trial comparing CT and exposure-based therapies in a sample of treatment-seeking electronic gaming machine (EGM) gamblers and found that CT is a viable and effective treatment for problem gambling. CT involves creating awareness of these distortions and attempts to modify them by helping problem gamblers understand that they possess false beliefs (Ladouceur, 2004; Ladouceur, Sylvain, Boutin, Lachance, Doucet, & Leblond, 2001; Ladouceur & Walker, 1998; Smith et al., 2015; Sylvain, Ladouceur, & Boisvert, 1997). As Toneatto (1999) explains, gamblers make "decisions that can be powerfully influenced by cognitive biases, distortions in reasoning and errors in judgement" (p. 1594), believing they can predict, manipulate, or somehow decipher an indiscernible and indeterminable outcome.

According to Toneatto (1999), a full understanding of these cognitions, including how they can be identified in treatment, requires an understanding of their phenomenology. Toneatto (1999) identified a vast array of distortion types that were derived from an extensive review of the literature on gambling-related cognitions that included a qualitative study of cognitive distortions (Toneatto, Blitz-Miller, Calderwood, Dragonetti, & Tsanos, 1997). The samples used to derive this typology included non-problem gamblers and university students or adolescents, thus risking the application of widespread generalizations to heterogeneous samples. Gambling subtypes (Blaszczynski & Nower, 2002; Lobo et al., 2014; Milosevic & Ledgerwood, 2010), including game-type differentiation, has become an important consideration for problem gambling research and treatment (Ledgerwood & Petry, 2010; Raylu & Oei, 2002; Toneatto et al., 2007). Although earlier research focused on irrational beliefs without game type specification (Gaboury & Ladouceur, 1989; Toneatto, 1999) researchers now acknowledge important differences in cognitive schemas by game type (Czerny et al., 2008), with some evidence lending support to these observations (Myrseth et al., 2010). This raises the questions: What gambling-related

distortions emerge from a sample of problem and moderate-risk slot machine gamblers? How are these distortions described by gamblers? Which distortions occur most frequently?

Method

Sample

A total of 43 adults who were moderate-risk (35%) or problem (65%) slot machine gamblers were recruited from Toronto, Ontario, via online and paper-based classified advertisements. Participants were screened by the principal investigator using the Lie-Bet instrument, a brief screening tool. During the interview, participants were assessed with the Problem Gambling Severity Index. As women are thought to favour games of chance (Hing & Breen, 2001), in order to avoid oversampling them, efforts were made to recruit an equal proportion of men and women. All participants had to be of legal gambling age, that is, 18 years or over. The sample demographics are outlined in Table 1. A semi-structured interview guide was administered to individual participants by the principal investigator, who asked questions centred on gambling-related beliefs, ritual activity, and gambling-centred social processes, but participants were encouraged to expand on their beliefs, ideas, and experiences throughout the interview. Feminist epistemological insight (Devault, 1990) was used to empower participants through interviewing. The principal investigator elevated the participants' insights above her own, which is particularly important for a population who is aware of the perceived irrationality of their beliefs, including felt stigma (Baxter, Salmon, Dufresne, Carasco-Lee, & Matheson, 2015). Participants were situated in the role of the "expert" regarding their lives and were referred to this role by the principal investigator during the interview when necessary. A set of demographic questions was asked at the end of the interview. Interviews lasted between 60 and 120 min. All participants were provided with a \$20.00 honorarium, with the monetary compensation being disclosed by the principal investigator only when asked by the participants in order to avoid its influence on their decision to participate in an attempt to avoid coercion.

The sample composition (Table 1) includes a high percentage of people aged 41 years or older (67%) who have engaged only in slot machine gambling (86%) and who have never been married (42%). Most had some post-secondary education (75%) and reported a gross annual income lower than \$40,000 (56%). The majority of participants were ethnically tied to Europe, followed by the British Isles; various parts of Asia were well represented (25.6%) as was the Caribbean (14%). Over half the participants were Canadian born (56%).

Analysis

The study was approved by the Research Ethics Board of the University of Toronto and all participants gave informed consent. Interviews were audio-taped, transcribed verbatim, de-identified to ensure anonymity, and coded for emergent themes by the

Table 1
Sample Composition (N = 43)

Characteristic	Percentage
Female	46.5
Age, years	
21–30	14
31–40	18.6
41–50	34.9
51–60	20.9
≥ 60	11.6
Marital status	
Never married	41.9
Married	18.6
Separated	4.7
Divorced	20.9
Widowed	2.3
Cohabiting	11.6
Education level	
Secondary	25.6
Trade school	9.3
Some college	4.7
College diploma	27.9
Some university	9.3
University degree	14
Masters/Professional degree	9.3
Income range	
Less than \$20,000	23.3
\$20,001–\$40,000	32.6
\$40,001–\$60,000	32.6
\$60,001–\$100,000	11.6
Ethnic background	
Aboriginal	2.3
British Isles	18.6
Caribbean	14
Eastern/Other European	4.6
Southern European	25.6
Western European	7
Latin/Central/South American	2.3
West and East/South East Asian	14
South Asian	11.6
Canadian born	
Yes	55.8
No	44.2
Problem Gambling Severity Index Score	
Moderate-risk level	34.9
Problem level	65.1
Slots exclusively	
Yes	86
No	14

principal investigator with NVivo, qualitative analysis software. Axial coding was performed by using a “coding paradigm” informed by an existing and analytically selected framework (Strauss & Corbin, 1990, 1998). In this case, the pre-set categories were determined by Toneatto’s (2002) typology. Negative cases, that is, data running counter to the typology, were coded separately to account for cognitive distortions not represented by Toneatto’s (2002) classification.

Results

Using the Toneatto (2002) conceptualization, the principal investigator organized the beliefs of this sample into categories, as shown in Table 2; modifications are presented as italicized text.² All participants held at least one gambling-related cognition; their frequency distribution is presented in Table 3.

The typology accounted for most beliefs reported by participants; however, some categories were not relevant to these data, and emergent belief types required the addition of several categories and descriptors. One category and four subcategories were created to account for the findings, and four descriptors were added to existing categories. Additionally, two categories and two subcategories were omitted from the typology. These additions and omissions are shown in Table 2, and a further edited version of the original typology, including verbatim quotations, can be seen in Table 4.

Karma was added as a category to capture beliefs referencing moral cause and effect. Tempered avidity or moral worth demonstrated by thoughts, actions, and overall mind states (e.g., relaxed/not eager) were perceived by the study’s participants to have an impact on gambling outcomes.

Magnified Gambling Skill was revised to include three subcategories to account for emergent strategy types. That is, Magnified Gambling Skill remained a catchment category for any gambling-related system specified by the sample, with subcategories to account for frequently specified types. The subcategories added include the following: (a) Hot Machine to account for the belief that machines in constant play will pay out, (b) Bet Max to account for the belief that placing a maximum bet on the machines will increase the chances of a win and the total winnings,³ and (c) Higher Denomination Machines to account for the belief that higher denomination machines will pay out more often and in greater amounts. Lastly, Representative Bias was added as a subcategory in Attribution Biases to house the belief that a machine that has just won will not immediately pay out again.

²The typology presented here was modified from the original source: Toneatto (2002).

³To win a jackpot on some machines, a player needs to bet the maximum to collect the win. However, the average return to the player is still set at a specific range, and random number generators do not assess whether a player has bet all possible lines. Gamblers notice a difference only if they experience the infrequent big win. In the end, gamblers pay more to play, which increases the speed at which their money is lost, likely leading to larger overall losses (British Columbia Responsible Gambling, 2015).

Table 2

Gambling-Related Cognitive Distortions: A Modified Typology

Cognitive distortion	Description
Magnified Gambling Skill	Overrated ability to win, exaggerated self-confidence despite persistent losing; efforts to acquire special knowledge and develop gambling systems.
<i>Hot Machines</i>	<i>A machine being continuously played will eventually win.</i>
<i>Bet Max</i>	<i>Always bet max to increase the chances of a win and the amount won.</i>
<i>Higher Denomination Machines</i>	<i>Target the higher denomination machines; the more you put in, the more you will be repaid.</i>
Superstitious Beliefs	
Talismanic Superstitions	Possession of certain objects increases the probability of winning (e.g., ring, hat) by conferring good luck; objects arrayed in ways believed to potentiate winning outcomes; lucky or preferred numbers.
Behavioural Superstitions	Certain actions or rituals can increase the probability of winning (e.g., seating preferences at bingo); verbal (e.g., verbal encouragement) and nonverbal (e.g., rubbing hands) behavior during play of a game (e.g., horse race) believed to modify the outcome.
Cognitive Superstitions	Mental states can influence probability of winning (e.g., prayer, hope); includes entrapment, the belief that one must continue to gamble or wager in the event that the winning outcome takes place. <i>Focus and positive mind states can help secure a win.</i>
Attribution Biases	
Attribution Errors	Dispositional factors (e.g., skills, abilities) overestimated to explain wins and situational factors (e.g., luck, probability) underestimated. <i>N/A</i>
Gambler's Fallacy	Losses interpreted as an indication that a win is imminent, often resulting in chasing.
Representative Bias	<i>Chance is perceived as a self-correcting process in which a deviation in one direction induces a deviation in the opposite direction to restore the equilibrium. A machine that just won will not pay out again immediately.</i>
Anthropomorphism	Human characteristics attributed to gambling objects (e.g., slot machines), which may be credited with wins/blamed for losses.
Temporal Telescoping	Wins will occur in the short-term rather than the long-term despite the very low odds of winning at all; near wins taken as evidence that a win is temporally near. <i>N/A</i>
Selective Memory	Wins, but not losses, selectively recalled, especially large wins, partly due to the availability of wins, which tend to be rare and salient, and the motivation to sustain the hope of winning. <i>N/A</i>
Over-Interpretation of Cues	Overinterpreted ambiguous stimuli to guide decisions to gamble or to persist (e.g., bodily sensations, intuitions, omens, unusual events).
Control Over Luck	
Aligning with Luck	Luck cannot be manipulated directly; strategy is to wait for periods (streaks) of good luck to wager and to avoid betting during periods of bad luck.
Luck as a Variable	Actively try to manipulate luck through superstitious behaviors. <i>Actively try to manipulate luck through cognitions.</i>

Table 2 Continued.

Cognitive distortion	Description
Luck as a Trait	Lucky by nature with certain games and unlucky with others. <i>Luck as it relates to specific machine types.</i>
Luck as Contagion	Success in other areas of life generalizes to success at gambling; consequently, frequency of gambling or size of wagers may increase; may also believe other gamblers bring either good or bad luck.
Probability Biases	Incorrect beliefs about randomness may lead to incorrect inferences about the likelihood of winning. <i>N/A</i>
Illusory Correlation	Assign causality to salient features of the environment correlated with gambling outcomes contiguous with such wins even if such associations are noncontingent. <i>Certain areas of the casino should be focused on to maximize winning potential, while others should be avoided.</i>
Karma	<i>The natural law of moral cause and effect. This relates to action, thought, and overall state of mind.</i>

Note. N/A = not applicable.

Findings demanded the modification of existing descriptors as well. Under the existing subcategory Luck as a Trait, a descriptor was added to represent the emergent belief that luck is related not only to game types, but also to machine types for this sample of slot machine gamblers. Similarly, for the subcategory Cognitive Superstition, focus or positive mind state was added to the original description. For Luck as a Variable, manipulation of luck occurred not only through superstitious behaviours but also through cognitions, which were specified in the modified description. The existing category Illusory Correlation required a focused specification, with all participants who endorsed this belief referencing spatial-oriented cognitions. In particular, participants referenced areas of the casino where machines were prone to win and/or produce significant payouts.

Two subcategories and two categories were not applicable and were later omitted from the modified typology. The subcategories Attribution Errors and Temporal Telescoping under the category Attribution Biases did not emerge from the data. Specifically, participants did not amplify their skill and nullify thoughts on probability and luck in the same sentence or idea, leading to the removal of this subcategory. Concerning the latter subcategory, Temporal Telescoping, although near wins were frustrating, participants failed to convey that this meant a win was near. Selective Memory and Probability Biases did not warrant specific categorization. In the end, most of the beliefs in the typology, in one way or another, disregarded probability theory or involved the memory of select events, especially those with a favourable outcome.

The most frequently occurring distortion types (Table 3) were Cognitive Superstitions, Gambler's Fallacy, and Over-Interpretation of Cues, whereas Anthropomorphism, Aligning with Luck, and Luck as a Variable occurred far less frequently.

Table 3
Gambling-Related Cognitive Distortions: Frequencies

Cognitive distortion	Frequency
Magnified Gambling Skill	12
Hot Machines	17
Bet Max	14
Higher Denomination Machines	10
Superstitious Beliefs	
Talismanic Superstitions	19
Behavioural Superstitions	20
Cognitive Superstitions	28
Attribution Biases	
Gambler's Fallacy	29
Representative Bias	11
Anthropomorphism	9
Over-Interpretation of Cues	30
Control Over Luck	
Aligning with Luck	6
Luck as a Variable	2
Luck as a Trait	20
Luck as Contagion	18
Illusory Correlation	10
Karma	11

Although the typology outlined by Toneatto (2002) offers a number of categories and descriptions, it lacks illustrative examples to give voice to categorization. Illustrative examples are provided in Table 4 to convey the tone and structure of gambling-related cognitions, each quotation representing a unique voice from the sample of 43 gamblers.

Discussion

The cognitive distortions found here align with the distortion types outlined by Toneatto (2002). However, in the present study, Toneatto's (2002) typology required the addition of one category, four subcategories, and four descriptors, along with the omission of two categories and two subcategories. These findings lend some support to Czerny and colleagues' (2008) suggestion that important differences in cognitive biases may vary by game type.

Indeed, many of the distortions explored here are specific to slot machine gambling. That is, several new belief types added to the category Magnified Gambling Skill account for machine-specific beliefs. Additional modification of the existing typology is equally reflective of the focus on slot machine gambling. For instance, the new description for Luck as a Trait references a game-type-specific belief that certain machines are luckier than others. Of relevance to bricks and mortar casino gambling,

Table 4

Gambling-Related Cognitive Distortions: A Modified Typology, Illustrative Examples

Cognitive distortion	Illustrative quotations
Magnified Gambling Skill	Because those machines, I know they're geared to go off at a certain time.... because that's the system. Honestly, I know they, they got a timer on those machines... But I honestly think that's the way it is, and you [have to] know what it is geared to; don't put in five dollars, sometimes it's geared for only a dollar-fifty or two [dollars].
Hot Machines	Each machine is computerized and they have, it's some kind of binary numerical systematic code and...it turns over when it's being used a lot. It's not warmed up, it's like when it's not warmed up, it won't turn over a win.
Bet Max	You won't get a winning if you don't play the maximum.
Higher Denomination Machines	I would say play the higher denomination machines. So don't play the penny or nickel slots and play minimum a quarter. The higher the denomination the more the machine returns in the long run. So the dollar ones return higher than the twenty five cent ones.
Superstitious Beliefs	
Talismanic Superstitions	I actually look at the numbers on the machines themselves. Yeah, the machines are numbered, so if I like the number then I'll proceed. [I pick] numbers that I feel are lucky, numbers that I like, that I prefer, birthdates, etcetera. Family members, my birthday, people that I like birthdays, and certain numbers that I just like. It's weird, I just like certain numbers. And there's no logic or reason to some of the numbers I like.
Behavioural Superstitions	When I walk in there [the casino] sometimes, say I've won for the night, right, so when I come in, like, you can either walk in left, you can then walk right, or you can go centre. So, if I won, I'm thinking, which way did I walk in? That way, next time, I'll try to follow my same footsteps. If I went to the right...[and I had] a winning night, I think the next time I come maybe I should do the same route. Because when you get in there [the casino], it's bringing back memories, ideas. I won \$250 here and I only bought \$50. How did I do that? Well, I went this way so let's try that again.
Cognitive Superstitions	I probably can say the times I've gone in there [the casino] with my head held high, feeling really, really good about everything, those are the days I won.
Attribution Biases	
Gambler's Fallacy	I think it's the psyche because you want to try—because you want that feeling. Obviously because you want to come back to try and make that loss back up. It's like you feel angry because the person died [your money] and you want them to come back to life [your money]. [I'm due for a win] because you know you get a series of losses. Like you go like every month or every week and it's like ten in a row. It's got to be due.
Representative Bias	It [the machine] tells you how much the last person won. So, if let's say if it's more than thirty dollars, for example, I would stay away from those machines. Since it's already won, it has a greater chance of not winning again for a while.
Anthropomorphism	You feel in control because you are—it's hard to explain, because sometimes you think that you can—you could fool the machine. Like if you just sit there and you try to mess the machine up. You try it, okay.

Table 4 Continued.

Cognitive distortion	Illustrative quotations
Over-Interpretation of Cues	Instead of pressing one [button], you will press this [another button], dab, dab, dab. You will figure that if you—you will try to mess up its mind. I often avoid the slot machines where I noticed someone is very upset and frustrated with it. I leave that one [machine] alone. I feel like it's one of those bad omens like in the sense like his frustration and just his [fellow gambler] negative energy from that is just lingering over it now.
Control Over Luck Aligning with Luck	Usually when I know it's going to be my day, it's when I start winning the first or second time. If I don't win the first time, the second time I start winning, then I stay longer then I have a feeling it's going to be my lucky day, and I'm going to win some money today... But usually, [if] it's three times that I lost, then I leave.
Luck as a Variable	You see the first bonus coming up [on the machine] and then what I do, because I don't want everyone to look, is when it starts to go before it stops, I always hide it [with my hand]. I don't want people to see. It's just they're going to give you...bad luck.
Luck as a Trait	Something will come to me and say "okay I think you should go there." It's like a magnet trying to get you there or I've had friends tell me that they've had good luck on certain machines like the prince [machine]. My sister has had good luck with the mermaids. So, she tends to like that.... And I have a favorite now, the Grizzly Bear [machine]. The Grizzly Bear machine has been lucky. And one of my sister's girlfriends she got onto it and she won a hundred twenty dollars.
Luck as Contagion	Yes. Like—there was something that happened the other day and I was like, man, I should have gone to the casino, but I think my name came up for something at work. Some like random draw. I didn't win much. All I won was like a coffee mug, but still. I was like, I should go to the casino...I feel like it will be kind of like a lucky streak kind of thing.
Spatial Correlations	Okay so what I've learned over the years and years of research is the highest paying machines, or the machines that pay a lot, are the ones by the doors and the ones that are away from the tables. I guess they gear the higher paying machines or the machines that payout a lot, to places where it's visible, more visible. So you try and go to places like near the bathroom [where there is the] highest visibility [or like] areas where you first enter into the casino. [That's where] the better machines are [where there is] high visibility. Yeah the ones that are more visible, so if you're coming out of the bathroom there's more people congregated around the bathroom. You have a higher visibility, [so] that they're going to see it. And then they're going to want to go back and be like, "That guy just won ten thousand, I'm going to go back and play it" type of thing.
Karma	It's a day when I'm not thinking about anything except just enjoying myself. I don't think about winning, I think about just enjoying myself so when I start thinking about winning some money that's when I never win. It's karma...saying, "You're thinking you're going to win, you're not going to win."

Illusory Correlation accounts for beliefs centred on the physical or spatial location of slot machines within a casino. Because slot machine gambling is exclusively chance based, the addition of the descriptor “focus” to cognitive superstition is noteworthy, although the idea of “positive mind states” lends itself to a game type devoid of control. Karma, another category with a cognition focus, emerged from the data, this time making reference to moral cause and effect. Analogous to King’s (1990) bingo players who believed wins would be awarded to those not expecting it, gamblers from this study indicated that tempered avidity increased the chances of a win. By the same token, the descriptor “cognition” was added to the subcategory Luck as a Variable to capture thought-oriented beliefs.

Representative Bias emerged from the data, although it was absent from Toneatto’s (2002) typology. The gambler’s fallacy is caused by the representativeness heuristic according to Tversky and Kahneman (1971) and Kahneman and Tversky (1972), which may underlie the absence of the category Representative Bias, with the category Gambler’s Fallacy perhaps accounting for both. In the present study, they were treated as two categories. Although both categorizations reference the “self-correcting process in which a deviation in one direction induces a deviation in the opposite direction to restore the equilibrium” (Tversky & Kahneman, 1974, p. 1125), Gambler’s Fallacy had undertones of fairness (i.e., I am due for a win after repeated loss), whereas Representative Bias was focused on equilibrium restoration (i.e., a machine producing a jackpot requires time before it does so again).

The categories Selective Memory and Probability Biases as these categorizations were nested in many of the other belief types. Temporal telescoping, a subcategory specified in the Toneatto (2002) categorization, failed to emerge from the data. It is conceivable, however, that the problem gamblers in the present study merely failed to convey verbally what was implied through action because near misses are described as powerful motivators for gambling behaviour (Dixon et al., 2011; Dixon, MacLaren, Jarick, Fugelsang, & Harrigan, 2013). Indeed, participants from this study articulated various cognitive distortion types, adding to existing research that highlights their presence in samples of problem and/or heavy gamblers. This study lends support to game-type specification. Additionally, the articulation of such beliefs may help researchers and clinicians gain a better sense of them, including their cognitive structure. Clinicians applying problem gambling-specific CT, which seeks to clarify the concept of randomness and increase awareness about erroneous beliefs and restructure them, would benefit from a list of distortion types and descriptive examples. Smith and colleagues (2015) administered CT over the course of 12 weekly sessions to a sample of treatment-seeking electronic gaming machine gamblers, where cognition was a therapeutic focus. Sessions involved patients monitoring their thoughts through diary entries while a therapist also worked with them to develop skills to challenge and cast doubt on erroneous cognitions that led to excessive gambling (Smith et al., 2015). A list of game-type-specific cognitions could aid in belief identification and awareness creation as treatment-seeking patients, with a particular game-type preference, move through the course of CT treatment.

The greater prevalence of certain cognitions, especially those linked to what Ejova, Delfabbro, and Navarro (2015) call “secondary” illusion of control, or a complex set of beliefs about supernatural forces such as God and luck, is a finding warranting further exploration. Cognitive distortions are connected to notions of individual control; however, many of the identified beliefs referenced secondary illusion. The notion of agency is an important factor worthy of enhanced focus in future studies on cognitive distortions. The findings here suggest the need for insight into whether specific distortion types have a greater impact on problem gambling severity.

This study is not impervious to limitations. The research draws on a small convenience sample from a specific geographic area, with findings not generalizable to the larger population. The sample is a mix of both moderate-risk and problem gamblers, and despite the larger sample of the latter, certain gambling cognitions might be correlated with gambling severity. Other subtypes, beyond game type, might be important considerations, although they are not reflected on here. Finally, verbatim quotations only represent one unique voice from the study, which limits the reporting of variations in the structure and tone of belief types within specific categories highlighted in Table 2.

Conclusion

This is the first study of its kind to use qualitative data to assess the applicability of a comprehensive list of distortion types found in other studies of gamblers. This research adds to the growing body of literature that concerns subtype specification. Additionally, it suggests the need for game-type specification when considering gambling-related cognitions. Certain belief types are most likely a reflection of game types and their associated environment. Although much has been written about the importance of subtype considerations for understanding problem gambling, more research is needed on cognitive variations among game types and the impact of particular distortions on problem gambling severity.

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Special Issue: *JGI* Scholar's Award, Category B

Gambling and Video Game Playing Among Youth

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Abstract

Gambling and video game playing represent two leisure activities in which adolescents and young adults participate. There are psychological and behavioural parallels between some forms of gambling (e.g., slot machines, video lottery terminals, electronic gambling machines) and some types of video games (e.g., arcade games). Both activities operate on behavioural principles of variable reinforcement schedules in order to reward and prolong play and use exciting and stimulating sound and light effects within game play. Additionally, both activities have similar negative effects associated with excessive play (e.g., poor academic performance, moodiness, loss of interest in activities previously enjoyed, and interpersonal conflict). Thus, there is concern that children and adolescents who are attracted to video games, for both psychological rewards and the challenge, may be at greater risk to gamble. We examined the gambling and video game playing behaviour among 1,229 adolescents and young adults. Results indicate that gamblers, relative to non-gamblers, were more likely to play video games. Video game players were more likely than non-players to gamble. Both social and problem gamblers had higher rates of video game playing than did non-gamblers, and addicted gamers had higher rates of gambling than did social and non-gamers. Results from the current study suggest significant overlap in youth participation in both gambling activities and video game playing. These results have implications for future research and the treatment of problem gambling and video game addiction.

Keywords: gambling, video game playing, problem gambling, gaming addiction

Résumé

Les jeux de hasard et les jeux vidéo sont deux loisirs auxquels s'adonnent les adolescents et les jeunes adultes. Il existe des parallèles psychologiques et comportementaux entre certaines formes des jeux de hasard (p. ex., les appareils à sous, les appareils de loterie vidéo, les machines de jeux électroniques) et certains jeux vidéo (p. ex., les jeux d'arcade). Ces deux types de jeux exploitent les principes comportementaux du programme

variable de renforcement pour récompenser le joueur et l'amener à jouer plus longtemps et utilisent des effets lumineux et sonores stimulants et excitants pour accroître l'attrait de l'expérience de jeu. De plus, ces deux activités entraînent des effets négatifs similaires chez les joueurs excessifs (p. ex., mauvais résultats scolaires, instabilité émotionnelle, perte d'intérêt pour des activités qui autrefois procuraient du plaisir, conflits interpersonnels). On craint donc que les enfants et les adolescents qui sont attirés par les jeux vidéo, en raison des défis qu'ils proposent et des récompenses psychologiques qu'ils procurent, soient plus à risque de s'adonner aux jeux de hasard. La présente recherche a examiné les comportements de jeu de 1229 adolescents et jeunes adultes relativement aux jeux de hasard et aux jeux vidéo. Les résultats indiquent que les joueurs de jeux de hasard, par rapport aux non-joueurs, étaient plus susceptibles de jouer à des jeux vidéo, et que les joueurs de jeux vidéo étaient pareillement plus susceptibles de s'adonner aux jeux de hasard que les sujets ne jouant pas aux jeux vidéo. Le groupe des joueurs sociaux et celui des joueurs à problèmes présentaient tous deux un taux plus élevé de pratique des jeux vidéo que celui des non-joueurs, et les sujets ayant une dépendance aux jeux vidéo s'adonnaient également en plus forte proportion aux jeux de hasard que les sujets ne pratiquant par les jeux vidéo ou les pratiquant de manière sociale uniquement. Les résultats de la présente étude donnent à croire qu'il y a un chevauchement important entre la pratique des jeux de hasard et celle des jeux vidéo chez les jeunes. Ces résultats ont des incidences sur les futures recherches et le traitement de la dépendance aux jeux de hasard et aux jeux vidéo.

Introduction

Young people are currently living in a digital age and their recreational activities increasingly consist of activities that interact with technology. Video game playing and, to a lesser extent, gambling represent two activities in which adolescents and young adults routinely participate. Although on the surface these two activities may seem distinct, researchers have increasingly recognized that gambling and gaming activities share many common features at a structural and aesthetic level (King, Gainsbury, Delfabbro, Hing, & Abarbanel, 2015). For example, psychological and behavioural parallels have been proposed between electronic machine gambling (e.g., slots, video lottery terminals, pokies) and video arcade game playing (Fisher & Griffiths, 1995; Griffiths, 1991, 2005b; Griffiths & Wood, 2000, 2004; Gupta & Derevensky, 1996; Ladouceur & Dubé, 1995; Wood, Gupta, Derevensky, & Griffiths, 2004). Both activities operate on behavioural principles of variable reinforcement schedules in order to reward and prolong play, use exciting and stimulating sound and light effects within game play to promote physiological arousal, require a response to predictable stimuli, involve eye-hand coordination, and necessitate varying degrees of concentration and focus. Additionally, both activities have similar negative effects associated with excessive play (e.g., poor academic performance, moodiness, loss of interest in activities previously enjoyed, interpersonal

conflict, depression, and mental health issues; Griffiths & Wood, 2004). The distinction between them is two-fold: Video games are most often played for points and/or status, whereas electronic gambling machines are played for money, and the outcome of video games is determined by skill, whereas with gambling the outcome is random (Griffiths, 2005b). However, it has been argued that the playing philosophy is similar for both. For some slot machine gamblers, the potential for winning money is less important than staying on the machine as long as possible, similar to the goal of video game players (Griffiths & Wood, 2004). This observation has clinicians concerned about “media convergence” (Griffiths, 2008b; King, Delfabbro, & Griffiths, 2010), the idea that traditional lines of demarcation between different media become blurred because of the growing use and influence of technology (Griffiths, 2008b). Adolescents’ involvement in gambling may stem from the similarity between gambling (in particular, slot machine gambling) and other technology-based games with which they are familiar (Delfabbro, King, Lambos, & Pugliese, 2009).

In attempting to explain why young people begin to gamble before they are of legal age to do so, researchers have examined factors that may contribute to early gambling behaviour (Delfabbro et al., 2009). One view is that young people’s interest and involvement in gambling stems from their greater familiarity with technology (Griffiths, 1995). Young people may be more open to particular forms of gambling (e.g., electronic gaming machines) because of their similarity to some types of video games, and youths who enjoy the psychological rewards and the challenge of video game play may seek similar situations through gambling (Brown, 1989). Playing video games may provide experience with a type of entertainment (i.e., watching graphics, using controls/buttons, obtaining outcomes) that could be readily transferred to gambling machines (Delfabbro et al., 2009). Of concern is that it then becomes increasingly difficult to separate the two activities (King et al., 2015; Wood, Gupta, et al., 2004).

Early exploratory research among video game-playing adolescents suggests higher levels of both gambling and problem gambling in this group (Griffiths, 1991; Gupta & Derevensky, 1996; Ladouceur & Dubé, 1995; Wood, Gupta, et al., 2004). Beyond these early initial studies, more recent research provides evidence for regular video game playing among gamblers and heavier involvement in video game play for adolescents at risk for gambling-related problems (Wood, Gupta, et al., 2004). Along with reported correlations between problem video game playing and gambling, individuals who self-reportedly excel at video gaming also self-report as being skilled at gambling (Delfabbro et al., 2009; Walther, Morgenstern, & Hanewinkel, 2012). Experimental studies have demonstrated that frequent video game players ($N = 104$, ages 9–14 years), in addition to reporting weekly gambling, wagered significantly greater amounts of money on an experimental blackjack task compared with those who did not play regularly (Gupta & Derevensky, 1996).

However, the research is not unequivocal. Although Delfabbro et al. (2009) reported that adolescents ($N = 2,669$, ages 12–17, $M = 14.63$) at risk for gambling-related problems were more likely to have heavier involvement in video game play, particularly hand-held and arcade games, this association was small and became negligible

when the investigators controlled for gender. Similarly, recent research failed to find a significant association between the frequency of video gaming and gambling for money or for credits or points online in Australian gamers ($N = 485$, ages 16–68, $M = 25.8$; Forrest, King, & Delfabbro, 2016). However, the researchers did find a small but significant relationship between problem video gaming scores and frequency of gambling for money. The discrepant findings highlight the importance of further exploring this area of research to identify any potential relationships.

Video game technology has become not only incredibly sophisticated, but has become an important part of the delivery of gambling activities as well (Gainsbury, Russell, & Hing, 2014; King, Delfabbro, Kaptis, & Zwaans, 2014). Portable game consoles have clear, cinematic-like graphics and enable playing anywhere and at any time. The Internet is playing a crucial role in changing the way young people gamble and play video games. Although playing for money once clearly differentiated slot-machine gambling and video arcade games, this differentiation is disappearing as gambling and gaming move online. Increasing overlaps between online gambling and gaming practices and technologies are given as a strong example of media convergence (de Freitas & Griffiths, 2008; Griffiths, 2008a, 2008b; King et al., 2010, 2014, 2015). A large number of online video games incorporate gambling situations and games of chance within the game itself (e.g., *Grand Theft Auto*, *Red Dead Redemption*, *Pokémon*, *Runescape*, *Fallout: New Vegas*; King et al., 2014; King, Ejova, & Delfabbro, 2012; Walther et al., 2012). Some online video games (e.g., first-person shooter games) pay players for every “kill” made, creating a potential to earn money (Harper, 2007). Online gambling companies routinely offer free gambling games and “demo” features of traditional money games—often played for virtual (“free”) currency—that bring them into the realm of video games. The popularity of digital technology in young people’s leisure and entertainment pursuits and the blurring of previously distinct lines between some types of gambling and video games may ultimately lead certain individuals to develop an interest in gambling at a young age. The concern is that children and adolescents who frequently play video games may begin to believe gambling activities operate under the principle that specific skills and practice are responsible for success and that their acquired skills can influence the outcome of a game of chance (Wood, Gupta, et al., 2004). Youth may become convinced that they can eventually master skills that will make them successful gamblers, despite the randomness of the outcomes, not unlike the way they master skills to become successful video game players. For instance, among regular gamblers who also play video games, game playing is significantly related to statements that reflect control over an experimental gambling task, as well as to overall ratings of direct control over outcomes of the gambling task (King et al., 2012). Video game playing may influence some gambling cognitions among gamblers, including illusion of control over the outcome of the game, superstitious thoughts about gambling, overestimating the amount of skill involved in a gambling task, and belief that video game playing experience results in gambling wins (King et al., 2012).

Activities that have the capacity to be either arousing or relaxing, allowing individuals to be distracted from their normal lives, have been shown to be highly

desirable and to have the potential for excessive participation by some individuals (Griffiths & Wood, 2004). The belief is that individuals with poorly regulated emotions may engage in maladaptive behaviours, such as gambling and/or video game playing, to escape from or regulate their emotions (see Jacobs, 1986). Some research has found specific deficits of emotion regulation in pathological gamblers and that using gambling as an escape is related to emotion regulation both at a neurological and a cognitive level (Weatherly & Miller, 2013; Williams, Grisham, Erskine, & Cassedy, 2012). Research into the role of video games as coping mechanisms is just beginning (Lobel, Granic, & Engels, 2014), though some studies have suggested that video games may provide a safe platform for experiencing emotions such as anger or fear (Jansz, 2005).

The pace at which technology has facilitated the convergence of online gambling and gaming has been much more rapid than that of the research examining this phenomenon. As previously noted, early research that found parallels between gambling and video game playing mainly examined arcade-type games and slot machine gambling among adolescents (Griffiths, 1991; Gupta & Derevensky, 1996; Ladouceur & Dubé, 1995; Wood, Gupta, et al., 2004). More recent research among adolescents has not replicated such an association (e.g., Delfabbro et al., 2009; Forrest et al., 2016). As gambling enters the digital age and converges with other digital media, including video games, clear-cut distinctions between the two activities begin to disappear (King et al., 2015). One of the biggest changes in the division between gambling and video game playing is the existence of social media games, that is, games played via social networking sites such as *Facebook* (Derevensky & Gainsbury, in press; Kim, Wohl, Salmon, Gupta, & Derevensky, 2015). Among adolescents, one quarter have engaged in simulated gambling in a video game (either as a bonus feature or as a virtual gambling experience; King et al., 2014). Exposure to past involvement with simulated gambling has been shown to be a significant predictor of problem gambling in young people (King et al., 2014).

A growing body of research has examined gambling via social networking sites such as *Facebook* and how this normalization of gambling may contribute to addictive behaviour in young people (Derevensky & Gainsbury, 2016; Griffiths, 2013, 2014; Kim et al., in press). Gambling early on has been linked to problem gambling later in life, and young people are being socially conditioned to view gambling as a legitimate social activity freely available to them (King et al., 2010). In an interesting study of video game genre and its relationship to problematic video game play, Elliott, Golub, Ream, and Dunlap (2012) recruited adults who played one or more hours of video games a week and discovered that one of the 15 genres of games respondents played was gambling (defined as simulations of poker, blackjack, and slot machine gambling) and that gambling was one of the video game genres most strongly associated with problematic video game play.

Strong empirical and clinical evidence shows an identifiable number of youth who display a gambling disorder or a gaming problem. This evidence, along with the fact that gambling and gaming share features that might be appealing to certain individuals,

raises the question of whether or not individuals with gambling problems also experience gaming problems. Conflicting research findings with respect to the overlap between gambling and video game playing also call attention to a need to explore any potential relationships. The primary goal of the current study was to examine commonalities between gambling behaviour and problem gambling among video game players and between video game playing and addicted playing among gamblers. We hypothesized that gamblers, relative to non-gamblers, would be more likely to play video games and that video game players would be more likely to gamble than non-players. We also hypothesized that problem gamblers would have higher rates of video game playing than non-gamblers and that problem gamers would have higher rates of gambling than non-gamers. Another goal of the study was to obtain overall prevalence rates for gambling, video game playing, problem gambling, and problem video game playing, as well as to examine gender differences.

Method

Participants

In total, 1,276 CEGEP¹ students completed the questionnaires. Fourteen participants were excluded because of inconsistent responding or missing information, one was excluded because he or she did not indicate gender, and a further 32 participants were excluded because they were older. The final sample included 1,229 individuals (534 males, 695 females), aged 16 to 24 years ($M = 18.69$, $SD = 1.41$). To facilitate categorical analyses, we divided participants into three age groups: under 18 years ($n = 150$), 18–20 years ($n = 944$), and 21–24 years ($n = 131$; four respondents did not indicate their age and were excluded from age analyses). Participants represented a convenience sample and were recruited from four local CEGEPs and one university in Montreal, Canada.

Instruments

Demographic questionnaire. Several items assessed participants' gender, age, cultural/ethnic background, and marital status.

Gambling Activities Questionnaire (GAQ; Byrne, 2004; McBride & Derevensky, 2009, 2012). A series of 12 items was administered to assess gambling behaviour (i.e., poker, lotteries [draw and scratch], sports betting, electronic gaming machines, betting on games of skill, etc.; Byrne, 2004). Respondents were asked to indicate if they had ever gambled for money and, if so, the frequency with which they engaged in the gambling activities during the previous 12 months on a 5-point Likert scale (*never, less than once a month, 1-3 times a month, once a week or more, or daily*).

¹CEGEPs (Collèges d'enseignement général et professionnel) are public, post-secondary education collegiate institutions exclusive to the education system in the province of Quebec. Most, but not all, CEGEPs offer two types of programs: pre-university (2-year) and technical (3-year).

All questions were asked directly and this instrument has been found to have good face validity (Ellenbogen, Gupta, & Derevensky, 2007).

Video game activities questionnaire (VAQ). This scale, developed on the basis of the GAQ, asked respondents to indicate if they had ever played video games or massively multiplayer online role-playing games (not reported in this study) and, if so, the frequency with which they played a variety of games during the previous 12 months (i.e., *Grand Theft Auto*, *Call of Duty*, *Halo*, *Mario & Luigi*, *NHL/NBA/FIFA*, *Rock Band/Guitar Hero*, *Dance Dance Revolution*, etc.). Frequency of play was reported on a 5-point Likert scale (*never, less than once a month, 1-3 times a month, once a week or more, or daily*).

Problem gambling. Respondents over 18 years of age completed the standardized checklist of the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev.; *DSM-IV-TR*; American Psychiatric Association, 2000) designed to assess problem or disordered gambling. The use of the *DSM-IV* as an index for problem gambling has been well established in research (Derevensky, 2012; Derevensky & Gupta, 2000; Petry, 2005). Respondents were identified as social gamblers if they had gambled in the past year and endorsed zero to two items on the *DSM-IV*, as at-risk for developing a gambling problem if they endorsed three or four items, and as probable pathological gamblers (PPGs; currently viewed as disordered gamblers) if they endorsed five or more items (American Psychiatric Association, 2000). Participants under the age of 18 completed the *DSM-IV-MR-J* (Fisher, 2000). This 12-item, nine-category instrument, a screen for severity of gambling problems during adolescence, was modelled after the *DSM-IV* and revised from the *DSM-IV-J* (Fisher, 1992). It has been widely used to assess youth problem and pathological gambling (Derevensky, 2012; Gillespie, Derevensky, & Gupta, 2007; Nower, Gupta, Blaszczyński, & Derevensky, 2004). Respondents were identified as social gamblers if they had gambled in the past year and endorsed zero to two items on the *DSM-IV-MR-J*, as at-risk for developing a gambling problem if they endorsed three items, and as PPGs if they endorsed four or more items (Fisher, 2000).

Game Addiction Scale (GAS; Lemmens, Valkenburg, & Peter, 2009). This 21-item scale was modelled on the *DSM-IV* criteria for pathological gambling and taps into criteria proposed by Griffiths (2005a), the components of which are salience, tolerance, mood modification, withdrawal, relapse, conflict, and related problems. The scale, based on research with two adolescent samples, had a Cronbach's alpha of .92 and .94 in two studies. It has been shown to have strong convergent and criterion validity (King, Haagsma, Delfabbro, Gradisar, & Griffiths, 2013). For the purposes of data analysis, gaming addiction was measured by the seven-item short version of this scale. Per Lemmens et al. (2009), seven items on the GAS were used to identify a gaming addiction. As the cut-off on the GAS for video game addiction can be established in a number of different ways, the current study used a procedure whereby each item was considered met when a person answered "often" or "very often" of seven possible choices (Lemmens et al., 2009). This is a conservative estimate of problematic gaming, as some studies include "sometimes" in their criteria (Collins & Freeman, 2013).

A polythetic format was adopted and a person was considered an “addicted gamer” when he or she endorsed four or more items on the seven-item scale.

Procedure

Participants were recruited through each participating college. Ethical approval was also obtained from each respective college’s research ethics board, and individual professors were contacted for permission to administer questionnaires to participants. For students under 18, permission was also provided by their parents.

The data were collected within individual classrooms by the researcher, doctoral students, and/or research coordinator. Students completed questionnaires independently, but any questions that arose were answered by the researcher or research assistants. Data were collected over a 7-month period beginning in November 2010 and ending in May 2011.

All participants completed a consent form, were informed that their participation was voluntary, were assured anonymity and confidentiality, and were free to withdraw from the study without penalty. If they wished, participants were entered into a draw for one of 20 movie tickets. The total time to complete the survey varied from 30 to 60 min, with most students finishing within 45 min.

Data Analyses

Frequency data for gambling and video game playing were examined to determine proportion rates for each activity in the sample. Non-parametric tests (e.g., chi-square, cross-tabulations) were used to examine the association between prevalence rates and demographic variables (e.g., gender, age), as well as problem gambling and problem gaming classification. Because of the numerous unplanned comparisons, Bonferroni correction was used and the probability level was set at $p = .005$; however, all p values are reported precisely.

Results

A total of 642 (52.2%) students reported some form of offline gambling during the past 12 months. The participation differences between males ($n = 364$, 68.2%) and females ($n = 278$, 40.0%) were statistically significant, $\chi^2 (1, N = 1,229) = 96.01$, $p < .001$. There were also statistically significant differences among the age groups: under 18 ($n = 51$, 34.0%), 18–20 ($n = 504$, 53.4%), and 21–24 ($n = 85$, 64.9%), $\chi^2 (2, N = 1,225) = 28.90$, $p < .001$.

On the basis of both *DSM-IV-MR-J* and *DSM-IV* criteria, and accounting for past-year gambling participation, 47.6% ($n = 585$) of the sample were identified as non-gamblers, 49.6% ($n = 609$) as social gamblers, 2.35% ($n = 29$) as at-risk gamblers, and 0.48% ($n = 6$) as PPGs. Because of the small number of PPGs in the present sample, this group was merged with the at-risk gambling category to form a single category labelled problem gamblers ($n = 35$, 2.8%), and those who endorsed zero to two items

and who had gambled in the past year were categorized as social gamblers. Previous research has suggested that individuals with a minimum of three gambling-related problems on these scales share similar characteristics to those meeting criteria for probable pathological gambling (Gupta & Derevensky, 1998). The differences between males ($n = 30$, 5.6%) and females ($n = 5$, 0.7%) for problem gambling severity was statistically significant, $\chi^2(2, N = 1,229) = 111.18, p < .001$. There were no significant age differences among non-gamblers and problem gamblers, or among social and problem gamblers. However, a comparison of non-gamblers and social gamblers revealed that a greater proportion of non-gamblers were under the age of 18 years ($n = 99$, 66.0%), whereas a significantly greater proportion of social gamblers were 21–24 years ($n = 82$, 62.6%), $\chi^2(1, N = 276) = 26.38, p < .001$.

A total of 1,107 (90.1%) students reported playing video games during the previous year. Males ($n = 524$, 98.1%) were more likely than females ($n = 583$, 83.9%) to have played, $\chi^2(1, N = 1,229) = 68.51, p < .001$. Interestingly, no differences were found on the basis of age group.

From gaming performance and the GAS, 9.5% ($n = 117$) respondents were identified as non-gamers, 87.6% ($n = 1,077$) as social gamers, and 2.8% ($n = 35$) as addicted gamers. There were significant differences in GAS identification of gaming addiction among males ($n = 29$, 5.4%) and females ($n = 6$, 0.9%), $\chi^2(2, N = 1,229) = 85.98, p < .001$. Gaming addiction by age group was not analysed because of the small cell sizes (only three addicted gamers in the 21–24 age group).

Gambling and Gaming

According to responses on the GAQ and the VAQ, 604 respondents reported both gambling and video game playing. Significantly more gamblers (94.1%) than non-gamblers (85.7%) played video games. Similarly, significantly more video game players (54.6%) than non-players (31.1%) gambled, $\chi^2(1, 1,229) = 24.15, p < .001$. A greater proportion of gamblers reported playing video games (94.1%) compared with video game players who reported gambling (54.6%), $\chi^2(1, 1,229) = 24.15, p < .001$.

As shown in Table 1, there were statistically significant differences in gambling severity for past-year video game playing, $\chi^2(2, N = 1,229) = 24.82, p < .001$. Although participation rates were relatively similar for problem and social gamblers, both groups had greater rates of past-year video game playing than did non-gamblers.

There was a significant difference in gaming addiction classification for past-year gambling, $\chi^2(2, 1,229) = 24.90, p < .001$ (Table 2). Addicted gamers were found to have the highest rates of gambling participation, and both addicted gamers and social gamers reported greater past-year gambling than did non-gamers.

A principle aim of the study was to examine how pathological gambling and gaming may intersect and whether the same individuals experience problems with both activities. In Table 3, one can see a significant difference among addicted gamers for

Table 1
Gambling Severity and Past-Year Video Game Playing

Gambling severity	<i>N</i>	Video game participation during the past year % (<i>n</i>)
Non-gambler ^a	585	85.6 (501)
Social gambler ^b	609	94.3 (574)
Problem gambler ^c	35	91.4 (32)
Total	1,229	90.1 (1,107)

Note.

^a *DSM-IV* score = 0, no gambling activity during the past 12 months.

^b *DSM-IV* score = 0–2.

^c *DSM-IV* score ≥ 3 .

Table 2
Gaming Addiction and Past-Year Gambling

Gaming addiction	<i>N</i>	Past-year gambling participation % (<i>n</i>)
Non-gamer ^a	117	30.8 (36)
Social gamer ^b	1,077	54.2 (584)
Addicted gamer ^c	35	62.9 (22)
Total	1,229	52.2 (642)

Note.

^a GAS score = 0, no gaming activity during the past 12 months.

^b GAS score = 0–3.

^c GAS score ≥ 4 .

Table 3
Gambling Severity and Gaming Addiction

Gaming addiction	Gambling severity % (<i>n</i>)			
	<i>N</i>	Non-gambler ^a	Social gambler ^b	Problem gambler ^c
Non-gamer ^d	117	69.2 (81)	28.2 (33)	2.6 (3)
Social gamer ^e	1,077	45.6 (491)	51.8 (558)	2.6 (28)
Addicted gamer ^f	35	37.1 (13)	51.4 (18)	11.4 (4)
Total	1,229	47.6 (585)	49.6 (609)	2.8 (35)

Chi-square

Gambling severity $\chi^2 (4, 1229) = 34.43, p < .001$

Note.

^a *DSM-IV* score = 0, no gambling activity during the past 12 months.

^b *DSM-IV* score = 0–2.

^c *DSM-IV* score ≥ 3 .

^d GAS score = 0, no gaming activity during the past 12 months.

^e GAS score = 0–3.

^f GAS score ≥ 4 .

gambling severity classification. Proportionally, significantly more addicted gamers than social or non-gamers were identified as problem gamblers. However, because of the small numbers of problem gamblers and addicted gamers, no reliable conclusions can be reached, as only four addicted gamers were also identified as problem gamblers. Although no clear association was found, the overlap between gambling and gaming problems deserves further investigation.

Discussion

This study compared gambling behaviours among video game players and non-players and video game playing behaviours among gamblers and non-gamblers and found that a plausible association does exist. On the basis of earlier findings of high levels of both gambling and problem gambling among video game-playing adolescents, as well as regular video game playing among gamblers (Delfabbro et al., 2009; Griffiths, 1991; Gupta & Derevensky, 1996; Ladouceur & Dubé, 1995; Walther et al., 2012; Wood, Gupta, et al., 2004), we predicted that gamblers, relative to non-gamblers, would be more likely to play video games and that video game players would be more likely than non-players to gamble. The results suggest that gamblers were more likely than non-gamblers to play video games and that video game players were more likely than non-players to gamble. These results are in line with previous findings that correlate problematic video game playing with gambling (Walther et al., 2012), but contradict other findings (Forrest et al., 2016; King et al., 2012). Although Forrest et al. (2016) found that video gaming frequency did not correlate significantly with the frequency of gambling for money, they studied a population of video game players, whereas we investigated the gambling and video game habits among a general sample of college students. The present study did find that a greater number of social gamblers reported playing video games compared with video gamers who reported gambling, which supports Forrest et al.'s (2016) conclusions that gambling may not be an appealing activity to regular video game players, who prefer different experiences than those provided by chance-based gambling (e.g., high skill level, strategy and planning, progress reward cycles). This explanation suggests that video game players, who choose to play games that rely on skill, may be less interested in gambling experiences that do not require skill. Gamblers may have false beliefs with respect to the extent that skill affects the outcome of their gambling, and playing video games, especially games that contain gambling opportunities, would reinforce these beliefs. For example, King et al. (2012) reported that regular video game playing among gamers was not a significant predictor of illusion of control or superstitious thoughts about gambling on an experimental gambling task, although it was such a predictor among gamblers. In fact, among gamblers, video game playing was positively correlated with overestimating the amount of skill involved in an experimental gambling task and the belief that video game experience helped to produce gambling wins in that task (King et al., 2012). The relationship between video games and gambling may also be related to specific types of gambling and specific types of video games. Poker, for example, may provide opportunities for skill, strategy, and reward cycles not found in other gambling activities and may be more attractive to video game players.

Delfabbro et al. (2009) found that adolescents played a greater variety of video games if they gambled on non-electronic gaming machine types, including gambling activities involving skill (cards, sports, racing). Although this study is cross-sectional and therefore cannot demonstrate that playing video games leads to gambling, the finding that video game players were more likely than non-players to gamble and gamblers were more likely than non-gamblers to play video games warrants further inquiry in this area to clearly establish whether a causal link exists. Video game playing may not be directly related to gambling behaviour; rather, it may influence some gambling cognitions among those who both gamble and play video games. It would be of interest to determine the extent to which individuals distinguish between gambling and video game playing with respect to skill in determining the outcome.

Problem Gambling and Addicted Gaming

It is noteworthy that the rates of problem gambling in the current study are lower than those typically cited (3% to 32%; see Nowak & Aloe, 2013), but are not inconsistent with those of other studies (Kessler et al., 2008; McBride & Derevensky, 2012). Gambling behaviour of college-age students experiencing gambling problems has been observed to fluctuate, and some previously identified gamblers experiencing problems have been found to be no longer experiencing any problems at a later date (Martin, Usdan, Cremeens, & Vail-Smith, 2012). Problem gambling may not necessarily be a progressive disorder, as has been previously assumed, and some researchers are noting that individuals move in and out of gambling problems during their lifetime (LaPlante, Nelson, LaBrie, & Shaffer, 2008; Slutske, 2006). It is also possible that problem gamblers were not found in the current population because of the demands of school; those currently experiencing problems may have already dropped out of school, missed class, or not attended CEGEP in the first place (CEGEP is not mandatory; it is attended following a high school diploma and comprises two streams: vocational programs and pre-university programs). The students who participated in the current study attended non-vocational programs; perhaps the rigour of academics engulfed the students' leisure time. There is some indication that gambling is higher among young people not attending college than among those enrolled in college (Barnes, Welte, Hoffman, & Tidwell, 2010). Research with individuals in this age group, often difficult to obtain in large numbers, who are not in school, would provide valuable insight into the gambling behaviour of young adults in general.

A small percentage of the current sample also self-reported a gaming problem. From the GAS, nearly 3% of participants were identified as addicted gamers. Although there is no single "gold standard" measure in identifying pathological video game playing, the current results are consistent with that of other research (Johansson & Götestam, 2004). Among the sample, only four individuals were identified as both problem gamblers and addicted gamers. We hypothesized that problem gamblers would have higher rates of video game playing than would non-gamblers and that problem gamers would have higher rates of gambling than would non-gamers. We found that gamblers in the current study, both problem and social, were somewhat

more likely than non-gamblers to play video games and that gamers, both social and addicted, were more likely than non-gamers to report past-year offline gambling. The fact the participation was not higher for problem gamblers or addicted gamers was surprising, but might be a reflection of the size of the sample of the respective groups. These results are consistent with the findings of Delfabbro et al. (2009), who reported that frequent video game playing was only a minor risk factor for the development of pathological gambling during adolescence. Overall, a better understanding is needed on how gambling and video game playing might converge (see Kim et al., in press). Future research is needed to determine what makes problem gamblers and addicted gamers similar, or different, and how the two activities do or do not influence the thoughts and behaviours of their respective players.

The possibilities offered by rapid technological development are expanding exponentially. This is an area of concern and full of possibility for future research because children begin interacting with technology earlier and earlier and the lines between gambling and gaming become increasingly blurred (King et al., 2015).

Gender Differences

Although the association between gambling and video game playing was the primary consideration of this study, the results further emphasized the over-representation of males in both activities, although the number of females involved in video gaming was larger than the number involved in gambling. Consistent with the findings of the majority of gambling research, significantly more males than females had gambled (Bakken, Gotestam, Grawe, Wenzel, & Oren, 2009; Barnes et al., 2010; Bhullar, Simons, & Joshi, 2012; Derevensky & Gupta, 2000b; Engwall, Hunter, & Steinberg, 2004; LaBrie, Shaffer, LaPlante, & Wechsler, 2003; Stuhldreher, Stuhldreher, & Forrest, 2007). Gambling may be more normalized for males than for females, especially during childhood and adolescence, whereas it may be seen less as a way to socialize and more as a risky activity by young females. Speculation for this difference includes a proclivity on the part of males for risky behaviour (Bradley & Wildman, 2002), adherence to social norms (Hing & Breen, 2001), and issues related to escape versus competition motivations (Wenzel & Dahl, 2009).

In the current study, significantly more males than females were identified as problem gamblers. Males are consistently reported to have higher rates of problem gambling than females are (Bakken et al., 2009; Barnes et al., 2010; Blinn-Pike, Worthy, & Jonkman, 2007; Burger, Dahlgren, & MacDonald, 2006; Engwall et al., 2004; Goudriaan, Slutske, Krull, & Sher, 2009; LaBrie et al., 2003; Platz, Knapp, & Crossman, 2005; Stinchfield, Hanson, & Olson, 2006). Although females are not exempt from developing gambling problems, they tend to develop problems later in life, and this was reflected in the current sample. Nevertheless, prevention programs should include gender-specific strategies and messages, including public service announcements from prominent female gamblers on the potential dangers of excessive gambling, especially for those females who are gambling online.

Males are also more likely than females to play video games and to score more highly on addicted gaming screens (Dauriat et al., 2011; Griffiths, Davies, & Chappell, 2004a, 2004b; Lemmens, Valkenburg, & Peter, 2011; Mentzoni et al., 2011; Padilla-Walker, Nelson, Carroll, & Jensen, 2010). Desai, Krishnan-Sarin, Cavallo, & Potenza (2010) reported gender differences between gamers and non-gamers. Among girls, gaming was associated with a lower risk of depression but increases in serious fights and carrying a weapon, whereas there were no significant negative health correlates of gaming in boys. The authors posited that their results were suggestive of a gender-specific self-selection process in that, whereas gaming may be more appealing to boys in general, it may be particularly attractive to girls with certain characteristics. However, this assumes that males and females are choosing to play the same kinds of games, something Desai et al. (2010) did not examine. Wood, Griffiths, Chappell, and Davies (2004) found that males and females differed in regard to what game characteristics they rated as important; males preferred sophisticated artificial intelligence, skill development, shooting, and surviving against the odds, whereas females preferred cartoon-style graphics, use of humour, solving puzzles, avoiding things (i.e., dangerous places, spells), finding/collecting things, and finding bonuses. Males chose competitive games that they would play in real life—replicating gender stereotypical behaviour—and females chose make-believe games that accumulated points, suggesting a preference for competition with themselves (Wood, Griffiths, et al., 2004). In the current study, significantly more males than females were identified as addicted gamers and social gamers, and significantly more females than males were identified as non-gamers, a pattern that has also been widely reported with problem gambling. This gender divide has been reported elsewhere (Desai et al., 2010; Gentile, Choo, Liau, Sim, Fung, & Koo, 2011; Griffiths et al., 2004b; Lemmens et al., 2009, 2011; Mentzoni et al., 2011; Padilla-Walker et al., 2010; Wood, Griffiths, et al., 2004). Whether or not game choice affected these results is beyond the scope of this paper but, as with gambling, video game manufacturers are becoming aware of the market potential of women gamers and these numbers may change as game designers create and promote games geared toward women and girls. Further research is needed to determine how structural characteristics might lead to an increase in behaviour and whether this differs on the basis of gender.

Limitations

Several limitations need to be acknowledged. Cross-sectional designs do not permit conclusions to be drawn about causality. In order to determine whether video game playing leads to gambling, longitudinal studies need to be carried out. A second limitation reflects the potential self-selection bias for sampling. It is possible that individuals who have a particular interest in gambling and/or gaming would preferentially elect to participate. The data were obtained by self-report, which in and of itself has implications for reliability, as it is possible that individuals may want to portray themselves in more positive ways. However, the anonymity of the questionnaires should be sufficient to counter, or at least limit, this concern.

Because of the length of the survey, it was not possible to include further detailed questions about other common or antecedent factors (i.e., other addictive behaviours) that might contribute to a greater involvement in both activities, and so we cannot make a conclusion about whether observed results are due to similarities between these specific activities or to a common disposition for addictive behaviours in general.

Although over 1,000 students were surveyed, in the end, relatively few of them were pathological gamblers and addicted gamers. Although this has positive mental health implications for young people, it makes statistical analyses difficult and caution should be exercised in generalizing results to a larger population. In addition, generalizability is not possible because of the convenience sampling strategy used in this study.

Recommendations

An important aspect of education must address the similar risk factors inherent in gambling and gaming (Derevensky & Gainsbury, in press). Although the leisure and positive aspects of gambling are highlighted, marketed, and understood, the downside must also be emphasized, especially regarding gambling disguised as video or social games.

The educational community needs to develop and implement strategic secondary prevention efforts, awareness, information, and education about gambling in general and the possible links with video game playing. This should include the signs and symptoms of problematic gambling and gaming. Particular emphasis should be placed on game playing, as this leisure activity is much more pervasive than gambling.

Social gaming operators must be more socially responsible in how they market their games and how they encourage in-game purchasing (Griffiths, 2014). Stricter age verification measures should be in place for social games, especially where such games allow young people to play games with gambling-related content (often with exaggerated payout rates), even if real money is not used. Video games that have alcohol and cigarette use, graphic violence, sexual references, and coarse language are more restricted, whereas video game versions of simulated gambling activities are rated for “everyone” or “teen” audiences by the Entertainment Software Rating Board (King et al., 2010).

The gender differences in gambling and gaming found in the present study have implications for gender-specific treatments. Young males, who may prefer gambling and video games that stress competition and risk-taking, would benefit from interventions that channel those drives in more healthy, active ways, whereas young females, who may gamble or game for escape, would benefit from emotion-focused coping strategies. Further research into motivations for playing on the basis of gender would help to inform treatment strategies.

Parents also need to assume responsibility when allowing their children to play social games or download gaming apps. Griffiths (2014) has articulated a number of suggestions for parents to work with their children to prevent them from buying in-game items for real money, including overseeing all apps they download, not providing online store passwords, deleting stored credit and debit card information from online accounts, and discussing buying in-game extras with their children. Video games have dramatically changed from the initial *Pong* and *Pac-Man*. Today's games are readily available via social media outlets. They are much more exciting, incorporate more sophisticated graphics, and can easily be downloaded on smartphones and tablets. From a public health perspective, carefully monitoring the behaviour of youth is highly recommended.

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Relations of Five-Factor Personality Domains to Gambling Motives in Emerging Adult Gamblers: A Longitudinal Study

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Abstract

At least three types of gambling motives have been proposed: coping motives (gambling to reduce negative affect), enhancement motives (gambling to enhance positive affect), and social motives (gambling to increase social affiliation). Few studies have examined the underlying personality traits that give rise to these different motivations. The present study tests the longitudinal link between changes in five-factor model personality domains and gambling motives among emerging adults. A sample of 679 emerging adults ($M_{age} = 18.90$ years; 51.8% female) was recruited as part of the Manitoba Longitudinal Study of Young Adults (MLSYA). Participants completed self-report questionnaires across four measurement occasions, with each measurement 12–18 months apart. The NEO Five Factor Inventory was administered at waves 1 and 3, and the Gambling Motives Questionnaire was administered at wave 4. Data were analyzed using longitudinal structural equation modeling. Emerging adults who experienced increases in neuroticism had higher coping motives at a subsequent wave. Those who experienced increases in extraversion had higher enhancement and social motives. Those who experienced increases in agreeableness had lower social and coping motives. Changes in conscientiousness and openness were unrelated to any of the motives after controlling for all other variables. Extraversion and agreeableness predicting social motives were the most robust findings. A multigroup analysis showed the measurement and structural models did not differ by sex. Longitudinal changes in five-factor model personality domains were linked to specific motives for gambling in a theoretically-expected fashion. Results have implications for personality-targeted interventions for problem gamblers.

Keywords: personality, motivation, gambling, longitudinal, emerging adulthood

Résumé

Au moins trois types de motivations au jeu ont été proposées : l'adaptation (jouer pour atténuer une émotion négative), la stimulation (jouer pour stimuler une émotion positive) et les rapports sociaux (jouer pour accroître ses liens sociaux). Peu d'études ont examiné les traits de personnalité associés à ces différentes motivations. La présente étude met à l'épreuve le lien longitudinal entre des changements touchant les domaines de la personnalité (selon un modèle à cinq facteurs NEO Pi-R) et les motivations au jeu chez les jeunes adultes. Un échantillon de 679 jeunes adultes ($M_{\text{âge}} = 18,9$ ans; 51,8 % de femmes) a été recruté dans le cadre d'une étude longitudinale sur les jeunes adultes du Manitoba (Manitoba Longitudinal Study of Young Adults [MLSYA]). Les participants ont rempli des questionnaires d'auto-évaluation lors de quatre séances de mesure espacées d'un intervalle de 12 à 18 mois entre chacune. Le test de personnalité à cinq facteurs NEO Pi-R a été administré aux participants pendant les séances 1 et 3, et ceux-ci ont répondu au questionnaire sur les motivations au jeu lors de la séance 4. Les données ont été analysées au moyen d'une modélisation par équation structurelle longitudinale. Chez les jeunes adultes dont la personnalité a connu un accroissement du domaine du névrosisme, les motivations relevant de l'adaptation étaient également plus élevées. Ceux chez qui le domaine de l'extraversion s'est accru, les motivations étaient de l'ordre de la stimulation et de la recherche de rapports sociaux, alors que ceux pour qui le domaine de l'agréabilité a augmenté, les motivations relevant de l'adaptation et de la recherche de rapports sociaux étaient moins importantes. Des changements dans les domaines de la conscience et de l'ouverture n'étaient associés à aucun type de motivation, après un rajustement pour toutes les autres variables. La constatation la plus robuste de l'étude consiste dans le fait que les domaines de l'extraversion et de l'agréabilité sont des variables explicatives des motivations d'ordre social. Une analyse de groupes multiples a montré que les mesures et les modèles structuraux ne donnaient lieu à aucune différence quant au sexe. Il existe un lien entre les changements longitudinaux touchant les domaines de la personnalité du modèle à cinq facteurs NEO Pi-R et les motivations propres au jeu, conformément à ce que prévoyait la théorie. Ces résultats ont une incidence sur les interventions auprès des joueurs à problèmes axées sur la personnalité.

Introduction

Affect plays a central role in the etiology of problem gambling. Theory and research (Milosevic & Ledgerwood, 2010; Stewart, Zack, Collins, Klein, & Fragopoulos, 2008) both suggest a subset of problem gamblers suffer from heightened negative affect, and are then motivated to gamble as a means of relieving that negative affect. Other

gamblers are predominantly approach-oriented, and gamble to heighten their positive emotions and arousal. Though some gamblers are motivated for non-affective reasons, such individuals tend to have fewer gambling problems overall (Stewart & Zack, 2008). Despite excellent work on subtyping the personality of problem gamblers, few scholars have thus far explored the link between personality and gambling motives (cf., MacLaren, Ellery, & Knoll, 2015), and virtually no studies have used longitudinal methods to establish temporal precedence and help to infer causality. Such relationships have been shown to play a central role in the case of other addictive behaviors, such as alcohol use (Cooper, Kuntsche, Levitt, Barber, & Wolf, 2015); thus, elucidating the longitudinal relationship between personality and gambling motivations may be important to understand better both the etiology and course of problem gambling. The present study tests the longitudinal link between personality change and gambling motives in a representative sample of emerging adult gamblers.

The Five Factor Model and pathological gambling

The five-factor model (FFM) (Costa & McCrae, 1992; Digman, 1990) suggests human personality comprises five higher-order, trait-like dimensions or “domains”: (a) *neuroticism* (a tendency to experience negative affect); (b) *extraversion* (a tendency to experience positive affect); (c) *openness* (a tendency to be reflective, imaginative, and intellectually curious); (d) *agreeableness* (a tendency to be friendly, trustworthy, and prosocial); and (e) *conscientiousness* (a tendency to be self-disciplined, organized, and constrain immediate impulses in favor of long-term goals).

A meta-analysis of 44 studies ($N = 7455$) found that pathological gamblers were lower in conscientiousness and agreeableness, higher on neuroticism, and had roughly the same levels of extraversion compared to healthy controls (MacLaren, Fugelsang, Harrigan, & Dixon, 2011b). This meta-analysis provides an important summary of personality differences between treatment-seeking problem gamblers and healthy controls. However, studies included in this meta-analysis are limited by selection bias. For example, persons seeking treatment for mental disorders tend to be higher in neuroticism and lower in both conscientiousness and extraversion (Goodwin, Hoven, Lyons, & Stein, 2002). Moreover, gamblers seeking treatment may represent only a small proportion of problem gamblers, as most problem gamblers do not seek treatment (Slutske, 2006). Beyond this, the hierarchical structure of personality (Markon, Kruger, & Watson, 2005) means that personality domains in the FFM are not fully orthogonal. Multiple regression might help tease apart the unique contributions of the FFM components when predicting gambling beyond what was shown in MacLaren et al. (2011b). Finally, though there is not necessarily a strong theoretical rationale for its inclusion, MacLaren et al.’s (2011b) meta-analysis did not examine openness, which is a potential limitation in method.

A mixed pattern of results has been found using community and student samples when all FFM domains have been entered as simultaneous predictors of gambling outcomes. Buckle, Dwyer, Duffy, Brown, and Pickett (2013) found that openness and agreeableness were negatively correlated with problem gambling in a university

student sample. In a sample of undergraduates, MacLaren, Best, Dixon, and Harrigan (2011a) determined that the impulsivity facet of neuroticism was positively associated with gambling problems, whereas facets of agreeableness and conscientiousness were instead negatively associated with gambling problems. In a community sample, Miller et al. (2013) established that only high neuroticism and low openness predicted gambling problems after controlling for other FFM personality domains. Thus, when all five personality domain scores are entered simultaneously to predict gambling outcomes in community and student samples, the pattern of results appears less clear than in designs comparing treatment-seeking problem gamblers to healthy controls (MacLaren et al., 2011b).

Gambling motives and pathological gambling

In addition to personality traits, certain motivations for gambling appear characteristic of pathological gamblers. Drawing on theory from the drinking-motives literature (Cooper, Frone, Russell, & Mudar, 1995), Stewart et al. (2008) proposed three motives for gambling. In this model, people can gamble to enhance positive emotions (enhancement motives), to inhibit negative emotions (coping motives), or to increase social affiliation (social motives) (Stewart & Zack, 2008; Stewart et al., 2008). Similar three-cluster models have been proposed and supported with latent profile analysis by other research groups (Nower, Martins, Lin, & Blanco, 2013).

Individual differences in gambling motives have been shown to predict gambling outcomes. Coping and enhancement motives, rather than social motives, appear to be characteristic of pathological gamblers (McGrath, Stewart, Klein, & Barrett, 2010; Stewart & Zack, 2008). Coping-motivated gamblers also display greater severity of gambling problems than other subtypes, and enhancement motivated gamblers display greater intensity and frequency of gambling behavior than those who are socially motivated (Stewart et al., 2008). Thus, coping and enhancement motives—both affect-laden or “internal” motives—appear to have the strongest relationship with adverse gambling outcomes, including pathological gambling.

Personality and gambling motives

Despite a robust literature on personality predicting problem gambling, few scholars have examined the link between personality and gambling motives. According to Cooper's theory, specific antecedent personality factors should be linked to specific motives for substance use (Cooper et al., 2015). Specifically, Cooper et al.'s (2015) review suggests neuroticism is positively associated with coping motives, extraversion is positively associated with enhancement motives, and conscientiousness is negatively related to all motives. A few studies have supported this contention. Sztainert, Wohl, McManus, and Stead (2014) found, in a sample of pathological gamblers, that reward sensitivity (i.e., a personality trait representing a tendency to seek out positive reinforcement) predicted both enhancement and social gambling motives, but did not predict coping motives. Using a 30-day experience sampling

design, Goldstein, Stewart, Hoaken, and Flett (2014), in a sample of at-risk gamblers, determined that negative affectivity was positively correlated with coping motives, positive affectivity was positively related to enhancement motives, and impulsivity was positively related to both coping and enhancement motives. Using a sample of frequent electronic gambling machine players, MacLaren et al. (2015) discovered that low industriousness had an indirect effect on problem gambling through coping motives. When inspecting the bivariate correlations, neuroticism was related to coping motives, conscientiousness was related to both coping and enhancement motives, and agreeableness and extraversion were unrelated to gambling motives (openness was not examined). Thus, preliminary evidence supports the notion that specific FFM domains predict theoretically-relevant motivations for gambling, in a similar way to research on substance use motives (Cooper et al., 2015).

Given the well-known links between neuroticism and psychopathology, studies linking psychopathology to coping motives are consequently also informative. Ledgerwood and Milosevic (2015) found participants with post-traumatic stress disorder are more likely to gamble to cope with their negative emotions. Similarly, participants with a current mood disorder tended to endorse more coping motives for gambling compared to participants without a mood disorder (Lister, Milosevic, & Ledgerwood, 2015).

Rationale and the present study

Though much research has examined the link between personality and problem gambling in treatment-seeking (MacLaren et al., 2011b) and university student samples (Buckle et al., 2013), few studies have examined the relationship in community emerging adults. Such tests are important to ensure that relationships between personality and problem gambling are not due to selection bias. Prior research has also tended to exclude the openness domain of the FFM. Though a few studies have tested the link between FFM personality and gambling motives (MacLaren et al., 2015), these studies have relied on cross-sectional methods, which makes causal inference difficult. Though FFM personality domains exhibit substantial stability, these domains can also change over time, especially during emerging adulthood (Robins, Fraley, Roberts, & Trzesniewski, 2001). More importantly, changes in FFM personality domains can predict co-occurring changes in addictive behaviours as well. For instance, Littlefield, Sher, and Wood (2010) found that increases in conscientiousness and decreases in neuroticism were linked to decreases in alcohol problems from ages 21–35. Thus, a stronger test would be whether the *changes* in personality that occur in emerging adulthood are associated with future gambling motives. More specifically, we tested whether increases and decreases in certain personality domains would predict specific, theoretically-relevant gambling motives at a later time point. Finally, most past studies have used Ordinary Least Squares regression to test hypotheses; however, structural equation modelling represents an improvement upon these statistical methods by reducing measurement error through the use of latent variables (Kline, 2011). The present study addresses

these gaps by using a longitudinal design with a community sample of emerging adult gamblers analyzed using structural equation modelling.

Hypotheses

We hypothesized that changes in certain FFM personality domains would lead to certain gambling motives at a future wave. Specifically, we hypothesized that: (H1) increases in neuroticism would be positively related to coping motives at a later wave; (H2) increases in extraversion would be positively related to social and enhancement motives; (H3) increases in conscientiousness would be negatively related to all motives; (H4) increases in agreeableness would be negatively related to all motives; and (H5) increases in openness would be unrelated to all gambling motives. Finally, because certain studies have found interactions between sex and personality when predicting gambling (Buckle et al., 2013), and because men tend to have more gambling problems than women (Slutske, 2006), we explored one open-ended research question: (RQ1) do the factor loadings or paths tested in H1-H5 differ by sex?

Method

Participants

Participants in MLSYA (MGCC, 2011) were recruited via a variety of methods, including random-digit dialing, participant referrals, survey recruiting, placing advertisements at video lottery terminal (VLT) sites and post-secondary institutions, and casino recruiting. To participate, individuals were required to be 18-20 years old at wave 1, and consent to repeated contact over a five-year period. Wave 1 consisted of 679 participants (51.8% female, mean age = 18.90 years, $SD = 0.79$), with high retention rates five years later (70.9%; $N = 530$). A minority of participants reported that they were past-year non-gamblers at wave 1 ($N = 78$), wave 2 ($N = 57$), wave 3 ($N = 49$), and wave 4 ($N = 43$). There were no significant differences ($ps > .05$) between gamblers and non-gamblers in terms of personality (ds ranging from $-.08$ to $.08$). Wave 4 non-gamblers were removed for the current study, as they could not have gambling motives. Thus, Wave 4 consisted of 487 emerging adult gamblers (52.6% female; mean age = 22.20 years, $SD = 0.91$). These participants reported spending an average of \$671.60 ($SD = \$1,602.35$), gambled an average of 28.42 days ($SD = 51.51$), and spent an average of 25.05 hours ($SD = 79.14$) gambling in the past year. Moreover, 15.0% of participants reported one or more gambling problems on the Problem Gambling Severity Index (Wynne 2003).¹

¹Relationships between gambling motives, gambling behaviours, and problem gambling using this data set are presented in Lambe, Mackinnon, and Stewart (2015b). They found that all three gambling motives subscales were positively correlated with gambling behaviours and problem gambling; however, only enhancement motives emerged as a significant predictor of gambling problems when the other motives and gambling behaviours were entered as simultaneous predictors. Results for gambling behaviours and problems are not presented in this paper to avoid duplication.

Measures

NEO Five Factor Inventory (NEO-FFI). The NEO-FFI (Costa & McCrae, 1992) is a standardized 60-item measure tapping the five domains of the FFM: (1) extraversion, (2) neuroticism, (3) openness, (4) agreeableness, and (5) conscientiousness. Each domain scale consists of 12 Likert questionnaire items on which participants respond from 0 (strongly disagree) to 4 (strongly agree). Missing responses were replaced by a score of 2 (neutral) as per instructions by the instrument's authors. Cases with ≥ 10 invalid responses were excluded ($n = 3$ at wave 1; $n = 1$ at wave 3). In samples of emerging adults, the NEO-FFI showed high test-retest reliability over a two-week interval ($r_s = .86-.90$) and acceptable internal consistency ($\alpha_s = .75-.85$, Robins et al., 2001). Over longer time intervals (e.g., 4 years), mean-levels of neuroticism and agreeableness exhibited the largest degree of change in this population (Robins et al., 2001).

Gambling Motives Questionnaire – Short Form (GMQ – Short Form). The GMQ – Short Form (Lambe et al., 2015b) is a modified 9-item measure of the original GMQ (Stewart & Zack, 2008). The GMQ assesses three dimensions of motives: (1) enhancement (“because it’s exciting”), (2) social (“as a way to celebrate”), and (3) coping (“to forget your worries”). Participants respond to each of the items on a 1 (*almost never/never*) to 4 (*almost always*) Likert scale. The GMQ – Short Form has been validated as a measure of gambling motives in emerging adults, with factorial validity supporting the 3-factor model and alpha reliabilities $\geq .78$ for all three subscales in the present sample (Lambe et al., 2015b).

Procedure

The MLSYA was a five-year longitudinal study that collected data from emerging adults in Manitoba. All participants gave informed consent. During each wave, participants were initially contacted by telephone to complete a telephone interview that included both closed- and open-ended questions. This was followed by a questionnaire battery that participants had the option of completing online (97.9%) or through a mail-in questionnaire (2.1%), both of which included the same measures in the same order. Four waves of data collection occurred, at approximately 12-18 month intervals. Archival data provided by the MLSYA was used for the current study. The NEO-FFI was administered only at waves 1 and 3. The GMQ was administered only at wave 4.

Data analytic strategy

Hypotheses were tested using structural equation modeling in Mplus 7.3 software. A robust estimate of fit indices and standard errors (MLR estimation) was used to account for minor deviations from multivariate normality. A full information maximum likelihood approach was used to handle missing data. Model fit was assessed using multiple fit indices. A root-mean-square error of approximation (RMSEA) and a standardized root mean square residual (SRMR) below .05 indicated excellent fit and

values below .08 represented adequate fit. Moreover, a comparative fit index (CFI) and Tucker-Lewis Index (TLI) over .95 indicated excellent fit, and values over .90 indicated adequate fit (Hu & Bentler, 1999; Kline, 2011).

Analysis proceeded in three steps: a (a) measurement model, (b) structural model, and (c) multigroup model split by sex. Before running the measurement model, the NEO-FFI subscales were first split into three item parcels per subscale, with each parcel consisting of four randomly selected items, following procedures from Little, Cunningham, Shahar, and Widaman (2002). Item parcels (three parcels for each latent variable) were used as observed indicators of latent variables for the NEO-FFI. Because the short-form subscales of the GMQ consist of three items, the individual items were used as observed indicators of gambling motives latent variables. Due to the longitudinal nature of the data, residuals of observed indicators were correlated across waves for the personality variables (e.g., wave 1 neuroticism parcel 1 with wave 3 neuroticism parcel 1). After assessing the fit of the measurement model, we then proceeded to the structural model by entering paths and correlations as depicted in Figure 1. Finally, we ran a multigroup model testing for invariance across sex. In this model, we tested for configural (i.e., same factor structure), metric

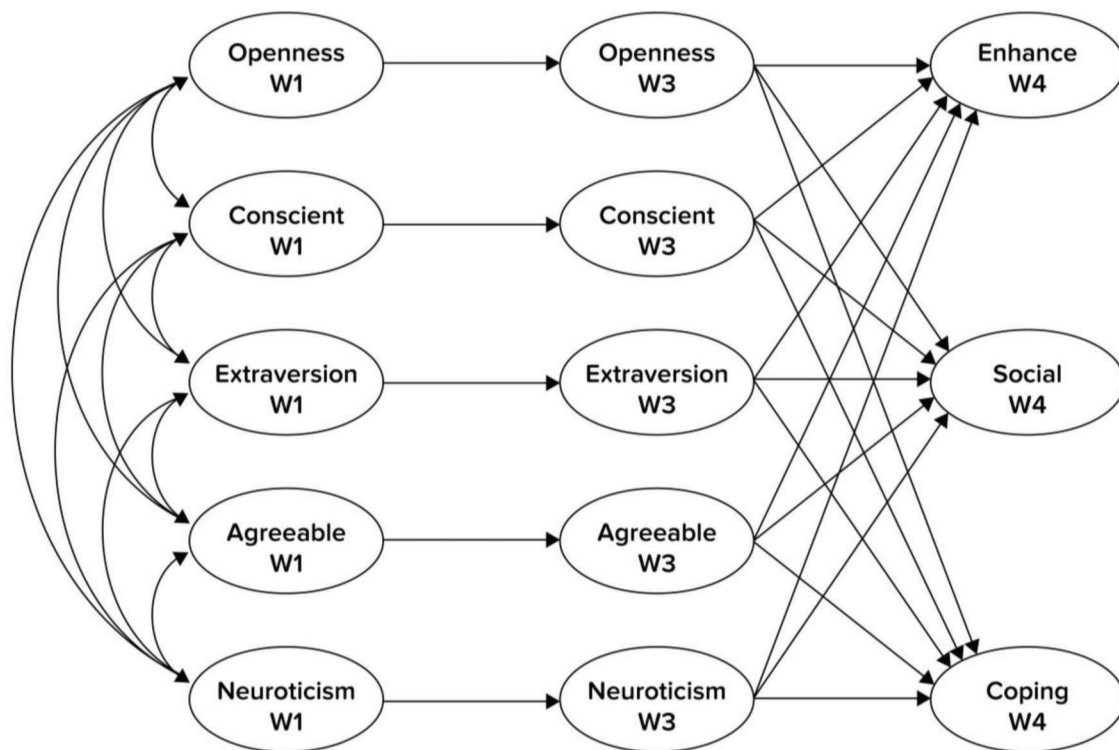


Figure 1. Structural equation model. Latent variables were created using item parceling for personality variables, and individual items for gambling motives. Residuals on item parcels were correlated across waves (observed indicators of latent variables not shown for clarity). Conscient = Conscientiousness; Agreeable = Agreeableness.

(i.e., same magnitude of factor loadings), and scalar invariance (i.e., same intercepts) of the factor structure (Wu, Li, & Zumbo, 2007). As well, we tested for invariance across sex for all structural paths and correlations in Figure 1 by comparing a model with all paths and correlations freely estimated, to a model with paths and correlations constrained across sex. When comparing nested models in these multigroup comparisons, we used ΔCFI of $|\text{.01}|$ as our critical value for determining differences in model fit (Cheung & Rensvold, 2002).

Results

Descriptive Statistics

Means, standard deviations, internal consistencies, and bivariate correlations are presented in Table 1. Overall, means and standard deviations were similar to previously published means (Robins et al., 2001; Stewart & Zack, 2008). Internal consistencies ranged from .70 to .87, suggesting adequate reliability. Test-retest correlations for personality domain measures (r s from .56 to .69) suggest substantial stability over time, but correlations were not so large as to preclude longitudinal analysis. Generally speaking, personality variables tended to be inconsistently correlated with outcomes in the bivariate correlations. However, because the FFM personality variables overlapped substantially (r s from -.37 to .40) and the gambling motives were also strongly intercorrelated (r s from .35 to .56), subsequent structural equation modeling where this overlap was partialled out was likely to prove more informative than relying on bivariate correlations.

Measurement Model

The measurement model fit well, $\chi^2(609, N = 678) = 1228.48, p < .001$; CFI = .94; TLI = .92; RMSEA = .04, SRMR = .05, and the standardized factor loadings ranged from .59 to .88. Together, these results support the factor structure of the measured constructs, and support moving forward with the structural model.

Structural Model

The structural model also fit well, $\chi^2(644, N = 678) = 1276.12, p < .001$; CFI = .93; TLI = .92; RMSEA = .04, SRMR = .05. The FFM personality traits all exhibited strong stability from Wave 1 to Wave 3 (β s from .62 to .87); however, substantial residual variance remained for use as a predictor of gambling motives in the full structural model. After partialing out Wave 1 personality, we examined whether wave 3 personality traits predicted wave 4 gambling motives. In this way, we examined whether rank-order changes in personality traits from wave 1 to wave 3 predicted gambling motives at a subsequent wave. Overall, we found that: (a) increases in extraversion predicted greater social motives at a subsequent wave, and (b) decreases in agreeableness predicted greater social motives. In the context of the full structural model, none of the other personality variables significantly

Table 1
Bivariate correlations, descriptive statistics, and internal consistency

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13
1. W1 Openness													
2. W1 Conscientiousness	-.04												
3. W1 Extraversion	.13**	.27**											
4. W1 Agreeableness	.15**	.27**	.31**										
5. W1 Neuroticism	.00	-.27**	-.36**	-.31**									
6. W3 Openness	.75	-.08	.07	.15**	-.01								
7. W3 Conscientiousness	.04	.65**	.21**	.24**	-.21**	-.02							
8. W3 Extraversion	.12*	.17**	.69**	.29**	-.25**	.12**	.30**						
9. W3 Agreeableness	.15**	.23**	.25**	.73**	-.17**	.17**	.35**	.40**					
10. W3 Neuroticism	.07	-.20**	-.26**	-.18**	.56**	.03	-.36**	-.37**	-.29**				
11. W4 Enhancement	-.02	-.10*	-.03	-.12**	.14**	-.02	-.13**	.00	-.13**	.13**			
12. W4 Social	-.06	-.03	.06	-.10*	-.02	-.04	-.02	.14**	-.11*	-.01	.47**		
13. W4 Coping	-.04	-.05	-.02	-.13**	.07	-.06	-.12*	-.07	-.17**	.16**	.56**	.35**	
Mean	3.36	3.51	3.54	3.58	2.75	3.39	3.61	3.52	3.63	2.68	1.35	1.57	1.12
SD	0.50	0.51	0.48	0.53	0.65	0.49	0.50	0.50	0.51	0.66	0.55	0.63	0.32
<i>A</i>	.70	.81	.75	.78	.84	.73	.81	.79	.79	.87	.80	.78	.79

Note. Listwise deletion $N = 451$.

* $p < .05$, ** $p < .01$

Table 2

Unstandardized and standardized path coefficients from structural model

Predictor	B	SE B	β	<i>p</i> -value
Predicting Wave 3 Personality (Test-Retest Stability)				
W1 Conscientiousness	0.70	0.05	.73	< .001**
W1 Extraversion	0.86	0.07	.78	< .001**
W1 Neuroticism	0.64	0.05	.62	< .001**
W1 Agreeableness	0.83	0.05	.80	< .001**
W1 Openness	0.88	0.06	.87	< .001**
Predicting Enhancement Motives				
W3 Conscientiousness	-0.15	0.10	-.12	.134
W3 Extraversion	0.27	0.13	.18	.045*
W3 Neuroticism	0.13	0.07	.15	.056
W3 Agreeableness	-0.17	0.10	-.15	.091
W3 Openness	-0.03	0.08	-.03	.709
Predicting Social Motives				
W3 Conscientiousness	-0.04	0.08	-.03	.642
W3 Extraversion	0.41	0.10	.31	< .001**
W3 Neuroticism	0.01	0.05	.02	.803
W3 Agreeableness	-0.24	0.08	-.25	.002**
W3 Openness	-0.06	0.06	-.06	.347
Predicting Coping Motives				
W3 Conscientiousness	-0.05	0.05	-.07	.285
W3 Extraversion	0.07	0.05	.09	.164
W3 Neuroticism	0.06	0.03	.14	.034*
W3 Agreeableness	-0.09	0.04	-.16	.024*
W3 Openness	-0.05	0.04	-.09	.173

* $p < .05$, ** $p < .003$ (i.e., a Bonferroni correction)

predicted gambling motives at $p < .003$ (i.e., after a Bonferroni correction). However, certain findings were statistically significant using a less stringent criterion of $p < .05$: (c) increases in neuroticism predicted coping motives; (d) increases in extraversion predicted greater enhancement motives; and (e) decreases in agreeableness predicted greater coping motives. Path coefficients and exact p -values are presented in Table 2. R^2 values were as follows: W3 openness (.76), W3 conscientiousness (.54), W3 extraversion (.60), W3 agreeableness (.65), W3 neuroticism (.39), W4 enhancement motives (.07), W4 social motives (.09), W4 coping motives (.07).²

²Given that item-parcelling is a somewhat controversial technique, we re-analyzed the data using Exploratory Structural Equation Modelling (ESEM), as recommended by Marsh, Lüdtke, Nagengast, Morrin, & Von Davier (2013). The following paths became non-significant ($p > .05$) in the ESEM analyses: (a) extraversion positively predicting enhancement motives, and (b) neuroticism positively predicting coping motives. The patterns of statistical significance for all other paths remained the same at $p < .05$. Please see Supplementary Material for a full presentation of these results.

Multigroup Model by Sex

We next explored potential sex differences by using multigroup analysis. Overall, the model fit well for the configural (CFI = .926), metric (CFI = .927), and scalar (CFI = .920) invariance models where the factor structure was constrained to equality across sex. Since the Δ CFI was not greater than .01, the factor structure was invariant across sex, supporting the decision to move forward with structural constraints. When a model with paths and correlations freely estimated, was compared to a model where the paths and correlations were constrained to equality, the models fit equally well (Δ CFI = .001). Thus, there were no observed sex differences in the factor structure or the magnitude of paths in the model.

Discussion

Overall, hypotheses received mixed support. The most robust findings pertained to the prediction of social motives. Emerging adult gamblers who experienced increases in extraversion and decreases in agreeableness were motivated to gamble socially. Weaker effects were found for coping motives, with increases in neuroticism and decreases in agreeableness predicting future coping motives. Increases in extraversion were weakly associated with future enhancement motives. However, findings regarding enhancement and coping motives tended to vary depending on the data analytic strategy used, thereby reducing confidence in those results.

Neuroticism

Results using item-parceling suggested that, as hypothesized, emerging adult gamblers who experienced increases in neuroticism were motivated to cope with those increases by gambling. However, this finding did not persist when analyzed using ESEM or when applying Bonferroni corrections. Thus, there is only weak evidence to support H1. Nonetheless, this finding is consistent with prior research showing negative affectivity predicts gambling motives when averaged across 30 days (Goldstein et al., 2014) and mirrors longitudinal findings for personality and drinking motives (Mackinnon, Kehayes, Clark, Sherry, & Stewart, 2014). This finding is also consistent with prior research suggesting a demoralized or avoidance-oriented subtype of gambler exists, one who experiences heightened negative affect, and who gambles as a way to escape those negative emotions (Blaszczynski & Nower, 2002; Milosevic & Ledgerwood, 2010; Stewart et al., 2008; Vachon & Bagby, 2009). Given the inconsistencies that emerge when data are analyzed using different approaches, future replication is advised before interpreting this effect further. Likely, the longitudinal contribution of neuroticism to coping motives is small in magnitude.

Extraversion

Increases in extraversion were positively associated with future enhancement motives, as hypothesized. As this relationship did not persist when analyzed using ESEM or applying a Bonferroni correction, this component of H2 also received

weak support. Nonetheless, the specificity of this relationship tentatively supports the notion of a hedonic or approach-oriented subtype of gambler (Milosevic & Ledgerwood, 2010; Stewart et al., 2008; Vachon & Bagby, 2009). This finding is also consistent with Goldstein et al.'s (2014) daily diary study, which determined a positive association between positive affectivity and enhancement motives. Given that this finding did not persist when the data analytic strategy was changed, we have decreased confidence in the robustness of this discovery. Indeed, given that MacLaren et al. (2011b) found a null relationship between extraversion and problem gambling, the existence of this effect more broadly in the general population remains uncertain. This relationship might be clarified by examining more fine-grained facets of extraversion. For instance, MacLaren et al. (2011a) ascertained that the positive emotions facet of extraversion is associated with fewer gambling problems, while Sztainert et al. (2014) found that reward sensitivity was associated with heightened enhancement motives and gambling problems. Future research might explore these relationships longitudinally to isolate the components of extraverted personality associated with specific patterns of gambling motives.

A more robust relationship was found between extraversion and social motives, supporting H2. Extraversion represents a tendency to experience and seek out positive emotions (Digman, 1990); thus, adolescents who experience increasing levels of extraversion are experiencing heightened positive affect, more social affiliation, and presumably greater psychological adjustment. Social motives are typically considered to be a healthier, non-pathological form of gambling motivation (Stewart & Zack, 2008). It appears then, that a pattern of increasing extraversion during emerging adulthood predicts healthy gambling motivations that are unlikely to place that person at risk for gambling problems. This contention is supported by other analyses using this data set (Lambe et al., 2015b). When all three motives were entered in as simultaneous predictors of gambling behaviours and problems, Lambe et al. (2015b) found that social motives were positively related to time spent gambling, but unrelated to money spent or gambling problems. In contrast, enhancement motives were associated with increased time spent gambling, money spent, and associated gambling problems. Overall, a pattern of increasing extraversion in emerging adulthood may represent a relatively healthy pattern of development, at least as it pertains to gambling risk.

Conscientiousness and Agreeableness

Changes in conscientiousness were unrelated to all motives after controlling for other FFM variables, failing to support H3. In contrast, increases in agreeableness were most strongly related to social motives, less robustly related to coping motives, and unrelated to enhancement motives, partially supporting H4. Though conscientiousness and agreeableness are considered separate in the FFM, Markon et al. (2006) demonstrated they both comprise a higher order “disinhibition” factor. When both disinhibited personality domain scores were entered longitudinally as predictors with other personality traits and motives, only change in agreeableness emerged as a more generalized predictor of gambling motives. The present data thus do not suggest that

conscientiousness is unrelated to gambling motives, but rather, that the proportion of the variance in conscientiousness that changes over time and is unique relative to the other variables (including agreeableness) does not predict gambling motives.

Results suggest unique features of disinhibited social behaviors may promote general motivations to gamble. For instance, disagreeable behavior might lead to relationship conflict, which in turn would lead to gambling to cope—a link observed in the drinking-motives literature (Lambe et al., 2015a). Moreover, the lack of specificity of the relationship (i.e., relations to both coping and social motives) suggests decreases in agreeableness confer risk for a more generalized, opportunistic set of motives, consistent with research on impulsivity and drinking motives (Mackinnon et al., 2014). Overall, disinhibited personality predicted gambling motives, to some degree, with the largest effect emerging for disagreeable personality predicting social motives.

Openness to Experience

Openness to experience remains something of an anomaly in the study of gambling, no theory exists to explain its link to problem gambling. For instance, MacLaren et al. (2011b) excluded it from their meta-analysis on problem gambling on theoretical grounds. However, low openness has sometimes been linked to problem gambling in prior research (Buckle et al., 2013; Miller et al., 2013), suggesting it may have a role to play when understanding gambling behaviors. Though the present data suggest openness is unrelated to gambling motives, certain facets of openness (e.g., willingness to experiment) might be related to problem gambling, and, to help resolve inconsistent findings, are worth exploring in greater detail in future research. Future qualitative research might explore the underlying motives for gambling in this personality type if consistent links to problem gambling are found for people low in openness.

Limitations and future directions

The present study has limitations. Ideally, we would control for levels of gambling motives at a prior wave using a full cross-lagged panel design (Cole & Maxwell, 2003). However, gambling motives were measured only at Wave 4, and personality only at Waves 1 and 3 in MLSYA. Thus, the present analytic strategy could not assess changes in gambling motives over time. Though longitudinal studies have advantages over cross-sectional research, no longitudinal study can strictly infer causality because of the possibility of third variable mechanisms. For instance, it is possible that the link between neuroticism and coping motives might be because of a co-morbid depressive disorder (Lister et al., 2015). Our use of item parceling is somewhat controversial, with arguments both for and against its use for modelling the five-factor personality traits in structural equation models (Herrmann & Pfister, 2013; Little et al., 2002; Marsh et al., 2013). More importantly, certain theoretically-predicted findings (i.e., neuroticism predicting coping, extraversion predicting enhancement) were not statistically significant when the data analytic strategy was changed to utilize ESEM or when Bonferroni corrections were applied. Thus, further studies are required to verify these less-robust findings. The present study was also

conducted with a relatively homogenous sample of emerging adults from a single Canadian province, and the results may not be generalizable to older or younger samples. Given that changes in personality are most common in emerging adulthood (Robins et al., 2001), it is possible that the current findings are unique to this age range. Moreover, these relationships may vary across different cultures or ethnicities. Finally, the NEO-FFI was designed to be a relatively brief measure of the FFM constructs and as such, taps higher-order personality domains, but not lower-order facets. Thus, more longitudinal research is needed to examine which facets are linked to specific emotion-regulation gambling motives (MacLaren et al., 2011a).

Clinical Implications and Conclusions

Overall, longitudinal changes in personality were linked to specific gambling motives in a theoretically-expected way, though the strongest findings involved the prediction of social motives. Prior research using this data set (Lambe et al., 2015b), and in other samples (Stewart & Zack, 2008) has found that social motives are generally unrelated to problem gambling, and that social motives are a healthier, more adaptive form of gambling motivation. Though researchers have traditionally emphasized risk factors for problem gambling (Milosevic & Ledgerwood, 2010), there is also clinical value in understanding the etiology of non-problematic gambling motives. From a positive psychology perspective, we might argue that psychology has too often focused on problem gambling, with comparatively little focus on what underlies responsible gambling. The present findings suggest emerging adults who become more extraverted across emerging adulthood are the most likely to gamble socially—and presumably, are not in fact at increased risk for problem gambling (Lambe et al., 2015b). It is hoped that future research will paint a clearer picture of the “healthy gambler” subtype that might combine information regarding personality, motivations, and other sources to identify gamblers that are at low risk for developing a gambling problem.

Much has been published on personality traits and addictive behaviours, including gambling (MacLaren et al., 2011b). However, clinicians may need to consider that personality has both state-like and trait-like components, as it is not perfectly stable over time (Robins et al., 2001). Moreover, different trajectories of personality change might be associated with different gambling patterns, as in the alcohol problems literature (Littlefield et al., 2010). Thus, clinicians might consider how personality and mental health change together over time. Given that personality is at least partially malleable, personality- and motivation-focused interventions with young people have proven effective in the substance abuse area (Conrod, Stewart, Comeau, & Maclean, 2006). These approaches might be equally effective in the problem gambling prevention field. Future research might explore specific, personality-focused treatment strategies for problem gambling, especially since their underlying motivations may differ from person to person. As research progresses, it is becoming apparent that problem gambling is not a unitary construct, but rather a collection of subtypes (Milosevic & Ledgerwood, 2010; Nower et al., 2013; Vachon & Bagby, 2009). There are numerous different pathways to addiction, and as we approach a

greater understanding of the different types of gamblers, we may be able to develop better effective, person-centered prevention and treatment strategies.

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Supplementary Materials

Exploratory Structural Equation Modelling

Certain authors have criticized the use of item parceling, and instead recommend analyzing data using individual items with exploratory structural equation modeling (ESEM) (Marsh, Lüdtke, Nagengast, Morrin, & Von Davier, 2013). This approach is a hybrid of exploratory factor analysis and SEM, and tests the measurement model and structural model simultaneously. ESEM is thought to be less biased than conventional confirmatory factor analysis in most practical applications when analyzing item-level data because it includes all possible cross-loadings (Asparouhov & Muthén, 2009). However, this decrease in bias comes at the cost of decreased model parsimony (i.e., many more parameters to estimate) (Asparouhov & Muthén, 2009) and may result in poorer interpretability, convergent validity, and discriminant validity (Herrmann & Pfister, 2013). As a point of comparison with the item-parcelled results presented in the main paper, data were re-analyzed using ESEM. In this model, factor loadings were constrained to equality and residuals were correlated across waves for the Big Five personality traits to account for the longitudinal nature of the data, and MLR estimation was used.

The model fit indices for the ESEM did not agree, $\chi^2(7827, N = 678) = 12228.30$, $p < .001$; CFI = .84; TLI = .83; RMSEA = .03, SRMR = .04. Notably, the absolute fit indices (RMSEA, SRMR) fit the data well, while indices that are relative to the null model (CFI, TLI) did not fit the data well. This discrepancy is likely due to the large number of variables in the model (63 in the present model). As the number of variables increases, absolute fit indices like RMSEA tend to be too liberal, while CFI and TLI tend to be too conservative when rejecting models (Kenny & McCoach, 2003). Given that these fit indices are similar in magnitude to those reported in prior research using ESEM on the NEO-FFI (Marsh et al., 2010), the unresolved problems with fit indices for models with many variables (Kenny & McCoach, 2003), and that the pattern of factor loadings is consistent with theory and research (Robins et al., 2001), we cautiously accepted the model as well-fitting.

Table S1

Selected unstandardized and standardized path coefficients from ESEM analysis

Predictor	B	SE B	β	<i>p</i> -value
Predicting Wave 3 Personality (Test-Retest Stability)				
W1 Conscientiousness	0.70	0.04	0.72	< .001**
W1 Extraversion	0.72	0.06	0.71	< .001**
W1 Neuroticism	0.63	0.05	0.61	< .001**
W1 Agreeableness	0.78	0.04	0.84	< .001**
W1 Openness	0.86	0.04	0.90	< .001**
Predicting Enhancement Motives				
W3 Conscientiousness	-0.11	0.07	-0.11	.126
W3 Extraversion	0.10	0.07	0.10	.149
W3 Neuroticism	0.14	0.07	0.14	.053
W3 Agreeableness	-0.15	0.08	-0.14	.058
W3 Openness	0.00	0.08	0.00	.970
Predicting Social Motives				
W3 Conscientiousness	-0.03	0.07	-0.03	.636
W3 Extraversion	0.23	0.07	0.22	.002**
W3 Neuroticism	0.00	0.06	0.00	.971
W3 Agreeableness	-0.23	0.08	-0.20	.006**
W3 Openness	-0.09	0.07	-0.08	.195
Predicting Coping Motives				
W3 Conscientiousness	-0.11	0.07	-0.10	.131
W3 Extraversion	-0.02	0.08	-0.02	.779
W3 Neuroticism	0.09	0.07	0.09	.168
W3 Agreeableness	-0.16	0.07	-0.14	.026*
W3 Openness	-0.09	0.09	-0.08	.315

* $p < .05$, ** $p < .01$

The same relationships reported in Table 2 of the main paper were re-examined in the EFA model and are reported in Table S1. Overall, a very similar pattern of results emerged. The most robust relationships were strong test-retest reliabilities, extraversion positively predicting social motives, and agreeableness negatively predicting social motives. When compared with the item-parcelling results, the following paths became non-significant in the ESEM analyses: (a) extraversion positively predicting enhancement motives, and (b) neuroticism positively predicting coping motives. The patterns of statistical significance for all other paths remained the same using $p < .05$ as the criterion.

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A Method for Classifying Pathological Gamblers According to “Enhancement,” “Coping,” and “Low Emotion Regulation” Subtypes

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Abstract

Pathological gamblers vary in their personality traits, psychopathological characteristics, and motivations for gambling. Methods for classifying them according to disseminated subtyping schemes, however, are not readily available, which may hinder further research on subtypes or efforts to incorporate subtyping schemes into clinical practice. With regard to affective motivations for gambling, we describe and evaluate a method for classifying pathological gamblers according to “enhancement,” “coping,” and “low emotion regulation” subtypes. Generalized squared distance was used to determine the best profile fit for 158 pathological gamblers on the basis of their Inventory of Gambling Situations (IGS) scores and in relation to refined IGS subtype profiles obtained through cluster analysis, these refined subtypes also having been validated via Gambling Motives Questionnaire scores. No gamblers were misclassified, suggesting that this method may perform well on cross-validation. For interested researchers and practitioners, an easy-to-use tool is available that automates this profile-matching approach to classification. Additional research is needed on how this method fares in independent samples of regular gamblers and of individuals with gambling disorder.

Keywords: gambling disorder, gambling motives, subtyping, classification, assessment

Résumé

Les joueurs pathologiques varient quant à leurs traits de personnalité, leurs caractéristiques psychopathologiques et leurs motivations à jouer. Il n'existe cependant pas de méthodes facilement utilisables pour les classer selon des schémas de sous-types disséminés, ce qui risque de ralentir la recherche sur les sous-types ou les efforts déployés pour intégrer des schémas de sous-types à la pratique clinique. En ce qui concerne les motivations affectives au jeu, la présente étude décrit et analyse une méthode de classement des joueurs pathologiques reposant les sous-types suivants : la « stimulation »,

l'« adaptation » et la « faible régulation des émotions ». La distance généralisée au carré a été utilisée pour déterminer la « meilleure correspondance de profil » pour 158 joueurs pathologiques en fonction de leur score au questionnaire de la liste des occasions de jeu (LOJ) et relativement à des profils plus précis de sous-types de la LOJ obtenus au moyen d'une analyse typologique et validés à partir des résultats du questionnaire sur les motivations à jouer. Aucun joueur n'a été classé de manière erronée à l'aide de la méthode analysée, ce qui laisse entendre qu'elle peut être efficace dans le cadre d'une validation croisée. Un outil « facile d'emploi » permettant d'automatiser une telle approche de classification par association avec des profils se trouve ainsi accessible aux chercheurs et aux praticiens intéressés. Des recherches supplémentaires sont nécessaires pour déterminer l'efficacité de cette méthode avec des échantillons indépendants de joueurs ordinaires et de joueurs présentant un problème de jeu.

Introduction

Individuals with gambling disorder vary in their personality traits, psychopathological characteristics, and motivations for gambling. In fact, a comprehensive review of the literature revealed 18 articles that described subtypes of gambling disordered individuals according to these variables (Milosevic & Ledgerwood, 2010). Some of these subtypes included “recurringly depressed” and “chronically understimulated” gamblers (McCormick, 1987); “escape seekers” and “action seekers” (Lesieur & Blume, 1991); “simple,” “demoralized,” and “hedonic” gamblers (Vachon & Bagby, 2009); and “behaviorally conditioned,” “emotionally vulnerable,” and “antisocial impulsivist” gamblers (Blaszczynski & Nower, 2002; Ledgerwood & Petry, 2010). Subtyping pathological gamblers in such ways may lead to a better understanding of the potentially distinct etiologies of problem gambling for each subtype, which could have implications for tailoring treatment strategies to best meet the needs of each group and improve their respective treatment outcomes. However, despite dissemination of potentially useful subtyping schemes, we are unaware of any empirically supported methods for classifying pathological gamblers according to these proposed schemes, which may hinder further research on subtypes themselves or efforts to incorporate subtyping schemes into clinical practice.

In clinical practice, establishing why a client gambles (i.e., functional analysis) may facilitate a focused intervention that could enhance the therapeutic outcome (Stewart & Zack, 2008). The purpose of this article is to describe and evaluate a method for classifying individuals with gambling disorder according to their affective motivations for gambling, more specifically, for classifying those with gambling disorders according to the “enhancement,” “coping,” and “low emotion regulation” subtypes first described by Stewart, Zack, Collins, Klein, and Fragopoulos (2008). In their original study, Stewart et al. (2008) had pathological gamblers complete the

Inventory of Gambling Situations (IGS; Littman-Sharp, Turner, & Toneatto, 2009)—a measure of the relative frequency of heavy gambling in various high-risk situations. Principal components analysis (PCA) was performed on the IGS subscale scores and revealed two higher order factors that were inferred from the observed pattern of factor loadings of the IGS subscale scores. These higher order factors included Unpleasant Emotions (i.e., a Negative Gambling Situations factor) and Pleasant Emotions (i.e., a Positive Gambling Situations factor). The factor scores were subjected to cluster analysis, which revealed three clusters: (a) enhancement gamblers, who were characterized by low negative and high positive high-risk gambling situation factor scores; (b) coping gamblers, who were characterized by very high negative and high positive high-risk gambling situation factor scores; and (c) low emotion regulation gamblers, who were characterized by low negative and low positive high-risk gambling situation factor scores. Factors were labelled according to the primary motives suggested by the main situations in which the participants reported heavy gambling. From these observed patterns of situation-specific gambling, it was inferred that enhancement gamblers gambled purely for positive reinforcement reasons; coping gamblers gambled for both positive and negative reinforcement, but mainly for negative reinforcement reasons; and low emotion regulation gamblers gambled for reasons other than to directly alter their mood (Stewart et al., 2008). Given that these subtypes were obtained by using a single, relatively brief, self-report measure of situation-specific gambling, it was argued that this subtyping scheme had the advantage of being readily applicable in the clinical setting. However, without an easy-to-use method for classifying pathological gamblers that approximates the subtyping scheme obtained through cluster analysis, practitioners may not be able to classify new clients according to the scheme, which could hamper its possible clinical utility and which further underscores the need for an empirically based method of classification.

The method for classification described here was borrowed from the pain literature (see McKillop & Nielson, 2011; Turk & Rudy, 1988) and has been used successfully to match chronic pain patients, from their responses to a multi-item pain inventory known as the Multidimensional Pain Inventory (MPI; Kerns, Turk, & Rudy, 1985), to “dysfunctional,” “interpersonally distressed,” or “adaptive copers” subtype profiles. More precisely, generalized squared distance (D^2), also referred to as Mahalanobis distance, was used in the present study to determine the best profile fit for pathological gamblers on the basis of their IGS factor scores and in relation to IGS enhancement, coping, and low emotion regulation subtype profiles obtained through cluster analysis. From some of the favourable results observed in the pain literature showing misclassification rates as low as 1.6% and 3% with kappa reliability coefficients as high as .96 and .975 (McKillop & Nielson, 2011; Turk & Rudy, 1988), we hypothesized that D^2 would approximate the assignment of gamblers to subtypes via cluster analysis with good precision.

Another equally important purpose of the present study was to first determine the extent to which the original subtypes derived by Stewart et al. (2008) could be refined by using an alternative, and perhaps more appropriate, clustering algorithm. It has been demonstrated that collinearity among variables can be problematic when

conducting K-means cluster analysis with Euclidean distance specified as the distance metric because it assumes independence of the clustering variables and may produce distorted results (Sambandam, 2003). In the original study by Stewart et al. (2008), K-means cluster analysis was conducted by using the moderately correlated IGS Negative Gambling Situations and Positive Gambling Situations factor scores with Euclidean distance used as the distance measure. The present article describes the results obtained from a cluster analysis by using these original IGS factor scores with Mahalanobis distance specified as the distance metric, as it has been deemed an effective solution to the problem of collinearity (Sambandam, 2003). Moreover, given that Mahalanobis distance takes the correlated nature of variables into account, both as a clustering algorithm and as a method of determining individuals' best profile fit, it made sense to refine the original IGS subtype profiles for enhancement, coping, and low emotion regulation gamblers. In keeping with this study purpose, and consistent with the original study conducted by Stewart et al. (2008), it was also necessary to determine the extent to which a refined cluster solution could be validated via scores on a measure of explicitly defined, directly assessed gambling motives, separate from the IGS and its focus on antecedents/high-risk situations and inferred motives.

Method

Participants

The sample comprised the same 158 gamblers (mean age = 36.0 years, $SD = 10.7$ years; 77% men) who were recruited from the community by Stewart et al. (2008) through advertisements, and the data analyzed here are the same data obtained from that sample. Gamblers had to meet probable pathological gambler status by obtaining a score of 5 or greater on the South Oaks Gambling Screen (SOGS; Lesieur & Blume, 1987; mean score at screening = 11.8, $SD = 4.0$). They also had to disclose consuming alcohol at least 50% of the time when they gambled, as they were originally recruited for a study that examined the parallels between drinking and gambling motives (see Stewart & Zack, 2008). The minimum age to be eligible to participate was 19 years, and gamblers also had to be alcohol-, drug-, and medication-free during their testing session. Exclusionary criteria included a history of chronic and serious mental illness (e.g., bipolar disorder, schizophrenia).

Materials

Participants completed a variety of self-report measures. The measures of relevance to the present study included the IGS (Littman-Sharp et al., 2009), the Gambling Motives Questionnaire (GMQ; Stewart & Zack, 2008), and the SOGS (Lesieur & Blume, 1987). Sample items for these measures can be seen in Table 1, along with the number of items for each of the subscales and internal consistencies (alphas) for the subscales in the present sample.

Inventory of Gambling Situations. The IGS (Littman-Sharp et al., 2009) is a self-report questionnaire made up of 63 items that measure the relative frequency of

Table 1

Characteristics of the Multi-Item Measures Used in Both the Original Study (Stewart et al., 2008, p. 259) and the Present Study

Measure/scale	No. items	α	Sample item
Inventory of Gambling Situations (IGS)			
Unpleasant Emotions	10	.91	When I couldn't stand things anymore and needed to get away.
Worried Over Debts	5	.88	When I was worried about my debts.
Conflict With Others	7	.90	When I had an argument with a friend.
Testing Personal Control	7	.88	When I started to believe that gambling was no longer a problem for me.
Winning and Chasing Losses	6	.83	When I needed to win back the money I lost gambling.
Urges and Temptations	9	.87	When I suddenly had an urge to gamble.
Pleasant Emotions	5	.85	When I was happy.
Social Pressure	7	.82	When someone challenged me to a bet.
Need for Excitement	6	.85	When I wanted some action.
Confidence in Skills	5	.80	When I felt confident about my gambling skills.
Gambling Motives Questionnaire (GMQ)			
Coping Motives	5	.77	Because it helps when you are feeling nervous or depressed.
Enhancement Motives	5	.78	Because it's exciting.
South Oaks Gambling Screen (SOGS)			
SOGS Total	11	.78	Have you ever felt guilty about the way you gamble or what happens when you gamble?

Note. IGS (Littman-Sharp et al., 2009); GMQ (Stewart & Zack, 2008); and SOGS (Lesieur & Blume, 1987).

heavy gambling in various high-risk situations. It is used to profile possible relapse situations for problem gamblers in both research and treatment settings (Littman-Sharp et al., 2009). The IGS was modelled after the reliable and valid Inventory of Drinking Situations (IDS; Annis, Graham, & Davis, 1987; Carrigan, Samoluk, & Stewart, 1998; Stewart, Samoluk, Conrod, Pihl, & Dongier, 2000). That is, items from the IDS Unpleasant Emotions, Pleasant Emotions, Social Pressure, Urges and Temptations, Testing Personal Control, and Conflict with Others scales were reworded to fit the context of gambling. Furthermore, new items were added that were specific to the context of gambling: items from the Winning and Chasing Losses, Confidence in Skills, Need For Excitement, and Worried Over Debts scales. The initial pool of items was reviewed by experts, and items were selected on the basis of psychometric analyses, including factor analysis (Littman-Sharp et al., 2009). When completing the IGS, gamblers indicate their frequency of heavy gambling over the past year (with responses ranging from 1 = *almost never/never gambled heavily in that situation* to 4 = *almost always gambled heavily in that situation*) in 10 separate categories of situations. The IGS has demonstrated strong psychometric properties (Littman-Sharp et al., 2009). It was used as the primary

measure of gambling motives in the present study, where motives were inferred by virtue of the primary situations in which gamblers reported gambling heavily.

Gambling Motives Questionnaire. Participants completed Stewart and Zack's (2008) GMQ, a measure modelled after the reliable and valid Drinking Motives Questionnaire (DMQ; Cooper, Russell, Skinner, & Windle, 1992). The GMQ captures the relative frequency of gambling for 15 specific reasons. GMQ items were adapted directly from the DMQ, except for one item. More specifically, this one item was rephrased from "to get high" on the DMQ to "to get a high feeling" on the GMQ, so that it was more appropriate to the context of gambling. Consistent with the DMQ, there are three subscales: Social, Coping, and Enhancement gambling motives. Participants rated the relative frequency of their gambling on the same 4-point scale used for the DMQ (i.e., 1 = *almost never/never*; 2 = *sometimes*; 3 = *often*; 4 = *almost always*). Stewart and Zack (2008) demonstrated that the GMQ has strong psychometric properties.

South Oaks Gambling Screen. The SOGS (Lesieur & Blume, 1987) is a 20-item self-report measure that taps respondents' lifetime gambling habits. The 20 items used to obtain the SOGS total score were derived from problem gambling counsellors, Gamblers Anonymous 20 questions, and the *Diagnostic and Statistical Manual of Mental Disorders* (3rd ed., American Psychiatric Association, 1980). Those with a likely gambling disorder (i.e., "probable pathological gamblers") are usually identified by using a total score of 5 or more as the SOGS cut-off score; the psychometric properties of the SOGS are acceptable (see Lesieur & Blume, 1987).

Procedure

This secondary analysis used the data set obtained by Stewart et al. (2008). In the original study, testing was completed individually. Participants were asked to abstain from alcohol consumption for a period of at least 12 hours prior to their appointment, and breath alcohol tests were used upon arrival at the laboratory in order to confirm abstinence. A computerized reaction time task was completed first (see Zack, Stewart, Klein, Loba, & Fragopoulos, 2005, for results). After a short break, participants completed the aforementioned self-report questionnaires.

Results

Reducing the IGS Data

In the original study by Stewart et al. (2008), prior to cluster analyzing the data from the IGS, factor analysis was performed on the IGS subscale scores in order to reduce the 10 subscales to a more parsimonious number of core types of gambling situations. The factor structure, factor labels, and factor scores for the participants in the original study were retained for the present study. To summarize, Stewart et al. (2008) conducted PCA on the 10 subscale scores of the IGS. The researchers could proceed with PCA on the given data set, as the Kaiser-Meyer-Olkin measure of

sampling adequacy was $> .50$ (i.e., .92). Oblique rotation was selected to permit inter-correlation among factors, and both inspection of the scree plot and use of Kaiser's eigenvalue > 1 rule indicated a two-factor solution. The two-factor solution obtained demonstrated excellent simple structure, with only one observed complex loading: The Urges and Temptations scale loaded on both factors. Furthermore, there were no hyperplane items, and there were a large number of salient loadings on each factor. It should be noted that the two factors obtained were found to be moderately inter-correlated ($r = .64$). Together, these two factors were found to account for 81.2% of the variance in IGS item scores. Because the first factor showed strong salient loadings on the Unpleasant Emotions, Conflict with Others, and Worried Over Debts subscales, it was labelled Negative Situations for gambling. Prior to rotation, the first factor was found to account for 70.1% of the variance in IGS subscale scores. Because the second factor showed strong salient loadings from the Pleasant Emotions, Need for Excitement, and Social Pressure subscales, it was labelled Positive Situations for gambling. Prior to rotation, the second factor was found to account for an additional 11.1% of the variance in IGS subscale scores.

Refining the Stewart et al. (2008) Subtypes of Pathological Gamblers With the Alternative Clustering Algorithm

In the original study (Stewart et al., 2008), initial clusters were first obtained via Ward's squared Euclidean distance method by using the factor scores for each participant. The scree plot method indicated a three-cluster solution for the number of clusters in the data set. Next, Stewart et al. (2008) conducted a K-means cluster analysis by using the IGS factor scores for each participant, and this analysis was constrained to produce a three-cluster solution. Euclidean distance was specified as the distance metric. In the present study, cluster analysis was re-run on the original IGS factor scores with Mahalanobis distance specified as the distance metric. The K-means cluster analysis conducted in the present study was similarly constrained to produce a three-cluster solution. Again, a cluster was identified that was characterized by high scores on both the Negative Gambling Situations factor (mean factor score = 1.128) and the Positive Gambling Situations factor (mean factor score = 0.577), with a notably higher elevation on the Negative Gambling Situations factor; thus, the cluster was inferred to involve gamblers who gamble primarily to cope with negative situations and was thus labelled the coping gamblers cluster ($n = 50$; 32% of the entire sample). As in the original study, another cluster was identified that was characterized by negative scores on the Negative Gambling Situations factor (mean factor score = -0.395) and positive scores on the Positive Gambling Situations factor (mean factor score = 0.321); thus, this cluster was again labelled as enhancement gamblers ($n = 70$; 44% of the entire sample) because of the relatively higher elevation on the Positive Gambling Situations factor. The third cluster was characterized by low scores on both the Negative Gambling Situations (mean factor score = -0.756) and the Positive Gambling Situations (mean factor score = -1.349) factors. This cluster was similar to the third cluster observed in the original study; thus, the cluster was again inferred to be motivated to gamble by reasons other than desires to regulate emotions

and was labelled low emotion regulation gamblers ($n = 38$; 24% of the entire sample) because of their low scores on both factors of the IGS.

For comparative purposes, the three clusters of gamblers obtained in the original study and those obtained in the present study are profiled in Figure 1. As can be seen in the figure, the three profiles of gamblers obtained via the K-means cluster analysis by using Euclidean distance (original study) were similar to the K-means cluster analysis obtained by using Mahalanobis distance (present study). Moreover, there was moderate agreement between the two clustering algorithms ($\kappa = .59$, $p < .001$; Landis & Koch, 1977). More specifically, 118 cases (75% of the entire sample) were assigned to similarly labelled clusters by both clustering algorithms.

Validation of the Refined Cluster Analysis with the GMQ

Stewart et al. (2008) performed a factor analysis on the GMQ prior to validating the original IGS cluster solution. Again, these factor analytic results were used for validating the refined IGS cluster solution. To summarize, a PCA with oblique rotation was conducted on the GMQ. This analysis produced the three expected GMQ factors of Enhancement, Social, and Coping motives, using Kaiser's eigenvalue > 1 rule to determine the number of factors to retain. Scores on the factors for each participant were saved for hypothesis testing, so that each gambling motive score was weighted for the relative contributions of each of the GMQ items. As in the original study, a 3 (refined IGS cluster group) $\times$ 2 (GMQ subscale) analysis of variance was conducted with the Enhancement and Coping GMQ factor scores entered again as the dependent variables. Consistent with the results of the Stewart et al. (2008) original study, the analysis indicated a main effect of IGS cluster group, $F(2, 151) = 27.03$, $p < .001$. As with the original study, this result was qualified by the predicted significant Refined IGS Cluster Group $\times$ GMQ Subscale interaction $F(2, 151) = 15.78$, $p < .001$, which again reflected relatively higher GMQ Enhancement factor scores ($M = .502$; $SD = .562$) versus GMQ Coping factor scores ($M = -.113$; $SD = .774$) in the IGS enhancement gambler cluster, as compared with relatively higher GMQ Coping factor scores ($M = .990$; $SD = .765$) versus GMQ Enhancement factor scores ($M = .578$; $SD = .634$) in the IGS coping gambler cluster. As in the original Stewart et al. (2008) study, there was a significant simple effect of refined IGS cluster group membership for the GMQ Enhancement motives factor scores, $F(2, 151) = 13.05$, $p < .001$. Games-Howell post hoc tests showed that, as was hypothesized in the original study, the IGS enhancement gambler cluster again obtained significantly higher ($p < .01$) GMQ Enhancement factor scores than did the IGS low emotion regulation gambler cluster ($M = -0.085$; $SD = .810$). Similarly, the IGS coping gambler cluster again obtained significantly higher GMQ Enhancement factor scores ($p < .001$) than did the IGS low emotion regulation gambler cluster; however, these clusters did not obtain significantly higher GMQ Enhancement factor scores ($p > .05$) than did the IGS enhancement gambler cluster. Consistent with the original Stewart et al. (2008) study, there was another significant simple effect of refined IGS cluster group membership for the GMQ Coping

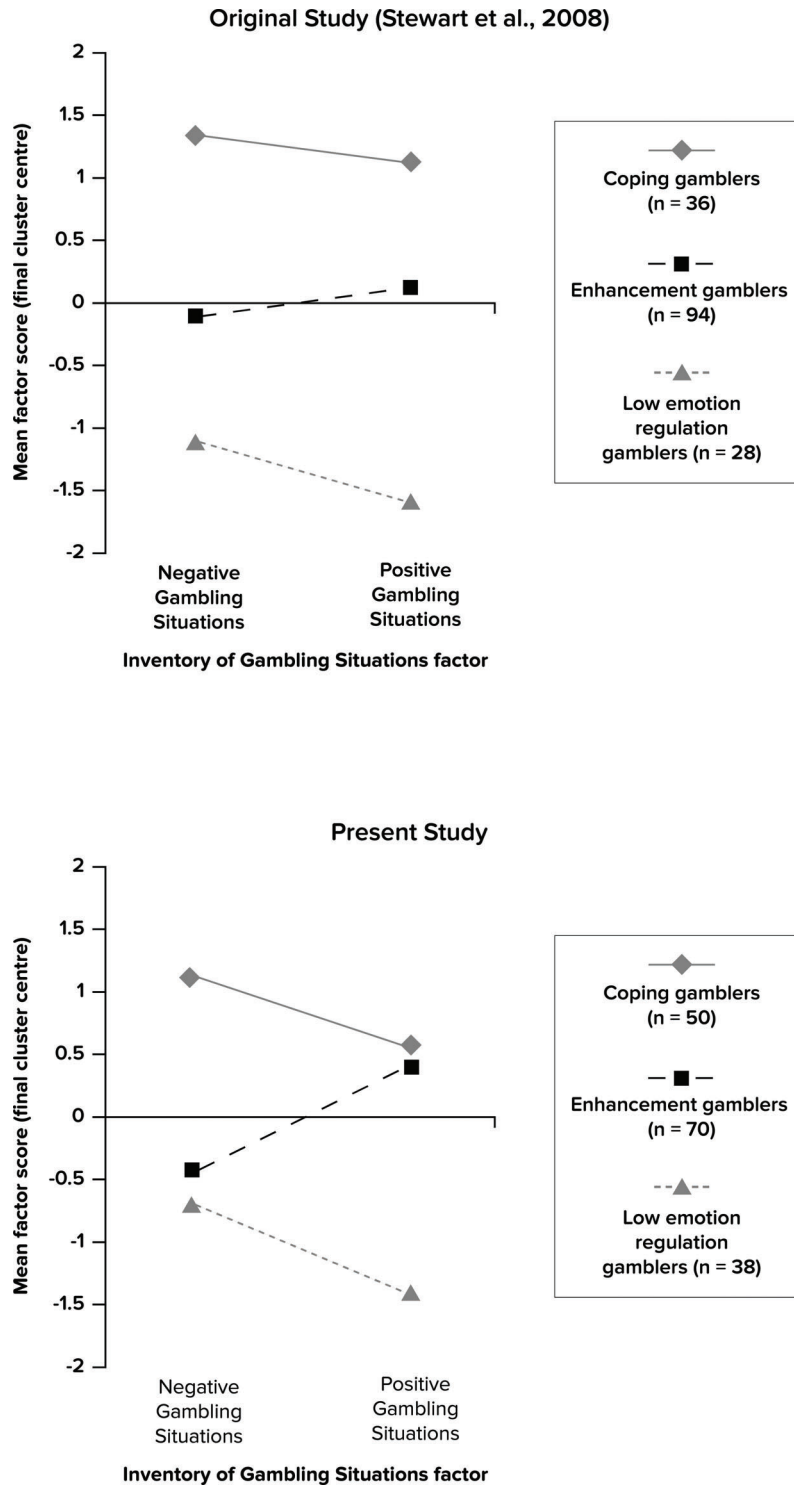


Figure 1. Comparison of gambler profiles obtained by using K-means cluster analysis on Inventory of Gambling Situations factor scores with simple Euclidean distance specified as the distance metric (original study) versus Mahalanobis distance specified as the distance metric (present study).

motives factor scores, $F(2, 151) = 27.53$, $p < .001$. As was hypothesized in the original study, the IGS coping gambler cluster obtained significantly higher GMQ Coping factor scores ($p < .001$) than did the IGS low emotion regulation gambler cluster ($M = -.024$; $SD = .997$) and significantly higher GMQ Coping factor scores ($p < .001$) than did the IGS enhancement gambler cluster. As was the case in the original study, GMQ Coping factor scores did not differ significantly between the IGS enhancement gambler and low emotion regulation gambler clusters in the present study ($p > .05$).

For comparative purposes, the GMQ Coping and Enhancement motives factor scores for the clusters of gamblers obtained with the IGS in the original study and the clusters of gamblers obtained in the present study with the IGS are plotted in Figure 2. (Note that the *ns* for each cluster in Figures 1 and 2 are not identical because full data on the GMQ were unavailable for four participants.) As can be seen in Figure 2, consistent with the results of the original study, the clusters of gamblers identified with the IGS in the present study were similarly cross-validated by a discriminating elevation in GMQ Coping motives in coping gamblers and by noteworthy elevations in GMQ Enhancement motives in both enhancement and coping gamblers.

Determining Profile Goodness of Fit for Individual Cases of Pathological Gambling

The method used by Turk and Rudy (1988), and later by McKillop and Nielson (2011), for comparing a respondent's scores on the MPI (Kerns et al., 1985) with three MPI psychosocial profiles—dysfunctional, interpersonally distressed, and adaptive copier—was used in the present study to compare a gambler's scores on the IGS with the refined IGS enhancement, coping, and low emotion regulation gambler profiles. More specifically, generalized squared distances (D^2) were calculated for each gambler by comparing his or her scores on the IGS factors with the three refined gambler profiles. These calculations yielded three D^2 values for each gambler, the lowest value representing the best profile fit for the gambler. D^2 is defined as follows:

$$D^2 = (x_i - x_j)' S^{-1} (x_i - x_j)$$

McKillop (2010) provided a description of the steps required for calculating D^2 , as well as an example of how to compare a respondent's profile of scores on the MPI to the adaptive copier profile. In a similar manner, the following example describes the comparison of a gambler's profile of IGS factor scores to the coping gambler profile to demonstrate these calculations in the context of the present study. More specifically, in the preceding formula, the terms x_i and x_j represent any two points in multivariate space, and the term S^{-1} represents the inverse covariance matrix of the IGS factor scores. The term x_i represents a vector or profile of factor scores for any particular gambler. As an example, assume that a gambler's Negative Gambling Situations factor score and Positive Gambling Situations factor score on the IGS are 2.196 and 1.566, respectively. Again, assume that this gambler's profile is being compared to the coping gambler profile, which has mean

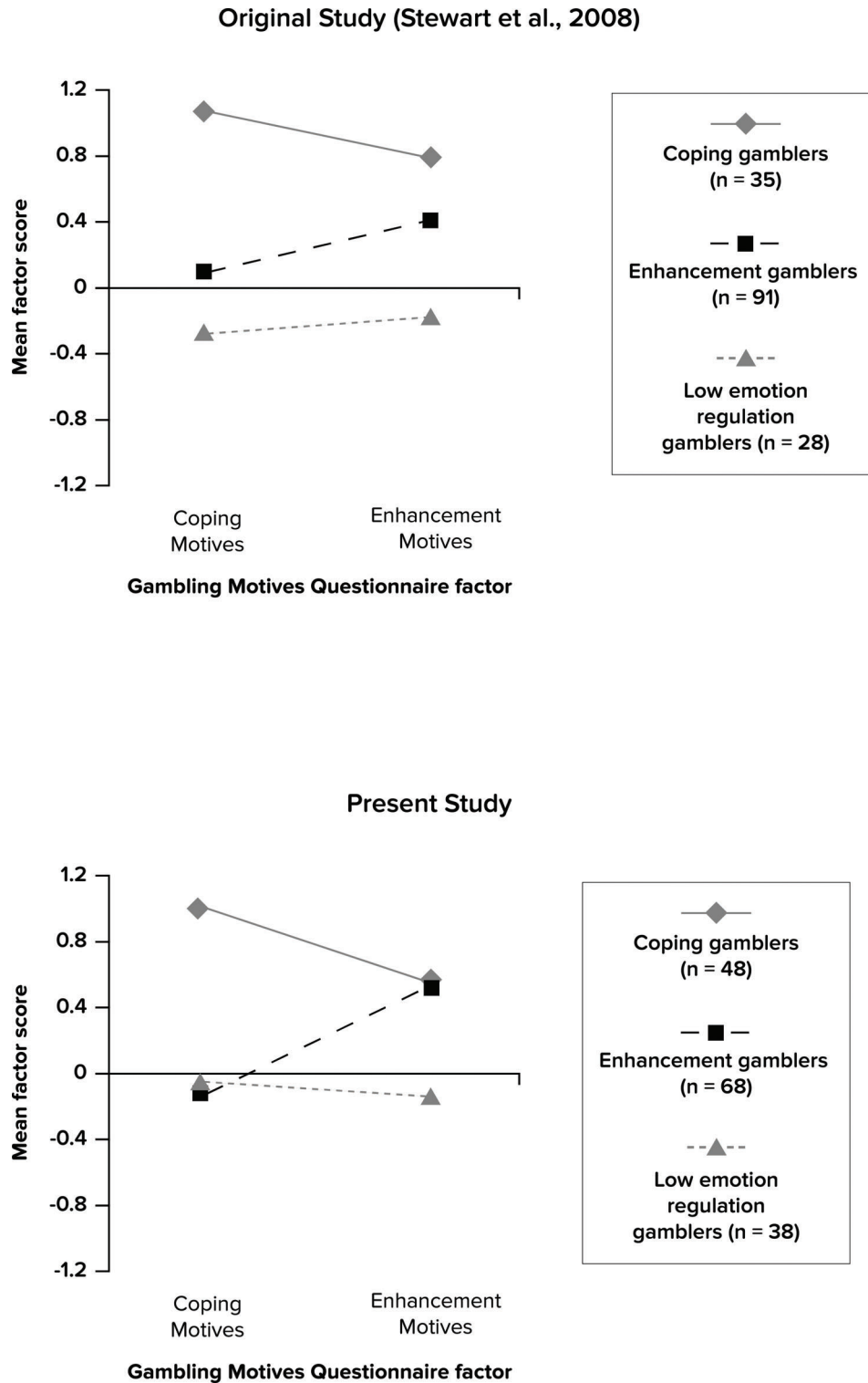


Figure 2. Comparison of Gambling Motives Questionnaire factor scores for subtypes of gamblers obtained by using K-means cluster analysis on Inventory of Gambling Situations factor scores with simple Euclidean distance specified as the distance metric (original study) versus Mahalanobis distance specified as the distance metric (present study).

values of 1.128 and 0.577 on the Negative Gambling Situations and Positive Gambling Situations factors, respectively. Thus, in matrix algebra form, $(x_i - x_j)'$ is expressed as follows:

$$\begin{aligned} & [2.196 - 1.128 \quad 1.566 - 0.577] \\ & = [1.068 \quad 0.989] \end{aligned}$$

The next step is to pre-multiply this vector by the inverse covariance matrix, which is expressed as follows:

$$\begin{aligned} & [1.068 \quad 0.989] \times \begin{bmatrix} 1.694 & -1.084 \\ -1.084 & 1.694 \end{bmatrix} \\ & = \begin{bmatrix} 1.068 \times 1.694 & 1.068 \times (-1.084) \\ 0.989 \times (-1.084) & 0.989 \times 1.694 \end{bmatrix} \\ & = \begin{bmatrix} 1.809 & -1.158 \\ -1.072 & 1.675 \end{bmatrix} \\ & = [0.737 \quad 0.517] \end{aligned}$$

Then, post-multiply to obtain the distance value between the gambler's profile and the coping gambler profile:

$$\begin{aligned} & [0.737 \quad 0.517] \times \begin{bmatrix} 1.068 \\ 0.989 \end{bmatrix} \\ & = \begin{bmatrix} 0.737 \times 1.068 \\ 0.517 \times 0.989 \end{bmatrix} \\ & = \begin{bmatrix} 0.787 \\ 0.511 \end{bmatrix} \\ & = [1.298] \end{aligned}$$

Generalized squared distance approximates a chi-square (χ^2) distribution with degrees of freedom being equal to the number of profile or vector variables (McKillop, 2010). Thus, goodness of fit for this particular example can be expressed as follows:

$$\chi^2(2) = 1.298, p = .52$$

For the present study, a spreadsheet was created to automate the calculations for generalized squared distances (D^2) for each gambler on the basis of his or her IGS factor scores. Thus, the spreadsheet also determined the best profile fit for each

gambler, as the lowest of the three obtained D^2 values indicated his or her best profile fit. This spreadsheet and the user guidelines are available from the authors upon request. In the same manner as McKillop and Nielson (2011), we compared the best D^2 for each gambler with the refined K-means cluster assignment for each gambler. Classification agreement was perfect, as none of the gamblers were misclassified ($\kappa = 1.0$, $p < .001$), indicating that generalized D^2 approximated the refined cluster solution with precision.

Discussion

The coping, enhancement, and low emotion regulation subtypes of pathological gamblers derived by Stewart et al. (2008) were refined when the data used to derive them were subjected to an extended cluster analysis by using an alternative clustering algorithm—an algorithm that used Mahalanobis distance specified as the distance metric instead of Euclidean distance. Consistent with the results from the original study, enhancement gamblers appeared to gamble purely for positive reinforcement; coping gamblers appeared to gamble for both positive and negative reinforcement, but primarily for negative reinforcement; and low emotion regulation gamblers appeared to gamble for reasons other than the direct modulation of mood. There seemed to be a moderate level of agreement between the clustering algorithm used in the original study and the algorithm used in the present study, suggesting that the results of the original study were not overly distorted by the use of Euclidean distance. The results obtained in the present study, however, could be considered somewhat refined because the cluster analysis that relied on Mahalanobis distance took into account the correlated nature of the clustering variables: gambling in negative situations and gambling in positive situations.

In the original study, the obtained cluster solution was based on gamblers' self-reported primary antecedents for gambling, as measured by the IGS (Littman-Sharp et al., 2009), and was validated with a measure of self-reported gambling motives, as measured by the GMQ (Stewart & Zack, 2008). Consistent with these original results, the cluster solution obtained in the present study also was “cross-validated” by selective elevations in GMQ Coping motives in coping gamblers and by elevations in GMQ Enhancement motives in both enhancement and coping gamblers (Stewart et al., 2008, p. 263). Given these findings, readers may ask: why not subtype gamblers according to their GMQ scores? Certainly this is a possibility that could be empirically tested. It should be pointed out, however, that one advantage of subtyping gamblers according to the method described here is that it does not require them to have insight into their gambling motives. Rather, it requires only that they have memory or knowledge of the situation(s) in which they have gambled most heavily.

Borrowing from the literature that described a method for matching chronic pain patients to dysfunctional, interpersonally distressed, or adaptive coper profiles on the basis of their responses to a multi-item pain inventory (McKillop & Nielson, 2011; Turk & Rudy, 1988), we used generalized squared distance (D^2) in the present study

to determine each individual gambler's best profile fit in relation to the refined coping, enhancement, and low emotion regulation gambler profiles. On this point, and consistent with the favourable results observed in the pain literature, D^2 approximated the refined cluster solution with precision. User guidelines and the spreadsheet that was created to determine each gambler's best profile fit are available from the authors upon request. This tool provides a means for making objective and empirically based decisions for classifying gamblers according to the refined subtypes; thus, it could be used by researchers or practitioners with an understanding of psychometric theory and skills in clinical assessment to determine other pathological gamblers' best profile fit for various purposes. On this point, it is worth mentioning that, because D^2 approximates a chi-square (χ^2) distribution, with degrees of freedom being equal to the number of profile variables (McKillop, 2010), a bonus of using D^2 is that it allows the user to comment on the significance of the values obtained (an option that is not available with the use of Euclidean distance). Given that the refined subtyping scheme is based on scores from a fairly brief self-report measure that is available for professional use at no cost (i.e., the IGS), classification of pathological gamblers according to these subtypes could be incorporated into clinical practice with relative ease. From the evidence from randomized controlled trials supporting the efficacy of motivation-matched treatments for substance misuse developed in recognition of subtyping schemes that incorporated underlying motivations and personality factors (e.g., Conrod et al., 2000), it has been hypothesized that motivation-matched treatments for pathological gamblers might help improve treatment outcomes (Stewart et al., 2008). Clinicians who specialize in the provision of gambling treatment could use this tool to match their clients to the aforementioned profiles and then tailor their treatments accordingly. As another example of its potential use, researchers could use the tool to identify the subtypes of gamblers in order to study their possible etiologies, as this provides one method of operationally defining them.

The potential limitations of the original study that were addressed by Stewart et al. (2008) still apply to the findings concerning the refined subtyping scheme (e.g., reliance on self-report measures, cross-sectional study design, use of a sample of participants who drank alcohol at least 50% of the time when they gambled) and are not discussed in detail again here. With regard to limitations of the method used to match gamblers to the refined profiles, this method requires cross-validation on samples of gamblers that are independent of the development sample; thus, research aimed at cross-validation would be a logical step forward, ideally on even larger samples of gamblers.

On these notes, the promising findings from the present study suggest that the proposed method for classifying subtypes should hold up well on cross-validation. However, the development sample was not necessarily representative of all problem gamblers given the inclusion criteria (e.g., drinking regularly while gambling; Stewart et al., 2008). For example, coping gamblers might be over-represented in this sample of problem gamblers who regularly drink while gambling because prior work has shown that coping gamblers drink more frequently and problematically than other

gambler subtypes (Stewart et al., 2008). Thus, future research should focus on the extent to which the method used to classify gamblers according to the present subtyping scheme can be used with other samples, including non-problem gamblers and those who do not regularly drink while gambling.

Intuitively appealing subtyping schemes for those with gambling disorders have not been incorporated routinely into clinical practice, perhaps because “easy-to-use” assessment methods for classifying gamblers have not been provided (Stewart et al., 2008, p. 258). It is our hope that the method of classification described in this article, along with the tool offered that automates classification according to gamblers’ affective motivations for gambling, may make the option of subtyping those with gambling problems more of a possibility for practitioners who would like to use this research to inform their clinical work. We also hope that dissemination of this classification method facilitates future research on these subtypes, as well as research on other subtyping schemes in general. Future investigations may reveal better models for subtyping pathological gamblers, better statistical procedures for subtyping them, and better methods for classifying them; however, we believe that the present work represents a positive step forward in dealing with the complex heterogeneity of those with gambling disorders in both research and practice.

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Appendix A

A Tool for Classifying Pathological Gamblers According to “Enhancement,” “Coping,” and “Low Emotion Regulation” Subtypes: User Guidelines

The supplementary material for this article is a spreadsheet that assists in the determination of whether a probable pathological gambler who meets the same study inclusion criteria described in the Method section of this article may be best considered an enhancement gambler, a coping gambler, or a low emotion regulation gambler (first described by Stewart et al., 2008) according to the gambler’s raw responses to the Inventory of Gambling Situations (IGS; Littman-Sharp et al., 2009) and according to the refined profiles of IGS Negative Gambling Situations and Positive Gambling Situations factor scores for the enhancement, coping, and low emotion regulation subtypes described in the Results section of this article.

More specifically, the spreadsheet calculates generalized squared distances (D^2) for a gambler by computing and comparing the gambler’s scores on the IGS factors with the IGS factor scores for the three refined enhancement, coping, and low emotion regulation gambler profiles. Thus, the spreadsheet produces three D^2 values for the gambler. The lowest of these three D^2 values represents the best profile fit for the gambler. Interested users may refer to the Results section of this article for an example of how to perform these calculations manually.

Because the spreadsheet calculates D^2 by using IGS factor scores, it calculates IGS Negative Gambling Situations and Positive Gambling Situations factor scores for each gambler that are based on input of his or her raw responses to the individual IGS items and that are based on the results of the principal components analysis (PCA) described in the Results section of this article (also see Stewart et al., 2008). As an intermediary step, because this PCA was performed on IGS subscale scores (e.g., Conflict with Others, Urges and Temptations, Need for Excitement), the spreadsheet also calculates the gambler’s IGS subscale scores on the basis of his or her raw responses to the individual IGS items (interested users may refer to Littman-Sharp et al., 2009, for instructions on how to manually calculate and interpret these scores).

The spreadsheet was created by using Microsoft Office Excel 2003 and should function with later versions of this program. The spreadsheet may be distributed and shared without permission, but it cannot be resold or distributed for profit.

Instructions

1. Download and open the Microsoft Excel Worksheet file named “Gambler Profile Match.” *Right-click on icon next to Appendix A title.*

2. Type the gambler's responses to the individual IGS items into the cells directly below those labelled "igs1" through "igs63." For example, if the gambler circled the number 2, indicating that he or she "rarely" gambled heavily in response to the first item on the IGS (i.e., "When I almost won and felt that I would win very soon"; Littman-Sharp et al., 2009), then type the number 2 into cell A4 of the spreadsheet. If the gambler circled the number 3 in response to the second item, then type the number 3 into cell B4, and so on.
3. After the gambler's responses to all of the IGS items have been typed into the spreadsheet, press the Enter button.

It should be noted that the spreadsheet is meant to handle data from a gambler who provides a response to all of the IGS items. It should also be noted that the spreadsheet does not flag data entry errors on the part of the user (e.g., entering a value of 40 instead of 4 as a response to an individual IGS item). Furthermore, copying and pasting a gambler's data from another spreadsheet or data set has been found to result in calculation errors; thus, manual entry of a gambler's responses to the IGS items is recommended.

Interpreting Output

After the gambler's raw responses to all of the IGS items have been entered into the spreadsheet and double-checked, the spreadsheet automatically calculates the gambler's IGS subscale scores and displays them in cells E20 through E29. As mentioned previously, interested users may refer to the work of Littman-Sharp et al. (2006) for direction on how to interpret IGS subscale scores.

The spreadsheet also automatically calculates the gambler's IGS Negative Gambling Situations and Positive Gambling Situations factor scores according to the PCA described in the present article and in Stewart et al. (2008). The gambler's IGS Negative Gambling Situations and Positive Gambling Situations factor scores are displayed in cells B35 and C35, respectively.

Finally, the spreadsheet automatically calculates D^2 for the gambler by comparing his or her scores on the IGS factors with the three refined gambler subtype IGS profiles (Steps 1 through 3 within the spreadsheet are provided for users who are interested in how the spreadsheet performs these calculations). The spreadsheet produces three D^2 values for the gambler in cells I33, I34, and I35 under the "Chi-square" heading. It should be noted that D^2 approximates a chi-square (χ^2) distribution, with degrees of freedom being equal to the number of profile variables (McKillop, 2010; i.e., two profile variables in this context). Cells I33, I34, and I35 are D^2 values in relation to the enhancement gambler profile, low emotion regulation gambler profile, and coping gambler profile, respectively. The lowest of the three D^2 values in these cells represents the best profile fit for the gambler. Thus, if the lowest value is in cell I33, then the gambler may be best considered an enhancement gambler. Alternatively, if the lowest value is in cell I34, then the gambler may be best considered a low emotion regulation gambler, or, if the lowest value is in cell I35, then the gambler may be best considered a coping gambler.

The values produced in cells J33, J34, and J35 are corresponding p values for the chi-square values displayed in cells I33, I34, and I35, respectively, which could be used to comment on the significance of profile fit if desired.

As an example, the default values saved within the spreadsheet upon first downloading it represent those of a hypothetical low emotion regulation gambler, as the lowest D^2 value can be seen in cell I34. Thus, goodness of fit for this hypothetical gambler can be expressed as follows:

$$\chi^2(2) = 0.575, p = .75$$

Special Section: *JGI* Scholar's Award, Category B

Preferred electronic gaming machine environments of recreational versus problem gamblers: An in-venue mixed methods study

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Abstract

The aim of the current study was to examine the different EGM environmental preferences of recreational compared to problem gamblers in Australia. Semi-structured interviews were conducted with 59 EGM gamblers recruited from EGM venues in Queensland and New South Wales, Australia. Interview data were organised using a thematic analysis into 42 major environmental features that gamblers identified as being of importance in choosing where and what to play. The frequency with which certain environmental characteristics were mentioned was analysed quantitatively, along with demographic information and PGSI status. Results showed that the most common reason for selecting the gambling platform was social, and in-venue gambling was largely but not exclusively preferred for this reason. The most frequently mentioned reason for selecting the provider was based on being close to home and enjoying the service at the venue. Finally, games were frequently selected based on features such as free spins, minimum bet sizes, graphics and in-game sounds. The survey results identified that persons experiencing gambling problems more frequently mentioned the availability of a number of game choices and the perceived potential for winning as important aspects in choosing an EGM environment. This study provides some preliminary evidence on what features of the EGM environment are important to players, and most conducive to safer gambling environments. The findings from this study will inform policy initiatives for player protection through the development of safer EGM gambling environments.

Keywords: EGM, pokies, slot, fruit machine, gambling, gambling environments, mixed methods

Résumé

L'objectif de la présente étude était d'examiner les différentes préférences quant à l'environnement d'un site d'appareils de loterie vidéo entre les joueurs qui font un usage récréatif de ces appareils et les joueurs à problèmes en Australie. Des entrevues semi-dirigées ont été menées auprès de 59 utilisateurs d'appareils de loterie vidéo recrutés dans divers lieux où de tels appareils sont accessibles dans le Queensland et en Nouvelle-Galles-du-Sud (Australie). Une analyse thématique des données des entrevues a permis d'organiser les données en 42 grandes caractéristiques environnementales ayant de l'importance pour les joueurs dans le choix d'un jeu et de l'endroit où jouer. La fréquence dans laquelle certaines caractéristiques environnementales ont été mentionnées a fait l'objet d'une analyse quantitative, de même que les données démographiques et l'indice de gravité du jeu problématique des joueurs. Les résultats indiquent que les raisons les plus communes pour le choix d'une plateforme de jeux étaient d'ordre social, et que, par conséquent, la préférence était en grande partie, mais non exclusivement, accordée aux espaces de jeu situés dans des lieux publics. La raison la plus fréquemment mentionnée pour le choix d'un lieu de jeu était la courte distance de la résidence et les services offerts par l'établissement. Enfin, le choix des jeux reposait généralement sur des caractéristiques comme l'offre de parties gratuites, le montant minimal des mises et les effets visuels et sonores du jeu. Les résultats de l'enquête indiquent que les personnes aux prises avec des problèmes de jeu mentionnaient plus fréquemment, parmi les caractéristiques importantes pour le choix d'un site d'appareils de loterie vidéo, l'éventail des jeux offerts et la perception d'une plus grande possibilité de gagner. Cette étude fournit de manière préliminaire des données probantes sur les caractéristiques environnementales des sites d'appareils de loterie vidéo qui sont importantes pour les joueurs et sur celles qui sont les plus propices à la création d'environnements de jeu sécuritaires. Les conclusions de l'étude éclaireront l'élaboration d'initiatives stratégiques visant à protéger les joueurs par l'établissement de sites d'appareils de loterie vidéo sécuritaires.

Introduction

Electronic Gambling Machines (EGMs) are widely regarded as the most high risk form of gambling, with between 15% and 33% of regular (at least once per week) EGM players being problem gamblers (Abbott, Bellringer, Garrett & Mundy-McPherson, 2014; Billi, Stone, Marden & Yeung, 2014; Productivity Commission, 1999, 2010). Most gambling on EGMs takes place in traditional land-based venues, but participation in online forms of gambling is increasing at a faster rate than with other modes, with 8% of Australians gambling using online platforms in 2014, compared with only 1% in 1999 (Gainsbury, 2014). Developing an understanding of those features or attributes of the current EGM environment that attract gamblers is important for enhancing knowledge about both traditional land-based venues and

online providers. Understanding the environmental preferences of certain groups of people, such as high-risk gamblers (i.e., PGSI 8+; Ferris & Wynne, 2001), will inform the development of safer gambling environments that promote features attractive to no-risk gamblers and eliminate features attractive to high-risk gamblers. The current study was part of a larger project focused on the Australian state of Victoria, and the following review of the literature gives an overview of those features that are most representative of the Australian EGM environment.

In understanding gambler choices regarding environmental features of EGM gambling, there is currently no organizational framework to allow the various features to be examined in a structured manner. Informed by Tversky's (1972) Elimination-by-Aspects (EBA) model, Thorne, Rockloff, Langham and Li (2016) propose a model for examining gambling environment decisions based upon the concepts of information availability and gambling as an experience good (Nelson, 1970). This model, the Hierarchy of Gambling Choices (HGC), states that, for someone to decide on their optimal, or at least satisfying, gambling environment, that person must, either consciously or subconsciously, follow the logical hierarchy-based decision structure of platform, then provider, then game. In other words, he or she must logically decide on, first, whether to gamble at a land-based venue, on a computer or on a wireless device (platform); second, the exact provider (e.g., a particular club, casino or website); third, the game to play. This model is used to contextualise the following literature on features of the gambling environment and to inform the method of the current study.

Platform Choice

Electronic gaming platforms include both traditional land-based venues and the more recent online options available on computers or wireless devices. Research into online platform choice has focussed on casino-style games and poker (Griffiths & Barnes, 2008), with preferences specifically regarding online EGM platforms receiving little research attention. Those persons who play EGM-style games online may have preferences that differ from those who gamble on other online games. Gainsbury, Russell, Blaszczynski and Hing (2015) found that there were indeed differences between land-based-only gamblers, internet-only gamblers and mixed-mode gamblers in terms of EGM play. Specifically, land-based gamblers and mixed-mode gamblers were equally as likely to participate in EGM gambling, while internet-only gamblers were far less likely to gamble using this form.

Based on the more general research on internet gambling, factors that influence gamblers' choices to play online rather than in land-based venues have been found to include anonymity, affordability, convenience, and a desire to escape emotionally (Griffiths, 2003; Wood & Griffiths, 2008; Wood & Williams, 2009). However, online gamblers have also expressed concern that the lack of social mediation available online increases the risk that they will overspend compared to in-venue EGM gambling (Wood & Williams, 2009). Furthermore, uncertainty regarding fairness of

the game and financial security of the website, as well as the lack of “real cash” winnings, acts as a deterrent from gambling online for certain gamblers (Wood & Williams, 2009). This may be especially the case in jurisdictions such as Australia—where the current study is set—as any website providing online EGM games to Australians is in fact operating illegally (Interactive Gambling Act, 2001).

Preferred Providers

In moving to the second level of the gambling choices framework, convenience and accessibility have been reported to be the main drivers of EGM venue choice, with a large longitudinal study reporting that over 50% of gamblers in the Australian state of Victoria travel less than five kilometres to reach their preferred venue. In addition, it was found that problem gamblers are significantly more likely than other gamblers to rate “the venue being close to home” as a top feature of their favourite venue (Hare, 2009). Similar findings have been reported in different jurisdictions (Astbury, & Reith, 2014; Pearce, Mason, Hiscock, & Day, 2008; Wardle, Keily, Welte, Wieczorek, Barnes, & Tidwell, 2006). These findings suggest that the role that accessibility plays in land-based venue choice is important. Given problem gamblers’ preference for convenient gambling providers, it is possible that online gambling may be particularly attractive to this group and represent a significant risk for gambling-related harm.

The opportunity for social interaction is another factor driving EGM provider choice. The level of “sociability” desired in a venue has indeed been found to differ by PGSI status, but the findings still reveal certain contradictions. Gambling with others has been found by specific researchers to be a protective factor from gambling problems (Clarke et al., 2007), yet a large study in New Zealand found that those participants in the moderate-risk to problem gambling group were more likely to gamble with one other person than alone (Abbott et al., 2014). Playing in a venue may create an illusion of social interaction, especially compared with online gambling, but in reality players maintain distance and anonymity; a feature shown to be relatively more attractive to problem gamblers (ACNielsen & New South Wales Department of Gaming and Racing, 2003). These conflicting findings show that the social aspect of gambling is complex.

In the case of land-based venue providers, a number of environmental features—e.g., specific lighting, including flashing coloured lights; and sound effects in gambling venues—have been found to increase gambling intensity to at-risk levels (Stark, Saunders, & Wookey, 1982; White et al., 2006). The availability of other forms of entertainment beyond the presence of EGMs, including other gambling modes, variety and pricing of food, and general venue atmosphere, have also been reported as important features in EGM gamblers’ venue selection (Hare, 2009; Hing & Haw, 2010; White et al., 2006).

Gaming Machine Characteristics

The third level of the Hierarchy of Gambling Choices (Thorne et al., 2016) is the choice of game. Game preferences are driven by the features such as sounds and

lights, game themes, jackpots, and bonus features. Although these features seem to be attractive to most EGM gamblers, the importance that gamblers place on their preferred game having certain features has been shown to differ by problem gambling status. For instance, as a group, EGM gamblers report high levels of enjoyment from the sounds and music associated with the games (Delfabbro, 2006; Livingstone, Woolley, Zazryn, Bakacs & Shami, 2008; Palmer du Preez et al., 2014). However, high-risk gamblers are more likely to rate music and lights as important, when compared to low-risk and no-risk gamblers. Additionally, the specific appearance and themes of EGMs appeal to gamblers in general but are likely to be a more important consideration in problem gamblers' decisions (Livingstone et al., 2008).

Whereas jackpots in general do intensify gambling across both lower and higher risk gamblers (Rockloff & Hing, 2013; Rockloff et al., 2014), the presence of jackpots also influences gamblers' EGM game-choice preferences. Delfabbro (2008) found that 30 percent of problem gamblers go to particular venues to play linked jackpot machines compared to three percent of non-problem gamblers. Similarly problem gamblers report an increased attraction to free spins (Livingstone et al., 2008). Thomas, Mora, and Rive (2010) suggest that jackpots and free spins being paired with lights and music creates a conditioning effect, with the latter acting as a secondary positive reinforcer. They argue further that this increases the likelihood of these features contributing to risky gambling. These findings are supported by Palmer du Preez et al. (2014), who found that EGM gamblers reported that the lights and sounds associated with winning free spins heightened the excitement associated with these wins and encouraged EGM use.

The Current Study

The current study explores the gambling preferences and experiences of EGM gamblers using an embedded mixed methods approach. We undertook semi-structured qualitative interviews with 59 EGM gamblers to investigate which EGM environmental features they preferred and the reasons for their respective choices. By converting discussed themes into binary variables, we aimed to identify the environmental and contextual features that EGM players prefer, and whether or not these choices were in fact associated with their gambling risk status. The following research questions were addressed:

1. What are the commonly identified characteristics of preferred Electronic Gaming Machine (EGM) environments?
2. What differences exist between low-risk and higher-risk gamblers in preferences for EGM environments?
3. How do low risk and higher risk gamblers justify or explain their EGM environment preferences?

Method

Participants

The participants in this study ($N=59$) included 31 males and 28 females aged between 20 and 81 years old ($M=55.2$). Participants were from diverse backgrounds (58% born in Australia, 7% Vietnam, 5% Lebanon, and 30% a mix other ethnicities). Within the sample, 27% had experience playing EGMs online or on another portable electronic device. Appendix Table 1 provides a summary of the sample characteristics.

Materials & Procedure

Participants were recruited from one large “casino style” EGM venue in the inner suburbs of Sydney, Australia, as well as four medium-to-small club and pub style venues in various suburbs of the Gold Coast, Queensland, Australia. These venues were selected to access patrons from diverse gambling environments. The recruitment process consisted of setting up signage at the venues that advertised the study, and waiting for customers to approach the uniformed researcher. Participants were compensated for their time with a \$50 supermarket voucher. Only customers who

Table 1
Sample characteristics

PG Status	Born	Gender	Age	Count (N)
Low	Australia	Male	Below 55	3
Low	Australia	Male	55 or above	1
Low	Australia	Female	Below 55	1
Low	Australia	Female	Age withheld	1
Low	Australia	Female	55 or above	3
Low	Vietnam	Female	55 or above	1
Low	Other	Male	55 or above	1
Low	Other	Female	Below 55	1
Low	Other	Female	Age withheld	1
Low	Other	Female	55 or above	2
High	Australia	Male	Below 55	10
High	Australia	Male	55 or above	5
High	Australia	Female	Below 55	5
High	Australia	Female	55 or above	5
High	Vietnam	Male	55 or above	2
High	Vietnam	Female	55 or above	1
High	Lebanon	Male	Below 55	2
High	Lebanon	Male	55 or above	1
High	Other	Male	Below 55	1
High	Other	Male	55 or above	4
High	Other	Female	Below 55	1
High	Other	Female	Age withheld	1
High	Other	Female	55 or above	5
High	N/A	Male	Below 55	1

were over 18 years of age that had experienced playing EGMs were permitted to participate. The university's internal review board issued ethical approval for the study (H13/08-150) and each participant gave signed informed consent prior to the commencement of the interview.

Script. An interview script was created to ensure each interview followed a standard structure (see Figure 1) and key questions were addressed. First, at the beginning of the interview, participants were shown pictures of the different “levels” of interest (see Figure 1, Panel A). It was explained that they would first be asked about their preferred platform (i.e., in-venue, on computer, or smartphone/tablet application). Second, they were asked about their preferred location of play and their reasons for this preference. Finally, participants were asked about their preferred games and reasons for their respective choices.

Interviews. Semi-structured interviews were conducted using a question guide. While extracting key information, participants were also encouraged to express views and reflections related to gambling that fell outside of the scripted topics. Interviews took place in the venue within sight of the gaming room so that participants could point out features of the gaming or venue environment to the interviewer without being overheard by other patrons and staff. Interviews were audio recorded and transcribed verbatim into text documents. Interviews ranged from 10 to 60 minutes in length ($M = 22$ mins).

Problem Gambling Status. Following the interview, participants were asked to complete the Problem Gambling Severity Index (PGSI) (Ferris & Wynne, 2001).

PLATFORM	PROVIDER	GAME FEATURES
		
Have you had experience playing the following? In the venue ☐ Computer ☐ Phone/Tablet ☐	List the places that you like to play and/or the websites you like to visit. _____ _____ _____ _____	List the games you like to play. _____ _____ _____ _____

WHICH DO YOU PREFER? WHY?

Figure 1. Overview of interview structure including visual aids supplied to participants

The scale consists of nine questions including “Have you bet more than you could really afford to lose?” Answered on a 4-point Likert scale, PGSI scores are summed determines one’s level of gambling risk (Holtgraves, 2009). Cronbach’s alpha for the current study was high ($\alpha = .88$).

Demographics. Participants completed a brief demographics questionnaire, one which asked for age, gender, marital, cultural, income, education, and employment status.

Qualitative Analysis

Interview transcripts were coded using NVivo 10 qualitative data management software and analysed using an interpretive methodological approach (Mason, 2002). The second author created the a priori codes on the basis of the interview questions. To ensure inter-rater reliability the first and second author reviewed and refined the finalized coding framework (see Appendix Table 2 for code structure).

Once codes were finalized, a binary yes/no variable was created for each code whereby participants were given a score of 1 if they did mention an item representing that code, and a score of 0 if they did not. Binary variables were then cross-tabulated with gender, age and PGSI status and Chi square statistics were examined to investigate significant relationships between codes and sample characteristics.

Results

The results reported are a combination of findings from the qualitative interviews, and the associated demographic information and PGSI-status of participants. Our explicit use of embedded mixed methods was judged to be most appropriate for addressing our three key research questions: (1) the commonly identified characteristics of preferred EGM environments, (2) how these answers potentially differed between people with and without gambling problems, and (3) the reasons provided for these preferences. The following findings are presented in sections that reflect certain of the key themes that emerged in the interview process, including (1) gambling as a social activity, (2) various online and in venue provider preferences, such as security, and facilities, (3) preferences that differed by gender and gambling status, and (4) game preferences such as graphics and value for money.

Table 1 describes the characteristics of the sample of interest, including the frequency of participants classified in each age, gender, cultural, and gambling status group. Just under half of the participants (42%) were classified as low-risk (0–2 on PGSI scale) and just over half of the sample (58%) were classified as moderate to high-risk gamblers (3+ on the PGSI scale). Of those participants who reported their age (three participants declined to), 44.6% were under 55 and 46.4% were 55 or above.

Table 2

EGM environment preferences and reasons for preference shown for total sample, and split by problem gambling status and gender

Preference	Reason	Total %	% Low PGSI (n = 25)	% High PGSI (n = 34)	% Male (n=31)	% Male (n=28)
In-venue EGMs	More social	36%	32%	38%	35%	36%
	More interesting	24%	32%	18%	26%	21%
	Real money	20%	12%	26%	19%	21%
	Not possessing the technology	22%	28%	18%	13%	32%*
	Avoid the risk of over spending	19%	8%	26%*	23%	14%
Device	Preferring the hardware/functions	53%	67%	50%	60%	43%
	Convenience	24%	33%	21%	20%	29%
	Prevention of addiction and money loss	18%	33%	14% ^	20%	29%
Home	Able to do other activities	18%	0%	21% ^	10%	29%
	Comfort	18%	0%	21% ^	20%	14%
Venue	Close to home	80%	76%	82%	81%	79%
	Service	80%	76%	82%	81%	79%
	Clientele	54%	56%	53%	52%	57%
	Social	54%	52%	56%	58%	50%
	Availability of other activities	68%	80%	59%	68%	68%
	Availability of good/cheap food and drink	49%	52%	47%	48%	50%
	General atmosphere	51%	44%	56%	39%	64%**
	Other opportunities to win money	20%	16%	24%	6%	36%**
	Amount of EGMs	36%	12%	53%**	42%	29%
	Familiarity	32%	28%	35%	35%	29%
	Size	32%	28%	35%	35%	29%
	Perception of winning more	27%	8%	41%**	39%**	14%
	Physical layout of the venue	58%	64%	53%	58%	57%
	Busy	27%	24%	29%	32%	21%
	Safety features	25%	32%	21%	26%	25%
	Member benefits	29%	24%	32%	29%	29%
	Prices at venue	31%	28%	32%	35%	25%
Online	More accessible	29%	33%	29% ^	20%	43%
Provider	Familiar	29%	0%	36% ^	40%	14%
	Good/wide selection of games	24%	33%	21% ^	20%	29%
	Value	24%	0%	29% ^	20%	29%
	Recommended	29%	67%	21% ^	20%	29%
Game	Features (e.g., free spins, extra games)	64%	56%	71%	58%	71%
	Jackpots	56%	44%	65%	65%	46%
	Perceived chance of winning	78%	80%	76%	65%	46%
	Value (cost of each spin)	49%	56%	44%	39%	61%*
	Familiarity	46%	48%	44%	48%	43%
	Graphics	69%	72%	68%	65%	75%
	Modernity	36%	28%	41%	32%	39%
	Combinations required to win	27%	32%	24%	19%	36%
	Sounds	20%	16%	24%	42%	86%*
	Sophistication of hardware	32%	24%	38%	19%	21%

**significantly more likely to mention this item according to Pearsons, Chi-Square test, $p < .05$,

* $p < .1$ (marginal result). Figures reported for items applicable to only online/device gambling are based on a sample including only participants which reported this behaviour (n=17). ^ = can't compute chi square because of low cell count.

Gambling as a Social Activity

Table 2 shows the most common¹ reasons provided by participants for preferring specific playing platforms, locations, and games. The social aspects of gambling in a venue (rather than on a device) was the most popular single response regarding platform selection: 36% of the sample mentioned it. For example, when asked why they preferred their favourite venue over others, certain participants described the club as a meeting place for them and their friends:

I know a lot of people here. I've got a lot of friends within the club... So [it's a] meeting place, I guess for some people... it's a meeting place to meet up, see people we know. Maybe if we're good friends, if we know each other's pay day, maybe we swap money. (F, 73 years)

Another participant enjoyed the social aspect of discussing his EGM gambling with acquaintances:

[T]here's a couple of blokes that come in here that I know—and one of them likes the machine next to the one I play—so we sit there conferring notes. (M, 70 years)

Other popular reasons for playing in venue were that subjects found it more interesting (24%) than playing online and associated playing in a venue with winning real money (20%). Certain participants mentioned that online EGM play was a less exciting option:

I know it sounds weird, but I don't find any of them entertaining to the extent of being in a club. Because, you know, you've got nothing falling out of the slot... If you don't put nothing in, there's nothing coming out. I might sometimes I have \$15,000 worth of credit, but its simulated money. (M, 74 years)

Certain participants also reported that playing in-venue safeguarded them against extreme money losses associated with gambling online (19%), and expressed concern at how others gamble on their phones and other devices:

Because you can win, win, win but there's always a time to lose—and if you play at home you can play while you're asleep too ... I play games on my phone before I sleep. (M, 53 years).

Other participants talked about how they were able to set limits for themselves when they gambled in-venue and how that protection may not be possible when gambling online:

You might just get a bit too taken away with it, so if I come to the pub with a limited amount of money—I spend that and I go home—and I don't worry about it. (F, 63 years)

¹Preferences reported by 10 or more participants, or 3 or more of the device using participants for preferences regarding device use.

Those participants who preferred playing on digital devices rather than at a venue most commonly mentioned the hardware or functionality (53%) and the convenience (24%) as a reason for preferring a device. One participant talked about the ease at which he can access multiple EGM gambling sites online from his computer:

On the game you've got—like there's more ways like you can play on the computer. But on the tablet you've got less pokies that you can play because you've got to download them ... on a computer it's all on the Internet—so it's easier to get onto the actual pokie machine. (M, 20 years)

Among the most commonly mentioned reasons for preferring to play on a device at home rather than at a venue included the opportunity to do other activities (18%) and comfort (18%). One participant discussed the comfort of playing EGM games on his phone while in bed:

Home is like ... you can lay down and relax. When you get bored ... when you feel sleepy—you can sleep straight away. Because if you go outside—you can't sleep straight away. (M, 20 years)

Provider

The two most commonly mentioned reasons for choosing the venue/provider were the service (i.e., staff and management) and the proximity of venue in relation to home, work or other facilities (80%). One middle-aged participant talked about how he felt so welcome at his preferred club:

So when I go to [my club] I don't have to produce my card at all, whatever. I get a laugh, smile with the service, no matter what. This is the difference. (M, 53 years)

Another young man talked about how the staff made him feel valued:

It's just like the service. When they come up to you they ask how's your day, how's it going. Just those little bit of conversations. (M, 20 years)

Other popular reasons for venue selection were aspects of the physical set up of the venue (58%) and general atmosphere (51%), the availability of other activities (68%), and social aspects, such as friendly or polite clientele (54%). Certain participants talked about the clientele at different venues, saying, for example:

I don't want to judge people, but I guess they're more family oriented here. Where when you go into pubs—they're like single guys on their own. Might get the odd female and that; and it's just not a very comfortable place. So I myself chooses [sic] these places because I tend to like the sense of family. (F, 43 years)

Online Provider

Popular responses regarding preferred online EGM providers included accessibility (24%), familiarity of a particular website or online store (24%), and a wide selection of

games (24%). One middle-aged woman talked about her strong preference for mobile EGM apps, citing the variety and accessibility on offer:

Well there's so many to choose from. So easy to get into, so easy to download—I love everything about it. (F, 43 years)

Games

The most common reason given for selecting a particular game (online or in venue) or machine (in venue) was the perceived chance of winning—that is, 78% of interviewees chose to play a specific game (both online or in venue) because they each believed it was lucky as a result of past wins, that it paid out more often or, in the case of machines in venue, because of pay out based on previous play. Machine and game features were of importance also; 64% of the sample chose a game based on the amounts of features in the game including: free spins, bonus rounds and extra chances to multiply winnings. The presence of a jackpot (56%) was also deemed of particular importance. One participant maintained that bonus features, especially free spins, were the biggest factors in attracting EGM players to a venue:

Yeah, that's what you come here for [free spins]. They're not designed to do that really, they're designed to take your money, I'm fully aware of that... (F, 52 years)

Another middle-aged participant expressed his disappointment in those EGM gambling sessions that do not yield an adequate amount of bonus features:

Yes, well just that satisfaction of getting a free game. There's nothing worse than spending \$20 or \$50 and not getting a free game. (M, 41 years)

The minimum cost of each spin was also mentioned frequently (49%), along with familiarity of the machine (46%), attractiveness of graphics (69%) and sounds (20%), and the sophistication of the hardware itself (32%). Interestingly, players reported substantially different preferences in terms of what they found attractive about these attributes. For example, many persons preferred modern games with bright graphics, unpredictable sounds and complex player options, whereas others preferred more traditional, familiar, less “flashy” formats. One participant described the theme of her favourite game in detail and how exciting the unexpected graphics are:

It's entertaining. When the feature comes—because it comes up randomly—and just comes out and it just [unclear...] and you're not paying really—you're paying more attention to hitting the buttons or talking or [unclear] and it just gives you a bit of a shock and then you find out how many bats you can get to how much money you can win and then there's another bat spin. It's just something that's entertaining, especially when—playing with my mother, it's entertaining for her because [unclear] another bat spin. She just thinks it's funny. (F, 63 years)

One 38 year old man described his preference for the games that he had always played in the past:

I just like the older machines. The ones that I know. I don't like any new ones...All these new ones I don't know the free games and that. (M, 38 years)

Similarly, a 63 year old woman talked about how new machines are not as enjoyable:

They're a bit harder to understand, yeah, for the elderly, yeah. The young ones, well they can pick up anything quickly. They can pick up that you don't go [makes noise] and they know exactly what they're doing. (F, 63 years)

One young man linked game-age with beliefs about winning:

I suppose I tend to go towards the old machines if I can. Only because I've heard that the odds are better on those. (M, 26 years)

Differences According to Gambling Status and Gender

Responses were also compared for gambling risk status and gender, revealing certain substantive differences in EGM player preferences between the levels of each group (see Table 2). Participants categorized as high risk of problem gambling tended to mention the amount of machines available and a perceived chance of winning more often than low-risk gamblers as important factors when selecting a venue to attend.

One participant described how his preferred EGM venue was the casino because of the amount of machines available:

It's just that there's so many to choose—like you've got many options. If you don't like that machine, there's like 1000 more to choose from. (M, 43 years, high-risk gambler)

High-risk gamblers also mentioned preventing risk of over-spending or addiction when discussing their platform of choice, and mentioned this aspect more often than low-risk gamblers. One participant preferred gambling on EGMs on his mobile phone and tablet as opposed to gambling in-venue, as he could play with simulated money:

Probably it fills up the time or keeps you away from losing money, I guess. (M, 39 years, high-risk gambler)

Conversely, another participant felt that gambling on EGMs in-venue was a safer option than online:

It's just the experience would be a bit different. Because I think coming in—if you bring in a certain amount: you use that much—whereas if you do it through a phone or a laptop, you can't really control how much you use ...I guess it's

just the fact that you decide how much you're willing to use on that day. So, for example, I might bring in \$50 for that day. So before I go in—I might leave my debit card at home. (M, 20 years, high-risk gambler)

Gender differences were also apparent. Female gamblers were more likely to base their venue preferences on atmosphere and other opportunities to win prizes, when compared to men. One woman described the myriad of entertainment options available at her preferred club, saying:

... we go there for the raffles, and we go there to play Bingo... sometimes they just have musical nights—and we're there for that, and we play lawn bowls there [too]. It's not just about playing the pokies there—it's a bit of everything. (F, 64 years)

Men mentioned more often than women that “perceived chance of winning” was a reason for selecting a particular venue. One man believed that the EGMs at his preferred venue paid out at a higher rate than a venue nearby, saying:

It's just that the ones at [the other venue] don't pay that very good... I find the ones at [the other venue] sort of rip you off a bit more. (M, 43 years)

No differences were apparent regarding features of the games themselves. However, female gamblers were more likely to mention the value of a machine, and their sounds, as a reason for selection a particular game. One older female gambler talked about how she enjoyed the sounds and music of her favourite “island girl” themed machine:

“I like the little music. It's very attractive... It's very tropical. Something different and, you know, if you're in the mood, why not?” (F, 61 years)

Discussion

This paper reported on gambling environment preferences of EGM gamblers in terms of platform, provider and game characteristics. A small sample of regular EGM gamblers were recruited from metropolitan and suburban clubs in Queensland and New South Wales, Australia. An embedded mixed-methods approach was used to analyse data in an exploratory manner, using both qualitative and quantitative methods. Although this study is limited in that the sample is a small and non-representative one, findings indicate that both high- and low-risk gamblers preferred the social aspect of using EGMs within a land-based venue, compared to the perceived solitude of online EGM gambling. Women were more likely to prefer venues that had a good atmosphere and provided other avenues to win money, such as playing bingo. These findings are consistent with previous studies suggesting EGM gambling fulfils social needs for many players (Thomas et al., 2010; White et al., 2006). For EGM gamblers who chose to play in land-based venues, their preferred venue typically featured quality customer service and personable staff who

gave the impression that they cared about their customers. Positive interactions with venue staff added to the valued social experience that in-venue gambling provided. The older average age of the current sample may have contributed to the preference for land-based EGM venues as being more social. Older persons may be less likely to embrace technology and less likely to seek out gambling opportunities online where there is interaction with other players, such as platforms that offer the option of “chatting” with other players while gambling.

The majority of gamblers tended to find in-venue gambling more interesting than online or mobile gambling. They enjoyed the “real money” aspect of being able to win cash at a venue, rather than credits online, even if these credits were redeemable for payment. The excitement and risk associated with “real cash” gambling is likely because of the tangible nature of cash in hand. In contrast, when gambling online, one is removed from the reality of spending money when instead of inserting cash, gamblers use electronic forms of payment. In terms of the use of purely simulated money (or points rather than credits), this lack of perceived risk and tangible reward provides an explanation to why the majority of gamblers did not find this form of “gambling” as exciting. Significantly, however, one participant *preferred* gambling online. This preference was because simulated money could be used rather than real money, indicating that this kind of “gambling” may be a reasonable harm-minimisation strategy for certain persons.

Furthermore, many participants reported that certain features of land-based venues protected them against over-spending against their limits. For example, certain participants mentioned that online gambling was too convenient and accessible, and was, moreover, an easy way to lose control. Because of harm minimization policies in Australia, large amounts of cash are often difficult to obtain at land-based venues. Harm minimization strategies, such as the removal of ATMs from gambling venues in certain jurisdictions, and restrictions on how much cash can be taken out at one time from the in-venue cashier, help to limit player investment, which is a protective feature not available by default when using a credit card online. Reports of spending control at land-based gaming venues may be a promising indication that certain gamblers set limits by only taking a certain amount of cash to the venue.

High-risk gamblers showed an awareness that gambling online was highly accessible and had the potential to cause overspending of both time and money. This introspection suggests that in-venue EGM high-risk gamblers engage in strategies to prevent themselves from excessive gambling. However, that they also self-identified as high-risk gamblers (by the PGSI) shows that they are still experiencing a high rate of problems and harms despite these attempts to control their gambling.

Notwithstanding the noted value of spending limits, having easy access to EGMs was an important criterion in land-based venue selection. This finding was consistent with research showing that, controlling for ages, sex and deprivation level, persons living closest to gambling venues are accordingly most likely to gamble, and are therefore most at risk of becoming problem gamblers (Pearce et al., 2008). High-risk

gamblers were more likely to select a certain venue because they perceived they had a better chance of winning, (i.e., the venue was luckier or fairer). In addition, men were more likely than women to choose a particular venue or game because they perceived it to be associated with a greater likelihood of their winning.

Limitations

There are limitations to this study that are worthy of noting. In addition to being a small self-selected convenience sample, participants were recruited solely from land-based gambling venues, a feature of the research which was likely to have led to the low number of online gamblers in the sample. The mean participant age of the sample being 55 years may have also skewed the sample towards exclusively land-based EGM gamblers, as older persons may be less likely to embrace new technology than younger persons. However, the study nonetheless provides a starting point for research into EGM specific preferences. It is suggested that future research address the limitations in the current study by recruiting a larger and more representative sample.

Conclusion

The current study was an exploratory one into the key environmental and contextual features of online, mobile and in-venue EGM gambling that drive consumer choices. Although the findings are only indicative because of the limitations mentioned above, they highlight the diversity in EGM environment preferences and the differences in preferences between low- and high-risk gamblers. From a policy perspective, features of the gambling environment that disproportionately attract high-risk gamblers can be discouraged, whereas features that attract recreational gamblers with fewer problems may be safer for expansion. As many of the participants in this study commented, gambling can be an enjoyable and sociable pastime. This study further enhances our understanding of what features of the environment are most important in gamblers making gambling choices, and provides evidence on what features are most consistent with safe levels of play.

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Appendix A

Table A1

Participant demographics, platforms used and gambling status.

ID*	Gender	Age	Country of Birth	Platforms experienced			Risk of PG (PGSI)	High Gambling Use (CPSG)
				In Venue	Computer	Phone		
004	Male	57	Fiji	✓			No risk	Yes
005	Female	64	Denmark	✓	✓	✓	Mod	Yes
006	Male	68	Australia	✓			Mod	Yes
007	Male	20	Philippines	✓	✓	✓	Mod	Yes
008	Male	66	Lebanon	✓			No risk	Yes
009	Male	39	-	✓	✓	✓	Problem	Yes
010	Female	61	Mauritius	✓			Mod	No
011	Male	53	Lebanon	✓			No risk	Yes
012	Female	-	Greece	✓	✓	✓	Mod	Yes
013	Male	47	Lebanon	✓		✓	Mod	Yes
014	Male	33	Australia	✓			Problem	Yes
015	Female	43	Australia	✓	✓	✓	Low	Yes
016	Female	63	Australia	✓			Mod	Yes
017	Female	59	Vietnam	✓			Mod	No
018	Male	57	Vietnam	✓			Mod	Yes
019	Male	20	Australia	✓			Low	No
020	Male	20	Australia	✓			Mod	Yes
021	Male	62	Vietnam	✓			Mod	Yes
022	Female	80	Australia	✓			No risk	Yes
023	Male	59	Pakistan	✓	✓	✓	Mod	Yes
024	Female	50	Philippines	✓	✓	✓	Problem	Yes
025	Female	67	Australia	✓		✓	No risk	Yes
026	Male	67	Egypt	✓			Low	Yes
027	Female	58	Vietnam	✓			Low	Yes
028	Male	41	Australia	✓		✓	No risk	Yes

Table Continued.

ID*	Gender	Age	Country of Birth	Platforms experienced			Risk of PG (PGSI)	High Gambling Use (CPSG)
				In Venue	Computer	Phone		
029	Male	65	Scotland	✓			Mod	No
030	Female	40	Australia	✓			Problem	Yes
031	Female	-	Australia	✓			No risk	No
032	Female	50	Australia	✓	✓		Mod	Yes
033	Female	64	Australia	✓			Low	No
035	Male	81	Australia	✓			Mod	Yes
036	Female	47	Australia	✓			No risk	No
037	Female	67	Australia	✓			No risk	No
038	Female	-	Spain	✓			Low	No
039	Male	38	Australia	✓			Mod	No
040	Male	50	Australia	✓	✓	✓	Mod	Yes
041	Male	50	Australia	✓			Problem	Yes
042	Male	41	Australia	✓	✓		Problem	Yes
043	Male	43	Australia	✓		✓	Problem	Yes
044	Male	70	Australia	✓			No risk	No
045	Male	61	Australia	✓			Problem	Yes
046	Male	48	Australia	✓			No risk	Yes
047	Female	78	Germany	✓			Mod	Yes
048	Female	60	England	✓			No risk	No
049	Male	26	Australia	✓			Mod	No
050	Female	77	England	✓			Low	Yes
051	Male	47	Australia	✓			No risk	Yes
052	Female	73	Australia	✓			Mod	No
053	Female	44	Australia	✓	✓	✓	Mod	Yes
054	Male	79	Australia	✓			Mod	Yes
055	Female	74	Australia	✓			No risk	Yes
056	Female	56	Germany	✓			No risk	Yes
057	Female	34	NZ	✓			Mod	No
058	Male	85	Australia	✓			No risk	Yes
059	Female	83	Australia	✓			No risk	Yes
060	Female	72	Hungary	✓			Problem	Yes
061	Male	74	NZ	✓	✓		Mod	Yes
062	Female	52	Australia	✓			No risk	Yes
063	Male	20	Australia	✓	✓	✓	Mod	Yes

* Participants 001 – 003 and 034 were removed from the sample because of incomplete interviews.

Appendix B

Coding the Interview Data

The second author went through each transcript identifying 2,049 statements where participants mentioned preferences and reasons for preferences. Repeated and contextually identical statements (within participants) were disregarded, resulting in a list of 173 statements for coding. The second author then applied the framework in Figure B1 allocating each statement to one of the 173 codes. This framework was

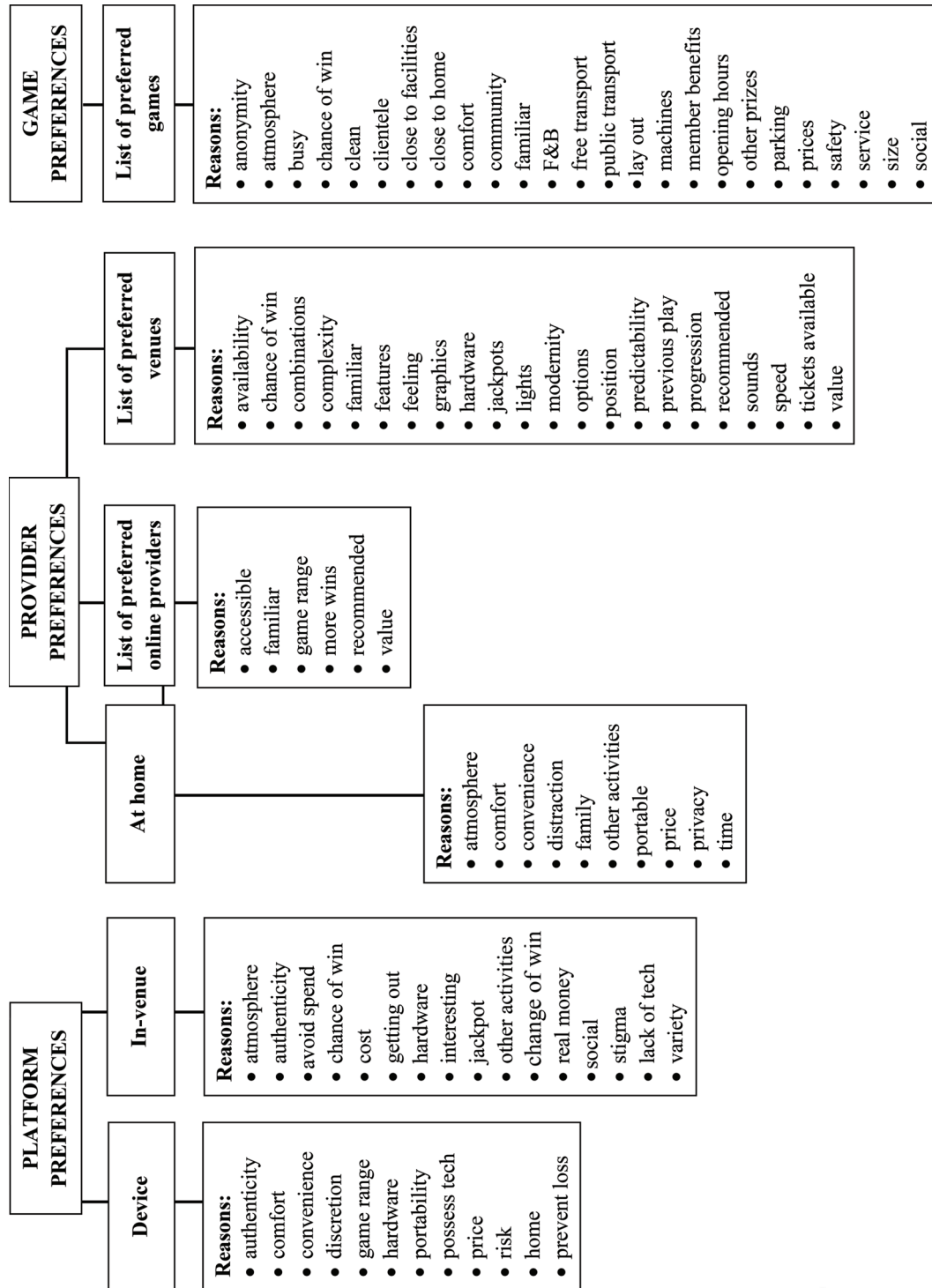


Figure B1. Flow chart of coding framework for interview data.

developed by the first, third and fourth authors in collaboration based on the initial study framework (see Thorne et al., 2016) and common themes that emerged from interview data. The list of 173 statements was then given to the first author, who independently allocated each statement into each code using the same framework. This statement allocation was near identical to the second author's, thus establishing inter-rater reliability.

In memoriam

A Tribute to Dr. Karen Gough (Finlay) by Drs. Sherry Stewart and Sunghwan Yi
Passed away January 24, 2016

Dr. Karen Gough (Finlay) received a PhD in Marketing and Consumer Behavior from the Rotman School of Management at the University of Toronto in 1992. She began her first faculty position that same year at the University of Guelph in the Department of Marketing and Consumer Studies, and remained there throughout her 24-year academic career. Karen's research interests in environmental psychology and the influence of atmospheric factors on consumption behaviour led her to found an important research program on gambling-related issues.

Karen received seven sizable research grants from the Ontario Problem Gambling Research Centre, all as principal investigator. She collaborated on these grants with her long-time colleagues Drs. Harvey Marmurek, Vinay Kanetkar, and Jane Londerville. Karen published widely in academic journals on a variety of gambling-related topics, and produced two co-authored papers in the current issue of the *Journal of Gambling Issues* (i.e., Hudson, Olatunji, Gough, Yi, & Stewart, this issue; Stiles et al., this issue). She was frequently invited to speak at conferences on her gambling research, and did so in such diverse locations as Slovenia, Sweden, Las Vegas, and Nova Scotia.

Karen's work contributed immensely to our understanding of such environmental effects as the effects of music, ambient casino sounds, and casino décor on problem gambling behavior (e.g., Finlay, Marmurek, Kanetkar, & Londerville, 2010). In later years, she studied these effects, in a startling innovation, through *virtual reality technology*—specifically, a large Panascope 360 unit. It proved a brilliant breakthrough in gambling research. It allowed for a convincing immersive experience for her participants, yielding in turn meaningful, extensive, and lasting findings. Karen and her colleagues enjoyed great adventures touring around casinos to obtain the 360 degree shots to use as visuals in her Panascope experiments. Her gambling research program also included work on slot machine characteristics and their influence on problem gambling (e.g., Finlay, 2010). Karen studied this topic in her slot machine laboratory, a place where participants could engage in gambling on real world slots (e.g., Noseworthy & Finlay, 2009). Her slot machines lab was one of only a handful of such ecologically-valid gambling research facilities in Canada.

Karen was not only an accomplished researcher but also a passionate instructor. She served as a mentor for a number of graduate students in the Department of

Marketing and Consumer Studies at the University of Guelph and as the graduate program coordinator from 2001–06. Karen earned an important award in 1995 for her graduate teaching. She was twice recognized by the University of Guelph through a Distinguished Professor Award, in 2006 and again in 2008. Karen was a warm, engaged, and fun-loving collaborator and mentor, one who will be sorely missed by all her colleagues, students, and friends in the gambling research field.

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